Elvira Khairullina

2021

Trams in Socialist Urban Planning in the 1960s and 1970s:

Urban and Transport Models in the GDR, the CSR and the USSR

Trams in Socialist Urban Planning ein the 1960s and 1970s:
Urban and Transport Models in the GDR, the CSR and the USSR

Doctoral student: Elvira Khairullina
Tutors: Prof. Luis Santos y Ganges and Prof. Jaroslav Hofierka
University of Valladolid and Pavol Josef Šafárik University, 2021

Universidad de Valladolid

ESDUVa
Escuela de Doctorado Universidad de Valladolid

DOCTORAL PROGRAMME IN ARCHITECTURE

DOCTORAL THESIS

TRAMS IN SOCIALIST URBAN PLANNING IN THE 1960S AND 1970S: URBAN AND TRANSPORT MODELS IN THE GDR, THE CSR AND THE USSR

Presented by Elvira Khairullina to apply for the degree of
Doctor of Architecture by the University of Valladolid,
University Institute of Urbanism, Valladolid, Spain

Supervised by:
Prof. Luis Santos y Ganges and Prof. Jaroslav Hofierka

2021

DOCTORAL PROGRAMME “SLOVAK HISTORY”

DOCTORAL THESIS

TRAMS IN SOCIALIST URBAN PLANNING IN THE 1960S AND 1970S: URBAN AND TRANSPORT MODELS IN THE GDR, THE CSR AND THE USSR

Presented by Elvira Khairullina to apply for the degree of
Doctor of Philosophy by the Pavol Jozef Šafárik University,
Department of History, Faculty of Arts, Košice, Slovakia

Supervised by:
Prof. Luis Santos y Ganges and Prof. Jaroslav Hofierka

2021

ACKNOWLEDGEMENTS

European Joint Doctorate “urbanHIST”. European Union. This project has received funding from the European Union’s Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement no 721933.

EC H2020 MSCA-ITN urbanHIST project.
Research topic: Contemporary History of Technical Infrastructures in European Cities and in Urban Planning.
2017-2021

Early Stage Researcher: Elvira Kharullina

Supervised by:
Prof. Luis Santos y Ganges and Prof. Jaroslav Hofierka

2021

ABSTRACT

This piece of research into urban history is devoted to tramway planning in the medium-sized cities of European Communist countries, in particular the German Democratic Republic (GDR), the Czechoslovak Socialist Republic (CSR) and the Union of Soviet Socialist Republics (USSR), in the 1960s and 1970s. The matter under study is the tram as a means of transport in towns and its relationship to urban structure and morphology. Consideration is given to the way in which trams came to be seen as a key element in the development of town and transport planning in so-called "Socialist cities" at the beginning of the final third of the twentieth century, during an important period in the development of "Socialist town-planning" and the consolidation of urban public transport infrastructures. The research takes a transnational approach, covering industrialized countries with highly developed public transport. It is also interdisciplinary, in that it includes three perspectives. The first and most fundamental is town planning, with investigations of the models for cities, focusing on tramways and all their implications for transport in relation to town planning and urban design. The second perspective is the whole field of urban transport, comprising transport engineering, traffic engineering and transport economics, branches of knowledge that enable the planning and management of infrastructures and services. The third perspective is historical, which is the most transverse in its topics, as it involves research about past events relating to urban and tramway issues.

The research focuses on gaining an understanding of the relationship between transport planning and town-planning. It also addresses the differences and similarities in the urban planning models for "Socialist cities".

Several hypotheses emerged in this investigation. The first hypothesis relates to the amount and quality of collective public transport, especially tramway systems, in Socialist countries, contrasting it, in some cases, with Western countries. The second hypothesis refers to the homogeneity of decisions and solutions in transport policy and Socialist town planning, granted that various national factors and aspects were involved. The third appertains to the existence of specific concepts of the "Socialist city", assessing the potential for, and extent of, intensive exchanges of ideas throughout Europe. Finally, the research suggested the possibility of a strong influence from transport solutions upon urban models.

The approach adopted is based on a historical-structural method, which is oriented towards understanding and explaining historical events. To this end, the research focused on the following contexts: political, economic, and professional factors, the level of experience, criticism, pre-existing traditions in city planning, and technological development. The method was also based on working with a range of historical sources: libraries, state and municipal archives, journals and conference proceedings, interviews, fieldwork, city plans and projects. The other approach used was a historical-comparative line, aimed at determining which aspects in the theory and practice of Socialist town planning were shared and which differed. A comparison of practical solutions was undertaken by defining specific or common situations in tram networks and city planning.

To conclude, verification of some of the hypotheses put forward was achieved. Among these, one striking fact was that tramways were not always a major means of transport in Socialist town planning. At times, priority was given to buses, trolleybuses, underground railways (metros), and commuter or suburban trains. Moreover, many decisions were taken that differed because of economic rationalization policies, pre-existing public transport infrastructures, or the level of influence from Modern Movement. In relation to this, it is clear that there was a reasonable knowledge of Western experiences, especially thanks to the translation of works and attendance at international congresses. Finally, it proved feasible to demonstrate a considerable influence from urban models upon transport decisions, this being an outcome both of the difficulties of organizing comprehensive planning processes, and of collaboration between transport and urban planners.

Keywords: trams, public transport, car traffic, Socialist city, Socialist urban planning, urban models, transport models.

RESUMEN

Esta investigación de historia urbana se dedica a la planificación de tranvías en las ciudades medianas de los países europeos del socialismo real, en especial la RDA, la CSR y la URSS, en los años sesenta y setenta del siglo XX. El objeto de estudio es el tranvía como herramienta de transporte urbano y su relación con la estructura y la morfología urbana. Se estudia el modo en que el tranvía llegó a ser considerado clave para la profundización en la planificación urbana y de transporte de la denominada "ciudad socialista" en el inicio del último tercio del siglo XX, en un periodo importante de desarrollo del "urbanismo socialista" y de consolidación de la infraestructura de transporte público urbano. La investigación se afronta desde una aproximación transnacional incluyendo países industrializados y con alto nivel de desarrollo de transporte público. Asimismo, es una investigación interdisciplinar que incluye tres perspectivas: la primera y fundamental es la urbanística, que atiende sobre todo al modelo urbano enfocando el asunto tranviario y todas sus implicaciones transportísticas en relación con la planificación urbanística y el diseño urbano. La segunda perspectiva es la de la esfera del transporte urbano, en concreto, la ingeniería del transporte, la ingeniería del tráfico y la economía del transporte, ramas del saber que permiten la planificación y la gestión de las infraestructuras y sus servicios. La tercera perspectiva y la más transversal es la histórica, puesto que se plantea una investigación sobre hechos del pasado en relación con lo urbano y con lo tranviario.

Con todo ello, los objetivos de la investigación se centran en entender las relaciones entre la planificación de transporte y la planificación urbanística, así como las diferencias y similitudes en la planificación del modelo urbano de la llamada "ciudad socialista".

La investigación planteó varias hipótesis. La primera hipótesis cuestionaba el nivel y la cualidad del transporte público colectivo, sobre todo del sistema tranviario, dentro de los países de socialismo real, a veces contrastando con los países occidentales. La segunda dudaba de la homogeneidad de las decisiones y soluciones en la política de transporte y en la planificación urbana socialista, asumiendo que en ello debían intervenir varios factores y aspectos nacionales. La tercera cuestionaba la existencia de ideas específicas de la "ciudad socialista", considerando la posibilidad e importancia de un intercambio intensivo de ideas en toda Europa. Y, por último, se planteaba la posibilidad de una influencia fuerte de las soluciones transportísticas en el modelo urbano.

La aproximación metodológica se basa en el método histórico-estructural, orientado a la comprensión y explicación de los hechos históricos. Para ello, la investigación se concentró en los siguientes contextos: político, económico, profesional, el nivel de la crítica de experiencia, la tradición y preexistencias en la planificación de ciudades y el desarrollo tecnológico. Asimismo, para ello se trabajaba con varias fuentes históricas, los archivos, estatales y municipales, las revistas y actas de congresos, las entrevistas, el trabajo de campo, los planes y proyectos de ciudades. El otro método aplicado fue histórico-comparativo, orientado a la determinación de los aspectos comunes y diferenciales en la teoría y práctica de la planificación urbana socialista. La comparación de las soluciones prácticas se realizó a través de la definición de las situaciones específicas o comunes en la planificación de tranvía y ciudad.

En conclusión, se ha podido comprobar algunas hipótesis planteadas, entre cuales destaca la idea de que el tranvía no siempre fue un medio de transporte importante en la planificación urbana socialista y, algunas veces, la prioridad fue otorgada a los autobuses, trolebuses, metro y trenes suburbanos. Por otro lado, hubo bastantes decisiones diferenciales relacionadas con la política de racionalización de la economía, las preexistencias en infraestructura de transporte público y la fuerza de las ideas del Movimiento Moderno. Y hubo conocimiento suficiente de la experiencia occidental, sobre todo mediante la traducción de obras y los congresos internacionales. Finalmente, se pudo comprobar el alto nivel de influencia del modelo urbano sobre las decisiones de transporte, lo que fue condicionado con las dificultades en la organización de la planificación integrada, así como del trabajo conjunto entre los planificadores de transporte y urbanistas.

Palabras clave: tranvía, transporte público colectivo, tráfico automovilístico, ciudad socialista, planificación urbana socialista, modelo urbano, modelo de transporte.

ZHRNUTIE

Tento výskum mestskej histórie sa venuje plánovaniu električiek v stredných mestách európskych krajín skutočného socializmu, predovšetkým NDR, ČSSR a ZSSR, v 60. a 70. rokoch 20. storočia. Cieľom štúdie je električka ako nástroj mestskej dopravy a jej vzťah s mestskou štruktúrou a formou. Študuje spôsob ako sa električka začala považovať za kľúčovú pri prehlbovaní v mestskom a dopravnom plánovaní tzv. „socialistického mesta" na začiatku poslednej tretiny 20. storočia, v dôležitom období rozvoja „socialistického urbanizmu" a posilňovania infraštruktúry verejnej mestskej dopravy. Výskum sa uskutočňuje z nadnárodného prístupu vrátane priemyselne rozvinutých krajín s vysokou úrovňou rozvoja verejnej dopravy. Okrem toho ide o medziodborový výskum, ktorý zahŕňa tri perspektívy: prvá a základná je urbanistická, pričom osobitnú pozornosť venuje mestskému modelu so zameraním na otázku električiek a všetky jej dopravné dôsledky súvisiace s mestským územným plánovaním a projektovaním. Druhou perspektívou je oblasť mestskej dopravy, najmä dopravného inžinierstva, inžinierstva premávky a hospodárstva dopravy, vedných odvetví ktoré umožňujú plánovanie a riadenie infraštruktúr a ich služieb. Treťou a najvzdialenejšou perspektívou je historická, pretože nastoľuje výskum o skutočnostiach z minulosti, ktoré súvisia s mestským a električkovým aspektom.

V rámci toho sú ciele výskumu zamerané na pochopenie vzťahov medzi plánovaním dopravy a plánovaním urbanizmu ako aj rozdiely a podobnosti v plánovaní mestského modelu takzvaného „socialistického mesta".

Výskum predstavuje niekoľko hypotéz. Prvá hypotéza spochybňuje úroveň a kvalitu hromadnej verejnej dopravy, predovšetkým električkového systému v rámci krajín skutočného socializmu, niekedy v porovnaní so západnými krajinami. Druhá hypotéza spochybňuje homogenitu rozhodnutí a riešení v dopravnej politike a socialistickom mestskom plánovaní, za predpokladu, že mali vstúpiť niektoré faktory a národné aspekty. Tretia hypotéza spochybňuje existenciu osobitných koncepcií „socialistického mesta", pričom sa berie do úvahy možnosť a dôležitosť intenzívnej výmeny nápadov v celej Európe. A nakoniec sa preskúmala možnosť silného vplyvu dopravných riešení mestského modelu.

Metodický prístup je založený na historicko-štrukturálnej metóde, ktorá je zameraná na pochopenie a vysvetlenie historických skutočností. Za týmto účelom sa výskum zameral na tieto aspekty: politické, ekonomické, profesionálne, úroveň kritiky praxe, tradícia a predchádzajúca existencia v plánovaní miest a technologický rozvoj. Na tieto účely boli použité viaceré historické zdroje, štátne a miestne archívy, časopisy, kongresy, rozhovory, práca v teréne, plány a projekty miest. Iná použitá metóda bola historicko-porovnávacia zameraná na stanovenie všeobecných a rozlišovacích aspektov v teórii a praxi mestského socialistického plánovania. Porovnanie praktických riešení sa uskutočnilo prostredníctvom definície špecifických alebo bežných situácií električkového a mestského plánovania.

Na záver sa mohli potvrdiť niektoré z uvedených hypotéz, medzi ktorými upozorňuje na myšlienku, že električka nie vždy bola dôležitým dopravným prostriedkom v socialistickom mestskom plánovaní a niekedy sa priorita pripisovala autobusom, trolejbusom, metrám a prímestským vlakom. Na druhej strane bolo dosť rozdielnych rozhodnutí týkajúcich sa politiky racionalizácie ekonomiky, predchádzajúcej existencie infraštruktúr verejnej dopravy a sily nápadov moderného hnutia. Existovalo dosť poznatkov o západných skúsenostiach, predovšetkým prostredníctvom prekladov diel a medzinárodných kongresov. Nakoniec sa mohla potvrdiť vysoká úroveň vplyvu mestského modelu pri rozhodovaní o doprave, čo bolo podmienené komplikáciami pri organizovaní integrovaného plánovania ako aj spoločnou prácou jednotlivých plánovačov dopravy a urbanistov.

Kľúčové slová: električka, hromadná verejná doprava, automobilová doprava, socialistické mesto, socialistické mestské plánovanie, mestský model, dopravný model.

PRESENTATION

I believe that this presentation acts as a sort of prologue, in which I can take the liberty of writing in the first person and introduce myself. Doing this will allow readers to gain a better understanding of the person writing, and of the personal context of the research being presented here for a Doctorate. It also permits me to express all the acknowledgements that I consider essential.

I am an architect of Kazakh nationality. I was awarded a first degree in Architecture by the Lev Nikolayevich Gumilyov Eurasian National University at Astana in Kazakhstan in 2012. Shortly afterwards, thanks to an Erasmus Mundus scholarship, I was able to read for a Master's degree in Town Planning at the University of Granada in Spain. Here I also learned Spanish and continued to improve my knowledge of English. It was during that Master's programme that I discovered I had an interest in the history of town planning. I studied the urban plans and projects for Astana during the Soviet period (1957 to 1987), taking advantage of my excellent knowledge of the Russian language. After submitting my Master's dissertation in 2015 and receiving a mark of Distinction, I returned to Kazakhstan, working as an architect and town planner, and lecturing at the university. At this point it appeared to me that things were running very smoothly, as I had good jobs, could combine practice with theory, was surrounded by colleagues, friends and family and had a feeling of being in control of my life. Nevertheless, an inner voice kept telling me that I should continue my studies, as there were still unfinished matters that might help me grow as a person. The path to be followed might be a doctorate, but at that moment the prospect seemed distant, especially because I felt that I was not yet ready for such an undertaking and still had much to learn.

I became aware of the existence of the *urbanHIST* programme thanks to an email from the Spaniard who had been my tutor for the Master's degree in Town Planning. This European Joint Doctorate scheme offered a magnificent opportunity to carry out research into urban history, with a wide range of possible topics. It was supported by the *European Union Horizon 2020 Framework Programme (H2020)* for research and innovation, under the rubric *H2020-EU.1.3.1*, in a plan called *Marie Skłodowska-Curie Actions - Innovative Training Networks*. Within this drive to foster new skills by initial training of researches, Grant 721933 was awarded for urbanHIST in 2016 to a consortium of participating institutions: Bauhaus-Universität of Weimar in Germany, the University of Valladolid in Spain, the Pavol Jozef Šafárik University at Košice in Slovakia, and the Blekinge Tekniska Högskola, (Institute of Technology) in Blekinge in Sweden, with thirteen academic and non-academic organizations associated as partners. The *urbanHIST* project has proved of great interest, being dedicated to an understanding of twentieth-century European town planning. It had a strong focus on interdisciplinary and transnational studies, with fifteen research strands. One of its topic areas was particularly concerned with town planning, being entitled *Public Infrastructure, Social Housing and the Evolution of European Cities*. This was under the aegis of the University of Valladolid, which offered me a post as a research assistant to enable me to complete a thesis on *Contemporary History of Technical Infrastructures in European cities and in Urban Planning*.

As I am an architect interested in issues relating to residential areas, transport did not seem particularly attractive to me, but there was an opening for which I had been selected. The urbanHIST programme offered me a chance to fulfil my dreams, to dedicate myself to work that I considered important, setting out on an inspiring path, to be able to do research and to make a contribution to knowledge. From the very start I saw this programme as a rewarding personal opportunity.

The inter-university work for my research was organized in the form of a doctorate jointly supervised by two universities: the University of Valladolid (UVA) and Pavol Jozef Šafárik University (Univerzita Pavla Jozefa Šafárika, or UPJŠ) in Košice. The programme

offered possibilities for interactions with a number of researchers, and for the organization of various meetings, presentations, workshops and discussion seminars. It also had good arrangements for mobility during the research period, with stays at a range of academic and non-academic centres being planned, these proving very advantageous not only for the development of my investigations, but also for my training as a researcher.

Despite assiduous assistance from my Spanish supervisor, the first few months of research at the University of Valladolid were difficult for me. I was seeking the most relevant and interesting topic to research, but my views as to what that might be kept changing. I first started by studying road infrastructures, which seemed to me to be a subject close to architecture. However, with the passage of time, I realized that this topic had already been amply covered, so that I needed to look for a more original or less extensively investigated topic. This brought me to the subject of urban public transport and its infrastructures. I initially considered railways and their relationship with urban development, but I finally decided on tramways in the cities of the European Communist countries. Trams were a means of transport crucial to the economy, society, and the development of cities under Socialist regimes, but they did not appear to have been studied in any depth. It took me several months to read as much literature as possible on this topic and to establish the research hypotheses. By the end of the first year of my contract, I had a firm work scheme and was fully focused on the research.

In the second year of the research, I visited the Dresden City Museum in Germany, the Urban History Centre of the University of Leicester in England and above all Pavol Josef Šafárik University (UPJŠ) at Košice in Slovakia. I also made various visits to State archives and libraries in Russia, the Czech Republic, Slovakia, Germany and England. Although the University of Valladolid was my main base and work centre, the subject of research required me to visit many different places in Europe in order to gather sufficient materials, and my mobility was facilitated to the maximum. During my repeated stays in Germany and other countries, I was able to visit research centres, to meet academics and planners working on issues related to cities, transport and infrastructures, to conduct interviews, to present my topic and to discuss it. On occasion, especially in Germany, the Czech Republic and Slovakia, people suggested bibliographic references; at other times they highlighted aspects I should consider, or gave details of other people whom I should contact. I was also often told that although my topic was relevant, my lack of knowledge of the specific languages would prevent me from continuing my research and that I should therefore study some other subject. Nevertheless, this did not dissuade me from pursuing and believing in my research. Since Russian and English alone were insufficient to permit fully comprehensive research, I made efforts to learn the basics of German and Slovak. Although the pressure was sometimes intense, things became clearer little by little, efforts found their rewards, and strong support from various people supported me in the belief that the research could be brought to a successful finish.

Now that I have concluded four years of research, I believe that I have successfully complied with the main conditions of the *urbanHIST* programme, having completed my investigations, and having been able to achieve personal development as a researcher. It has been necessary to learn to carry out tasks correctly but swiftly, as the programme has been both very intensive and demanding. Large amounts of work have had to be done and I have had to ration my time carefully, without dawdling; at times this was enjoyable, at other times stressful, leaving me anxious and blocked. All in all, though, I see this period as the most interesting in my life. There were many presentations, congresses and workshops; there was language learning and contacts with researchers, as well as many city visits. I gained a knowledge of different cultures, made new friends and experienced the richness of life.

At this point, I should like to express my thanks to a number of people without whom it would not have been possible to complete the thesis and without whom this period of my life would have lacked meaning. First of all, I would like to thank my supervisor Professor Luis Santos y Ganges, Director of the Institute of Town Planning of the UVA, for his guidance in the research. He never lost faith in me, always understanding my concerns and aspirations, and gave me just the right encouragements to proceed, supporting me in every step

and challenge of this journey. My heartfelt thanks for his patience with my mistakes and stubbornness, not to mention the multiple revisions of the text. His contribution is beyond measure. I also wish to thank my joint supervisor Professor Jaroslav Hofierka of the Institute of Geography at UPJŠ for his gracious understanding and comments, and the effort he put into organizing courses on the ArcGIS information system.

Furthermore, I wish to record my gratitude to members of the Institute of Town Planning of the University of Valladolid for the encouragement I have received from them. This is especially true of Professor Maria Castrillo Romón and Professor Marina Jiménez Jiménez, who cheerfully assisted me in confronting the complex formalities of the programme. I found the staff of the Department of History at the UPJŠ in Košice very welcoming, and I am especially grateful to Professor Martin Pekár and Mrs. Katka Hajduková for their support. I should also like to thank the members of the *urbanHIST* consortium for the collaborative spirit they evinced during this period, and especially Professor Max Welch Guerra as the co-ordinator of the programme.

In respect of my short visit in Leicester, I should like to thank Professor Simon Gunn for his guidance on British sources, his comments on my research and his helpfulness in organizing my time there. With regard to my stays in Germany, I am grateful to the German planners Dr. Ulrich Rabe, Dr. Ditmar Hunger, Professor Heinz Schwarzbach and Dr. Bruno Flierl, who demonstrated genuine interest in my research topic and assisted me to the fullest extent during our conversations.

My thanks must also go to the municipal archives in Ostrava, Brno, Yaroslavl and Magdeburg, which made it possible to find historical materials and whose staff were always willing to help from a distance, and in addition to Ms. Josephine Hanke and to Mr. Siegfried Hansel from archive of Dresden Transport Company for great assistance in the search for materials. I must give special thanks to the *Sächsische Landesbibliothek - Staats- und Universitätsbibliothek* (SLUB) in Dresden, because my studies would not have been possible without this library. Its attentive staff and magnificent organization made it a place where I could concentrate and work hard, requesting and finding almost all the materials I needed, and turning it into a safe haven in this ocean of travels and movements. I am also grateful to the Library of the School of Architecture of the University of Valladolid, for always being very helpful in facilitating my access to whatever I required through the interlibrary loan service.

I should like to thank my friend Takezhan Talgar, whom I got to know in Dresden during this research, and who helped me to collect materials when I could not personally visit the library. I also wish to express my thanks for his kindness to another friend of mine from Dresden, Boris Gerlitz.

I am very grateful to Professor Rafael Reinoso Bellido, my tutor during my Master's studies, for the support and encouragement I have received from the very first day I met him. I very much appreciate our mutual understanding and friendship.

For these past four years I had to be far away from my family, not being able to spend holidays and festive seasons with them. With all my heart, I thank my parents and my sister for always being by my side, despite distances, and for sharing their care and love with me. Finally, I thank my husband and partner Daniyar, for accompanying me on this journey, for his constant support and for his fortitude during this time of struggle, dedication, losses, failures, anguish, searching and discoveries. My hope is now that he can enjoy sharing this moment of satisfaction with me.

To my parents

CONTENTS

The construction of pedestrian tunnels in Pirnaischer Platz, Dresden, 1971. Source: Dresden Stadtmuseum, SMD_Ph 795_05_Pirnaischer Platz_August.

I. INTRODUCTION. TRAMS AND CITIES: COMPLEX INTERRELATIONSHIPS

"The interrelationships between cities and transport are not easy to explain, not being limited to cause-and-effect linkages, since they involve a number of factors that influence and are in turn influenced (…) This is a reciprocal and circular relation over time."[1]

(Oyón, 1999)

"At the same moment that motor traffic won out in mobility within and between cities, and urban roads and highways became central elements in town planning and design, railways began to be seen as a system specializing in the transport of goods, particularly to industrial plants, and thus already peripheral, or as a mass transport system that was not particularly suitable for urban use, requiring it to be removed from street level by employing elevated or underground tracks. In this way a contradictory view of railways emerged from a town-planning angle, confusing reality and cultural image. Trains were seen as more or less necessary, but essentially problematic."[2]

(Santos, 2007)

This text is the outcome of research into urban and transport history. It is a doctoral thesis on the role of tramways in European cities during the Communist period half century ago.

The aim of the research was to study the relationships between transport and urban planning, together with various technical and non-technical considerations relating to trams in cities, from the perspective of history and town planning. It covered medium-sized cities in the Union of Soviet Socialist Republics (USSR), the German Democratic Republic (GDR) and the Czechoslovak Socialist Republic (CSR) in the 1960s and 1970s.

In view of its theme and the viewpoints adopted in approaching it, the research had to overcome a number of epistemological difficulties and to deal with a variety of methods and techniques. These are explained in this introduction.

1 "Las interrelaciones entre la ciudad y el transporte no es un asunto fácil de explicar y no puede limitarse a las interrelaciones de causa y efecto, ya que tiene varios factores que influyen y después quedan influidos (…) Es 'una relación recíproca y circular en el tiempo.'"

2 "Precisamente cuando el tráfico automovilístico triunfa en los movimientos urbanos e interurbanos y el vial urbano rodado o la carretera son elementos centrales en la planificación y el diseño urbanos–, el ferrocarril comienza a ser considerado bien como un sistema especializado en el transporte de mercancías, en relación con las instalaciones industriales y por lo tanto ya periférico, o bien como un sistema de transporte masivo pero poco urbano, que hay que sacar de la calle, elevándolo o soterrándolo. Comienza entonces una visión contradictoria del ferrocarril desde el urbanismo, que confunde realidad e imagen cultural: los trenes son más o menos necesarios, pero esencialmente problemáticos."

Three principal difficulties were faced by the research, apart from other minor problems. First, the subject lies on the boundary of the disciplines of town planning and transport engineering. Second, this is a study in urban history, which is necessarily a part of the academic field of history. Third, it deals with an extensive number of cases covering three different countries with differing languages and cultures.

The author is a native speaker of Kazakh, having a solid command of Russian, English and Spanish. However, it was necessary to learn the rudiments of German, Slovak and Czech for the work. This was because it was essential to consult national bibliographies and a range of archives. This required rather more tenacity than finesse, since the inevitable difficulties had to be overcome by appropriate efforts.

Despite the enormous challenges and the extent of this work, the author was fortunate in being able to rely on constant advice from a supervisor with an in-depth knowledge of the world of railways, who also holds doctorates in both urban planning and history. His involvement in the research and his intelligent approach to the issues facilitated numerous actions.

Finally, although such a procedure may seem somewhat circular or repetitive, it would appear appropriate to differentiate a number of items in this introduction. These are the subject and objectives of the research, the hypotheses and questions arising, the state of the art in this field, methodological issues, the conceptual framework, and, finally, a description of the research process with a comparison to the scheme of explanation adopted.

1.1. RESEARCH SUBJECT AND OBJECTIVES

The research has one theme and three perspectives. The theme is trams in cities, in the twofold aspects of urban infrastructures and metropolitan transport services. Initially, the spatial and temporal limits that were considered for adoption would have been European Communist countries in the second half of the twentieth century. However, this implied a vast scale that a single researcher would not be able to cover, so that the field was cut down to three countries (the USSR, the GDR and the CSR), restricted to their medium-sized cities, and limited to two key decades, the 1960s and 1970s. This narrowing of the field made the task somewhat more manageable, although it remained a huge and difficult undertaking, as it required visits to several countries and a good reading competence in various different languages.

As for the three perspectives mentioned, the first and most basic is urban planning (the area of knowledge in which the author specializes), dealing primarily with urban models, but focusing on the issue of trams and all the implications of transport in relation to town planning and urban design. The second perspective is that of the field of urban transport, namely transport engineering, traffic engineering and transport economics, branches of knowledge which include the planning and management of infrastructures and their services. The third and most transverse perspective is historical, since the research looked into past events in relation to urban and tramway issues. Consequently, it was necessary to undertake theoretical and practical studies so as to incorporate methods and techniques from the field of academic history, in order to analyse, understand and interpret a complex, non-experimental reality. In this, the essential point was the interrelationships between spatial and technical aspects, in which the planning of tramways had its influence over towns, and vice versa. Likewise, there were aspects concerning standards, ideology and culture that provided the context for decisions in town and transport planning.

The topic under study is the tramway systems in medium-sized European Communist cities. The spatial and temporal boundaries that were set covered the USSR, the GDR and the CSR, and the 1960s and 1970s. In order to better understand the limits and interest of the research, it is necessary to explain the reasons for the selection and delimitation of its subjects. The first subject is trams. This includes conventional, rapid, underground and elevated trams, operating both within cities and in their suburban surroundings. Trams constitute an original and fascinating object for research as they have an intimate relationship with the urban structure of certain cities. The planning of tramways tended to be carried out along routes with predictably heavy, stable passenger traffic, as they are a long-lasting type of infrastructure with large initial costs. Moreover, because of the limited development of underground and suburban trains (metros and commuter services) in the cities, rapid trams played a considerable role in public transport, complemented by other transport systems. Thus, studying tramway infrastructures is a major tool in understanding both the planning of urban transport systems and Socialist town planning. The qualities of tramways also served to implement strategies for guided or ordered urban growth, for the limitation of urban sprawl, and for the provision of links between the most crucial areas in towns. Hence, in Socialist planning tramways became a principal element of urban structure, even the backbone for urban models.

The choice of countries for the research (the USSR, the GDR and the CSR) is an outcome of their methodological interest. On the one hand, there was the hegemony of the USSR in many areas, including the establishment of the principles of Socialist city planning. On the other hand, there was the high level of development in urban transport planning in the GDR and the CSR. This opened up possibilities for studying exchanges of ideas related to the interrelationship between urban planning and transport engineering, which led to the selection of these three countries.

With regard to the concept of medium-sized city, it should be noted that tramways, as a means of mass transport, were introduced in large and medium-sized cities, and far less so in small cities. When it comes to transport planning, the size of the city involved is always of crucial importance. The planning of tram infrastructures was mostly in respect of medium-sized cities where distances to be covered were typically six to eight kilometres at most. The optimal deployment of trams was thus to be expected principally in medium-sized cities (in the GDR this type of city was called *großflächige Mittelstädte* [extensive medium cities], as indicated by the *Ministerium für Verkehrswesen* [Transport Ministry], 1966, p. 127). Such cities had populations of approximately 100.000 to 750.000 inhabitants and demonstrated functional public transport needs exceeding the capacity of buses and trolleybuses, but insufficient to justify an underground (metro). In addition, it proved of interest to include new districts added to big cities, in order to explain the phenomenon of urban extension supported by tram networks.

Within the general class of cities, preferences went to those undergoing reconstruction or extension, as they were of special interest for analysing changes in tramway infrastructures and urban models. In contrast, completely new cities were omitted from this research, because of their specific complexities. In any case, the part played by trams in them was minimal. The new cities in the GDR and CSR had no need for trams because of their small size, ranging mostly from 30,000 to 80,000 inhabitants, whilst in the new cities of the USSR the principal means of public transport were buses and trolleybuses, with tramway development carried out only at later stages.

The choice of the 1960s and 1970s is due to the fact that they were the point in time when tramways really started to develop. The history of the Soviet Union is to be seen as a background for this period. The research covers a period starting in the Khrushchev era, from 1954 onwards, when changes in Socialist town planning began in earnest. The ideas of the Modern Movement underlay the rationalization of town planning solutions, requiring reconsideration of existing principles for plans. This change was announced in 1960 at an All-Union Congress on Town Planning in Moscow. The period studied ends with the death of Brezhnev in 1982. By the early 1980s, the phase of political stability and some slight economic progress, or at worst stagnation, in Communist countries came to an end (White, 1992; Hanson, 2003; Steiner, 2010, p. 172). Among other problems, various major sectors in the USSR had deteriorated in a context of low productivity, low growth in per capita consumption and some shortages of manpower (Dowlah and Elliot, 1994). Post-Brezhnev politics saw a recognition of grave economic problems and attempts at revitalization (Harrison, 2002). Thus, it may be stated that this research focuses on the central period in the development of Socialist town planning, when the main changes in urban structures and models took place, and urban and public transport infrastructures were consolidated.

These matters, the historical period, the intersections of themes, the subjects under analysis, and interrelationships among Communist countries, taken together as a whole, are the grounds for claiming originality and utility for this research, especially in the light of its transnational scale and great complexity. The work has a twofold objective. On the one hand, it aims to analyse and explain the interrelationships between transport planning (with a particular focus on the planning of tram infrastructures, as its main subject) and town planning. On the other, it attempts to identify and interpret the regularities and variations in the urban and transport models found in the three countries, as well as the mutual influences from academia and from political practice.

As indicated above, the first objective was to understand the relationships between urban transport planning and town planning. This would allow further research on the topic in a complex and contradictory period, when it is not possible to define the ideas and objectives of planning with any ease. When transport engineering and economics emerged as important disciplines for cities, they had to be considered in town planning practice. Hence, a grasp of one discipline in the light of the other would make it possible to deepen comprehension of their interrelationships.

The second objective was to comprehend the urban and transport models for the so-called Socialist city. A comparison of the policies of the USSR, the GDR and

the CSR, in particular those of some of their cities, would make it feasible to identify repeated and differed modes and logics that led to the formation of urban and transport models. An acquaintance with their differences and similarities would aid in contributing to a historical analysis. This would help to define a nuanced history of the culture of transport and urban planning in these countries.

In addition to these objectives, the research was motivated by a desire to contribute to professional knowledge of the disciplines concerned, on the basis of a definition and assessment of planning theory and practice, potentially of interest to planners in contemporary urban interventions. It is well known that history is shaped by current times, in the same way that historical knowledge is necessary to make better decisions in the present. In the words of English transport historians:

> *"We are not arguing that history repeats itself, or that every contemporary transport dilemma has an historical counterpart: but we are suggesting that in many contexts of transport planning a better understanding of the context and consequences of past decisions and processes could lead to more effective policy decisions" (Divall, Hine, Pooley, 2017, p. 1).*

Tramways equate to a railway infrastructure, and are therefore very durable within urban structures, creating inertia that tends to oppose change. Thus, a thorough understanding of how transport infrastructures were planned should provide useful insights into transport policy and the reasons for decisions, which would make it possible to learn from past experience what constitutes good and bad practice.

1.2. BASES, QUESTIONS AND HYPOTHESES

The electrification of trams at the beginning of the twentieth century turned them into the main means of urban transport in cities of a certain size throughout Europe, including Russia (and later the USSR). The extension of cities was also rendered possible by the development of tramways, forming a radial structure that allowed or encouraged residential and industrial functions to be directly connected to city centres. Because of their prompt industrial development and the early assumption by municipalities of competence for tramway regulation, European cities were largely served by tram lines or networks, which in the USSR existed in only a limited number of cities.

With the arrival and consolidation of private transport and the provision of road infrastructures, there came in addition the technological advance of motorized public transport such as buses and trolleybuses. Consequently, the role of trams began to decline and they were even abandoned in many cities around the world, although not so much so in Central and Eastern Europe. The principles of city planning and the organization of urban spaces were reconsidered in relation to the needs of motor car transport. The ensuing approaches were in conflict with the existing tram lines and their planning needs. Trams became seen as an outmoded means of transport, an obstacle to the circulation of motorized transport, and this idea took shape in one way or another in both the Western and the Communist worlds. However, in the latter there was also a very clear and rigorous intention to provide the accessibility and urban connectivity necessary for economic activities and industrial production. Public transport was a necessary, even an indispensable

service for production. "People here are in action as a labour force. For them to carry out their jobs, there is a need to move them from their homes to their workplaces and back again"[3] (Lacek, 1983, p. 27). Cars could not, and would not, respond to social and economic needs, and were not effective in transporting large flows of passengers. The maintenance and development of tramway infrastructures and tram services thus in many cases formed the basis for a public transport policy that differentiated, or sought to differentiate, the Socialist city. In contrast, in the West in the 1960s and 1970s the idea of underground public transport was predominant in a context of the hegemony of the automobile. These trends continued until a period of tramway renaissance began in the 1980s.

Although in Socialist town planning trams were often seen as a temporary solution to support urban growth, they played a major role in the formation of large urban spaces in quite a few cities. The strategies of compact, orderly and controlled urban development were largely based on a planning policy for tramway infrastructures. Moreover, as trams gradually evolved into a means of rapid transport, their role burgeoned in the late 1960s, bringing a need to reconsider planning principles linked to them, from urban structure to urban design issues. In order to achieve the maximum benefit from tram operations both in urban redevelopment and in the expansion of cities, the integration of tramway planning and town planning was defined as a major policy from the mid-1960s onwards. From that time on, numerous studies and proposals were developed in relation to the ideas of prioritizing the development of tramway infrastructures, seeking a balance between trams and motor vehicles, and integrating urban transport systems with pedestrian traffic.

However, despite the powerful cliché that the Eastern bloc was monolithic, diversity was the norm: there were no agreed principles regarding the development of urban public transport and its infrastructures. Rather than competition between trams and cars, there was a dilemma concerning modes of public transport, but this was not so much between metros and trams as between trams, trolleybuses and buses. In the USSR, the GDR and the CSR, despite their all following a more or less shared vague concept of a Socialist city, the process of tramway planning was neither homogeneous nor consistent. The main debate was whether to prioritize the development of trams or to give preference to buses and trolleybuses. In the context of the triumph of Modern Movement, trams sometimes shared street space with motorized transport, sometimes received priority in the shape of segregated tracking, and sometimes were abandoned, being replaced by buses and trolleybuses.

There was a lack of integration of town and transport planning, insufficient mutual understanding among planners, unclear competencies and conflicts between motorized transport and tramway infrastructures. Along with ambiguous policies on urban transport development, an absence of administrative co-operation between institutions, departments and ministries complicated any realization of ideas of integrating trams into cities. Confusion prevailed over clarity. On the one hand,

3 Original text is: "Člověk zde vystupuje: jako pracovní síla a k její realizaci potřebuje přemístění z místa bydliště no pracoviště a zpět". However, Mikuláš Lacek made a radical distinction between the production process and mass transport for workers in public transport, because according to classical Marxist theory, passenger transport lacked a "subject of production", did not create surplus value and was not part of the production process, and was therefore to be considered a service to industry.

there were different levels of development of tramway systems, together with different priorities for the use of electricity or hydrocarbon resources. On the other, the differing ideas and cultures of planners of policies for public transport development, along with other factors, contributed to differences between Socialist countries. However, these have not been extensively studied in respect of urban and transport history, an understanding of which should enable advances in the comprehension of the keys to Socialist town planning.

In order to analyse, clarify and interpret these ideas, various technical aspects of urban theory, town planning, plans for tramway systems, traffic engineering, transport technology development, urban geography, urban economics, and the like, required to be more thoroughly understood. In addition, many aspects of political, social and cultural realities may also have been relevant in decision-making processes. In consequence, various questions arose, of which the following are but a few. How were tramway networks planned and operated in relation to urban structures? How were tram lines routed in relation to urban spaces or to other transport systems in cities? How were tramways planned for peripheral and suburban areas? How were sites organized for the stops or stations? There was certainly numerous features to consider, but it was necessary to establish a focus.

To tell the truth, all research starts with some form of question. In the case of this thesis, a reading of the literature on Soviet urban planning pointed to various books in Russian on town planning experiences in the GDR and the CSR. This gave rise to the question of whether the GDR and the CSR were ever able to influence the USSR. Further consultation of relevant books and journals highlighted the importance of trams in the functioning of transport in the cities of Communist countries, as well as the differences in solutions adopted for tramway infrastructures between one Communist country and the others. This led to an additional question, of why the ideas and results of tramway planning differed so much when the principles of town and transport planning were, or seemed to be, common to all the States involved.

Subsequently, these questions began to take on a more specific form and content. To what extent did the USSR influence transport planning in the GDR and the CSR? If it did, was there any return influence? What were the benchmarks and models for transport planning? How did urban transport policy relate to town planning policies? Was there integrated planning in the European Socialist countries? How did their experience differ from that of Western countries? Finally, what role did the planning of tramway infrastructures play in urban structures and forms? These questions triggered a persistent search for answers. A thorough reading of the literature gave rise at first to a multitude of doubts, but finally to the formulation of the following research hypotheses:

Hypothesis 1. The cliché that the European Communist countries had well-developed public transport systems is implausible.

Both historical and contemporary literature stresses the larger number of systems and the greater mileages of tram lines in European Communist countries, this often being contrasted with Western realities (Tarkhov, 1996; Lois Gonzalez, 2013; Seidenglanz, 2016; Potemkina, 2020). An explanation is to be found in the limited presence of motor cars and an ideology of collective mass use of public transport,

as well as the importance of industrialization and production in cities. However, this did not completely define public transport policy in Socialist town planning. Several aspects were shared both by Western and by Communist countries. In the 1960s and 1970s, Modern Movement ideas triumphed in Communist countries as they had elsewhere. As in Western countries, planning for road transport assumed that metros and buses were the ideal solution. It was hoped that other modes of mass public transport could be found that would not interfere with motor traffic. These futuristic visions prevented the development of tramway systems. Therefore, as happened in Western European countries, tramway modernization was a long time coming and was mostly seen as a temporary solution.

Hypothesis 2. In contrast to the idea of a closed, monolithic bloc, there was considerable diversity in the solutions adopted

There was more diversity than might have been expected in the totalitarian regimes of the so-called Eastern Bloc, with differing solutions being chosen. The ideas of plurality of modernity or invented modernity[4] have been put forward and studied by various authors to explain how Modern Movement, despite being an international movement, was able to develop country-specific interpretations of town planning. Benedetto Gravagnuolo, when studying Modern Movement in town planning, stressed that continuity was also important in such planning: "Traditions that in spite of innovations and radical changes are transmitted in the form of a set of inherited experiences, being reworked under new conditions" (1998, p. 215). The Czechoslovak sociologist Jiří Musil emphasized that the diversity in interpretations of concepts in Socialist town planning such as modernity, equality, optimization and rationality, led to problems in respect of how they were realized spatially in the planning of settlements in Communist countries (1980, pp. 179-185). All these works pointed to the first hypothesis, which was that there would be variations, indeed even of some significance, in urban and transport planning policy in the Communist countries. However, the question still arose as to whether there was a norm, perhaps with variants and anomalies, or whether there was really no homogeneity at all.

Hypothesis 3. Town planning, and especially traffic and transport engineering, were considered technical disciplines, with no clear ideological background, so Western ideas were able to have an influence over them without prior vetting

In spite of attempts to establish ideological controls and filters over ideas coming from the capitalist world, Socialist town planning did use relevant criteria taken from them. Because of the extensive development of road infrastructures and traffic congestion, Western countries could offer useful concepts for Communist cities in the field of transport planning, such as the organization of traffic in city centres, types of developments in public transport, the rapid movement of motor traffic, calculation models for traffic engineers trying to achieve balanced distributions of passenger flows, and the like. In the face of similar technical problems, it made no sense to forbid learning from Western solutions and thinking. Nevertheless, this did not bring with it an uncontrolled surge in private vehicles, so that public transport policies were always present in the Communist countries, with particular views on topics such as choice of mode, accessibility to public transport, pedestrian proximity, compact development of cities around public transport routes, and so forth.

4 Several authors analysed the phenomenon of appropriation of Modernist Movement rules in the context of different countries, among them see Javier Monclús and Carmen Díez Medina (2016) Modernist Housing Estates in European Cities of the Western and Eastern Blocs, *Planning Perspectives*, 31 (4), pp. 533-562, which explain the idea of influence of traditions on the urban morphology of modernist residential districts. Daria Bocharnikova explains this phenomenon as "Invented Socialist Modern" emphasising the continuity of avant-garde traditions and ideas in Soviet urbanism, see Bocharnikova, D. (2014) *Inventing Socialist Modern: A History of the Architectural Profession in the USSR, 1932-1971*, PhD thesis, May, Florence, European University Institute, pp. 30-35. Kimberly Zarecor also underlines specific qualities in socialist urban planning such as the notion of the city as an integrated entity and infrastructural thinking in the planning of urban structure. See Zarecor, K. E. (2018) What Was So Socialist about the Socialist City? Second World Urbanity in Europe, *Journal of Urban History*, 2018, 44 (1), pp. 95-117.

Hypothesis 4. The model for planning tramway infrastructures was a relevant factor in urban modelling and Socialist town planning decisions

Although there was a significant growth in road infrastructures, tramways maintained their standing in the planning and functioning of cities in the Communist orbit. Thus, trams proved capable of acting as a major instrument in co-ordinated and integrated land-use planning. Tramway planning was applied as a political and economic tool, as well as in controlling urban patterns, so as to provide an orderly development of cities and to maintain spatial relations between the main areas as towns grew. Tram networks played an important role in the consolidation of the shape of urban areas, facilitating the compact expansion of cities. From a given urban form, a proportional extension could be achieved by controlling the configuration and length of tram networks.

In general, these questions and hypotheses aimed at establishing what contexts and factors, whether technical or not, affected successes or failures of town plans and projects. On these lines, the intention was to embrace a transnational scale in the interrelationships, influences, and interdependencies of ideas in the integration of town and transport planning in the shape of tram networks.

1.3. THE STATE OF THE ART

There are few studies, but many perspectives, in tramway research. Architects and town planners prefer a viewpoint focused on the city with its spaces and contents, and rarely concentrate specifically on the role of tramway infrastructures in urban planning. In contrast, scholars of transport investigate the issue from the perspectives of their own backgrounds and academic interests. So, engineers have focused on transport infrastructure planning and technological developments. Geographers have focused on tramway networks, without relating them to aspects of town planning. Finally, historians have put their efforts into studying transport companies and people's perceptions of changes in transport, emphasizing the importance of economic, political and social factors, and not always including spatial aspects.

At the present time, there are only a few pieces of research related to the topic of the interrelations between tramways and town planning that take a historical and land-use angle. Among these would be work by Barbara Schmucki. Her doctoral thesis *Der Traum vom Verkehrsfluss: städtische Verkehrsplanung seit 1945 im*

deutsch-deutschen Vergleich [The Dream of Traffic Flows: City Traffic Planning since 1945 Compared in the Two Germanies] (2001) opens up a new perspective on urban transport planning in East and West Germany. It concludes that there were parallel dynamics in the development of urban transport systems, this being explained by understanding that the science of traffic planning was a discipline shared by both East and West Germany. It highlights the aspirations of GDR planners to develop metro and light rail systems and their doubts about retaining or modernizing tramways. However, this work is limited to the German experience and does not include the experiences of other Western and Communist countries.

Another piece by Schmucki, her article "Fashion and Technological Change: Tramways in Germany after 1945" (2010), is dedicated to an analysis of the development, decline and renaissance of tramways in the Federal Republic of Germany (FRG). It analyses the technological development of trams and rapid changes in policy since the early 1960s. It gives a good explanation of how the aspiration of politicians and planners to provide a modern image of the city influenced decisions on public transport planning. Traffic engineering was dominated by technological fashions. Changes in planners' thinking about what constituted efficiency in public transport planning are also clearly explained. It is worth noting that Schmucki's work considers the decline of trams and the growth of motor transport as similar phenomena in the GDR and the FRG, although their significance was not equivalent. In the GDR, despite the goals of providing fluid street traffic and underground public transport, tramway infrastructures remained present in small and medium towns.

In general, German research provides excellent insights into the history of public transport in the cities of the GDR. This is probably to be explained because it considers both East and West Germany, which enriches its results. For example, researchers such as Barbara Schmucki and Hans-Liudger Dienel in their book of which the short title is *Mobilität für alle* [Mobility for All] (1997) offer a thought-provoking view of the history of public transport as a story of ups and downs, changing in accordance with technical and social conditions, and the decisions of actors or organizations. This work sought to investigate the factors that influenced the development and decline of public transport, explaining the importance of technology, political interests and the actions of companies in urban traffic management. In doing so, it opened up new topics relating to the history of public transport planning in Europe. However, the book was primarily concerned with comparisons between large cities, and focused mainly on relationships between companies and on a social study of users, not concentrating very much on the spatial dimension of cities.

Another major work on the development of urban transport infrastructures in the cities of the GDR is *Straßen- und Verkehrsgeschichte deutscher Städte nach 1945: Dresden – Leipzig – Halle – Chemnitz – Erfurt* [A History of Streets and Traffic in German Cities after 1941: Dresden – Leipzig – Halle – Chemnitz – Erfurt], which was published by a consortium of German researchers in 2001. The book provides an explanation of the organizational processes for city planning in the GDR, and the role of the *Büros für Verkehrsplanung* [transport planning departments] within it. The study of five cities provided an acquaintance with a variety of ideas and problems in urban transport solutions at a local level. Among these five, the case of Erfurt is extensively explained by its former transport planner Hermann. H. Saitz. The question of integration between general plans for transport and the overall

urban plan is exemplified with reference to specific transport planning situations, to discussions between planners and political actors and to the influences from technical aspects. The book also focuses on the issue of tramway planning in city centre redevelopment and residential extensions. The work is generally very helpful for understanding the linkages between transport and city planning in the GDR. However, it concentrates mainly on providing a general view of transport planning, and supplies only a few guidelines on the development of tramway infrastructures and their interrelationships with cities.

The experience of tramway planning in Western countries receives a useful treatment in Massimo Moraglio's article "Shifting Transport Regimes. The Strange Case of Light Rail Revival" (2015). Moraglio stresses the importance of trams for mass transport in Western European cities in the 1960s and 1970s. Although the experience of Communist countries is not presented in this work, it does give a good examination of the emergence and development of the light rail concept in Western European countries during the 1970s and 1980s. It defines the contradictory nature of this decision, its conflicts and debates, and this is helpful in gaining a better understanding and nuancing of the Communist experience.

Another article that offers a balanced view of the development of tramway systems in European countries is Pierre-Henri Émangard's "Les tramways en Europe: une vision diachronique" [Trams in Europe: A Historical View] (2012). In this article the division between Communist and capitalist countries fades away, as an objective approach to tramway policy is presented. Its comparison of the trends to eliminate tram networks in European cities allows the identification of various crucial shaping factors, such as national policy, geographical location within a country, the size of a city, or its level of urbanization and industrialization. This article offers valuable insights in that it permits the cliché suggesting a direct link between trams and Communist ideology to be refuted.

Apart from these works, any account of the state of the question also required an analysis of literature which was not directly related to the research topic, but which might serve to expand, complement and contextualize data and concepts. The bibliography drawn upon was very extensive,[5] despite a number of limitations relating to access to information, language, and so forth. Precisely this was the only way to achieve, or at least attempt to achieve, an integrated overview. Thus, various issues and perspectives were studied in order to gain a better understanding of the particular topics that might be useful during the development of this interdisciplinary research topic. A number of viewpoints were identified.

a) The Geographical Perspective on the Historical Development of Tramway Networks in Russian Publications

Russian transport researchers have recently contributed several studies on the development of tramways in the USSR. For example, the works of S. A. Tarkhov (1990) *Tramvai i trolleibus v gorodakh SSSR: Spravochnik na nachalo 1990* [Trams and Trolleybuses in the Cities of the USSR. An Introductory Guide], and *Straßenbahnatlas* [der] *ehem*[aligen] *Sowjetunion / Tramway Atlas of the former USSR* (1997), are ori-

5 As professor Juan Luis de las Rivas noted in one of his lectures, you have to listen to millions of voices in order to find your own voice.

ented towards the history of the development of tramway networks in Soviet cities, providing a chronology indicating key moments in tramway expansion or abandonment. This information is useful for tracing major changes. An article by I. V. Shpakov and P. V. Zyuzin explains the development of tram production technology in the USSR, its problems and prospects for development in the 1970s and 1980s, gives guidelines on technological aspects and their possible spatial influences. Zyuzin's doctoral thesis (2012) is a good description of developments in public transport systems in the post-Socialist period in Eastern Europe, the USSR and China. While this work takes a geographical viewpoint concentrating on explaining changes in the configuration of public transport networks, it also provides a historical perspective on trams during the Socialist era, highlighting the political and economic factors that enabled their growth and caused their decline. The varying timespans needed to bring in metros, trams, trolleybuses, or buses are explained, highlighting the different dynamics and patterns of development in various countries (USSR, GDR, CSR, Poland) and a range of types of cities (new, consolidated, small, large, or industrial). Despite this, the work focuses mainly on expounding contemporary public transport problems and does not focus specifically on the role of tram lines in urban planning over time.

A comprehensive approach to the development of public transport can also be found in the collective work *Transport Systems of Russian Cities: Ongoing Transformations* (2016) published by the National Research University Higher School of Economics in Moscow, which includes a historical perspective on the development of public and private transport networks in explaining contemporary problems. A historical view of urban transport planning and modelling in Russia was also offered by A. Trofimenko and K. Kulakov in their journal article "Transport Planning and Transport Modelling", which gives a good account of modelling of public transport systems in the USSR, highlighting a certain freedom to learn from Western experiences that was enjoyed by transport planners in the USSR in the 1960s, 1970s and 1980s (2016, p. 11). Despite this, the idea of determining the origin and destination of passenger journeys was preserved in transport plans. This perspective provides a better understanding of the technological, transport, economic and political features of Soviet cities.

b) Socialist Transport Planning as a Question of Road Infrastructure Development

This newly developed perspective aims at explaining the car-oriented city planning paradigm in Communist cities. Elke Beyer's article "Planning for Mobility Designing City Centers and New Towns in the USSR and the GDR in the 1960s: Automobility in the Eastern Bloc" (2011) is given over to an explanation of how urban traffic was organized in the hearts of cities in the USSR and the GDR. The main conclusion from the comparison is that the two countries did not differ much in the urban traffic solutions adopted for their main city centres. However, the research does not pay attention to public transport planning, which was of great importance in the cities of the Communist world. Furthermore, it focuses only on representative spaces in the centres of large or new cities, and this cannot give a complete picture of the organization of internal traffic at the level of a city as a whole. Nevertheless, the work is relevant for understanding the crucial part played by road infrastructure planning in the Socialist city.

In relation to this perspective, it is also worth mentioning the book *The Socialist Car: Automobility in the Eastern Bloc* (2011) edited by L. H. Siegelbaum, which presents one of the first pieces of research to offer an integrated view, covering production and consumption, car culture, and urban mobility, in describing the phenomenon of the motor car in Socialist countries. In the section dealing with car mobility in urban spatial planning, the cases of new cities such as Naberezhnye Chelny, the Kalinin (New Arbat) Avenue project, Alexanderplatz, Halle Neustadt, and others are brought under the microscope. The expounding of these cases provides valuable insights into the crucial role of motor transport and its infrastructures in Socialist town planning. A similar approach was taken by Christoph Bernhardt (2017),[6] who put forward the idea that from the 1960s onwards the Socialist world accepted a capitalist city model oriented towards the development of motor transport infrastructures, radically changing the principles of town planning.

However, while these cases present interesting and valuable insights into the development of road traffic and its infrastructures in the cities of the Communist world, they do not explain its relationship to other transport systems. Roads are only a part of the complete transport system (Roth, 2015, p. 1), which also includes public mass transport, urban rail, regional modes of transport and their facilities, which were not always eliminated and replaced by motorized transport and its infrastructures. In this connection, it should be noted that ideas on the development of road networks and the role of the motor car in Socialist town planning cannot be not denied, but there is still the question of the part played by public mass transport, trams and their infrastructures, in relation to road infrastructures and town planning. In this approach, work on the development of road networks is used to shed light on interventions in the tramway system, spatial conflicts and their solutions.

c) The History of Various Cities and their Town Planning

With regard to the relationship between town and tramway planning, it is also worth mentioning works on certain specific cities. On Dresden, there is *Abschied vom alten Dresden* [Farewell to Old Dresden] by Matthias Lerm (1998). For Magdeburg, there is *Städtebau in Magdeburg 1945-1990: Planungen und Dokumente* [City Development in Magdeburg 1945 to 1990: Plans and Documents] which was published by the *Stadtplanungsamt Magdeburg* [Magdeburg City Planning Office] (1998). On Bratislava, there is *Urbanizmus 20. storočia na Slovensku. Prípadová štúdia Bratislava* [Twentieth-Century Town Planning in Slovakia: A Case Study of Bratislava] by Peter Horák (2017). There are also numerous other works devoted to the history of city planning during the Socialist period. The focus of this literature falls on the reconstruction of city centres, housing interventions, on the industrialization of construction processes, on residential extensions and concepts of urban structure. The planning of tramway infrastructures is mostly assigned a reduced role in ur-

6 This publication by Christoph Bernhardt was part of the ongoing research project of the "Conflict field 'car-friendly city', Inner-city space design as urbanization strategy since 1945 in East and West" [Konfliktfeld 'autogerechte Stadt' Innerstädtische Freiraumgestaltung als Urbanisierungsstrategie seit 1945 in Ost und West] which is being carried out by the Leibniz Institute for Spatial and Social research.

ban development. Nevertheless, these works are of interest for understanding the development of cities, sometimes also serving to pick out relevant town planning situations.

d) Research on the Contemporary Role of Tramway Infrastructures

Some research has been carried out with the aim of identifying the qualities of trams, in order to promote them as a sustainable means of public transport. Most of this work was undertaken in Czechoslovakia, where the modernization of tramway systems had not yet reached its fullest extent. Consequently, works such as the articles "Czechoslovak Light Rail - Legacy of Socialist Urbanism or Opportunity for the Future?" (Seidenglanz, 2016) or "Tramway-Oriented Development: What Results in What Context? Comparative Approach between France and the Czech Republic" (Zelezny, 2014) aim to evaluate the Communist experience and recognize the opportunities for modernizing tramway systems. These pieces also contain an appropriate historical perspective and an evaluation of spatial features that were of relevance for the literature review.

The main conclusion to be drawn from the bibliographic survey summarized here is that the role of tramway planning in town planning has yet to be studied adequately. There is a more complex and diverse explanation for actions taken in the planning of tram systems than what is presented in contemporary research. The publications reviewed, although to some extent including analyses of tram networks, do not focus sufficiently on the interdependencies and interrelationships between trams and cities. Moreover, they put forward a scale-free view of individual cities and lack an international perspective that could help in understanding the specific planning issues met with in European cities and countries. Whilst these points were identified on the basis of its review of the literature, it should be noted that the present thesis is not merely aimed at "filling the gap in scientific knowledge" (Ward, Freestone, Silver, 2011, p. 245).

1.4. METHODOLOGICAL CHALLENGES AND APPROACHES

The methodological approach taken by research had two major stages. The first step in the historiographical methodology was the application of a historical structural method[7] (Aróstegui, 2001, p. 300-306). The intention was to analyse, to comprehend and to explain the dynamics over time of historical events, together with the structures they encountered and those that ensued. In accordance with Aróstegui, the aim was to seek understanding as found in the humanities, together with the explanatory and comparative features expected in social sciences. In order to grasp historical structures, it was necessary to read texts, both historical documents and contemporary research. This involved an extensive survey of subjects, trusting to the value of a broad view permitting an acquaintance with the complex, multiple contexts of historical reality so as better to focus the research. However, it also sought to explain historical processes "within the structural context in which they occur" (Aróstegui, 2001, p. 301). The second step was an application of a comparative historical method to ideas and practices relating to cities, trams and planning, in a search for variations and regularities in the solutions, contextualizing and accounting for them. According to this twofold methodological approach, understanding required working with diverse sources. There is very little academic literature on these lines, but an adequate supply of historical works, archival materials, technical literature, and plans and projects. This section first discusses working with sources, and then addresses other methodological considerations.

7 Aróstegui proposed the research methods understanding/explanation and comparison in his work Historical research: theory and method (La investigación histórica: teoría y método, 2001). The main idea was based on the fact that it is not only possible to understand, because it is a limited method, it was also necessary to explain the historical facts, their existing and subsequent structures. Explanation for Aróstegui is a higher form of historical science, which includes the explanation not only of social actions, but also of social change and the degree of permeability of existing structures to these changes.

1.4.1. SOURCES AND THEIR LIMITATIONS

The focus of this research on its specific objectives made it possible at all times to keep in mind the real requirements for this work, and to permit a limitation or exclusion of personal, temporal and changeable matter. However, this did not imply stringent restrictions on the literature consulted, which might have had a negative impact on the quality of the research. On the contrary, an attempt was made to search through a varied and wide-ranging bibliography, interrogating it carefully in relation to the research objectives. Carrying out a study with a transnational perspective is not an easy task, as it involves considerable mobility in order to access both primary and secondary literature, items which are not located in a single place and are not always available through the Internet.

An ability to use Russian, English and Spanish facilitated access to a large amount of literature, especially not very well-known Soviet publications. However, the fact that a major part of the research required translations from German, Czech and Slovak made it necessary to learn as much as possible of these languages. An elementary knowledge of the three was of use during early work in archives and libraries intended to select material related to the research topic. However, in order to undertake a critical study of the texts, it was necessary to translate them into English. Certain specific or technical terms required the use of technical dictionaries or consultation with local academics and technicians during stays in Germany and Slovakia. It should be noted that even this did not solve all the problems concerning access to materials, as the language barrier was a limiting factor during work in archives, when there was a need to be highly selective. The following paragraphs give an account of the process and the challenges of working in various countries, cities and places.

a) Official Documents and Other Materials in National Archives and Libraries

The earliest stages of the work were carried out at a national level, involving official documents located in the State archives of Germany, the Czech Republic, Slovakia and Russia. The materials comprised theoretical proposals and debates, together with manuals, institutional documents, laws, decrees and ministerial orders. Plans and projects were also located in the archives, specifically the case for Bratislava, Dresden and Erfurt. Although some of the material could be found in State archives, much of the information was unfortunately not accessible there.

Especially in the Czech and Slovak archives, there were problem of uncatalogued documents which were thus inaccessible. Only occasionally was it possible to gain special permission to work with such non-inventoried documents, this being a slow and extremely laborious process. As a result, one part of the CSR's transport planning materials from the 1970s had to be omitted from the research. It proved possible to access the archive of the *Hochschule für Verkehrswesen* [Institute for Transport] in Dresden, a visit that helped in the collection of materials on the activities of similar institutes and their role in the formation of the principles of urban transport planning.

b) Archives and Libraries Related to the Case Studies

In order to round out the theoretical overview with practical experiences at a local level, visits were made to archives and libraries in the cities chosen for case studies, Dresden, Erfurt, Magdeburg, Ostrava, Bratislava, Brno, Orel, Yaroslavl and Lviv. Special attention was paid to letters between planners and politicians, graphic documents in the shape of plans and projects (also incorporating previous phases and alternatives) and photographs of "before and after" spatial transformations, which provided a striking way to identify the degree of implementation of ideas in urban reality. It was easy to work in the municipal archives of Czech and Slovak cities: these establishments granted free access to complete and well-structured collections of historical materials and the possibility of making personal copies, very convenient when operating with a limited knowledge of the language. German archives were more difficult, because there were very extensive collections of materials, but it was not possible to make personal copies for further consideration and translation. It was therefore necessary to be more selective in the information chosen. As far as Russian archives were concerned, the situation was the opposite. There were no problems with the language, but the information in the archives was scarce. Urban and transport plans for cities are still kept surprisingly confidential. This constituted a major obstacle to developing a complete picture. In most cases it was not known where the plans were, and even if they could be located, working with them was not allowed. Only in the case of Yaroslavl, after lengthy explanations and great effort by the researcher, did it prove possible to obtain the general urban plan for the city. In other Russian cities, it was necessary to work with plans found on the Internet, collating various pieces of information and reconstructing everything by means of personal techniques. On the other hand, there were archives of urban public transport companies, town planning and transport departments, and tramway museums which were of considerable use. The main limitations were that some of these archives allowed only restricted access or were not organized for public consultation.

c) Work with Journals and Conference Proceedings

A number of academic and technical journals were also consulted, together with official publications. The latter were often found to give a good indication of the ideas of planners, their approaches to problems and changes taking place during the period studied. This work with a wide variety of journals was a consequence of the intention to provide a full overview and to demonstrate the heterogeneity of ideas on the subject of integration of trams into cities. Among the journals used, particular attention was paid to those dedicated to town and country planning, urban transport and traffic planning, tramway infrastructure planning and technological developments in trams. The most relevant publications were the following: *Arkhitektura SSSR* [Architecture of the USSR], *Doprava* [Transport], *Die Strasse* [The Street], *DDR Verkehr* [Transport in the GDR], *Deutsche Architektur* [German Architecture], *Architektur der DDR* [Architecture in the GDR], *Architektura ČSR* [Czechoslovak Architecture], *Verkehrs-Wissenschafliche Tage* [Journal of Traffic Studies], *Wissenschafliche Zeitschrift der Hochschule für Verkehrswesen* [Academic Journal of the Institute for Transport] , *Architectura a Urbanizmus* [Architecture and Town Planning], *Územní plánování a Urbanizmus* [Land-Use and Town Planning], papers from the Light Rail Transit Association in the UK, the *Modern Tramway* magazine, *Railway Gazette International, Perspektivy Moderních Tramvají* [Perspectives of Modern Tramways].

Other contemporary research published in journals was found in libraries in various cities and countries, and through databases[8] provided by the University of Valladolid. It also proved beneficial to go through materials from the Czechoslovak Society of Science and Technology [*Československá vědeckotechnická společnost*] which devoted several symposia and professional meetings to the planning, organization and technological development of public transport. Further information was found in the research reports [*Výzkumné zprávy*] of the Institute of Road and Urban Transport [*Ústav silniční a městské dopravy*] in Prague relating to financial assessments of tram operations in the cities of the CSR. The proceedings of conferences of the UITP (the *Union Internationale des Transports Publics* or International Association of Public Transport) and of the International Union of Architects proved useful, especially those that assisted in identifying public transport problems and discussions on their solutions. The proceedings of the All-Union Conference on Urban Planning held in Moscow in 1960 were also consulted, as well as other meetings organized by the Communist parties of the USSR, the GDR and the CSR, these being studied to define official policies on the development of urban and public transport.

d) Working with Specific Bibliographies

The bibliography noted above was not the sole source for the central theme of this thesis. There was a need to go through a large amount of other literature. This was not only from Central and Eastern Europe, but also from Western Europe, especially the United Kingdom. It covered not merely transport and the city, but also town planning in general and political history.

Indeed, to gain a full picture of urban transport planning, a review was carried out of the British literature on the topic, which is considered to be among the most advanced. Of particular interest were the publications on urban and transport planning in Communist countries, both contemporary to the events and from the present day. To achieve a better understanding of the context of Western debates on this topic, visits were organized to the Urban History Centre in Leicester, and to various UK libraries: Leicester University Library, UCL School of Slavonic and East European Studies Library, UCL Bartlett School Library, and the British Library. The

8 Databases such as Proquest, Web of Science, Sage, JStor, Google Scholar. The process of searching for contemporary studies has been realised by working with citations in articles and books that have been read, recommendations from professors, or keyword searches on the Internet and electronic catalogues of libraries.

first items consulted were articles from major journals on the history of town and transport planning such as the *Journal of Transport History, Transport Reviews, Urban History, Urban Studies, Planning Perspectives*, and similar. Thereafter, it was crucial to consider publications on Socialist urban experiences that were published during the period under study. Examples would be H. Hunter's book, *Soviet Transport Experience: Its Lessons for Other Countries* (1968), or M. Crouch's *Problems of Soviet Urban Transport* (1979). These and other publications[9] served to provide an alternative, Western view of Socialist experiences in urban transport planning.

Apart from the works just mentioned, reference should be made to Colin Buchanan's report *Traffic in Towns* (1963), the *Highway Capacity Manual* (1950, 1965), Alker Tripp's book *Road Traffic and Town Planning* (1942), Benton Mac Kaye's *The Townless Highway* (1930) or Patrick Abercrombie's *Greater London Plan* (1944), among others. These gave a deeper understanding of concepts in town and transport planning. This literature served to provide an overview of the development of ideas on planning for motor traffic and its infrastructures in the Western world, the problems mentioned and the proposed solutions.

Bibliography covering the general political and economic context was also considered relevant. Political decisions had a key influence upon the spatial transformations of Socialist cities and, logically, at times were the deciding factor. Hence, the political and economic context had to be understood and for this purpose official documents were unsuitable, so it was necessary to review contemporary criticism that could provide an independent view of the key moments in history, the ideological models, and the logic behind decisions. Kevin Mc Dermott's book *Communist Czechoslovakia, 1945-1989: A Political and Social History* (2015) provided relevant insights into the peculiarities of the Czechoslovak Communist regime, explaining its political and economic particularities and their implications for the principles of town planning. Peter Grieder in his book *The German Democratic Republic* (2012) emphasized the dominance of political and economic issues in the solutions suggested for social problems. Consideration of these and other perspectives put forward in recent literature was an indispensable part of the thesis, as they contextualize and aid to relate political and economic contexts to town and transport planning.

e) Fieldwork and Non-Textual Sources

In order to achieve a better grasp of the spatial solutions, fieldwork was carried out in the cities selected as case studies. This gave a clearer understanding of details such as the siting of tram stops, pedestrian access, intersections of tram lines with other types of traffic (whether level crossings, or at different levels), the layout of road junctions, and other similar points. Physical observation of these urban spaces, their dimensions, proportions and heights, also provided guidelines for comprehending concepts expressed. Thus, for example, it proved feasible to gain a physical appreciation of certain solutions that could not always be understood by

9 The Western debates on "the socialist city", its advantages and disadvantages, apart from the scientific-professional interest, were an important political issue. The competition between the Western and socialist worlds influenced not only the physical planning of cities, but also comparisons and criticisms, in the case of the European communist countries the criticism of the problem of traffic congestion in Western cities, while in the case of the capitalist countries the criticism related to the lack and inadequate functioning of public transport in communist cities.

reading the texts and plans. Examples would be the ups and downs of terrain in the residential areas of Brno, the level crossings at tram stops in Gorbitz in Dresden, the inconvenience of access to the centre and the consequential need to change lines multiple times in Yaroslavl, among others.

As far as oral sources are concerned, information was gathered from on interviews, sometimes directed, sometimes informal. The significant limitations of this type of source were kept in mind, these including ideological forgetfulness, stereotypes, social lies, memories skewed because of personal interests, distorted life histories, and many others. In addition, the question of collective representations and the processes of social life were not addressed in this research.

The interviews were quite illuminating, revealing new fields and approaches, and helping to get a grasp on invisible aspects that are not usually documented in historical sources. For this purpose, key people were sought out: the transport planners and architects who were involved in the projects, some of whom now questioned the principles of town planning, both in the literature and in practice. Attempts were made to contact people who had worked in state departments of transport planning, local planners and those who had studied urban transport within the town planning programmes. Among the interviewees, the following provided material of particular interest: Dr. Bruno Flierl, Dr. Ditmar Hunger, Dr. Ulrich Rabe, Dr. Ludwig Klaus, Prof. Heinz Schwarzbach, Prof. Hans-Liudger Dienel, Dr. Pavel Zyuzin, and the archivist of the Dresden public transport company, Siegfried Hansel.

As for graphic sources, it must be noted that plans and projects, just like written documents, form a crucial aid to understanding the differences between official discourse and actual practice in town planning. They serve to provide a picture of regions and cities, what changes and what remains unchanged, when there is no written record, as well as revealing hidden, forgotten and unusual ideas. As Professor Josep Parcerisa pointed out: "The shape of an idea or ideas gives a form to town plans that are distilled into images appearing in projects (…) town plans are concrete gestures and visions" (2012, p. 213).[10] A graphic analysis of plans and projects implies looking beyond what is shown on paper, noticing what was previously in existence and what changed without being recorded.

For graphic analysis, programs such as Corel Draw, Adobe Illustrator and Adobe Photoshop were utilized. These smoothed the path to reconstructing low-definition plans, to processing large-scale schematics and to superimposing information from different sources. Additionally, manual graphic analysis was applied in order to produce the interpretative maps considered to be of interest, because they provide a more sensitive and attentive approach.

To conclude this sub-chapter, it can be stated that the work was undertaken with multiple sources and resources in order to discover what was the most important or significant information, aspects, factors and contexts. By approaching the topic from a multitude of bibliographical angles, it was feasible to arrive at a trustworthy, rigorous explanation and interpretation.

10 "La forma de la idea o de las ideas guían los planes urbanos, que se manifiestan en imágenes, que figuran en los proyectos (…) los planes urbanos son gestos y visiones concretos."

1.4.2. OTHER METHODOLOGICAL CONSIDERATIONS

"Although technology might be a prime element in many public issues, nontechnical factors take precedence in technology-policy decisions (…) Many complicated sociocultural factors, especially human elements, are involved, even in what might seem to be 'purely technical' decisions (…) Technologically 'sweet' solutions do not always triumph over political and social forces."

(Kranzberg, 1995)

In the light of Kranzberg's ideas, an attempt was made to take into account various features, avoiding an excessive focus on the technical world of trams and seeking possible non-technical causes. In this way, the aim was to provide a better explanation for the tensions between technical or professional issues, and those of a political or financial nature in town planning theory and its practical implementations. The following fields were given pride of place. First, there were politics and ideology, the role of agents, actors, institutions and planners in transport solutions and town planning, the organization of work and the interactions between all of these. Second, there was the development of the professions of town planning and transport engineering, dependency on roads, and exchanges of ideas between different countries and practitioners. Third, there was the development of technology in urban public transport, in so far as it might influence spatial planning solutions. In order to contextualize these matters and to progress with the thesis, various methodological approaches are clarified in the following paragraphs.

a) Transnational History and the History of Ideas

The decision to undertake research covering several countries was by no means a whim, but rather a response to the questions posed and to the fundamental appropriateness of approaching the subject transnationally, and especially at European level. The GDR and the CSR were selected because they had highly developed urban transport planning, which made it of interest to determine their degree of autonomy and any influence they might have had upon the USSR. Likewise, the ideological pressure that the USSR brought to bear on Socialist countries made it interesting to verify possible reciprocal influences. A comparison between countries within a single political and economic system appeared to be a methodological approach of value in detecting any specific aspects and in questioning accepted generalizations. In the 1970s, the GDR and the CSR shared economic dynamics and possessed a certain degree of flexibility or autonomy in criticism and action (Requate, 2009, p. 191). This might well have caused marked variations in urban solutions. All of this made it of academic interest to choose the USSR, the GDR and the CSR, in order to analyse the development of a shared phenomenon: the integration of town and public transport planning.

The research does not involve a formal, regular comparison of the cities and countries scrutinized, as it is recognized that they are too different to be comparable. Rather, the main thrust of analysis was to investigate the application of ideas in different spatial contexts. The aim was thus not to compare as such but to understand "(…) how and why knowledge generated by planning movements in one country has been variously learnt, adapted or imposed within other countries." (Ward, 2011, p. 237). Hence, the main method used in the research was not to contrast town planning in the various countries or cities, but to compare ideas and phenomena. Working with ideas requires the identification of intentions and motives, the degree of relationships with sociocultural aspects, traditions of town planning and interactions with the political and economic context.

b) Permanence and Change

Consideration of permanence and change makes it possible to deal with the complex issue of historical facts. In doing so, there was a need to address three questions during the reading of the bibliography. These were: how the urban space was planned, how it took shape and to what extent tramways were integrated into the city. The answers led to interpretative keys about the continuities and discontinuities of ideas triggering historical events, an understanding of when and why things change, why ideas disappear or why they continue in force. These are considered from medium- and long-term angles, although the approach is not so bold as to differentiate between "conjunctural" and "structural" history in Braudel's terminology (1970). Rather, it simply takes into account the idea of history as a dialectic of duration that must combine short-, medium- and long-term phenomena. It is not the events of the *histoire-récit* or (his)tory that are of interest, but that scale which mediates between what is episodic and what structural.

According to Aróstegui (2001, p. 222) "Historical time is not real time, but time as determined by historical events."[11] In the light of this idea, a further methodological objective was to situate historical facts within history, gaining an understanding of their importance, effects and contexts on differing spatial and temporal scales. Medium-term and long-term chronologies, or "conjunctural" and "structural" time, represent a methodological approach needed for delimiting the level and scale of relevance of historical events. In the present research, the medium term relates to the objective of contextualizing the historical events on a local scale, in the three selected countries, this helping to determine the timespan over which ideas developed, and simultaneously the period to be studied. The long-term framework was applied to contextualize historical events on a global scale, with special reference to the experience and ideas of Western countries. Furthermore, the longer term was related to the consideration of historical facts in relation to other periods, before 1960, when the idea of integration between town and transport planning had not yet fully emerged, and after 1980, when there was another shift in the planning paradigm of both disciplines.

Keeping in mind that historical change occurs when ideas enter into crisis, the historical searches in this investigation were directed towards the integration of town and transport planning. This issue seemed to be an aspiration of Communist regimes for many years. Different attempts were made to relate road infrastructure to land uses, or the amount of passenger traffic to transport infrastructure parameters, but yet no consideration was given to the characteristics of public transport, among them the technological characteristics of modernized tramways. In parallel, the problem of declining accessibility continued to grow, manifesting itself in outdated plans and financial costs. Apart from this problem, industrial and residential growth was foreseen over the next few decades that would affect urban structures and accessibility conditions, worsening the problem yet more. Existing ideas on

11 "El tiempo histórico no es tiempo real, sino el tiempo determinado por el hecho histórico."

town and transport planning could not provide for compact, ordered, proportional urban growth while still keeping travel times within established limits. City and transport schemes continued without significant change until the political and economic changes of the mid-1960s, with their consequences for town planning.

c) Historical Events

The process of selecting historical events was based on provisional interpretations, evolving and changing as new data and clarifications arose (Carr, 1987, p. 40). Identification of the crucial historical events was a complex process, which needed time for verification and accuracy. First, the primary and secondary bibliography was read, in an attempt to spot a turning point in ideas about town and transport planning. As a result, a critical reading of the whole literature and town planning experiences led to a tentative selection of historical facts. Thereafter, it was necessary to determine their relationship to the hypotheses. Verification of this was based on a re-reading of the bibliography, graphic analysis of plans and projects, and the incorporation of fresh literature related to other disciplines or other periods of study. These items were then correlated one with another, allowing a coherent discourse to be established. It should be noted that the establishing of historical events, their value and implications, is an important matter, but more important still is "knowing how the events are established" (Schaff, 1974, p. 40). Thus, the contexts of historical events have received special attention in this research. The value of historical facts was related to their importance, significance and effects in changing ideas.

After, or sometimes almost simultaneously with, the selection of historical events and their contexts, a further methodological issue was to define the phenomena of primary interest. Here, a phenomenon is understood to be a typical urban or transport situation, which may have been perfectly solved in one pioneering city, and then partially or fully achieved in other cities. Case studies were used to detect repetitions and to identify unusual events. They were all of use in highlighting certain features of the interrelationships between trams and cities. Thus, the cases studied had no intrinsic value in themselves, but rather were of utility in stressing given features: what was inherited and maintained over the long term, what was specific to the period, but became generalized, what was unique or unrepeatable, and the like. The impetus for decisions may have been due to professional contributions from town planners or to the decisions of politicians, or related to the political or economic importance of the city or urban space involved.

The process of defining the phenomena was based initially on a critical review of the literature and professional experiences. In the review of the bibliography, the first stage was to identify new ideas regarding the integration of town and tramway planning. The second was to evaluate these ideas against the criteria for integration of trams into cities. These criteria were chosen on the basis of a reading of the primary literature and of professional urban planning knowledge spotted during the research period. First came the level of accessibility and pedestrian proximity of tram stops. Second was the extent of connectivity and accessibility of urban areas. Third came the degree of integration of tram lines into public spaces. The fourth was the role of tram infrastructures in the development of urban layouts.

Sixthly there was the level of integration of tram networks with other public transport systems. Seventh and final was the extent to which tramways were planned and constructed simultaneously with new urban areas.

d) Objectivity and Subjectivity in Historical Research

One of the methodological concerns of the thesis has been the question of truth in history, in other words, objectivity. The question of historical truth has been raised and debated for a long time and by many authors. From the beginning of the twentieth century, objectivity in history began to be strongly questioned by researchers such as C. Becker, C. Beard, or E. Carr, to name but a few. A relativistic view emerged, seeing historians as all having their own truths, dependent upon the conditions of the time in which they live (Anbalakan, 2016, p. 24). The debate on truth in history is closely related to the question of whether or not history is a science, and by what methods a historian might claim objectivity and search for historical truth. The process of documentary evaluation, in which historical documents served as stable or objective evidence with which the historian could demonstrate a degree of detachment from subjective factors, was brought into question. Over time, the radical divisions between two schools of thought have not disappeared, but this has often brought about a practical or intermediate approach where, despite all its possible subjective limitations, truth in history was taken to be a way towards a possible goal (Schaff, 1974; Aróstegui, 1995; Galasso, 2001).[12]

In this research, truth in history was seen in this way. History was accepted as lying both in the humanities and in the social sciences, so certain conditions had to be defined for its interpretation.

The first condition relates to the quality of analysis. In this respect, various major features such as precision, complexity and consistency can be highlighted (Bevir, 1994, p. 336). All three of these relate to the idea of establishing a logical system of explanations, implying that truth in history contains an explanation on the basis of certain historical events and their internal logic of functioning.

The second condition is concerned with the idea of comparing interpretations one with another, which allows the refining of ever more rigorous and reliable analyses. Bevir has noted: "Historians make better and better sense of the past through a continuous competition between rival webs of interpretations which themselves constantly progress in response to criticism" (Bevir, 1994, p. 337). Historical research accepts or rejects alternative analyses in order to develop a new interpretation. By comparing, superposing, confirming or refuting different historical interpretations it is feasible to draw nearer to the truth in history. Establishing new relationships between historical events can lead to new interpretations. In these relationships each piece of historical research can be seen as aspiring to get closer to the truth.

12 Julio Aróstegui has argued that truth in History can never be attainable in philosophical terms because it cannot explain all of reality, yet there can be a systemic approach where the whole -the social structures and the parts- of historical events reciprocally influence each other (2001, p. 299). In fact, he states that history is not a story but an explanation: "historiography is explanatory knowledge, not merely descriptive or narrative" (2001, p. 152).

Thus, there is no question of presenting an objective reality, but of trying to make a contribution to a subject, which is to serve the "accumulation of relative truths" (Schaff, 1974, p. 342).[13]

To discover which interpretations are suitable for comparing, what kinds of opinions exist on the subject, and how analyses have developed over time, it is crucial to work with a wide range of literature, paying great attention to details. Comparison enhances the process of verification or falsification of theories that depend on a knowledge of a variety of analyses, materials and information. Hence, a second condition for addressing the truth in history is to carry out extensive and intensive reading on the research topic. Thus, reading and re-reading of bibliography, testing of theories, disproving them so as to lead to new theories, evaluating and re-evaluating contexts, establishing an explanatory system and modifying it, all of these constitute the attempts or approaches in the search for historical truth by this research.

A third condition is the attempt to achieve the highest possible level of self-awareness and reflection. This would allow authors to discover the personal and social conditions moulding their thinking. Taking into account the idea that interpretations are conditioned by the time during which a historian lives, the intention should always be to query the ideas that develop during research. In the present case the questions of why the researcher reasoned in a given way, and whether it was really related to the subject and the period under study were always to the fore. A monologue of this sort was incessant, present in for a major part of the research process, before any explanation was offered for historical events. After all, historical truth is possible, as Schaff states: "Objectivity is the difference between good and bad subjectivity, not the total elimination of subjectivity" (1976, p. 338).

In relation to this idea that subjectivity cannot be avoided, certain subjective aspects that researchers might develop should be considered. The inevitable subjectivity of research also relates to the notion that such investigations are a rigorous but creative process that involves contributions from each individual's original thinking. Research is a dynamic and changeable process, in which separate fragments emerge and, in the end, come together in an interpretative discourse. In the light of this, it can be said that the whole process of research is one of "the manifestation of creativity" (Anzola Salom, unpublished article). In every instance researcher are always faced with making choices related to the research topic itself, resources, contexts, objectives, methods including subjective preferences and evaluations, and others. Intuition, the logic of thinking, individual decisions to separate or connect ideas, imposition of a hierarchy upon contexts, all these constitute a vital part of the process of creativity in historical research.

On the other hand, the discipline of town planning in itself is creative as well as pro-active, as decisions about the transformation of spaces and urban structures are based on creative methods and intentions to create new solutions. An external

13 Adam Schaff in his work *History and Truth* (1974) expressed the opinion that truth in historical science is always partial because it is produced by human beings, since human beings cannot exist outside of society. Also, because "society" is a very complex and dynamically changing concept, it was admitted that it is impossible to arrive at the whole of the real truth. Therefore, Schaff's main solution was to accumulate knowledge about society and to recognise the most reliable studies in order to create a general idea about some historical issues.

approach to urban construction, or to the "product of creative processes"[14] (Bermúdez, 1995, p. 313), is always a process related to the discovery of the new, the implicit, and the creative.

e) Interdisciplinary Aspects

This piece of research is the work of an urban architect with a liking for history and a humble willingness to seek a historical knowledge of urban issues. As far as possible, this research work was intended to be transdisciplinary and interdisciplinary, as it takes a historical perspective to approach complex issues of town planning, and the economics and engineering of urban traffic and transport. Thus, this research involves the history of cities and their trams seen from the viewpoint of town planning. Although the author is neither a historian nor a traffic engineer, an attempt has been made to undertake this research as rigorously as possible.

Town planning is a technical discipline interwoven with other disciplines, theories, methods and practices, with a methodological approach that must necessarily be adapted to the specific field under study. History can be considered a science or an art, but nowadays nobody would define town planning as a science. Rather, it is a set of bits of theoretical and practical knowledge, a "know-how" situated as a discipline within a culture and a technique, although without a framework. History, as "the science about humans and human actions" (Febvre, 1982, p. 29),[15] needs to consider other disciplines and sciences that in the end can serve to expand its complexity. With these ideas in mind, the research undertaken here concentrated on combining the disciplines of town planning ("urbanism") and transport planning (transport engineering and economics, and traffic engineering). These are not simple questions, because of the need both to know about the different aspects of these disciplines, and to know how they interrelated in the past. Indeed, the interrelationship between these two disciplines has not been extensively studied and is sometimes overlooked. Therefore, bringing these two disciplines together in the same piece of research constitutes a considerable interdisciplinary challenge.

With the growth of cities, the importance of urban transport planning has also grown. At a certain point in time, public transport planning methods started to play a significant role within the methodology of town planning. Traffic engineering, traffic modelling, passenger calculations, transport economics, technological characteristics of urban mass transport (especially trams), accessibility and connectivity started to have some prominence in urban solutions. On the other hand, there were situations where attempts were undertaken to find new methods or to rejig existing approaches so as to find a satisfactory solution both for the functioning of urban transport and for the maintenance of the quality of urban environments. The recognition of this interdisciplinary feature of urban history implies a thought-provoking task of gaining an understanding of the development of both disciplines.

14 Similar idea of the need to relate the creative/artistic disciplines to the artistic research approach was expressed by Professor E. Bermudez following with recommendations for researchers: "The evaluation should be accomplished within the tradition, within the set of norms and parameters that constitute the context in which that creative discipline is functioning" (1995, p. 315).

15 Lucien Febvre emphasised the primordial importance of interdisciplinarity in history: "To negotiate perpetually between distant or proximate disciplines; to concentrate in bundles on the same subject the light of several heterogeneous sciences: that is the primordial, the most urgent and the most fruitful task" (1982, p. 30). (1982, p. 30).

f) The Concept of the Socialist City

One of the methodological problems for the research lay specifically in the controversial concept of the "Socialist city", which has generated much debate, and about which there is no clear agreement. The idea of the Socialist city began to receive attention from both Western and Communist researchers in the 1970s and 1980s. The main question was, and is, whether this Socialist city is a theoretical concept whose practical embodiment has never existed. Understanding this circumstance and establishing any given author's position on it would contribute to getting a take on the solutions proposed for the planning of tram networks and town structures. The Socialist city was supposed to have principles for town planning closely related to the issues of enhancing industrial production, such as the concepts of linear and parallel development in the form of a band, the autonomous establishment of residential areas in the form of satellite towns or dormitory districts, the defining concepts for an optimal city, flexible urban structures, and the like. A number of these issues also arose in Western countries but the main difference was in the scale and intensity of debates about town planning practices.

On the one hand, some authors insist that the Socialist city never existed as such because cities in the Communist countries shared spatial characteristics with Western cities; they were simply cities in European Communist States. Lefebvre, for example, questioned the existence of Socialist space with its supposed particular characteristics, implying that there was no Socialist space but "a Socialist experience with failed Western practices" (1991, p. 54-55). Other researchers have raised the issue of inequity in accessibility and the spatial distribution of residential areas and facilities, thereby supporting the idea that the development models in Communist cities were not so very different from those of capitalist cities (Smith, 1989, p. 4).

On the other hand, there are researchers who stress the specificity of the Socialist city. This view has taken particular prominence in recent years. There is an emphasis on the fact that the particularity of a Socialist city was to have a coherent combination of transport and social infrastructures that served as an urban backbone to address the issue of a city as "an integrated entity" (Kosenkova, 2000; Bocharnikova, 2014; Zarecor, 2018). There was also early work along these lines, such as French and Hamilton's *The Socialist City*, which argued that Socialist cities had features, some particular to it, some shared with capitalist cities (1979, p. 4):

> *"Has the exercise of this formidable power during three decades, or even during six, created an urban form which is a distinct, special phenomenon, more or less sharply differentiated from the capitalist or market-economy form? The editors contend that the answer to such a question is definitely 'yes' – but with certain qualifications."*

The understanding of the concept of Socialist city in the present research is based on the idea that a city created under capitalist political and economic conditions cannot be identical to one created under the conditions of Socialism (French and Hamilton, 1979; Zarecor, 2018), especially when long periods of time were involved. The differences manifest themselves in the principles for the distribution of resources (residential spaces, amenities, central services) within cities and ensuring their accessibility through public transport. This was heavily reliant upon a centralised economic policy and ideas about equality. With these principles, tram transport played a crucial role in shaping the pattern of movements of people within cities, as well as in the layout of urban structures.

To conclude, this sub-chapter has tried to show the main methodological considerations, which doubtless might have been much more extensive and detailed, in view of the complexity of the historiographical issues involved. However, the main aim has been to clarify various key historical issues which the research should explore and to lay out the author's position on the theoretical issues that shaped the investigation. A constant strategy in this work has been to maintain an open and attentive view of historical complexity, hence the diversity of methodological lines presented.

g) General Methodological Scheme

In order to organize the process of discovering theoretical ideas and investigating urban phenomena, a methodological scheme was developed (Figure 1), certain features of this being modified over the course of the research process. The starting point was the subjects, objectives and hypotheses of the research, and the process of constructing the scheme quickly emerged from them. The theoretical references and the methods chosen made it possible to situate the subjects of enquiry in their historical surroundings. The epistemological, and above all the methodological, contributions from history helped to raise knotty issues and to create a basis for the research such that it would yield trustworthy results.

The objectives of the research and its general approach gradually gave way to specific decisions on the selection of contents. Transdisciplinary features are also visible in the structure of the scheme, in which consideration of various elements and themes from the two disciplines help in explaining their interdependence and mutual influences where urban and transport decisions are concerned.

After the principal issues had been established, a process of selection of preliminary ideas was initiated, being accompanied by intensive reading of the literature. These preliminary concepts having been chosen, a process of verification began, including activities such as re-reading bibliography, bringing in new literature and searching for additional materials. This whole working process was always undertaken in relation to the contexts established, as well as on the basis of intuition and prior knowledge of town planning, and experience in historical research, thus allowing the clearing up of uncertainties. The final stage was to compare, check, and contrast the ideas selected, and to relate them one with another in order to create a consistent historical discourse.

Once theoretical ideas had been defined at the overall level, they were taken as theories or guides for further analysis and exemplification at a local level. New primary and secondary materials on the various urban areas were then incorporated, so as to situate the theoretical approaches in specific cities. The process was accompanied by fieldwork, detailed observation of plans and projects, and graphic analysis of historical maps. These activities were enhanced by the academic knowledge about Socialist urban planning that had been acquired during the author's research for a Master's degree, the subject of which comprised the

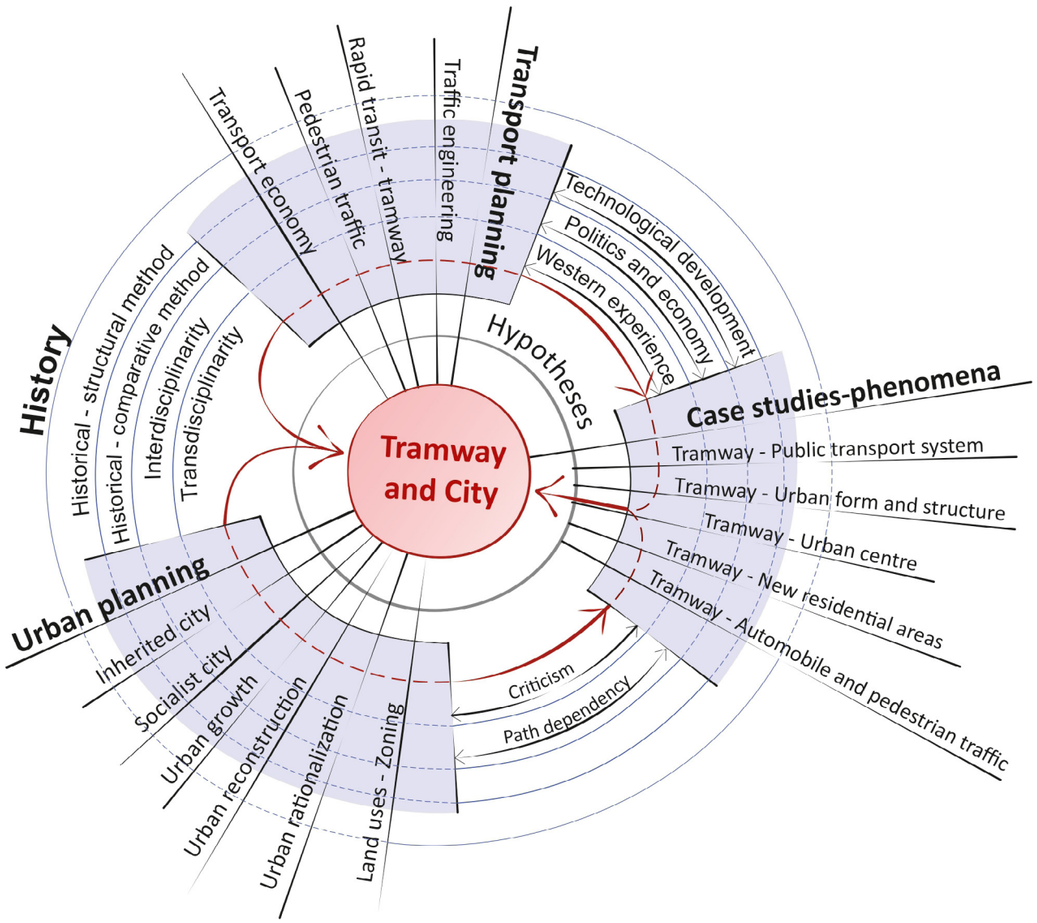


Fig. 1: Synoptic scheme of the methodological process of discovering ideas and phenomena in the transdisciplinary framework. Source: Author's elaboration.

history of ideas in Soviet city plans and projects in the 1950s to 1980s.[16] Moreover, the author's practical experience of town planning in Kazakhstan was also of use in establishing evaluation criteria and in defining phenomenological situations.

The phenomena picked out were compared with experiences in a range of different countries and cities, in an attempt to identify their degree of relevance and the variations occurring within the historical discourse. Once their relationship with theoretical ideas and the practical relevance of the phenomena had been confirmed, the research developed along the lines of providing explanations and interpretative maps. The spatial implementations found in typical situations were contrasted with the initial theoretical assumptions in order to define which concepts remained stable, which varied, and the contexts in which this happened, leading to explanations of the regularities and variations encountered in the various case studies.

16 See Khairullina, E. (2015) *Una Mirada Concentrada en la Línea del Horizonte: los Planes y Proyectos de Astana en los años 1957-1987*, master thesis, University of Granada.

1.5. CONCEPTUAL FRAMEWORK

During the research there was a need to study concepts which were related to both urban and transport planning, considering both their variants and technical evolution. The objective was not to define their meaning (due to their variable and differential character, which makes them neither clear nor homogeneous even today) but rather to be aware of their various meanings and scope of application. Therefore, it was important to specify and contrast the interpretations of these ideas in different countries, which, in turn, would enable common and differential issues to be identified, and changes during the period of study to be understood. The studied concepts are organised into three groups: urban concepts related to transport planning, traffic engineering and urban planning concepts.

1.5.1. URBAN CONCEPTS RELATED TO URBAN TRANSPORT

There are many concepts related to transport that are historically relevant in urban planning and urban studies. Beside the initial notions such as viability, circulation and velocity, and subsequent concepts such as accessibility and connectivity of collective transport, have been considered very important. The idea of centrality is also relevant, and it is possibly a central issue in urbanism which is at times explicit yet most of the time not. Finally, a concept more often linked to people than to infrastructures, and today somewhat primordial in urban planning, is that of mobility, which started to be used in the second half of the twentieth century.

a) Accessibility

Accessibility is a "spatial" term that is related to places and their relational infrastructures, as well as to urban means of transport. For a long time, accessibility was a term related only to places and the criterion of distance. The provision of accessibility was based on the idea of the relation between urban planning and of transport network configuration (Yakshin, 1946, Sheleijovski, 1946, p. 35). Over time, recognising the weakness of this principle, especially in the problem of overcoming long distances, it became necessary to consider urban planning in relation to urban transport characteristics. After WWII and with the technological development of urban means of transport, the growth of the importance of time criterion in the definition of the concept of accessibility can be observed. Thus, since the 1950s, the provision of accessibility began to be evaluated with the criteria of infrastructure viability, transport velocity and circulation conditions.

In comparison to western countries, the criterion of accessibility provision was the central policy in urban transport planning of the socialist countries. This was related to the economic objectives and to the ideological premise of the socialist city with regards to equal access to urban goods, services and facilities. To achieve these objectives, equal traffic distribution based on the isochronous method was widely applied which helped to measure distances and calculate trip time. This understanding of the accessibility concept continued in the 1970s, although with some nuances on urban space relativity identified by trip time on urban transport:

> *"Accessibility is the relative value of a place, defined by its location in relation to transport system, in the operational sense it is a changing parameter that characterizes centrality or proximity in relation to other functions and places" (Smykovskaia, 1972, p. 35).*[17]

In western urban planning, accessibility had a similar meaning, identifying this concept with places that could be easily reached in terms of time, comfort and price (Thomson, 1977, p. 94). While in western countries the provision of accessibility was occasionally applied in the planning process, in the socialist countries this was a common and important objective; determining urban transport solutions, land use system planning and organisation of the entire urban structure.

b) Public transport connectivity

This concept was related to the configuration of the transport network and urban structure. Due to the high cost of the construction of transport connections (public transport lines, road infrastructure, etc.) connectivity was considered a very valuable spatial quality. Therefore, some centralities and inter-regional transport facilities were located in areas with maximum transport connectivity. The value of this connectivity is explained in the work of O. K. Kudryavtsev and Y. P. Bocharov *Planirovochnaya Struktura Goroda*:

> *"Connectivity is one of the most important characteristics of the transport structure. Increased connectivity improves the selectivity of movement directions and therefore reduces travel distance, while at the same time it increases the network length and the number of junctions, i.e., the overall cost of the transport system. Hence, a differentiated approach to different functional areas is important. The greatest number of connections is required for urban centre area. For all other zones it is enough to have two or three connections" (1972, p. 113).*[18]

Connectivity was then the number of accesses/services with urban transport infrastructure to a certain place. The proposals were based on the topological analysis of road and public transport infrastructure represented in connectivity graphs. Facilitating accessibility to urban places was the main quality of connectivity. On the other hand, connectivity can also be explained as the existence of a public transport service that provides connection with urban areas. Therefore, in terms of transport engineering, connectivity is related to operation regularity and frequency. In both cases, facilitating access to urban places was the main quality of connectivity.

17 В узкоспециальном смысле – это относительная ценность участка, определяемая его положением относительно транспортной сети, в операционном смысле – это переменный параметр, характеризующий центральность или близость к другим функциям и местоположениям."

18 "Связность одна из важнейших характеристик транспортной структуры. Увеличение степени связности улучшает избирательность направлений движений и, следовательно, сокращает дальность поездки, в то же время оно ведет к росту протяженности сети и числа пересечений и, т. е. к общему удорожанию транспортной системы. Отсюда важен дифференцированный подход к районам разного функционального назначения. Наибольшего числа связей требуют районы городских центров. Для всех остальных зон достаточно иметь две-три связи."

c) Centrality

Centrality is a complex concept that relates to urban structure and the urban transport model. It is not so much the physical reality of the city centre (historical centre, geometric centre), but rather it is a conceptual quality subject to ideological interpretation and related to central functions. In theoretical-practical terms centrality has its political, economic, social and spatial planning conditions. The main urban centre in socialist urban planning was then explained as an area which contained principal functions such as administrative-political, cultural, transport, communal, commercial and one which provided episodic service to the whole city, or to the group of cities (Bocharov, Kudryavtsev, 1972, p. 135).

The main concern then was to locate the urban centre in the geometric centre of the urban plan, considering the possibility of future territory extension. Apart from the main centre, other centralities were designed to have special value in socialist urban planning, such as workplaces, regional transport facilities and recreational areas which were also given a high level of connectivity and accessibility.

The main difference between Western and socialist planning in the spatial solutions of centralities was the balanced location (in the geometrical centre of the urban plan), the accessibility of the centralities with public land transport, or the provision of a travel time of 30-40 min. The control of accessibility, connectivity and distribution of facilities in the communist cities was probably a radical difference between the radically different political systems. From the other hand, contradictorily to the idea of equal traffic distribution, there existed the ideological importance of having only one main city centre (concentrated in one place) in order to represent the power of the communist party, and not to weaken the meaning of its ideological representation in urban space. The main city centre, due to its multifunctionality, had great importance not only in urban area, but also in the whole urban agglomeration. This importance was also explained by the integrational function of urban centre.

On the other hand, maximum connectivity could not be achieved for all centralities as this implied high economic expense for the construction of transport infrastructure. Therefore, activities were concentrated in one main city centre with maximum connectivity with other urban areas. Despite having several centralities in city, the functional value of these centralities was not similar. It should be noted that the main urban characteristic of centrality is to attract people "beyond its own nucleus" (Mayorga, Fontana, 2015, p. 15)[19] which is explained principally by the mix of different urban functions. For this reason, micro districts and district centralities did not actually present the "real" centralities, as they served only at local level. The same can be said of the monofunctional specified centralities at the level of city importance such as the institutes, the big cultural centers and, the hospitals.

The main transport problem that existed in the urban centre was that of providing both fluid circulation of urban transport and a traffic-free space for pedestrians. This was even more difficult in the context of socialist urban planning when land public transport could not only be planned on the periphery of urban centre and needed to be developed inside the urban centre area in order to provide reasonable pedestrian accessibility. Therefore, the existence of multiple alternatives in

19 "más allá de su mismo núcleo"

the configuration of the main centre with public transport stops located in different places, the organisation of pedestrian accesses, the various itineraries of public transport systems, etc., always presented considerable questions for urban planners. Within these issues, the question of whether tram lines should pass through the centre or whether they should be located outside presented special interest for discussions. Variations in the solutions found can be explained in the different ways: the ideas of urban traffic separation with the elimination of tram lines and its substitution with buses and trolleybuses prevailed; the impossibility of reorganising tram networks in subway system due to economic limitations or, on the contrary; the importance of maintaining tramway lines to preserve reasonable pedestrian accessibility.

d) Mobility

Mobility, in contrast to accessibility, is a social attribute (Santos, De Las Rivas, 2008, p. 20) that represents a set of people's movements on different modes of transport and for different reasons, as well as the existence of a choice of movement directions. In socialist planning, mobility was applied to represent the level of travel intensity (Efremov, Kobozev, Yudin, 1980, p. 170). The objective of applying this concept was to control, regulate and change the amount and direction of people movements. This can be defined as "the planned movement of people", as there was a notion of "forced distribution" of passenger traffic along the public transport network or in nearby areas (1980, p. 93). Gennady Goltz, transport planner in the USSR, stressed the importance of preserving stability of people's mobility in order to maintain stability of trip time in reference to this connection. In the USSR this indicator was maintained between 1930-1970 within 780-1.200 times of movements per person per one year (1981, p. 160-161). Thus, in socialist countries, planners in the 1960s and 1970s continued with the method of distribution of passenger flows in urban means of transport and infrastructure.

Compared to this idea, in the western world the concept of mobility was evolving during the 1960s and 1970s. In the 1950s and early 1960s mobility was also defined and established by planners as the number of people moving for different reasons. Later in the plans of Runcorn (1965) and Greater Peterborough (1970) in England, the first attempts were made to identify "personal mobility" or "true mobility"[20] which was aimed at relating the different needs of different social groups with infrastructure planning for movement via different means of urban transport. Mobility was then determined as the "freedom to move around in a convenient way" (Potter, 1976, p. 141), which implied the use and provision of good and sufficient infrastructure for pedestrians, cyclists, motorists and public transport. It can thus be concluded that the definition of the concept of mobility was different between western and socialist countries, which influenced the methodology in which flows were calculated and the planning decisions for urban transport infrastructure made.

20 Arthur Ling, planner of the new city Runcorn, in his work *Runcorn New Town*, Runcorn Development Corporation, 1967, p. 66., also emphasized the importance of the individual decisions in people movements: "To provide economically and socially satisfactory movement of people and goods without the environment being dominated by vehicles and communication ways."

1.5.2. TRAFFIC ENGINEERING CONCEPTS

Traffic engineering emerged as a specialty of transport engineering, in its effort to design roads and networks for automobile traffic and achieve the best level of service. The basic concepts were: capacity, intensity and commercial speed.

a) Capacity

The concept of capacity has a dual meaning, depending on whether it is approached from the idea of car traffic on a road (motorway, road, street...) or from the idea of collective transport service in specialised means (tram, metro...). Firstly, it was related to the capacity of a private transport road that was defined using the quantity of vehicles that could fit on a certain road in a certain time. Secondly, it was the capacity of a public transport system that depended on the frequency, dimension, speed and level of occupation of vehicle (Valdés, 1971, p. 829). The concept of capacity was first extensively explained in the *Highway Capacity Manual* in 1950. According to the manual, capacity differed in relation to ideal conditions, in prevailing traffic and road conditions, and capacity in practical conditions assessed by vehicle users (1950, p. 6-8). Subsequently, in 1965, these ideas evolved with the aim of eliminating confusion regarding the concept of capacity. Basic capacity began to be known as capacity under ideal conditions, the concept of possible capacity was maintained, while practical capacity changed to be defined as the level of service which represented various qualitative road conditions during the vehicle driving process.

This concept had a different interpretation in the USSR, where road traffic capacity was defined as "the maximum number of vehicles that can pass in a studied section in the most loaded direction in the period of maximum traffic under normal conditions of road use and traffic safety" (Cherepanov, 1964, p. 234); [21] with consideration of 20%-25% road planning reserve from the maximum traffic volume. Capacity was divided into three types: most loaded lane capacity in one hour, roadway capacity in one hour and, capacity usage. The use of capacity represented the level of factual use of the carriageway which could be equivalent to the meaning of the level of service. On the other hand, the term loaded lane capacity was also applied to public transport, which referred to "the maximum number of passengers transported in the cross section in a given time in one and another direction" (Efremov, Kobozev, Yudin, 1980, p. 82).[22] In order to calculate the indicator of uneven filling conditions of public transport vehicles, the concept of factual loading capacity of public transport was applied. Finally, the term public transport capacity was related to the possibility of vehicle occupation and the minimum interval between the cars (Lacek, 1983, p. 45).

It could be concluded that the estimation of road traffic growth and the absence of the idea of its management in the years 1950-1970 resulted in the invention of

21 "Пропускной способностью проезжей части улицы называется максимальное число транспортных единиц, которое может быть пропущено через исследуемое сечение в течение одного часа в одном более загруженном направлении в период максимального движения при нормальных условиях использования улиц и безопасности движения."

22 "Максимальное количество пассажиров, которое может быть перевезено, через ее поперечное сечение в том или другом направлении."

the capacity concept. Capacity was then explained as the maximum number of vehicles that can pass on a roadway (Highway Capacity Manual, 1965, p. 5). In short, it was not possible to calculate the road capacity as it is changeable in relation to subjective decisions of people (such as the growth of car use or the preferences for use of a particular road). Thus, although capacity was established with a satisfactory indicator, over time the level of road usage increased along with the need to reconsider the level of capacity. After all, it was not possible to establish the possible or maximum capacity as it is an amorphous, changeable and elastic term. It was invented with the objective of improving the fluidity of traffic circulation and in order to prevent the emergence of the problem of peak hours.

b) Traffic intensity

The concept of traffic intensity is related to that of capacity and the problem of peak hours. It was applied in order to define the level of road use and to provide free traffic circulation in case of an increase in the number of vehicles at a given time (daily, annual cycles) and within a given traffic composition (modal split). The traffic intensity in the *Highway Capacity Manual* is referred to as "traffic volume" which is calculated using traffic density and speed (Highway Capacity Manual, 1950, p. 5). During the road infrastructure planning process, intensity was defined by comparing estimated and observed traffic, with up to 18 % volume added as an error factor (Valdés, 1971, p. 93). This percentage in the case of socialist urban transport planning was as high as 20%.

In Soviet literature, traffic intensity had a similar meaning to that of Western literature and was defined as "the number of vehicles passing through cross-sections or traffic lines in a given time" (Efremov, Kobozev, Yudin, 1980, p. 42). The maximum number of vehicles passing through roads was referred to as "maximum traffic intensity" (Efremov, Kobozev, Yudin, 1980, p. 42), "traffic volume" (Highway Capacity Manual, 1965, p. 8) or "service intensity" (Valdés, p. 1971, 112). The main objective was to find the proportionality between traffic intensity and capacity. As a result, provision space for road construction was considered as the main criterion for avoiding the urban traffic problem and improving transport circulation and velocity.

c) Commercial velocity

Commercial velocity was an important concept in public transport planning as it defined the level of competitivity between public transport systems. This concept was explained as the total travel time between origin and destination including: access to the station or stop, waiting time and transfers and, the journey in the vehicle (Valdés, 1971, p. 827). This concept in Soviet literature was termed "maximum required time for door-to-door trip" which was intimately related to travel time and city size (TSNIIP, 1966, p. 362). Having already determined the technical characteristics such as public transport velocity and its operation frequency, the important solution to minimise travel time was found in urban planning solutions. Among them it is possible to emphasise the reduction of pedestrian access distances to public transport stops, increasing density of the public transport network and, the reduction of transfer time between different means of public transport.

1.6.3. CONCEPTS OF URBAN PLANNING

Due to the complex interrelationship between transport and city planning, it is necessary to raise the meanings and relationships between difficult issues such as planning process integration or joint work, concepts of transport and urban model, as well as those related to urban structure and general urban plans.

a) Integration of transport systems - integration between transport and city

In the post-war period, urbanism and transport planning were developed with sectoral projects and plans. However, after almost two decades of such planning, criticism began to appear with regards to this planning process. In western countries this process was fundamentally related to the growth of the road traffic problem, while in socialist countries it was related to the problem of urban growth and increasing passenger mobility which, in both cases, resulted in an increase in trip time. The concept of integration had two meanings: integration between urban transport systems and, integration between urban and transport planning. In both cases the integration implied a complex implementation process that contained following levels:

1. Firstly, integration required the establishment of common objectives for all ministries. This first level helped to establish an understanding between different ministries in order to have similar strategies and to avoid controversial issues in transport and city planning. In socialist urban planning texts, the advantage over western planning in the question of integration of urban and transport planning interests was emphasised (Lacek, 1983, p. 89). However, the political discourse related to this issue was vague and controversial because of the idea of adjusting solutions in response to the politics of economic rationalisation.

2. Secondly, the legislative level represented in laws, decrees, public transport and planning policies was also important in establishing the basis for joint work. The objective was to establish a dialogue on paper between two stagnant and sectoral worlds, in order to avoid contradictions in the decisions made by authorities and urban planners. Among the different issues in the integration process, too detailed laws and, normative documents that did not give the opportunity for variations in planning solutions, can be highlighted. On the other hand, misinterpretations of these documents by planners or a reluctance to apply new laws during the planning process also contributed to the breakdown of both disciplines.

3. Finally, the common objectives and legislative documents were intended to be put into practice in the joint work of political actors and planners in order to arrive at solid results. The joint work on the implementation of integration policies involved integration in planning (work organisation of planning institutions and spatial solutions) and, integration in transport systems' functioning (technical coordination of the construction of transport infrastructures and coordinated work of urban

transport companies).[23] However, in practice these ideas experienced difficulties which were explained by the absence or inefficient functioning of coordinating departments. Thus, engineers and architects often came to a different understanding of city and transport planning models during that period. On the other hand, the search for an effective solution between the two disciplines required time and effort between the political actors and planners, which could not be carried out in the period of realisation of urban plans and projects.

In western literature the integration of transport meant a coordination in the operation of various means of transport which were considered competitive. Integration was then necessary to avoid conflicts in the circulation of traffic and economic expenditures (Buchanan, Crow, 1974, p. 123). This economic objective of integration was also strongly present in socialist ideas. Various explanations of the terms "integration" and "coordination" appeared in the texts of socialist literature. Soviet transportation planner Kominarov explained integration as a versatile process:

> *"When we talk about coordination, this concept includes a set of organizational, planning, economic and operational measures to ensure a high level of transport services and efficient use of all types of urban passenger transport" (1970, p. 18).*[24]

The joint work was also difficult to organise as the concept of integration was primarily related to spatial-physical solutions. In order to achieve effective and rapid integration, the establishment of spatial relationships between urban transport networks and land use helped to achieve the most important goal - rationally distributed urban traffic flows (Lammert, 1977, pp. 104-105). Integration was then explained as the functional division of urban traffic between different means of transport and infrastructures, and their relationship with land uses functions. From this, it can be noted that the concept of integration and coordination was based not mainly on technological progress or innovations in means of transport and their infrastructures, and not so much on the development of new principles of spatial integration between transport infrastructures and the city, but on the intensive use of transport capacities and existing infrastructures[25] in order to limit, as much as possible, economic expenses.

23 M. Lacek in his book *Městská doprava: základy teorie a praxe* (1983) highlighted two types of integration: 1. Territorial integration related to the problem of interrelation between urban territory and urban transport. This was based on the idea of integration of transport with urban agglomeration planning, as well as between all means of urban transport. Departmental integration was explained as the coordinated work of urban transport companies in technical, economic and operational aspects of urban transport. For Lacek, the integration of interests as the absolute condition for organizational integration (1983, p. 90), which ultimately did not always function. Studying the work carried out in socialist or western countries in this direction until 1983, one can notice the scarcity of concrete examples of integration in socialist countries.

24 "Когда мы говорим о координации, то в это понятие включается комплекс организационных, планировочных, экономических и эксплуатационных мероприятий, обеспечивающих высокий уровень транспортного обслуживания населения и эффективное использование всех видов городского пассажирского транспорта."

25 About the policies of "intensive use of capacity in mass transport" see the work of Holland Hunter (1968) Soviet Transport Experience: Its Lessons for Other Countries, Washington: The Brookings Institution, pp. 123-135, which provides effective explanation about the importance of economic factors in rail transport operation.

b) City and Transport Model

As geographers Richard J. Chorley and Peter Haggett noted, the main function of a "model" is the representation of the most important aspects of some phenomenon or reality by a significant simplification of its complexity (1971a, p. 12). The term "model" has sometimes been used interchangeably with the term "structure", which also represents significant elements and their relationships. However, in the search for the crucial issues, any selection process will be characterized by subjective interests oriented towards specifying certain desirable outcomes (Ortúzar and Willumsen, 2008, p. 27). Therefore, the urban model has often represented a partial perspective, mainly relating to the structure of activities and of transport networks.[26]

In Socialist town planning, modelling tools were very important because they facilitated the understanding and control of urban growth and change. This can be noted, for example, in Alexei Gutnov's work, *Evolutsiia Gradostroitelstva* [The Evolution of Town Planning], in which the author stresses how crucial it is to search for stable and consistent elements that "allow the feeling of menace emanating from rapid urbanization and the distortion of urban structures to be assuaged" (1984, p. 30).[27] It is clear that the use of models to determine how cities might grow was also present in Western countries. At that time, concepts were being studied and reproduced, both from well-known examples such as London, Chandigarh, Brasilia or Moscow, and from lesser-known conurbations. They served in the formation of models understood as realities from which to learn and copy, especially for the fluid circulation of road traffic, the organization of transport in city centres, the location of industrial and residential areas, arrangements for public transport systems, and so forth.

Urban and transport models were interdependent, as any change in the system of land use entailed alterations in transport solutions and vice versa (Richardson, 1971). However, transport models were grounded in mathematical modelling on the basis of estimates of the size and direction of urban traffic flows. These mathematical models were based on functional and spatial aspects, but did not include social factors (Kulakov, Trofimenko, 2016, p. 12). The application of mathematical modelling arose from a requirement to plan cities in relation to set goals, controlling the process of implementation, and creating scenarios for future changes. Apart from a need to handle the complexity of urban realities, the use of models addressed the question of ease and flexibility of management in planning processes.[28] Thus, the allocation of passenger flows to zones moulded planning decisions for private and public transport networks.

26 J. Hrůza explained the city model as urban plans or schemes that could represent the characteristics of a given city (1977, p. 186).

27 "уменьшить общее ощущение опасности, которое вызывает у человека наши дней ускоренная урбанизация и потрясение городской структуры."

28 The purpose of mathematical models according to Hrůza, "(...) can be a great of the necessary precision of urban works, to clarify concepts, criteria and norms, as well as to provide quantification of individual phenomena and their effects (...) in case of planned urban development and settlement on the socialist territory mathematical models of society have favourable conditions for their application", ((...) mokou být výrazným podnětem k nezbytnému zpřesnění urbanistické práce, k ujasnění pojmů, kritérií i zákonitostí a také k žádoucí kvantifikaci jednotlivých jevů a jejicb vztabů (...) při plánovitém rozvoji měst a osídlení v socialistické společnosti mají matematické modely příznivé podmínky pro využit), (1977, p. 187).

The shaping of transport models was also influenced by differing transport policies, especially in relation to the choice of mode and to the organization of interrelationships between different transport systems and types of traffic. Such models were also defined by ideological objectives such as an intention to limit car use, a preference for the development of collective public transport, and the efficiency of urban transport solutions.

d) Urban structure

In his dictionary *Slovník soudobého urbanismu*, prof. Jiří Hrůza explained the urban structure concept with special attention to urban functions which was an idea adapted to the principles of the Modern Movement, termed functionalism:

> *"The basic social and economic functions are then projected into space and manifested in its functional structure. It expresses in particular the development of different types of workplaces, residences, equipment and services, recreational facilities and various institutions, their mutual relations and accessibility" (1977, p. 254)*[29]

The main role of planning then was to determine "the basic functions" in order to be able to locate them in urban space and connect them with transport infrastructure in an "optimal way". The term "optimality" had extraordinary economic significance for socialist countries. Therefore, there was an intention to resolve the contradictions with geographical characteristics of cities and pre-existing urban structure by establishing some typologies of optimal urban structures. Urban structure then served to control the planning process in order to be confident in the realisation of desirable future plans.

A similar definition of urban structure was proposed by C. Buchanan who underlined the physical form of the urban environment as the main quality of urban structure (1971, p. 28). Comparing objectives of urban structure concept application in the East and West, some common ideas can be outlined. One of them was related to the notion that "structure should be capable of growth without a risk of deformation or distortion" (Buchanan, 1971, p. 29). Similar ideas were expressed in the work of the GDR, the CSR and the USSR planners, where the main concern was "the preservation of the functional and structural unity" of the urban structure (Bocharov, Kudryavtsev, 1972, p. 3)[30] and where the urban structure itself was applied as a tool for controlling urban development.

Within the concept of urban structure, the idea of "integrity" was very important. It was discussed in Western European countries, especially in the work of the FRG. In the countries of real socialism this issue was emphasised as something that differentiated the socialist and the capitalist city. With urban growth rapid public

29 "Základní sociální a ekonomické funkce uspořádání jsou pak promítnuty do prostoru a projevují se ve funkční struktuře. Ta vyjadřuje především rozmístění jednotlivých druhů pracovišť, bydlišť, vybavení a služeb, rekreačních zařízení a různých institucí a jejich vzájemné vazby a dostupnost."

30 Soviet architect Y. Bocharov in the years 1960s and 1970s realized several studies dedicated to the idea of "flexible urban structure" which was based on the directional grid model. It was represented as the most appropriate urban structure for urban and territorial development. The main idea was to combine the needs of motorized transport functioning (that was realized with grid structure) and, at the same time, the possibility for directional-radial extension of rapid public transport network.

transport started to become important: "Separate elements will be interconnected by high-speed transport lines, which will be a condition for the functioning of the settlement system as an organic and complex whole"[31] (Hrůza, 1965, p. 245). Although the main strategy was the minimisation of people's movement, based on pedestrian accessibility between working and residential spaces. It is worth noting that these "traffic limitation strategies" (Thomson, 1977, p. 263), were not only thought of in the countries of real socialism but also in some Western countries, such as Sweden, Austria and the FRG.

e) A General Urban Plan

The aim of studying this concept was to understand the scope of the application of the urban plan, its objectives and tasks, as well as identifying the meaning of the term "planning" in socialist countries. The concept of "planning" was central to the socialist regime as it was related to national politics and economics, and for this reason determined the whole life of the society (Zile, 1963, p. 19). This notion can explain the intimate interrelationship between the planning of political-economic development and spatial planning of socialist cities. Effective city functioning was directly related the organisation of fluid urban traffic. Therefore, finding a successful solution within an urban plan was considered equivalent to finding a successful solution to transport problems (Butyagin, 1974, p. 191). These objectives lead to the idea of considering a city as "a production machine", which was realised through an urban plan.

An urban plan was related to different policies such as the search for spatial equilibrium, the establishment of relations between the centralities and the rest of the city, the relationship between residence and work areas, the maintenance of the global structure of cities, the estimation of future changes, the provision of accessibility with public transport systems and, the search for proportional distribution of passenger flows. All these objectives created crucial points in an urban plan as they determined the economic effectiveness in city functioning. The objective of planning, thus, was to find unified principles directly related to ideological ideas for building socialism (Zarecor, 2018, p. 112). Planning meant mainly spatial action, change or the reorganisation of urban space and structure, adapting the way of life and the needs of society to economic objectives.

The problem of the existence of excessive rigidity of an urban plan was similar in this period for both socialist and capitalist cities. In both cases the administration and regulation of the state played a significant role in urban decisions. In the United Kingdom, for example, the 1947 Planning Act, an urban plan was concentrated on land use planning in order to control the development of cities. This inflexibility of solutions led to the rapid "ageing" of urban plans (Cullingworth, 1989, p. 79). Similar problems existed in socialist countries, when a large number of urban plans became obsolete due to the fact that they did not consider urban growth and social factors.

31 Отдельные звенья будут взаимосвязаны линиями скоростного транспорта, который, таким образом, станет условием функционирования системы расселения, как органичного и комплексного целого.

The main change began in the late 1960s when planners in the West began to search for the relationship between economic-social objectives and land use plans. Plans served to establish objectives and alternative solutions (Hall, 1992, p. 148), resulting in a paradigm shift in urban planning,[32] whereas in socialist countries it continued with the idea of spatial-functional development. For example, in the work of Kudryavtsev and Bocharov *Planirovochnaya struktura sovremennogo goroda* [The planning structure of contemporary city], 1971 the ideas in urban structure planning remained unchanged:

> *"Preserving the functional and structural unity of cities requires comprehensive consideration of the prospects and pace of development of industrial, residential and other zones, as well as it needs organized territorial expansion of settlements" (1971, p. 28).*[33]

Similar ideas were expressed in GDA and CSR, emphasising the importance of functional and structural management of cities. In GDR the general urban plan "Generalbebauungsplan", was also oriented towards the structural-spatial development of industrial zones, social and technical infrastructure, residential areas and, urban centres, etc. with the main task of designing the city in the long term under the conditions of scarce economic resources (Lammert, 1979, p. 99-115). In the CSR, E. Hruška also noted that the objective of an urban plan "Uzemni plan" resides in providing planned spatial development of cities in accordance with the economic objectives of the state (pp. 28-29),[34] or with the objective to represent spatial and functional organization of urban territory (Hrůza, 1977, p. 271).

It should be noted that these ideas were not so homogeneous in the GDR and the CSR: from the mid-1960s there was a concern to include social research in urban planning. For example, a study carried out on CSR by Jiří Musil in 1966-1970[35]

32 About the paradigm shift see Hall, P. (1992) *Urban and Regional Planning*, Routledge. It is emphasised that the main idea of the paradigm shift after the 1960s was related to understanding that urban planning was only a small part of a big planning process (p. 228). The transition was made from an urban structure-oriented perspective to the concept of urban system. The urban system was explained as the combination of physical-spatial planning and activity planning (Buchanan, 1971). In the book of Cowan, P. (1973) *The Future of Planning*, London: Heinemann, translated into Russian in 1976, the author also expressed the need for the application of the concept of the "system" divided into social system, resource system and planning system (1976, pp. 37-43).

33 "Сохранение функционального и структурного единства городов требует всестороннего учета перспектив и темпов развития производственных, жилых и других зон, а также организованного территориального расширения населенных мест"

34 See Hruška, E. (1966) *Problémy súčasného urbanizmu*, Bratislava: Vydatelstvo Slovenskej Académie Vied; where the author explained the concept of "Urbanism" which also had a meaning strongly related to spatial aspects in city planning: "Urbanism is a science, technology and art, designed to create optimal spatial relations between peoples, to make social cooperation more effective and more cultured. It creates a socially progressive, efficient and beautiful environment" (Urbanizmus je veda, technika i umenie, má za úlohu vytvárať optimálne priestorové vzťahy medzi ľucfmi, urobiť spoločenské spolunažívanie prevádzkovo účelnejším a všeobecne kultúrnejším. Vytvára teda spoločensky pokrokové, účelné a krásne životné prostredie, 1966, p. 43).

35 See Musil, J. (1972) Goal-setting in urban planning: A case study from Czechoslovakia, *Journal of Social Policy*, Volume 1, Issue 3, July, pp. 227-244. The author raised the need for coordination between the urban planning objectives set by the state and those set by local planning departments. The ideas for establishing future development goals of Ostrava were mainly based on changes in the orientation of industry and urban centre organization. The main contribution of this work was methodological approach, emphasising the importance of social effects of the proposed changes, as well as developing different spatial scenarios in order to achieve certain social objectives.

implied the importance of understanding the city as "a social process". The idea was to promote "active planning", where local objectives in spatial development of cities were changed according to specific needs and problems of cities. These intentions were partially developed in the 1970s in both countries in the form of local planners' participation in the establishment of planning objectives principally related to the maintenance of historical buildings and, the improvement of pedestrian and transport accessibility and urban space quality. Similar efforts were made in the GDR in the 1970s when local planning departments began to participate in the formation of geographic and social needs in the urban plans of some cities.

However, this could not be fully realised under the planned economy regime. Some local objectives, as a result, were strongly related to state economic objectives. Thus, specific necessities and local aspects which did not concur with the ideas of socialist state planning (those which required additional resources and did not relate directly to the production process), were not yet fully considered in the urban planning process.

1.6. FROM RESEARCHING TO EXPOUNDING: THE STRUCTURE OF CONTENTS

The research process had its own logic, as explained over the course of the introduction, although in this final section it is appropriate to give a deeper explanation of the radical differences between the research process and the order of presentation of results. It is well known that a research process does not coincide with the process of expounding its outcomes. When there is sufficient information combined with suitable hypotheses and questions, then the work of analysis and reflection proceeds in a meaningful way, and it is clearer how research should be written up in such a way as to make it more comprehensible and open to critiques.

This research started with a reading of Soviet literature on the topic, simply because of linguistic and cultural proximity. However, it cannot be said that it was easy to access this bibliography, since frequent travel in Russia was not feasible. The bulk of the material consisted of historical books and periodicals, together with contemporary studies. At first, the timespan to be covered had not been very clearly delimited, so the readings covered the entire Soviet period after the Second World War. The aim was to identify key moments in the development of town and transport planning. From these first readings, it was possible to observe an intensity of new ideas and approaches in the 1960s and 1970s. Consequently, the search for specialist literature covering this period was redoubled. This phase in the work required approximately one year, since it was necessary to read a multitude of texts, to think through the approach to be used, and to refine the specific subject, objectives and hypotheses of the research. Simultaneously and in parallel, consultation of historical literature had to be initiated, both of historiography and the methodology for historical research, in addition to the history of the countries under study and of tramways. The materials read were at first in Russian, and then in Spanish and English.

In this way, in terms of archival materials and historical technical literature, research started with Soviet materials and expanded into German and Czechoslo-

vak. However, the extent and value of these latter, and a growing appreciation of the heterogeneity of discourses changed the way in which these historical realities were analysed. In consequence, there was further exploration of literature from these European countries. Thus, once the scheme for expounding the research had been defined in relation to this, taking very nearly another year, it could commence with all relevant materials acting as a general framework and background, as laid out in the second chapter.

II. From Tram City to Car City: Transport and Town Planning, 1945-1964

2.1. The Background: Electric Tramways as a Public Service and as a Tool for Urban Growth

2.2. The Beginnings of Crisis for Trams and the Triumph of Car Cities from the 1920s Onwards

2.3. De-Stalinization, the Crisis in Socialist Town Planning and the Rationalization of Urban Structures and of Planning for Motor Vehicle and Tram Infrastructures

2.4. The Variety of Solutions for Tramway Networks in the 1950s and 1960s: Case Studies of Magdeburg, Ostrava, Orel and Simferopol

As can be seen from the titles of the sub-chapters, the aim was to gain an understanding of pre-existing ideas in public and private transport planning that influenced the formation of the urban structures of European Communist cities. It was also intended to investigate whether there was a lasting culture of urban transport planning that persisted over time. The chapter begins with the more distant background, analysing the rapid development of tramways, together with concepts of urban growth and their relationship to urban form and structure. It then focuses on the period during which the motor car made rapid headway, leading to the start of a crisis for trams, but which brought little change to urban structures in the 1930s and 1940s. Nevertheless, this was a crucial period for the formation of theoretical ideas about car cities. These ideas were extensively developed after World War II, leading to a tram crisis in European countries.

While the author was learning languages as quickly as possible and carrying out research stays, materials on the central theme and its collaterals were collected, with searches in the State archives of Germany, the Czech Republic and Slovakia. After this second, more detailed reading, it proved possible to establish an initial idea of the development of town planning, urban transport, traffic and trams. This knowledge enabled a selection to be made of cities for case studies. Once sufficient material on theoretical studies and debates on transport and city planning in the 1960s and 1970s had been analysed and reorganized, the writing of the third chapter, perhaps the most central, if not necessarily the most important, could proceed. After a first draft had been prepared, new questions arose which needed to be answered in the second chapter, especially in terms of antecedents, which is why this chapter was the first to reach virtual completion.

III. Transport and The City, 1964-1980: The Need to Integrate Town Planning with Urban Transport Planning

3.1. Rapid Urbanization and Public Transport Problems. The Context for Integrated, Comprehensive City and Transport Planning (1964 to 1968)

3.2. The Paradigm Shift in Socialist Town Planning in the 1970s. New Theoretical Approaches to Integrated Planning

3.3. International Congresses on Transport and City Planning in the 1960s and 1970s. Advances and the Exchange of Knowledge between Communist and Capitalist Countries

3.4. The Practice of Integrated Planning. Case Studies of Dresden, Bratislava and Yaroslavl

The titles of the sub-headings in Chapter III follow a set expository order. The first point was to gain a grasp of the crisis in town planning and political changes in the European Communist countries that occurred in the mid-1960s. The second was to explain the ensuing period of paradigm shift in town planning and the new conception of integrated transport and city planning. A section analyses the work carried out to set up research centres dealing with town planning, urban transport and integrated planning. The third point was to contrast this experience with Western ideas presented and discussed at international congresses on town planning and transport. This allowed an understanding of the objectives, problems and common approaches throughout Europe. In addition, a study of the practice of integrated planning in three cities, one each in the USSR, the GDR and the CSR revealed both differences and similarities among them. As a conclusion, the elements came together to provide a feeling for the urban planning atmosphere of the 1970s, so that the following chapter could better contextualize and explain the ideas of rapid tramway planning.

In the end, taking all the ideas from the second and third chapters together, it was realized that a final fourth chapter on trams in the 1970s was needed, in which a somewhat wider scope was adopted so as to introduce discourse on certain planning and urban design issues.

IV. The Development of Rapid Trams and Their Relationship with Urban Structure and Form

4.1. The Technological Development of Rapid Trams and their Increasing Role in Town Planning

4.2. Rapid Tramways for New Residential Areas: The Combination or Separation of Road and Tramway Infrastructure. Case studies of Brno, Dresden and Lviv

The titles of these sub-headings reveal the intention to identify certain issues regarding the way that fast trams were introduced into the cities. The first and most crucial point is to understand the political decision to install rapid tramways in the cities of Communist countries, which was accompanied by theoretical debates among planners. Thereafter, an explanation is needed of how to interpret the concepts of light rail and rapid tramways in terms of technological differentiation, levels of development and scope of application. To give a better understanding of the solutions in town planning, technical developments and difficulties in the con-

struction of rolling stock are analysed. The chapter then proceeds to focus on the new urban and transport plans that incorporated rapid tramway lines. It highlights the objectives, methods and difficulties involved in the putting into operation of rapid tramway projects, and evaluates their level of integration with urban transport systems and city structures. As a second step, a more close-up view is given in order to explain the methods of inserting rapid tramways into new residential areas. At this point details are given of conflicts in planners' thinking on the organization of car, pedestrian and tram traffic. This shows there was some variety in technical opinions and solutions on issues such as the priority of public transport, pedestrian safety, fluid traffic movements, the modernity of urban spaces and the organization of public and residential areas, which influenced the formation of diverse concepts in the planning of new residential quarters.

As can be seen, the structure of the thesis is organised according to a mixed chronological-thematic criterion. Chapters II and III follow the chronology and serve mainly to explain the theoretical-urban context. The results of these chapters are verified and developed in Chapter IV, which has a thematic criterion and is oriented towards the study of the rapid tramway planning practices.

Finally, it should be noted that each chapter has its own independent bibliographical references, in addition to the full bibliography at the end of the thesis.

1.7. BIBLIOGRAPHICAL REFERENCES

Abercrombie, P. (1945) *Greater London Plan 1944*, London: Stationary Office.

Anbalakan, K. (2016) Objectivity in History: An Analysis, *Kemanusiaan*, 23 (1), pp. 21–33.

Anzola Salom, R. B. (1999) *La Investigación como el Proceso Creativo*, Anuario Universidad de Carabobo Facultad de Ciencias Jurídicas y Políticas Instituto de Derecho Comparado, Valencia -Venezuela, 22, pp. 365-372.

Archiv für die Geschichte des Strassen- und Verkehrswesens (2001) *Straßen - und Verkehrsgeschichte deutscher Städte nach 1945: Dresden - Leipzig - Halle - Chemnitz – Erfurt,* 16, Bonn: Kirschbaum Verlag.

Aróstegui, J. (2001) *La Investigación Histórica: Teoría y Método*, Barcelona: Crítica.

Bermúdez, E. (1995) *La Investigación y los Procesos Creativos*, documento presentado para Rectoral commission of Investigation in University of Colombia.

Bernhardt, C. (2017) Long buried and yet alive: The contradictory history of the 'car-friendly city', *Historical Research: Studies in Contemporary History*, 3, https://zeithistorische-forschungen.de/3-2017/id=5527.

Bevir, M. (1994) Objectivity in History, *History and Theory*, 33 (3), pp. 328-344.

Beyer, E. (2011) Planning for Mobility Designing City Centers and New Towns in the USSR and the GDR in the 1960s, in Siegelbaum, L. H. (ed.), *The Socialist Car: Automobility in the Eastern Bloc*, London: Cornell University Press.

Bocharov, Y. P., Kudryavtsev, O. K. (1972) *Planirovochnaya struktura sovremennogo goroda*, Moskva: Izdatelstvo literatury po stroitelstvu.

Bocharnikova, D. (2014) *Inventing Socialist Modern: A History of the Architectural Profession in the USSR, 1932-1971*, doctoral thesis, Florencia, European University Institute.

Bocharnikova, D., Harris, S. E. (2018) Second World Urbanity: Infrastructures of Utopia and Really Existing Socialism, *Journal of Urban History*, 44(1), pp. 3–8.

Braudel, B. (1970) *La Historia y las Ciencias Sociales*, trad. Mendoza, J. G., Madrid: El Libro del Bolsillo.

Buchanan, C. (1964) *Traffic in Towns*, Harmondsworth: Penguin Books.

Buchanan, C., and Partners (1971) South Hampshire Study, in Lewis, D. (ed.), *Urban Structure*, Architects' Year Book – 12, London: Elek Books, pp. 17-40.

Buchanan, C., Crow, G. (1974) An Integrated Transport System, *Journal of the Royal Society of Arts*, 122 (5211), pp. 117-128.

Butyagin, V. A. (1974) *Planirovka i blagoustroistvo gorodov*, Moskva: Stroiizdat.

Carr, E. H. (1987) *What is history?* segunda edición, Harmondsworth: Penguin Books.

Cherepanov, V. A. (1964) *Transport v Gradostroitelstve*, Moskva: Izdatelstvo Literatury po Stroitelstvu.

Chorley, R. J., Haggett, P. (1971a) *La geografía y los modelos socio-económicos*, trans. Carlos Ferran Alfaro, Madrid: Instituto de estudios de administración local.

Committee on Highway Capacity. Department of Traffic and Operations (1950) *Highway Capacity Manual: Practical Applications of Research*, Washington: US Government printing office.

Cowan, P. (1976) *Budushchee Planirovki*, trans. Yaroshevski, B. E., Moskva: Stroiizdat.

Crouch, M. (1979) Problems of Soviet Urban Transport, *Soviet Studies*, 31 (2), pp. 231-256.

Cullingworth, B., Nadin, V. (1989) *Town and Country Planning in the UK*, London: Routledge.

Dienel, H. -L., Schmucki, B. (1997) *Mobilitat für Alle. Geschichte des offentlichen Personennachverkehrs in der Stadt zwischen technischem Fortschrittund sozialer Pflicht*, Stuttgart: Franz Steiner Verlag.

Divall, C., Hine, J., Pooley, C. (2017) Introduction. Why does the past matter? in Divall, C., Hine, J., Pooley, C. (eds.), *Transport Policy: Learning Lessons from History*, London: Routledge, pp. 1-14.

Efremov, I. S., Kobozev, V. M., Yudin, V. A. (1980) *Teoriia Gorodskikh Passazhirskikh Perevozok*, Moskva: Vysshaia Shkola.

Elliot, J. E., Dowlah, A. F. (1994) Gorbachev, Perestroika and Democratizing Socialism Origins, Institutions and Policies, *International Journal of Social Economics*, 21, pp. 73-115.

Émangard, P.-H. (2012) Les tramways en Europe: une vision diachronique, *Transports Urbains*, 1 (120), pp. 3-8.

Febvre, L. (1982) *Combates por la Historia*, trans. Francisco, J., Fernández Buey y Enrique Argullol, Barcelona: Editorial Ariel.

French, R. A., Ian Hamilton, F. E. (1979) Is there a Socialist city? in French, R. A., Ian Hamilton, F. E. (eds.), *The Socialist city: Spatial Structure and Urban Policy*, London: John Wiley and Sons. Ltd.

Galasso, G. (2001) *Nada Más Que Historia: Teoría y Metodología de la Historia*, Barcelona: Ariel.

Gravagnuolo, B. (1998) *Historia del Urbanismo en Europa 1750-1960*, trad. Calatrava, J., Madrid: Ediciones Akal, S.A.

Goltz, G. (1981) *Transport i rasselenie*, Moskva: Nauka.

Grieder, P. (2012) *The German Democratic Republic*, New York: Palgrave.

Gutnov, A. E. (1984) *Evolutsiia Gradostroitelstva*, Moskva: Stroiizdat.

Hall, P. (1992) *Urban and Regional Planning*, third edition, London: Routledge.

Hanson, P. (2003) *The Rise and Fall of the Soviet Economy. An Economic History of the USSR 1945 – 1991*, New York: Routledge.

Harrison M. (2002) Economic Growth and Slowdown, in Bacon E., Sandle M. (eds.), *Brezhnev Reconsidered. Studies in Russian and East European History and Society*, London: Palgrave Macmillan, https://doi.org/10.1057/97802305010893

Highway Research Board, National Academy of Sciences (1965) *Highway Capacity Manual*, Washington.

Horák, P. (2017) *Urbanizmus 20. storočia na Slovensku Prípadová štúdia Bratislava*, doctoral thesis, Slovenská Technická Univerzita v Bratislave, Fakulta Architektúry, Ústav urbanizmu a územného plánovania.

Hruška, E. (1966) *Problémy súčasného urbanizmu*, Bratislava: Vydatelstvo Slovenskej Académie Vied.

Hrůza, J. (1977) *Slovník soudobého urbanismu*, Praha: Odeon.

Hrůza, J. (1972) *Teoriia Goroda*, trans. Mostovaya, L. B., Moskva: Izdatelstvo Literatury po Stroitelstvu.

Hunter, H. (1968) *Soviet Transport Experience: Its Lessons for Other Countries*, Washington: Brookings Institution.

Khairullina, E. (2015) *Una Mirada Concentrada en la Línea del Horizonte: los Planes y Proyectos de Astana en los años 1957-1987*, master thesis, University of Granada.

Kominarov, Z. L. (1970a) *K Voprosu Koordinatsii Razvitiia i Raboty Raznykh Vidov Gorodskogo Passazhirskogo Transporta, Kompleksnoe Razvitie Gorodskogo Passazhirskogo Transporta*, Materialy po Kratkosrochnomu Seminaru, Leningrad, pp. 15-19.

Kosenkova, Y. L. (2000) *Sovetskii Gorod 1940 i pervoi polovine 1950 godov: ot Tvorcheskikh Poiskov k Praktike Stroitelstva*, tesis doctoral, Rossiiskaia Akademia Arkhitektury y Stroitelnykh Nauk, Moskva.

Kranzberg, M. (1995) Technology and history: Kranzberg's Laws, *Technology and Society*, 15 (1), p. 5-13.

Kulakov, A., Trofimenko, K. (2016) Transport planning and transport modelling, in Blinkin, M. Y., Kocheva, E. (eds.), Transport Systems of Russian Cities. Ongoing Transformations, Cham: Springer, 2016, pp. 1-38.

Lacek, M. (1983) *Městská doprava: základy teorie a praxe*, Praha: Nakladatelství dopravy a spojů.

Lammert, U. (1979) *Städtebau: Grundsätze, Methoden, Beispiele, Richtwerte*, Berlin: Verlag für Bauwesen, VEB.

Lefebvre, H. (1991) *Production of Space*, trad. Nicholson-Smith, D., Oxford: Editions Basil Blackwell Ltd.

Lerm, M. (1998) *Abshied vom alten Dresden*, Dresden: Hinstorff.

Ling, A. (1967) *Runcorn New Town: Master Plan*, Runcorn: Runcorn Development Corporation. Lois González, R. C., Otón, M. P., Wollf, J.-P. (2013) Le tramway entre politique de transport et outil de réhabilitation urbanistique dans quelques pays européens: Allemagne, Espagne, France et Suisse, *Annales de géographie*, 6 (694), pp. 619-643.

MacKaye, B. (1930) The Townless Highway, *The New Republic*, pp. 93–95.

Mayorga, M. Y. (2012) Espacios de Centralidad Urbana y Redes de Infraestructura, *Bitácora*, 21 (2), pp. 11-26.

Mc Dermott, K. (2015) *Communist Czechoslovakia, 1945-1989: A Political and Social History*, London: Jeremy Black.

Ministerium für Verkehrswesen der DDR (1966) *Informationen der Forschungsgemeinschaft "Städtischer Verkehr,"* August, Berlin.

Monclús, J., Díez Medina, C. (2016) Modernist Housing Estates in European Cities of the Western and Eastern Blocs, *Planning Perspectives*, 31 (4), pp. 533-562.

Moraglio, M. (2015), Shifting Transport Regimes: The Strange Case of Light Rail Revival, in Kopper, C., Moraglio, M. (eds.), *Organization of Transport: A History of Users, Industry and Public Policy*, New York: Routledge International Studies in Business History, pp. 155-172.

Musil, J. (1972) Goal-setting in urban planning: A case study from Czechoslovakia, *Journal of Social Policy*, 1 (3), pp. 227-244.

Musil, J. (1980) *Urbanization in Socialist Countries*, New York: M.E. Sharpe.

Ortúzar, Juan de Dios., Willumsen, L. G. (2008) *Modelos de transporte*, trad. Portilla, A. P., Santander: Ediciones de la Universidad de Cantabria.

Oyón, J. L., (1999) Transporte público y estructura urbana (de mediados s. XIX a mediados s. XX) Gran Bretaña, España, Francia y países Germánicos, *Ecología Política*, 17, pp. 17-35.

Parcerisa, J. B. (2012) *Forma urbana: Cinco ciudades bajo sospecha*, Barcelona: Editorial: Laboratori d'Urbanisme.

Potemkina, M., Gryaznov, M., Pashkovskaya, T. (2020) Public Transport and Soviet Industrialisation: The Tram Service in the Socialist City of Magnitogorsk (USSR), *Industrial Archaeology Review*, DOI: 10.1080/03090728.2020.1804159.

Potter, S. (1976) *Transport and New Towns: The Transport Assumptions Underlying the Design of Britain's New Towns, 1946-1976*, Milton Keynes: The Open University, New Towns Study Unit.

Requate, J. (2009) Visions of the Future: GDR, CSSR and Federal German Republic in the 1960s, chapter 8, in Haupt, H. G., Kocka, J. (eds.), *Comparative and Transnational History: Central European Approaches and New Perspectives*, New York – Oxford: Berghahn books, pp. 178 – 203.

Richardson, W. H. (1971) *Economía del Urbanismo*, trad. Blanca Paredes Larrucea, Madrid: Alianza Editorial.

Roth, R. (2015) Introduction, in Roth, R., Divall, C. (eds*.), From Rail to Road and Back Again? A Century of Transport Competition and Interdependency*, Farnham: Ashgate.

Santos y Ganges, L. (2007) *Urbanismo y ferrocarril. La construcción del espacio ferroviario en las ciudades medias españolas*, Madrid: Fundación de los ferrocarriles españoles.

Santos y Ganges, L., De Las Rivas Sanz, J. L. (2008) Ciudades con Atributos: Conectividad, Accesibilidad y Movilidad, *Ciudades*, 11, pp. 13-32.

Schaff, A. (1976) *Historia y Verdad*, trad. Sanfeliu, I. V., Barcelona: Crítica.

Schmucki, B. (2001) *Der Traum vom Verkehrsfluss: Stadtische Verkehrsplanung seit 1945 im deutsch-deutschen Vergleich*, Frankfurt: Campus Verlag.

Schmucki, B. (2010) Fashion and technological change Tramways in Germany after 1945, *Journal of Transport History*, 31 (1), pp. 1-24.

Seidenglanz, D., et al., (2016) Czechoslovak light rail — Legacy of socialist urbanism or opportunity for the future? *Journal of Transport Geography*, 54, pp. 414-429.

Sheleijovski, G. (1946), *Kompositsiia gorodskogo plana kak problema transporta*, Moskva: Giprogor.

Shpakov, I. V., Zyuzin, P. V. (2016) Sostoianie Otrasli Gorodskogo Elektrotransporta v RSFSR v kontse 1980 godov, in Koroteeva, N. N. (eds.), *Kraevedcheskie Zapiski*, Investsfera, pp. 61-68.

Siegelbaum, L. H. (2011) *The Socialist Car: Automobility in the Eastern Bloc*, London: Cornell University Press.

Smith, D. M. (1989) *Urban Inequality under Socialism: Case Studies from Eastern Europe and the Soviet Union*, Cambridge: Cambridge University Press.

Smykovskaia, G. (1972) Organizatsiia gorodskoi territorii pri povyshenii strukturnoi znachimosti sistem skorostnogo transporta, in Bolonenkov, G., Smykovskaia, G., (eds.), *Transport v planirovke gorodov*, Moskva: TSNIIP Gradostroitelstva.

Steiner, A. (2010) *The plans that failed: An Economic History of the GDR*, New York and Oxford: Berghahn Books.

Tarkhov, S. A. (1990) *Tramvai y trolleybus v gorodakh SSSR: Spravochnik na nachalo 1990*, Moskva.

Tarkhov, S. A. (1996) *Tramway Atlas of the former USSR*, Berlin: Arbeitsgemainschaft Blickpunkt Strassenbahn e.V. Berlin in conjunction with Light Rail Transit Association London.

Tarkhov, S. A. (1997) *Gorodskoi passazhiskii transport Moskvy: Kratkii istoricheskii ocherk k 125-letiiu vozniknoveniia*, Moskva.

Tarkhov, S. A. (2002) Prostransvennye Zakonomernosti Evolutsii Transportnykh Setei, *Izvestiia Seriia Geographicheskaia*, 2, pp. 15-22. TSNIIP Gradostroitelstva (1966) *Principi sovetskogo gradostroitelstva*, vol. 1, Moskva: Stroiizdat.

Thomson, J. M. (1977) *Great Cities and their Traffic*, London: Victor Gollancz Ltd.

Tripp, A. (1943) *Town Planning and Road Traffic*, London: Edward Arnold.

Valdés, A. G. (1971) *Ingeniería de Tráfico*, Madrid: Dossat S. A.

Ward, S. V., Freestone, R., Silver, C. (2011) Centenary paper: The 'new' planning history: Reflections, issues and directions, *The Town Planning Review*, 82 (3), pp. 231-261.

White, S. (1992), *Perestroika and After*, New York: Cambridge University Press.

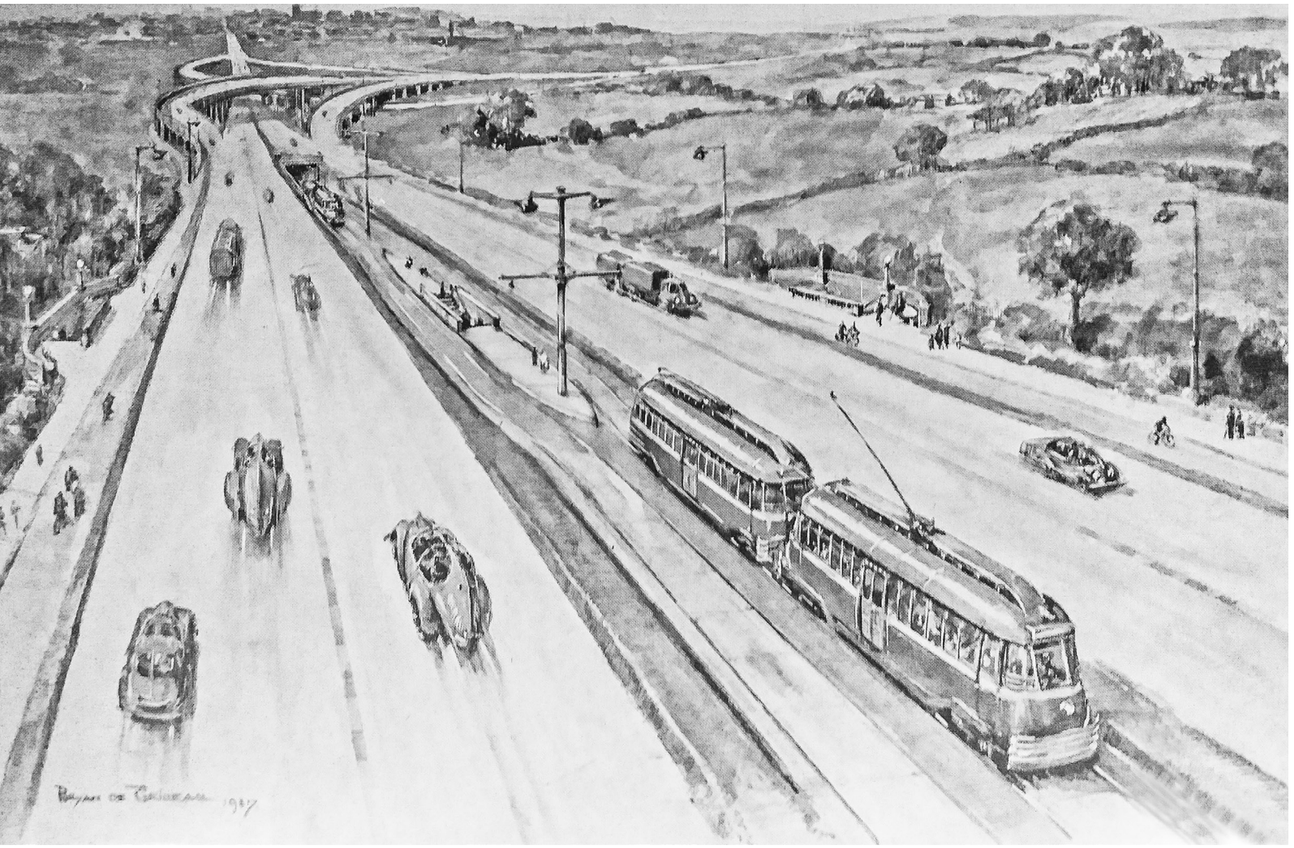
Yakshin, A. (1946) *Planirovanie gorodskikh transportnych setei*, Moskva: Gosudarstvennoe Arkhitekturnoe Izdanie.

Zarecor, K. E. (2018) What Was So Socialist about the Socialist City? Second World Urbanity in Europe, *Journal of Urban History*, 44(1), pp. 95–117.

Zelezny, R. (2014) *Tramway-oriented development: what results in what context? Comparative approach between France and the Czech Republic*, Transportation Research Arena (TRA), Paris - La Défense.

Zigurds L. Z (1963) Programs and Problems of City Planning in the Soviet Union, *Washington University Law Review*, 1, pp. 19-59.

Zyuzin, P. V. (2012) *Prostranstvennaia Transformatsiia Setei Gorodskogo Passazhirskogo Transporta Postsocialisticheskikh Stran Tsentralno-Vostochnoi Evropi i byvchego SSSR*, doctoral thesis, Moskva, Moscow State University named after M. V. Lomonosov.



The image of a modern arterial road developed by the painter Bryan de Grineau in 1937. Source: Bizeray, C. R. (1944) *Towards Ideal Transport in Town Planning and Reconstruction,* London: Light Railway Transport League, p. 44.

II. FROM TRAM CITY TO CAR CITY: TRANSPORT AND TOWN PLANNING, 1945-1964

This second chapter of the research is given over to a consideration of the development of tram and motor transport prior to the 1960s and its implications for urban structure, focusing primarily on the period from the end of the Second World War to the Khrushchev era. It first analyses the development of trams relative to that of motor transport in European countries, the experiences of Western European being contrasted with Communist European countries. The aim is to understand the logic behind the burgeoning of car-oriented cities and the decline in importance of tramways for transport. All of this had its theoretical beginnings in the earliest debates on the disadvantages of trams in the 1930s, these intensifying in the post-war period and leading to the abandonment of tram routes.

During the Stalin era the problems of urban traffic planning received barely passing notice. The arrival of Khrushchev enabled the inclusion of some functional issues, emphasizing the crucial part to be played by the rationalization of urban structures and architecture, a standardization of housing, and the rendering more scientific of urban planning and traffic engineering. In the context of the Cold War and in the light of aspirations to catch up with and surpass the West, modern, rationalized methods were considered to be the quickest response to socio-political needs. Thus, the triumph of Modernist principles in the early 1960s tended to intensify the tram crisis. However, each country put forward different solutions to this crucial question, going from abandonment and complete replacement of the tramway system to maintaining it in recognition of its potential for future modernization.

This chapter begins with Section 2.1, devoted to an analysis of the background, technological issues and electrification of tramways, which contributed to the possibilities for urban growth. There is also a discussion of interventions by the authorities in the organization of public transport services, which were limited by the low level of municipal control. Section 2.2 is dedicated to a study of the ideas of Modern Movement and the decline of tram transport in the Soviet Union, and to a lesser extent in Germany and Czechoslovakia. Section 2.3 studies post-war proposals and the turning point in so-called Socialist town planning, which led to a paradigm shift in this field. Rationalization of urban structures and the smooth flow of road traffic became signs of modernity, contrasted with the slowness and rigidity of tram transport. This brought yet more doubts about its functioning in the cities of the Socialist countries and led to changes in urban transport policies. Finally, Section 2.4 is given over to an analysis of various case studies, intended to give a better understanding and verification of the different ideas that were present in the 1950s and 1960s in the three countries under scrutiny.

In short, the task of this chapter is to gain a grasp of the processes of continuity and change affecting ideas of tramway planning in the GDR, the CSR, and the USSR, and to see traditional methods of town and transport planning in relation to influences from the ideas of Modern Movement. The differences and similarities found in this second chapter will be of assistance in the third chapter when it comes

to addressing the period of paradigm shift in town planning that took place from the mid-1960s onwards. These are ideas about, and implementation of, integrated planning for both transport and city, as well as the principles, policies and methods adopted in planning rapid tramway systems and new urban growth in the 1970s.

Summary of Chapter II:

II. From Tram City to Car City: Transport and Town Planning, 1945-1964

2.1. The Background: Electric Tramways as a Public Service and as a Tool for Urban Growth

2.2. The Beginnings of Crisis for Trams and the Triumph of Car Cities from the 1920s Onwards

2.3. De-Stalinization, the Crisis in Socialist Town Planning and the Rationalization of Urban Structures and of Planning for Motor Vehicle and Tram Infrastructures

2.4. The Variety of Solutions for Tramway Networks in the 1950s and 1960s: Case Studies of Magdeburg, Ostrava, Orel and Simferopol

2.1. THE BACKGROUND: ELECTRIC TRAMWAYS AS A PUBLIC SERVICE AND AS A TOOL FOR URBAN GROWTH

> "Electric traction has thus in a few decades released the city from the bondage of slow transportation and has stimulated urban growth in a way that would never have been possible under other conditions"
>
> (Koester, 1914, pp. 104-107)

Towards the end of the nineteenth century, public transport underwent a revolutionary development based on the electrification of tramways, which enabled the expansion of large European cities (McKay, 1976, p. 239; Divall, Schmucki, 2003, p. 1). These urban extensions were called streetcar suburbs (Warner, 1978) or tramway cities (Gullberg, Kaijser, 2004). A process of expansion through suburbanization was accompanied by lower densities as compared to the hearts of cities (Capuzzo, 2003, p. 24). The extension of cities was due to this "powerful force" of tramway development (Divall, Schmucki, 2003, p. 1). Indeed, electric tramways provided the possibility of moving farther and faster than ever before. The tram was no longer an urban, but also a suburban, means of transport. With moderate fares, it facilitated real estate initiatives on the outskirts of cities and increased the level of mobility in various directions of travel (Daniels, Warne, 1983, p. 26). Cities tended towards having a star-like layout because of direct connections from the centre to the new residential areas. This process was not homogeneous, varying in relation to local decisions and being the result of the confluence of various factors. Among these, variations in transport policy (Goodman, Chant, 1999, p. 142), cultural considerations

(Divall, Schmucki, 2003, p. 4), socio-economic conditions (McKay, 1976; Capuzzo, 2003, p. 47) and town planning (Ward, 1964, p. 489; Divall, Schmucki, 2003, p. 2) have all been highlighted.

Countries and cities in Europe differed in the provision of electric tramway services and in the decisions and possibilities relating to urban extension. The development of tramway systems occurred earlier and more intensively in the more industrialized countries, mainly in the form of lines laid out in city centres, with some extensions to existing or future suburban areas. Despite their advantages, electric trams were still slow in being widely established in suburban areas. In most European countries, intensive residential development occurred after the First World War, with trams installed as a stable public mass transit service (Capuzzo, 2003, p. 40). The different extents and forms of development of electric tramways were strongly influenced by local transport policies, by economic and technological difficulties relating to investments in infrastructure and rolling stock development, and by the degree and character of industrialization and urbanization in each country, as well as by the variety of concessions, contracts and management systems of tramway enterprises.

The task of this sub-chapter is to understand the dynamics and characteristics of electric tramway development and its relationship with urban growth in European countries and in the USA. Furthermore, the study of this period should allow an optimal understanding of the decision-making logic, with possible path dependencies and inertias in the urban structure. To this end, questions such as the technological development of the tramway, theoretical approaches to the relationship between trams and cities, the process of municipalization and public service provision, as well as the reality of the electric tramway in the cities of the three countries under study are analysed.

2.1.1. THE TECHNOLOGICAL DEVELOPMENT OF TRAMWAYS

Tramways have their origin in the streetcar lines established in the United States from 1830 onwards (Freeman, Aldcroft, 1988, p. 151) and they became a crucial means for suburbanization of its cities in the 1880s and 1890s (McKay, 1984, p. 118). Despite this, the tramway concept was not clearly defined for a long period, with numerous variations in usage, and changes over time. The term tramway essentially referred to a means of rail transport whose infrastructure was laid out on existing public highways, roads and streets. Thus, in the UK for a while the terms used were street railway or road railway, emphasizing the combination of public roads and fixed metal tracks (Clark, 1878, p. 1). As the French traffic engineer Henri Hirszson noted, the terms were not well defined, mainly because of the novelty of the concept (1900, p. 1). Several attempts were undertaken to achieve a comprehensive explanation of the means and systems of rail transport already built. The first differentiation established was between urban or suburban railways and long-distance interurban routes. Even after this, confusions still arose between elevated metros, trams and suburban railways.

For example, in Germany, according to Wolfgang Hendlmeier, the terms for tramways were not unified until 1930 and therefore had different meanings. One

word used was *Kleinbahn* [literally, small railway] because it had rolling stock for local use, lighter and with a narrower track gauge (Trautvetter, 1920, p. 4; Hendlmeier, Slotta, 1993, p. 28). It was in 1898 that a differentiation between trams and other local railways was made for the first time, until when "*Strassenbahn* [literally street railway] meant not just inner-city trams, but also railways connecting neighbouring areas, because of structural, technical and operational features and the nature of passenger transport"[1] (Hendlmeier, Slotta, 1993, p. 28). Despite attempts at clarification, the precise meaning of the word was not clear, mainly owing to difficulties in co-ordination between the various different local authorities that might be involved and a lack of standardized legislation. This resulted in the emergence of several terms that had different meanings and confusions in their application.[2] The German traffic engineer Karl Trautvetter devoted several works in the inter-war period to clarifying terms in rail transport. According to him, trams were a means of public transport operating on public tracks within a territorially limited location to serve small-scale traffic, which also used few carriages but operated with a high frequency (Trautvetter, 1920, p. 3).

In fact, it was difficult to explain terms because of the confluence of infrastructural, technological, organizational and service characteristics. From the late nineteenth century onwards, electrification was applied to rail transport in general, but mainly in its more urban forms: trams, suburban trains and metros. It was not always possible to make a clear differentiation in technical matters such as design factors, safety measures adopted, differences in rolling stock and its dynamic characteristics, track gauges and other features. In terms of areas covered, it was also not possible to distinguish one system from the other, as tramways began to adapt to urban and suburban expansion. In certain complicated locations, trams came to be run underground or in sections of cutting, which increased the confusion with metros, which in their turn also had started to have elevated or surface-level sections. Moreover, electric trams were mainly employed to connect the urban periphery and suburban areas to the city centre, while its value in this core area was recognized later. Thus, trams were confused with suburban trains and some secondary or local railways. A systematic differentiation based on the technical characteristics of tracks for these modes of transport was only achieved in the 1960s.

In addition, the technological evolution of trams was a long process, involving much research and various alternatives. The change from animal traction to mechanical methods, whether steam power, cable cars or electrification, was not always considered acceptable for city centres. However, a demand for greater mobility and an enhanced housing supply accelerated the search for an appropriate means of urban public transport. The industrial demand for mass movements

1 "Danach waren Straßenbahnen neben den innerstädtischen Straßenbahnen auch solche Bahnen, die trotz einer Verbindung von Nachbarorten einen straßenbahnähnlichen Charakter halten - aufgrund ihrer baulich- und betrieblich-technischen Einrichtungen und des Charakters der Personenbeförderung."

2 Some of the terms, according to Trautvetter at the beginning of the 20th century, were: *städtische Straßenbahnen*, *straßenbahnähliche Vorortbahnen*, *straßenbahnähliche Überlandbahnen* o *Nebenbahnen*, *Stadtstraßenbahnen*, Überlandstraßenbahnen, Überlandnebenbahnen. All of them contained words related to rail transport operating on the street, either in urban, metropolitan or suburban areas, which resulted in different assessments by different German authorities (1920, p. 5). See also Trautvetter, K. (1921) *Die Notlage der deutschen Kleinbahnen und Privateisenbahnen und Mittel zu ihrer Behebung*, Berlin: Springer-Verlag.

meant that optimal, economical modes of transport had to be found. Rail was a universal means of travel at the time, so its development to cover the needs for urban movement was a logical solution. If at first mechanical transport was not considered appropriate for urban services, tramway systems did eventually come to be seen as the best tool, even in the light of the complexities of construction and operation, and of the implications for urban structures.

a. Horse-Powered Tramways

The first trams were horse-drawn, emerging in the 1830s and developed in the 1850s and 1860s (Hilton, 1969, p. 123). They were introduced mainly because of a need to increase passenger transport capacity above what could be offered by the alternative, the horse omnibus. In addition, tramways ran on even tracks on streets and roads where it was not possible to organize other means of transport effectively (Hendlmeier, 1988, p. 1). Among the advantages of trams pulled by one or two horses were higher speed, smoother and more stable operation, greater tractive capacity and less noise than the omnibus (McKay, 1976, pp. 6-7; Daniels, Warne, 1983, p. 33). In the light of these characteristics, tramways complemented trains, whether intercity or suburban, and were a mode of transport with an eminently urban character (Goodman, Chant, 1999, p. 130).

However, relative to the scale of nineteenth-century urban development, the horse-drawn tram had limited capacities and speeds, and could not serve as a means of mass transport. Its pace was not sufficient to serve territorial extensions of more than around six to eight kilometres in radius (Tarr, McShane, 2008, p. 69), and its carrying capacity was likewise insufficient for areas above a certain density of population. Tramways were mostly organized by private companies with their own interests, so that routes did not always serve the public particularly well (McKay, 1976, p. 20). Similarly, co-ordination between various different private companies providing horse tramway services was either non-existent or poorly organized, which downgraded the quality of service. There was an additional disadvantage, the cost of maintaining horses and the inconvenience of using them (Vucnic, 1981, p. 16). The continuation of the trend for cities to grow stimulated a search for new technical solutions in urban transit in order to overcome these limitations by mechanizing the means of public transport.

b. Steam Tramways

The first new solution was the steam tramway, which started to develop in the 1870s. Such a system provided higher speeds and transport capacities to cope with increasing passenger traffic. It was one of the earliest attempts to introduce a mechanized means of transport into inner cities. However, systems of this kind encountered various difficulties relating to town planning, the environment and economics. This technical solution for mechanization did not correspond to the requirements of urban life, having operating characteristics more suitable to a suburban railway. Acceleration and braking required longer distances between stops, which influenced the development of suburban nodes (Goodman, Chant, 1999, p. 141). Curves in lines and long braking times increased the danger of pedestrian accidents (McKay, 1999, p. 91). Environmental issues were mainly related to coal smoke, often considered incompatible with an urban environment (McKay, 1976, p. 31; Vucnic,

1981, p. 16). Furthermore, these tramways were costly and noisy (Cheape, 1980, pp. 5-6). Consequently, in some European countries this approach was adopted, with horse trams continuing in operation. This meant that animal traction maintained a presence both in cities and in some suburban areas (Freeman, Aldcroft, 1988, p. 13). In fact, throughout practically the whole nineteenth century horse tramways retained a relatively prominent presence in urban transport (Tarr, McShane, 2007, p. 15). In the light of these problems, the steam tramway was not found suitable for widespread use, this encouraging a search for fresh solutions.

c. Electric Tramways

The application of electricity to tram networks solved most of these difficulties. Electrification took place between the late 1880s and the early 1930s. Electric tramways had a significant influence on urban development, forms and structures (Freeman, Aldcroft, 1988, p. 155; Monclús, Oyón, 1996, p. 224). Among the main advantages of the electric tram in comparison with the steam tram were its cleaner operation and its requirement for less investment in both construction and operation (Cheape, 1980, p. 7). It was much better suited to operation on narrow streets than steam trams (McKay, 1976). Moreover, with its more agile accelerating and braking capacity, it became the main tool supporting the expansion of European cities. Its main role was to provide accessibility to newly developed neighbourhoods in large cities and even into growing suburban areas. Because of their speed, electric trams could easily reach out across a more extensive urban territory, ranging even beyond six to eight kilometres, and because of their carrying capacity they enabled the densification of central urban areas. In this way, they were a tool of the real estate business as much as, or more than, a public service.

The installation of electric tramways was a slow process, which has sometimes been explained by a lack of adequate electrical technology, the need for large capital investments and uncertainty about their profitability (Cheape, 1976, p. 259). In consequence, horse trams and omnibuses continued to operate in the hearts of cities (Divall, Schmucki, 2003, p. 17) until the early twentieth century. Among the first countries to electrify their trams, at the beginning of the twentieth century, were Germany, Belgium and France (Vucnic, 2007, p. 18). The main condition for a rapid spread of electric tramways was the technological possibility for electrification in the most industrialized and urbanized European countries, for example, thanks to companies operating in Belgium, the United States, Germany and the United Kingdom (McKay, 1999, pp. 95-96). Electric trams were an optimal solution that responded both financially and technically to the needs of expanding cities. In some European countries such as the UK and Germany the role of such trams was clearly and directly associated with modernity and innovation (Schmucki, 2012, p. 1076).

However, despite the recognition of the efficiency of tramways, research was carried out in an attempt to achieve even greater versatility. Experiments and tests were performed with an eye to producing a hybrid system somewhere between the new motor buses and the electric tram (Fig. 2). The aim was to apply it to all streets, so that vehicles could run either on tracks or on public roads without rails, drawing electricity from overhead lines or from batteries. The use of buses was still expensive and inefficient when compared to electric tramways (Scientific American,

1900). The question of efficient accessibility was a that time an unresolved issue, and has been ever since: the idea of a trackless trolley car seemed appropriate, because it could be run more economically, connecting less densely populated areas, as an alternative to trams and horse-drawn omnibuses (Aman, 1911). Trolleybuses were basically the outcome of this quest, while more recently there has been the application of more powerful and efficient batteries to buses. However, regardless of the history of these inventions, which sometimes take the focus away from historical realities, electric tramways became a widespread landmark in cities.

Fig. 2. Experiments by Siemens and Halske in 1899: an electric tramway with the possibility of operating as a battery-powered omnibus on the streets. Source: Anonymous (1900) A Combined Automobile and Tramway Omnibus, *Scientific American*, 82 (16), p. 245.

There were, nevertheless, several limitations to the extensive development of tramways in European cities. The electric tram was not always considered a desirable means of transport, especially in large city centres, where the best solution seemed to be underground railways (Schmucki, 2012, p. 1070). Another problem was the aesthetic issue of overhead cables running through iconic or heritage sites, which seemed incompatible with the image of the city (McKay, 1976, p. 84). Furthermore, Capuzzo (2003, pp. 34-38) lists a range of other factors that hindered the development of tramway systems, such as wage bills for their workers, the tertiary functions of the urban centre or the land market in large European capitals. However, despite these uncertainties about the introduction of electric trams, there were no real alternatives available to solve urban accessibility.

The technical characteristics of the tramway influenced urban plans and restructuring. Urban areas were concentrated along tramway lines, a different nuance from the nodal character of development around railway stations (Warner, 1978, p. 49). Connections between urban centres and peripheries and between workplaces and homes were ensured by trams, as were some links between municipalities (Gravagnuolo, 1998, p. 59). The star-shaped development of cities before the generalization of the motor car was related to railways and tramways, since transport systems running on rails tended to adopt radial routes to provide quick, direct connections from outlying areas to city centres, along with some concentric lines. Thus, having the advantages and characteristics mentioned above, electric tramways grew in prominence as the main means of urban development. This was followed by a search for models for urban growth based on the development of electrified tram lines.

2.1.2. THE TRAM AS AN INTEGRAL PART OF THE CITY CONCEPT

Consideration of the possibilities of electric tramways and urbanization soon led to studies of possible urban growth patterns. The expansion of cities interacted with transport capacities, and this had to be taken into account in town planning. Hence, studies of new urban patterns were based on the possibilities of transport. As McKay (1976, p. 219) noted: "Electric tramways did indeed open up large areas for new residential construction and thereby greatly facilitate socially desirable decentralization" (quoted in Schmal, 2003, p. 69). After the electrification of tramways at the end of the nineteenth century, theoretical conceptions began to appear that included tramway lines in their proposals.

One of the first to consider the relationship between trams and urban form was Arturo Soria y Mata. A tramway was the main thrust of the new urban development he proposed for Madrid, an extended form of garden city. However, this *Ciudad Lineal* [Linear City] had rather little urban character and was more a form of de-urbanization (Gravagnuolo, 1998, 78). Soria y Mata proposed a tramway as an axis along which this residential area was planned, although the population density was not really sufficient to support such a service. His legacy was the idea of tram routes as the organizing axes of urban growth, leading to a linear form (Hrůza, 1972, p. 109). In other words, his linear city proposal was based on the concept of urbanization supported by a transport line (Santos and Ganges, 2007, p. 202).

Another approach that linked the tramway to the city of the future was that of Tony Garnier and his *Cité Industrielle* [Industrial City] proposed in 1904. Garnier also considered the tram as a modern means of transport, relevant to industry and new cities. Tramways could function as an organizing element in both urban and suburban areas (Sica, 1981, p. 59).

Ebenezer Howard's "Garden City" concept, intended to solve the problem of the enormous urban sprawl of large cities by setting up new satellite towns, did not take urban tramways into consideration, as the size of each city was small and oriented towards pedestrian accessibility. In this model, the main means of public transport was the suburban train connecting the satellites to the big city. The idea of the garden city was a great success in many European countries, being interpreted in a range of different ways and most usually being applied to a construct that was not quite the same thing: the "garden suburb." As garden suburbs contained neither workplace areas nor any sufficient provision of facilities, they were highly dependent on the city, like other suburbs or more so. Access to these districts was provided by rail transport. The idea of the garden suburb was extensively developed to create residential areas contiguous to industrial zones in the United States[3] and in several European countries. Tramways were put into place in the development of various garden suburbs: Peter Hall (1996) pointed out several such, including as Hellerau in Dresden, the "cottage estate" of Totterdown Fields in London or Mitcham Garden Suburb (later renamed Colonel Light Gardens) in Adelaide. The three were built for different purposes, the first to provide working-class housing, the second for the middle class, and the third primarily for soldiers returned from the First World War. In Russia, the garden suburb idea was a solution also applied in relation to residential-industrial areas (Fig. 3).

Robinson proposed an urban model with a nucleus associated with the railway station (Fig. 4). The idea of the potential centrality of points with maximum accessibility, like railway stations and tram stops, was already unquestioned. Railway stations in the new garden cities were accompanied by the creation of new central facilities, as for example in Welwyn and Letchworth in the United Kingdom or Forest Hills Gardens (Fig. 5) and Vandergrift in the United States. In the suburbs of European cities, suburban railway stops were also poles of attraction where small town centres were created, as for example in H. Jansen's 1910 proposals for Greater Berlin. The idea of the creation of central cores next to tram stops was not developed in this period, but appeared later, especially in the 1960s with the development of the speeds and capacities of rapid tramways.

As far as the more or less continuous development of the existing city was concerned, the use of the tramway was considered as a modern response to urban expansion. German, Austrian and Dutch planners worked on these issues, starting either from the idea of radio-centric growth with the creation of interspersed green belts or zones, or from the idea of star-shaped continuous urban development supported by radial mass transit lines. In both cases, the necessity of not breaking the continuity of existing urban structures was kept in mind.

Among other authors, Berlage and Wagner developed continuous extension proposals for Amsterdam and Vienna in the second decade of the twentieth century. The main idea was to maintain a radial urban model, where tram transport played an important role in providing the integrity of new extensions. On the other hand, other planners such as Stübben, Eberstadt or Wolf defended urban models that contemplated a need for peripheral development and decentralization within the idea of radial urban growth.

The organization of public transport infrastructures was an indispensable condition for the new urbanization of planned residential areas (Eberstadt, 1909, pp. 660-667). Rudolph Eberstadt's model scheme (Fig. 6) showed the intention to structure urban and metropolitan territories (Sica, 1981, p. 39) with the provision of accessibility through tramway lines connecting directly to the city centre. Paul

3 For working-class garden suburbs in the United States see Crawford, M. (1995) *Building the Workingman's Paradise: The Design of American Company Towns*, London-New York: Verso.

Fig. 3. Khodinskoe Pole garden suburb in Moscow, realised after the IGM. The tram line in red colour. Source: Meerovich, M. (2017a) *Gradostroitelnaia politika v SSSR (1917-1929): Ot goroda sada k vedomstvennomu rabochemu poselku*, Moskva: Novoe literaturnoe obozrenie, p. 58. It was located in the north-west direction of Moscow; the planning was an initiative of the City Council of the city and was based on the idea of renting. Due to the height of the residential buildings (3 storeys), access to green areas was limited.

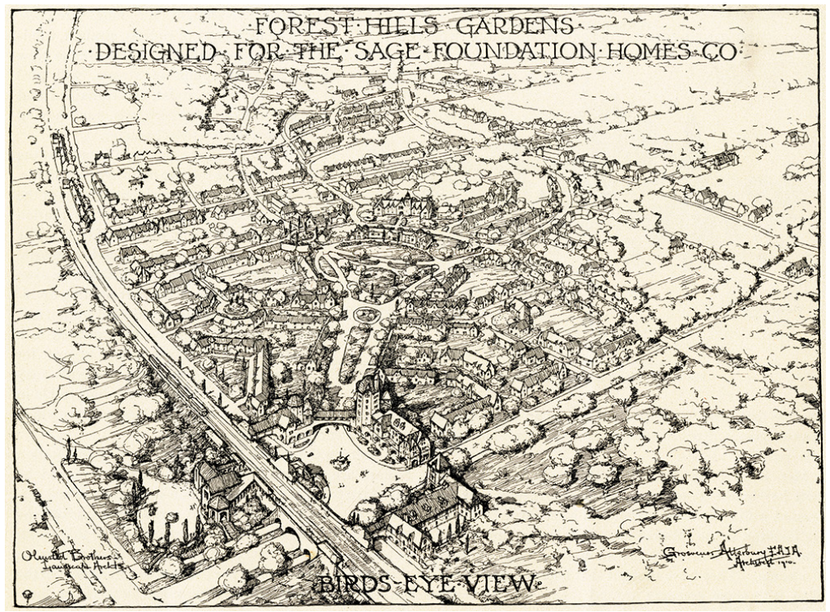
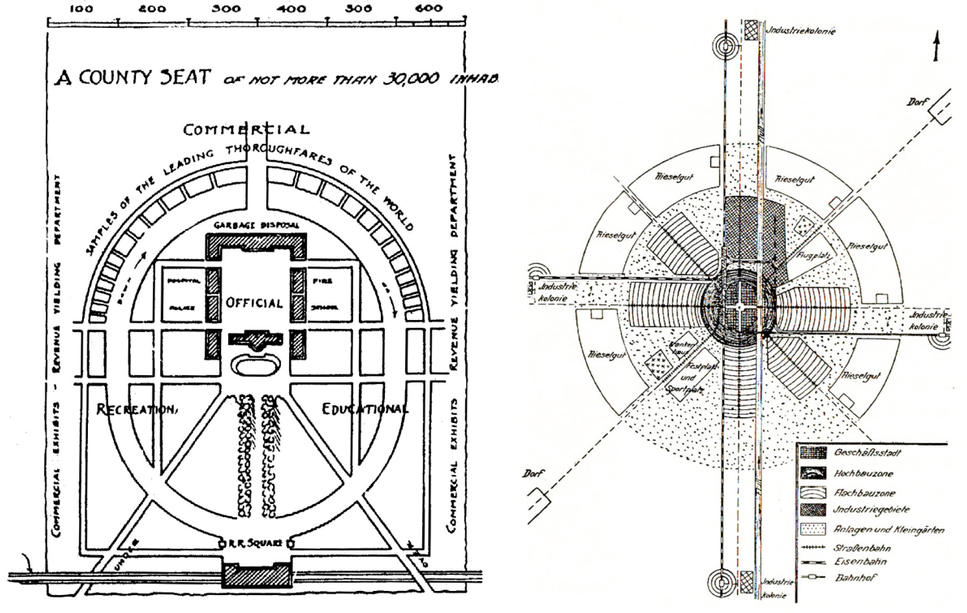


Fig. 4. C. M. Robinson's scheme of centrality in his 1902 model city. Source: Robinson, C. M. (1902) The Plan of the Model City, The Criterion, 3, pp. 34-38, published at http://urbanplanning.library.cornell.edu/.



Right, Fig. 5. View of the American garden suburb Forest Hills Gardens in New York, Edward Hale Brush, 1909. Source: https://www.metropolismag.com/. Buildings with retail, office and leisure functions are located next to the train station.

Left, Fig. 6. Rudolph Eberstadt's scheme of the city in 1912. The tramway connects the city centre with the residential and industrial areas on the periphery. Source: Sica, P. (1981) Historia del Urbanismo. El siglo XX, Madrid: Instituto de Estudios de Administración Local, p. 39.

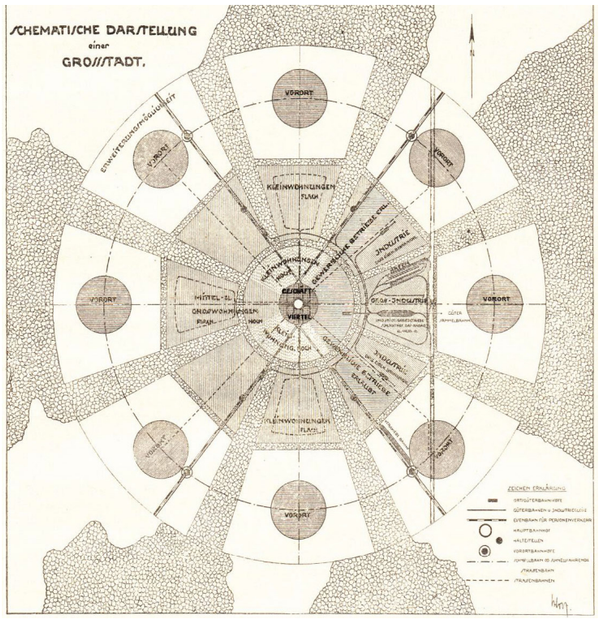


Fig. 7. Schematic presentation of a metropolis city according to Paul Wolf, in 1919. Source: Vonau, E. (2014) Garden city and "standard" layout, in Vonau, E. (ed.), The Fabric of town planning. Garden cities, between France and Germany 1900-1924, Lille: Northern University Press, published at https://books.openedition.org/. The development of new separate residential districts with green space and well connected by tram to the consolidated city.

Wolf's proposal (Fig. 7) was similar to Eberstadt's, with separate settlements close to the city and connected by mass transit lines (Gravagnuolo, 2008, p. 139). This type of growth was on the one hand continuous with the existing urban structure, and on the other "hygienic" and organic, being an intermediate idea between traditional and modern city development.

Josef Stübben in his book *Der Städtebau* [Town Planning] stressed the various possible solutions for city development based on tramways according to differing urban forms and existing street structure (Fig. 8). The different possibilities in the organization of tram networks, radial, circular and diagonal configurations, central and peripheral locations, with the need for incorporation of lines into an integrated system were evaluated. Furthermore, trams were seen as needing to be complemented by suburban rail and other means of urban transport (Stübben, 1907, p. 252). A requirement for modernization through the use of segregated tracking to develop high speeds was also considered.

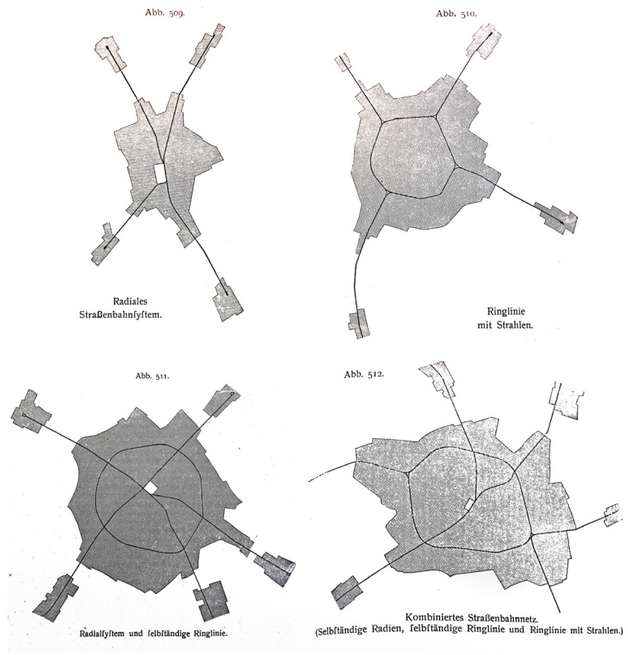


Fig. 8. The configuration of the tramway network according to the size of the city. The last picture represents the possibility of combining several configurations in a city in order to organise a more flexible or optimal network. Source: Stübben, J. (1907) Der Städtebau, second edition, Stuttgart: Alfred Kröner Verlag, p. 250.

It can be concluded that in the early decades of the twentieth century tramway systems were an important means of transport aiding real estate growth and the development of urban models. The role of tram transport in dense urban areas, and for the peripheries and new garden suburbs was recognized. Thus, tramway development had a certain influence on urban forms and structures.

2.1.3. TRAMWAY MUNICIPALIZATION AND ITS GENERALIZATION AS A COLLECTIVE PUBLIC TRANSPORT SERVICE

> "The history of municipal tramways is largely a story of the transfer of inefficient private enterprise undertakings at high, paying better wages, and charging lower fares, prices, and their transformation into convenient and well-equipped services
>
> (Suthers, 1938, cited in Ochojna, 1974, p. 89).

From the start, the development of tramways and similar urban services in cities was a private initiative, albeit always under some control by municipalities, on the basis of weak legal powers derived from railway legislation. In general, tramway development was not supported by the State, although its benefits for improving people's living conditions were obvious. The transfer to municipal hands of urban services was not a matter rapidly achieved. This so-called democratization or socialization of public transport was delayed in its implementation.

Tramway electrification in the United States, the United Kingdom and the Netherlands gave the wealthier classes the possibility to travel comfortably to plush suburbs (Yago, 2006, 134; Capuzzo, 2003, p. 29). A quite different phenomenon also occurred when large industrial companies intervened in terms of workers' housing and accessibility to trams for their employees. However, overall, in practice the tramway was a manifestation of an intensification of social segregation, and widespread access to tram services proved possible to organize only during the inter-war period (Divall, Schmucki, 2003, p. 10).

Tramways were a powerful tool in the hands of large-scale real estate speculation. Land prices were based on the times taken, more than on actual physical distances, to central areas, so that having a tramway meant an effect of enhanced proximity and a rise of the value of housing in the areas that it served. The land market in big cities relied heavily on the construction of tram infrastructures, leaving the problem of social housing unresolved (Gayler, 1970). Urban developers used tramways as a key means to increase real estate prices. There was a reverse to the coin, since tramway builders recognized the interrelation of business, industry and real estate. Thus, land was acquired cheaply, a tram line was installed, and the territory was urbanized and sold for construction. This was a typical scenario for the real estate business that was applied in many countries. Trams served to provide accessibility for middle-class suburban areas whose residents could afford to pay for such a service and preferred to live in better conditions outside cities (Ward, 1964, pp. 487-488; Kane, Bell, 1985). However, they also served to urbanize new working-class areas or districts, which were already beginning to be more distant from city centres.

The process of tramway municipalization was a manifestation of the strength and commitment of some city councils in thriving conurbations to improve the quality of operation of urban services. The intervention of municipal authorities in tramway operations was justified by the high demand for passenger mobility (Cheape, 1976, p. 262), but was also related to left-wing visions of an egalitarian right to urban goods and services (Hallenberg, Linarsson, 2017, p. 73), sometimes referred to as

"municipal Socialism" (Schmidt, 2014, p. 247). The municipalization of British trams was seen by the Fabians as a social tool for the mobility of workers living in suburban areas (Fabian Society, 1898, p. 1; Gunn, Townsend, 2019, p. 95).

However, municipalization did not occur in any widespread way. Frederic Howe indicated the different level of its development in Europe (1915, p. 194):

> "Municipal ownership in Europe is largely the product of the last twenty years. It has become the universally or almost universally accepted policy in Great Britain, and only to a less extent is it the accepted policy in Germany and Switzerland, while to a somewhat lesser degree is it accepted in Italy, Austria-Hungary and the Scandinavian countries."

There were also financial motives for municipalization, related to an aspiration to integrate tramways into the operation of urban areas and to ensure they were efficient and economically viable (Howe, 1915, p. 195). New urban extensions were sometimes difficult to develop in agreement with private companies. On the other hand, in the German case the need for municipalization was also explained by the existence of comprehensive city schemes (Howe, 1915, p. 206) which included proposals for new tramway lines. Trams were seen as a relevant means of transport to improve urban conditions, especially for the working class (Hall, 1996, p. 61). Extending, and adding branches to, lines made it possible to go farther and make land more accessible for the construction of new residential areas (Warner, 1978, p. 154). However, it was still too early for there to be much thought about the need to co-ordinate modes of transport (Foster, 1981, p. 16) and to integrate them into town planning.

Electricity remained a relatively expensive technology in its early years (Schott, 2008, p. 172), depending on whether or not there were resources for hydro-electric power generation. In some countries, such as the United States and the United Kingdom, electric trams became a tool for social segregation (Sica, 1981, p. 674), as they benefited the suburbs where the privileged classes lived. Private electric tram companies were driven by profit, and not by social needs, and only municipal action could retrieve this situation. Some basic municipal control came from the fact that private tramway companies were obliged to seek a contractual concession of the right to use urban space from councils, so that the municipalities could orient tramway services in the general interest and had some power of inspection. This form of organization was widespread in the United States and Europe, where private companies obtained the right to use public roads under municipal by-laws and regulations, which might even cover the planning of tramway infrastructures in a city (Johnson, 1907). A second phase in municipal control was a step towards the municipalization of private companies, which took place in the UK and Germany, for instance. Some local authorities acquired or rescued tramway companies, and took over their management and operation. In principle, this implied better regulation and an improved, stable, cheaper service. However, municipalization did not always have positive consequences. In the UK, for example, the public management of trams was sometimes directed towards profit maximization, which worsened operating efficiency (Tennent, 2017, p. 402).

The setting up of new suburban areas for classes with lower incomes was rarely accompanied by the establishment of tram services (Ochojna, 1974, p. 129). However, this situation started to change after the First World War, when States began

to respond to the demand for housing for war veterans and the working classes. This is when the gradual process of democratization of tramways began, lasting until the early 1930s (Miralles-Guasch, Oyón, 1998, p. 161). In that decade, municipalization took place to a large extent and public authorities were able to influence planning decisions. The shift from private to public enterprises can be considered as an evolutionary process in which the growth of cities led to a need for greater municipal control of urban services.

However, it is not possible to make generalizations, as every country and every city had its own different situation. The differences might perhaps be explained by taking into account local, geographic transport policy, urban structures and traffic factors (Oyón, 1999, p. 17).

2.1.4. THE PECULIARITIES OF TRAMWAY DEVELOPMENT IN GERMANY, CZECHOSLOVAKIA AND RUSSIA

In the case studies of the three countries, the general features mentioned so far for urban trams were present, but there were also significant differences, which makes it difficult to define clear patterns.

a. Germany

One of the first countries in Europe where trams were electrified was Germany (Fig. 9). This can be explained by the coincidence of several conditions. Germany had high levels of industrialization, population growth and urbanization between the 1870s and the First World War (Milward, Saul, 2011, pp. 45-46; Hietala, 1987, p. 107). Urban populations grew by around 11.6 million people between 1850 and 1910 (Reulecke, 1977, p. 27). This intense period of expansion in German cities, and the consequent demand for public transport, coincided with the development of the electric tramway. Several German cities tripled their population in the period from 1870 to 1914, examples being Erfurt, Frankfurt am Main and Dresden, and this led to the rapid construction of electric tram infrastructures (Schmidt, 2014, p. 263; Hietala, 1987, p. 121). Tram networks spread as the main means of urban transport, not only for connections to industrial areas, but also for the social needs of citizens. The expansion of German cities had specific features, such as the incorporation of suburban areas into central municipalities (Schott, 2003, p. 99; Goodman, Chant, 1999, p. 142) in the form of continuous extension based on the prolongation of tram networks. Tramways were seen as a means for urban integration during this expansion.

Municipalization in the German case was motivated by the conflict of private and public interests. Private tramway companies did not adequately consider the cities' needs to expand (Ladd, 1990, p. 203). It was in the public interest to provide a satisfactory public transport service and to co-ordinate of transport development with urban development. As a result, early cases of municipalization showed an increasing integration between travel needs and the planning of tram lines, whilst the private organization of companies maintained tensions affecting the integration of such decisions (Schmidt, 2014). Municipalization and co-operation from tramway enterprises made it possible for the first time to integrate decisions relating

to trams into town planning (Hietala, 1987, p. 257). This overlap of approaches between transport undertakings and cities was considered one of the most important factors in matching supply and demand in public services.

Fig. 9. City Halle, the railway station in 1891, with the simultaneous operation of horse trams and electric trams. Source: Hendlmeier, W., Slotta, R. (1993) Der städtische Nahverkehr, Icomos – Hefte des Deutschen Nationalkomitees, 9, p. 29. It can be appreciated the importance and organisation of tramway transport at such an early date for a medium-sized city.

Urban expansion took the form of new suburbs and satellite cities, but at the same time thought was given to their integration within a consolidated city (Gravagnuolo, 1998, p. 374). From the end of the nineteenth century onwards, there arose the idea of a metropolis [*Großstadt*] which was based on compact city extensions together with residential areas supported by railway and underground lines (Gravagnuolo, 1998, p. 248). Metropolitan growth in Germany occurred earlier than in other countries of the Continent, in the late nineteenth century, and this had a certain influence. A major idea shared by most planners was the importance of connections between the centre and peripheral areas (Kress, 2017, p. 180; Yago, 2006, p. 29; Schmucki, 2012, p. 1072). As a result, many cities in Germany municipalized their tramways in the period up to the outbreak of the First World War. It should be noted that the German experience influenced neighbouring countries, such as Sweden and Finland (Hietala, 1987, p. 387), and served as an example for debates in other European and North American States about models for urban growth.

It should be noted that opposition to overhead electric cables was less strong than in other European countries. On the contrary: trams were associated with a powerful image of modernity and progress. Hence, small and medium German cities also installed tramways (Hendlmeier, Slotta, 1993, p. 31). This explains the widespread presence of this means of transport in almost all German cities. Howe noted that (1913, p. 106): "Street railways, gas, electric light, and water are treated as the cities' vital organs to be owned and operated for service, comfort, and convenience. They are owned by the city because they control its life, its growth, its development" (quoted in Hard, Stippak, 2008, p. 138).

The development of tramways in tandem with new residential areas continued during the Weimar Republic in the 1920s. In the larger cities, such as Berlin, Munich or Hamburg, residential developments were supported by the extension of railway lines, while other cities, for instance Magdeburg (Fig. 10), Leipzig or Cologne, grew on the basis of tram lines. Thus, while in some countries tramways started to decline in this period, in Germany the process of consolidation of the tram networks continued.

Fig. 10. The new residential area Große Diesdorf in Magdeburg with tram line access in the 1920s. Source: https://www.ddr-postkarten-museum.de/.

In the German case, several factors favoured the development of tramway systems. These included early municipalization, a perception of the need for accessibility of peripheral urban areas, consideration of social needs in conjunction with the provision of a sufficient level of service, and an evaluation of the financial viability and efficiency of transport implementations using tramways.

b. The Austro-Hungarian Empire and Czechoslovakia

Until 1918, Czech and Slovak lands within the Austro-Hungarian Empire had no significant tramway development. Austria was more industrialized than Hungary, but still lagged behind countries such as Germany or the United Kingdom (Komlos, 1983, p. 113). The proportion of urban populations in the Empire was not very high, rising from 10.4% in 1869 to 19.9% in 1910 (Fassmann, 1986, p. 10). Cities of administrative and industrial importance developed their electric tramway networks, while other less important cities built only a few lines or had none at all. This was because of the limited interest of the State in the organization of urban transport and the criterion of private profitability of the companies (Závodná, 2012, p. 132). Interesting ideas expressed by Paolo Capuzzo (2003, p. 31) related the degree of development of tramway systems with people's mobility, and the levels of wages and of tram fares. Thus, the cities of the Austro-Hungarian and Russian Empires had only sparse tramway development, because of their low levels of wages.

At the end of the nineteenth century, few cities in Bohemia and Moravia had electric trams in comparison with their German counterparts. This lagging behind might in part also have been due to technological difficulties with the installation of electric trams (Závodná, 2018, p. 20). However, from the beginning of the twentieth century, most cities also started to have electric trams.

In Slovakia, electric tramways operated in only two cities, Bratislava (from 1895) and Košice (from 1914), which may have been largely an outcome of the low level of industrialization and urbanization. Among the most dynamic Czech cities in their urban development were Brno (as an administrative centre) and Ostrava (as an industrial centre), which also had better developed tramway infrastructures (Závodná, 2016, p. 11). In 1895, the government of the Habsburg monarchy took the decision to encourage the electrification of trams. Its interest was more financial than social, and inspired by electricity companies. There were private, mixed and public tram undertakings. Only a few companies were municipalized before the First World War, examples being Brno and Ostrava. These two cities had complex tramway systems, mainly because of their larger size as they integrated suburban areas. Other Czech cities also had electric trams, although they had less extensive systems based on the typical idea of connecting the city centre with the main railway station.

Furthermore, one possible explanation for the late development of electric tramways is an ambiguity in the understanding of what urban rail transport was, as suburban railways were considered to be an urban mode of transport that therefore somehow took the place of trams (Závodná, 2016, p. 258). After the creation of Czechoslovakia in 1918, companies providing public transport started to be municipalized. This was accompanied by the metropolitan growth of larger cities through the inclusion of suburban areas into the urban territory, which eventually boosted the consolidation of tramway system.

Trams were not a widespread mode of transport in Czech and Slovak cities. This may have been in part because of only moderate levels of industrialization and urbanization, in part because of weak commitments by local authorities. Larger cities with a strong industrial base were able to develop their tramway networks, while in others there were only a few lines, which were mostly completed in the 1920s and 1930s. In practice, trams maintained their standing in the cities where they had existed before. Attention was also paid, for example, to cities such as Mariánské Lázně, Jablonec nad Nisou, Liberec or Ústí nad Labem. The main actions were related to the lengthening of existing lines and the opening of new routes, mainly to connect suburban areas with cities. In this way, the co-existence of trams and suburban trains was maintained.

c. The Russian Empire and the USSR

Modern processes of industrialization and urbanization also began in Russia at the end of the nineteenth century. Until the beginning of the twentieth century (around 1905 or 1906), in Russia the main means for moving people was horse-drawn transports (Tarkhov, 2014, p. 89; Goodman, Chant, 1999, p. 306). Russia's industrialization began to intensify from 1880 onwards, continuing uninterruptedly until the First World War (Milward, Saul, p. 403). However, one of the peculiarities of Russian cities was the weak relationship between urbanization and industry: most

industrial sites lay outside the cities, this supporting a growth in the rural population (Fedor, 1975, 175). The population rose from 74 million inhabitants in 1860 to 170 million in 1916 (Goldsmith, 1961, p. 441), with a low level of urbanization of 7.8% in 1917 (Szymańska, 2004, pp. 77-78). This is probably why the development of tramway lines was on no large scale, being restricted to only the most important cities and limited even there. The construction of residential areas was sparse and did not enjoy any public support (Sitin, 1926, p. 86). The use of trams was mainly oriented towards central inner-city areas, while peripheral areas were barely taken into account. The process of tramway electrification was slow and completed only in a few large cities. Thus, the development of tramway systems in Russian cities was selective and limited in nature, being characterized by a few lines connecting the most important urban areas.

The tramway operators were private companies, associated with foreign technologies, and with a need to bring rolling stock and spare parts in from abroad. In fact, several companies from Germany, France and Belgium were involved in their construction (Shpakov, 2013, p. 246). Municipalities were not able to build tramway infrastructures themselves (Simonov, 2017, p. 168). Likewise, subsequent municipalization was very limited, owing to the financial weakness of municipalities (Tarkhov, 2014, pp. 120-121). Nevertheless, of the thirty-eight tramway enterprises in the Russian Empire, only twenty-seven were private (Simonov, 2017, p. 187). In general, private operators were not interested in public service but only in short-term profits (Shpakov, Mikhailova, Koroteeva, 2015, p. 1025). One of the first books published on tramways in Russia was the work by G. A. Dubelir from 1908. For the first time, a full description was given of the technical characteristics of rolling stock, infrastructure and electrification. The work was produced with the aim of helping to improve the development of tramway systems by explaining technical issues that were then quite new to technicians and planners.

The tramway networks were badly damaged during the First World War and especially during the Soviet revolution, with proper maintenance and repairs being impossible (Tarkhov, 2014, p. 106). Trams were nationalized after the October Revolution. The management of undertakings, the manufacture of rolling stock, and the construction of infrastructures were issues that had to be resolved in a context of many limitations. On the other hand, the absorption of suburban areas by large urban municipalities started to pick up from 1917 onwards in big cities such as Moscow and Leningrad. In 1927, 55% of the tramway infrastructure was to be found in just four large cities: Moscow, Leningrad, Kiev and Odessa (Simonov, 2017, p. 187), which is an indication of the low level of tramway development in other large and medium urban areas. In 1929, with 721 cities in the USSR, there were only forty-one tramway enterprises, which in general did not have extensive operations (Orlov, 2019, p. 146).

It should be noted that, throughout the 1920s, tramways were not taken into account in the avant-garde proposals for the Socialist city [Sotsgorod]. The new concepts of linear cities and satellite cities relied basically on road and rail infrastructure (the latter mainly for freight). However, Stalin's industrialization policy and the construction of new industrial cities did bring a requirement for optimum public transport services (Fig. 11). The urgent need for industrialization was the main explanation for the need to improve public transport, especially trams, which were a relatively cheap means of mass transport.

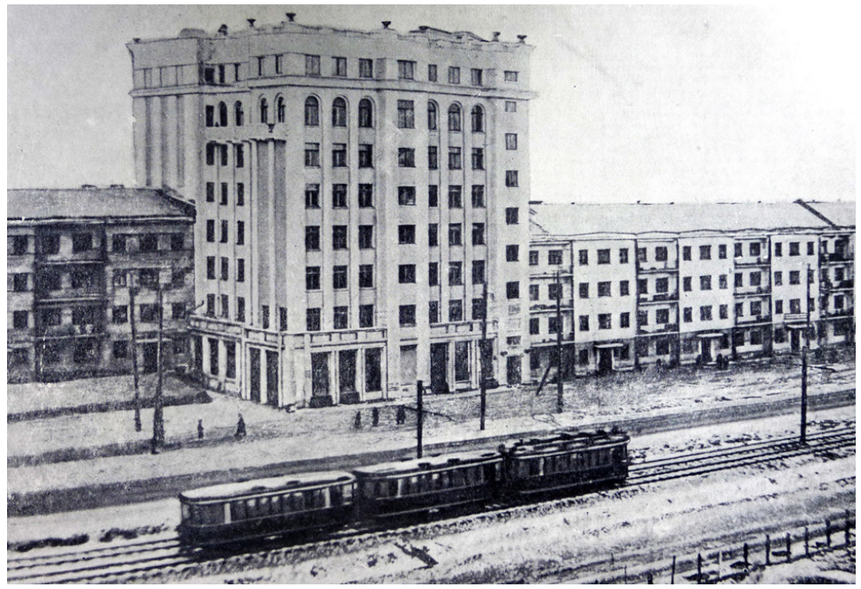


Fig. 11. Three-car tramway (one motor and two trailer cars) on a reserved platform on Kirova Street in Magnitogorsk in 1938. Source: https://transphoto.org/.

2.1.5. CONCLUSIONS

The electric tramway was the result of the search for a solution to provide fast communications from city centres to outlying areas, and it enabled urban growth, especially in larger cities. Electric trams were a ground-breaking tool for the development of industrialization and urbanization. They proved slow in becoming a true public service, because at first, they served as an instrument of the real estate business and then as enterprises merely seeking to meet demand, with the social benefits of collective urban transport being largely ignored. The relatively high speeds and capacities of electric tramways contributed to the formation of suburban areas and even satellite cities with larger populations, although it was suburban trains that played the most important role in the latter. The development of mobility facilitated the expansion of cities into forming metropolitan areas. With the growth of cities and increases in urban traffic, trams came to seem ever more necessary. The municipalization of private tramway companies brought positive consequences in terms of improvements in services and their co-ordination with town planning. This was a process considered necessary to organize and control urban development.

Urban growth, whether on more modern or more traditional lines, was based on tramway routes. They were the main means of transport for cities and their peripheries, as well as for garden suburbs and linear cities. They were applied as the principal tool for urban extension and the solution of problems arising from rapid urbanization. This was mainly because trams were considered a modern means of transport, a viewpoint that lasted without any doubt from the final decades of the nineteenth century at least until the 1920s.

Consideration of the three countries under analysis shows different historical dynamics for tramway development. Various factors were involved: different levels of urbanization, industrialization, technological development, municipalization and transport technology. In Germany, the rapid expansion of cities combined with technological possibilities and the taking of long-term views to encourage tramway development. On the other hand, the early institutionalization of town planning also favoured improvements in tram services. Public transport development in what was to become Czechoslovakia was somewhat limited, although the exceptions, such as Brno, Ostrava or Prague, were significant. In the areas that became the USSR, public transport before the Soviet revolution was weak and poorly implemented. The low level and isolated nature of industrialization and urbanization also contributed negatively to the development of electric trams, which were limited to a few large and medium cities.

Starting in the 1920s, the first clear conflicts between trams and cars appeared, as the latter grew commoner in cities. Moreover, tramway development in the 1930s was already paralleled by the introduction of other competing options, such as trolleybuses and buses. This topic is discussed in the following section.

2.1.6. BIBLIOGRAPHICAL REFERENCES

Aman, F. T. (1911) The Trackless Trolley System: Some General Observations, T*he Town Planning Review*, 1 (4), pp. 299-302.

Anonymous (1900) A Combined Automobile and Tramway Omnibus, *Scientific American*, 16 (82), pp. 245-246.

Capuzzo, P. (1998) Transportation system and urban space. Vienna 1865-1938, *Jahrbuch für Wirtschaftsgeschichte / Economic History Yearbook*, 39 (2), pp. 153-168.

Capuzzo, P. (2003) Between Politics and Technology: Transport as a Factor of Mass Suburbanization in Europe, 1890-1939, in Divall, C., Bond, W. (eds.), *Suburbanizing the Masses. Public Transport and Urban Development in Historical Perspective*, Burlingtone: Ashgate, pp. 23-47.

Cheape, C. W. (1976) The Evolution of Urban Public Transit, 1880-1912: A Study of Boston, New York and Philadelphia, *The Journal of Economic History*, 36 (1), pp. 259-262.

Cheape, C. W. (1980) *Moving the Masses: Urban Public Transit in New York, Boston, Philadelphia 1880-1912*, Harvard University Press, Cambridge, MA.

Clark, D. K. (1878) *Tramways. Their Construction and Working*, London: Crosby Lockwood and Co.

Clark, C. (1958) Transport: Maker and Breaker of Cities, *The Town Planning Review*, 28 (4), pp. 237-250.

Crawford, M. (1995) *Building the Workingman's Paradise: The Design of American Company Towns*, London-New York: Verso.

Daniels, P. W., Warnes, A. M. (1983) *Movimiento en Ciudades, Transporte y Tráfico Urbanos*, trans. Tellez, S., Madrid: Instituto de Estudios de Administración Local.

Divall, C., Schmucki, B. (2003) Introduction: Technology, (Sub)urban Development and the Social Construction of Urban Transport, in Divall, C., Bond, W. (eds.), *Suburbanizing the Masses. Public Transport and Urban Development in Historical Perspective*, Burlington: Ashgate, pp. 1-19.

Dubelir, G. D. (1908) *Gorodskie Elektricheskie Tramvai*, Kiev: Pechatnya S. P. Yakovleva.

Eberstadt, R. (1909) The Problems of Town Development, *Contemporary Review*, 96, pp. 660-667.

Fabian Society (1898) Municipal Tramway, *Fabian Tract*, 33, pp. 1-4.

Fassmann, H. (1986) City-Size Distribution in The Austrian-Hungarian Monarchy 1857-1910: A Rank-Size Approach, *Historical Social Research/Historische Sozialforschung*, 38, pp. 3-24.

Fedor, T. S. (1975) *Patterns of Urban Growth in the Russian Empire*, Chicago: The University of Chicago Department of Geography.

Foster, M. S. (1981) *From Streetcar to Superhighway: American City Planners and Urban Transportation, 1900–1940*, Philadelphia: Temple University Press.

Freeman, M. J., Aldcroft, D. H. (1988) *Transport in Victorian Britain*, Manchester and New York: Manchester University Press.

Gayler, H. J. (1970) Land Speculation and Urban Development: Contrasts in South-East Essex, 1880-1940, *Urban Studies*, 7 (1), pp. 21-36.

Glenn, Y. (2006) *The Decline of Transit. Urban Transportation in German and US Cities 1900-1970*, Cambridge: Cambridge University Press.

Goldsmith, R. W. (1961) The Economic Growth of Tsarist Russia 1860-1913, *Economic Development and Cultural Change*, 9 (3), pp. 441-475.

Goodman, D., Chant, C. (1999) *European Cities and Technology, Industrial and Post-industrial City*, Milton Keynes: Routledge.

Gravagnuolo, B. (1998) *Historia del Urbanismo en Europa, 1750-1960*, trans. Juan Calatrava, Madrid: Akal Arquitectura.

Gullberg, A., Kaijser, A. (2004) City-building regimes in post-war Stockholm, *Journal of Urban Technology*, 11 (2), pp. 13-39, DOI: 10.1080/10630730412331297297.

Gunn, S., Townsend, S. C. (2019) *Automobility and the City in Twentieth-Century Britain and Japan*, London and New York: Bloomsbury Publishing Plc.

Hall, P. (1996) *Ciudades del mañana: historia del urbanismo en el siglo XX*, Barcelona: Ediciones del Serbal.

Hallenberg, M., Linnarsson, M. (2017) The quest for publicness: political conflict about the organisation of tramways and telecommunication in Sweden, c. 1900–1920, *Scandinavian Economic History Review*, 65 (1), pp. 70-87, DOI:10.1080/03585522.2016.1258007.

Hard, M., Stippak, M. (2008) Progressive Dreams: The German City in Britain and The United States, in Hard, M., Misa, T. J. (eds), *Urban Machinery: Inside Modern European Cities*, Cambridge and Massachusetts: The MIT Press, pp. 121-139.

Hendlmeier, W. (1988) Gesichtspunkte der Umweltverträglichkeit beim Straßenbahnbetrieb – Vergleich mit anderen Verkehrsmitteln, *Stadtverkehr*, 1, pp. 1-30.

Hendlmeier, W., Slotta, R. (1993) Der städtische Nahverkehr, *ICOMOS – Hefte des Deutschen Nationalkomitees*, 9, pp. 28-32.

Hietala, M. (1987) *Services and Urbanization at the turn of the Century. The Diffusion of Innovations*, Helsinki: SHS.

Hilton, G. W. (1969) Transport Technology and the Urban Pattern, *Journal of Contemporary History*, 4 (3), pp. 123-135.

Hirszson, H. (1900) *Gorodskie dorogi bolshoi skorosti. Sooruzhenie, Eksploatatsiia i Finansovoe polozhenie*, trans. Yablonskii, P. O, Sankt Peterburg: Leshtukovskaya Parovaya Skoropechatnya.

Howe, F. C. (1913) *European Cities at Work*, New York: Charles Scribner's Sons.

Howe, F. C. (1915) Municipal Ownership-The Testimony of Foreign Experience, *The Annals of the American Academy of Political and Social Science*, 57, pp. 194-208.

Hrůza, J. (1972) *Teoriia goroda*, trans. L. B. Mostovaya, Moskva: Izdatelstvo literatury po stroitelstvu.

Johnson, E. R. (1907) Public Regulation of Street Railway Transportation, *The Annals of the American Academy of Political and Social Science*, 29, pp. 31-47.

Kane, K. D., Bell, T. L. (1985) Suburbs for a Labor Elite, *Geographical Review*, 75 (3), pp. 319-334.

Koester, F. (1914) *Modern city Planning and Maintenance*, New York: McBride, Nast and Company.

Komlos, J. (1983) *The Habsburg Monarchy as a Customs Union. Economic Development in Austria-Hungary in the Nineteenth Century*, New Jersey: Princeton University Press.

Kress, C. (2017) German Traditions of Städtebau and Stadtlandschaft and their Diffusion through Global Exchange, in Hein, C. (ed.), *The Routledge Handbook of Planning History*, New York: Routledge, pp. 173-191.

Ladd, B. (1990) *Urban Planning and Civic Order in Germany, 1860-1914*, Harvard University Press.

McKay J. P. (1976) *Tramway and Trolleys: The rise of Urban mass transport in Europe*, New Jersey: Princeton, p. 240.

McKay, J. P., Gicquiau, A. (1984) Les transports urbains en Europe et aux Etats-Unis. 1850-1914, *Les Annales de la recherche urbaine*, 23 (24), pp. 115-126.

McKay, J. P. (1999) Comparative perspectives on Transit in Europe and the United States 1850 – 1914, in Roberts, G. K. (ed.), T*he American Cities and Technology Reader. Wilderness to Wired City*, London and New York: Routledge, pp. 88-97.

McShane, C., Tarr, J. A. (2007) *The Horse in the City*, Baltimore: The Johns Hopkins University Press.

Meerovich, M. (2017a) *Gradostroitelnaia politika v SSSR (1917-1929): Ot goroda sada k vedomstvennomu rabochemu poselku*, Moskva: Novoe literaturnoe obozrenie.

Milward, A. S., Saul, S. B. (2011) *The Development of the Economies of Continental Europe 1850-1914*, Oxon and New York: Routledge.

Miralles-Guasch, C., Oyón, J. L. (1998) De casa a la fábrica. Movilidad obrera y transporte en la Barcelona de entreguerras, 1914-1939, in Oyón, J. L. (ed.), *Vida obrera de la Barcelona de entreguerras*, Barcelona: CCCB.

Monclús, F. J., Oyón, J. L. (1996) Transporte y crecimiento urbano en España, mediados s. XIX - finales s. XX., *Ciudad y Territorio, Estudios Territoriales*, XXVIII (107-108), p. 217-240.

Ochojna, A. D. (1974) *Lines of Class Distinction. An economic and social history of the British tramcar with special reference to Edinburgh and Glasgow*, PhD Thesis, University of Edinburgh.

Orlov, I. B. (2015) *Kommunalnaia Strana: Stanovlenie Sovetskogo Zhilishchno-Kommunalnogo Khoziastva (1917-1940)*, Moskva: Vysshaia Shkola Ekonomiki.

Oyón, J. L. (1999) Transporte público y estructura urbana. (De mediados s. XIX a mediados s. XX): Gran Bretaña, España, Francia y Países germánicos, *Ecología Política*, 17, pp. 17-35.

Reulecke, J. (1977) Growth and Urbanization in Germany in the 19th Century, *Urbanism Past & Present*, 4, pp. 21-32.

Robinson, C. M. (1902) The Plan of the Model City, *The Criterion*, 3, pp. 34-38.

Santos y Ganges, L. (2007) *Urbanismo y ferrocarril. La construcción del espacio ferroviario en las ciudades medias españolas*, Madrid: Fundación de los ferrocarriles españoles.

Schmal, H. (2003) The Historical Roots of the Daily Urban System, in Musterd, S. and Salet, W. (eds.), *The Historical Roots of the Daily Urban System*, Amsterdam: Amsterdam University Press.

Schmidt, J. (2014) Public services in Erfurt and Frankfurt am Main compared (c. 1890–1914): capabilities in Prussia? *Urban History*, 41 (2), pp. 247-264.

Schmucki, B. (2010) Fashion and Technological Change: Tramways in Germany after 1945, *Journal of Transport History*, 31 (1), pp. 1-24.

Schmucki, B. (2012) The Machine in the City: Public Appropriation of the Tramway in Britain and Germany, 1870–1915, *Journal of Urban History*, 38 (6), pp. 1060–1093.

Schott, D. (2003) Suburbanizing the Masses for Profit or Welfare: conflict and Cooperation Between Private and Municipal Interests in German Cities, 1890-1914, in Divall, C. and Schmucki, B. (eds.), *Suburbanizing the Masses: Public Transport and Urban Development in Historical Perspective*, Burlington: Ashgate.

Schott, D. (2008) Empowering European Cities: Gas and Electricity in the Urban Environment, in Hard, M., Misa, T. J. (eds), *Urban Machinery: Inside Modern European Cities*, Cambridge and Massachusetts: The MIT Press, pp. 165-186.

Simonov, N. (2017) *Nachalo elektroenergetiki Rossiiskoi Imperii i SSSR kak problema tekhnotsenoza*, Moskva-Vologda: Infra-Inzheniriya.

Shpakov, I. V. (2013) Istoriia proektirovaniia otechestvennykh sochlenennykh tramvainykh vagonov na Ust-katavskom vagonostroitelnom zavode imeni S. M. Kirova, *Gramota*, 4 (71), pp. 212-214.

Shpakov, I, V., Mikhailova, E. D., Koroteeva, N. N. (2015) The Belgian Investments in Mass Transit of the Cities in Russian Empire at the End of the XIXth and at the Beginning of the XXth Centuries, *Bylye Gody*, 38 (4), pp. 1019-1027.

Sica, P. (1981) *Historia del Urbanismo. El siglo XIX*, vol. 2, trad. Joaquín Hernández Orozco, Madrid: Instituto de Estudios de Administración Local.

Sitin, P. V. (1926) *Kommunalnoe Khoziaistvo i Blagoustroistvo Moskvi v Sravnenii s Blagoustroistvom Drugikh Bolshikh Gorodov*, Moskva: Novaya Moskva.

Stübben, J. (1907) *Der Städtebau*, segunda edición, Stuttgart: Alfred Kröner Verlag.

Szymańska, D. (2004) Some problems of Urbanization in Russia, *Current Politics and Economics of Russia*, 19 (2), pp. 75-97.

Tarkhov, S. A. (2014) Gorodskoi Transport Rossiiskoi Imperii v gody Pervoi Mirovoi Voiny, *Ekonomicheskii zhurnal*, 4 (36), pp. 89-123.

Tarr, J. A., McShane, C. (2008) The Horse as an Urban Technology, *Journal of Urban Technology*, 15 (1), pp. 5-17, DOI: 10.1080/10630730802097765.

Tennent, K. D. (2017) Profit or utility maximizing? Strategy, tactics and the Municipal Tramways of York, c. 1918-1935, *Journal of Management History,* 23 (4), pp. 401-422.

Trautvetter, K. (1920) *Linienführung elektrischer Bahnen,* Berlin: Verlag von Julius Springer.

Trautvetter, K. (1921) *Die Notlage der deutschen Kleinbahnen und Privateisenbahnen und Mittel zu ihrer Behebung*, Berlin: Springer-Verlag.

Vonau, E. (2014) Garden city and "standard" layout, en Vonau, E. (ed.), *The Fabric of town planning. Garden cities, between France and Germany 1900-1924*, Lille: Northern University Press, publicado en https://books.openedition.org/

Vucnic, V. R. (1981) *Urban Public Transportation. Systems and Technology*, New Jersey: Prentice-Hall. Inc.

Vucnic, V. R. (2007) *Urban Transit Systems and Technology*, New Jersey: John Wiley and Sons.

Ward, D. (1964) A Comparative Historical Geography of Streetcar Suburbs in Boston, Massachusetts and Leeds, England: 1850-1920, *Annals of the Association of American Geographers*, 54 (4), pp. 477-489.

Warner, S. B. (1978) *Streetcar suburbs: the process of growth in Boston, 1870-1900*, Cambridge: Harvard University Press.

Yago, G. (2006) *The Decline of Transit. Urban Transportation in German and US Cities 1900-1970*, Cambridge: Cambridge University Press.

Závodná, M. (2012) The electrification of tramways in Ostrava in 1900–1901, *Acta Polytechnica*, 52 (5), pp. 130-132.

Závodná, M. (2016) *Koleje a město. Problematika městské kolejové dopravy ve vybraných moravských a slezských městech v letech 1850–1918*, Ostrava: Bohumír Němec – Veduta, Nakladatelství a vydavatelství.

Závodná, M. (2018) From Vienna to Ostrava – from Austria to Czechoslovakia: Urban Rail Transport in the Czech Lands (on the Example of the Ostrava Agglomeration, 1894 – 1924, *Mesto a Dejiny*, 7(1), pp. 18-39.

Internet sources:

https://www.metropolismag.com/

https://www.ddr-postkarten-museum.de/

https://transphoto.org/

2.2. THE BEGINNINGS OF CRISIS FOR TRAMS AND THE TRIUMPH OF CAR CITIES FROM THE 1920S ONWARDS

After the First World War, most European cities continued extending their tramway networks and normalized their operation as a public service. However, at the same time, motor transport burgeoned, which led to doubts about the role of trams in cities. The motor car changed views of the future of the city. Town planners, while accepting the value of trains and trams, began to consider the car as a key to city modernity.

The fluidity and speed of motor traffic began to be considered incompatible with trams. There were even plans for the complete replacement of trams with other new alternatives which did not require tracks, such as trolleybuses and motor buses. The tramway crisis between the 1930s and the 1950s was more literary than real, but in fact some tram networks were decommissioned. Technical approaches were rather lacking in objectivity, biased and reliant on the versatility of motor vehicles and road infrastructures; the disadvantages of trams were emphasised, and their advantages and potential modernization were ignored. Tramways started to be viewed as an old, slow, noisy, dangerous mode of transport.

Despite this, ideas and projects for the modernization of tramway systems were developed in some European countries before the Second World War, and in this inter-war period the economic situation prevented the immediate abandonment of tramways, leading to repair and rebuilding. However, from the 1950s onwards, road traffic engineering techniques began to gain more weight and influence in all European countries. Studies of transport and urban traffic planning were scarce and under a strong influence from American and British ideas and experiences.

The European Communist countries experienced a period of uncertainty about how to proceed with the reconstruction of their cities. It seemed feasible to incorporate new traffic planning principles, so as to forestall problems of congestion in the future. It was also crucial to gain a knowledge of urban traffic management. Therefore, the planning of streets and roads to provide for motor traffic began to be introduced as a modern method, putting in question the need for trams. Within this general trend, some constraints persisted that favoured tramways, such as those which emerged from careful assessments of their economic, social and environmental efficiency, supported by policies for the co-ordinated operation of various modes of urban public transport with each other. All this led to mixed solutions in town planning in Western, Central and Eastern European countries.

The aim of this chapter is to understand the dynamics of the tramway crises in the 1930s and 1950s. How and why did tramways begin to lose their pre-eminence? Why were they retained in some Western European countries? What ideas did these countries have in common? What were the differences in their logics? This historiographical problem is approached through an analysis of the ideas of Modern Movement and apologetics for the car city, as well as consideration of studies and practices for collective public transport and the exchange of ideas on traffic engineering. In addition, technical literature produced and translated in that period was studied, together with influences and changes in opinions. Several plans and projects were also investigated, in order to exemplify interventions in tramway planning.

The idea of decommissioning tramway systems was not yet strong in the 1930s and 1940s, and was mostly mooted in more advanced countries and their big cities. However, no general need for widespread replacement was felt, and even the potential for modernization was not considered. This changed in the 1950s, when a belief in the need to adapt cities to the requirements of motor traffic triumphed, spurred on by an aspiration to modernize and rationalize cities. There were a few countries and cities that resisted this trend, partly because of economic difficulties, but also because they had stable and defined criteria for public transport planning.

2.2.1. RAIL AND TRAM TRANSPORT VERSUS AUTOMOBILE

The liberal revolutions, technical advances and industrialization of the nineteenth century turned "progress" into a widely used term, albeit conceptually elusive. At the beginning of the twentieth century, "modernity" was the benchmark. The motor vehicle was an indispensable attribute for modernized cities. It was an invention or application that differed from anything that had gone before, because for the first-time land transport could have great flexibility and speed. These two features in transport technology transformed urban spaces (Divall, George, 2005, p. 108). Traffic engineering was becoming a powerful tool for "rationalizing" cities.

It was often difficult to see the importance of reconciling the traditional and the new, with progress taken to extremes, and the loss of valuable accumulated experience (Mumford, 1963, p. 306). Certain countries were able at this time to recognize the major role tramways could play in collecting and concentrating large urban passenger flows.[4] Despite their financial and social efficiency, trams were tarred with the brush of being contrary to progress, old and reactionary. This was a trend that started in more developed countries, but was assimilated by quite a few others.

In the United States, true mass production of motor cars began in 1913 (Flink, 1990, p. 40). The opening up of manufacturing subsidiaries of American companies in the United Kingdom, France and Germany in the second decade of the twentieth century contributed from the 1920s onwards to a growth in the mass production of cars in these countries and to the adoption of similar production methods by European manufacturers. For example, during the 1920s, car production in France grew from 41,000 units per year at the start of the decade to 212,000 units by its end (Flink, 1990, p. 45). Mass production of cars in other countries such as Czechoslovakia, Sweden or Italy started in the mid-1920s (Krpec, Hodulák, 2018; Pavlínek, 2002), although it was not able to attain the production levels of the most advanced European countries. Apart from this growth in the production of motor vehicles, a further factor intervening was the strategy of American companies in the 1920s which aimed at exporting cars to Europe (Dassbach, 1994, p. 492). This led to an enormous growth in vehicle fleets.

The great expansion in the presence of motor cars and increased accessibility for more people were issues that thinkers, planners and designers used to form a "modern" vision of cities. The technological transformation of streets, well described by Hénard in *Les villes de l'avenir* [Towns of the Future] in 1910, required the

4 Decades later, L. Mumford (1963, p. 307) recognised that "A good transport system reduces unnecessary transport. Diffusion and concentration are the two main poles of transport."

addition of routes below and even above street level, which would allow trams to be removed from the street onto elevated tracks, or railways to be run underground. This concept was much relied upon by urban thinkers in many countries (Fig. 12).

Le Corbusier was the most influential, and at the same time the most radical, of the advocates of architectural and town planning modernity. His writings, drawings and projects made it possible to visualize a modern mode of operation for traffic and transport: the creation of arterial routes for motor traffic, hierarchies of roads in their urban roles, the separation of pedestrian from vehicular traffic, and the exclusion of rail transport. The issues of urban transit were also expounded, critiqued or postulated in Le Corbusier's texts. The operation of railways was justified only for freight traffic and they should be moved to the urban periphery. Railways were branded as a means of transport that caused suburban sprawl, with suburbs and garden cities spreading out horizontally, and a loss of time in comparison with a vertically organized city. The order and rigidity that rail transport gave to both urban traffic and the organization of cities was slated uncritically in his *Propos d'urbanisme* [Concerning Town Planning] of 1946, whilst he saw motor transport as helping to break away from this rigidity, giving a breath of fresh air to cities and providing freedom of movement:

> *"Here there is a double catastrophe. A menacing loss of equilibrium. In these tentaculate cities life is madness. Men move about their cities sitting over the wheels of trams, undergrounds, cars, suburban trains, living a disordered and demoralizing existence. This is a new slavery." (Corbusier, 1980, p. 57).*

However, Le Corbusier, apart from a vertical separation of traffic, which was too costly to be generally applicable, did not provide any alternative solution to cope with mass movements and avoid urban vehicular congestion. In *Les trois établissements humains* [The Three Human Establishments] of 1944, his solution for mobility was simply to rely on road infrastructures with cars, motorbikes, motor buses and trolleybuses, and on a road hierarchy based on speed:

> *"Railways brought dispersion and its inevitable consequence of waste: an immense waste of time, effort, money, and thus of work. (…) One transport problem is of particular importance. It does not concern people, since the water, road and rail network for moving goods is exclusively involved in industrial operations and must be built for that purpose. Movements of people have their origins in industrial establishments, but also in their places of residence. For them there should be branches off the motor roadway that is the spine of the linear city. Human transit is by such roads, using trolleybuses, coaches, buses, motorbikes or bicycles. The main arterial road is restricted to heavy goods vehicles. Here is an opportunity to create ideal, modern, rapid transit routes. Where green factories, residential areas and their extensions evince a new state of mind, roads with speeds of a hundred kilometres an hour will be the perfect technical and aesthetic expression of this new instrument of mechanical speed placed in the hands of men, which until now they have turned into disorder, ugliness and even a threat to their health." (Corbusier, 1981, pp. 114-115).*

Le Corbusier considered the urban structure of existing cities unsuitable for modern life. Railways, in his view, disordered the city with their dense criss-crossing networks. In contrast, he saw development of motor transport as harmonious

with, and an instrument for, achieving order in land use and the modern functioning of cities. Existing cities thus had to adapt to the new speed of moto vehicles with a hierarchy of roads, accesses and streets (Corbusier, 1981, p. 127).

His solution to the main problem, urban transport in city centres, was a proposal for a vertical organization of traffic. "A new technique, high-rise construction, combined with vertical traffic flows, will replace the disastrous approach of dispersed construction with endless horizontal flows" (Corbusier, 1981, p. 114).

Le Corbusier associated motor vehicles with the vertical city, the icon of modernity, and railways with the horizontal city, a manifestation of the most unsuitable town development. However, F. L. Wright's proposal in Broadacre City (1932) associated cars with low densities and extensive city development, or rather, general suburbanization. Furthermore, the vertical city of Hilberseimer (Fig. 13) and Le Corbusier was not based exclusively on motor vehicles, but also and fundamentally on railways, albeit running underground, as unsuitable for urban space, which provided accessibility to dense areas. Rail transport facilitated density, while verticality was needed in order to find space for the circulation of cars and other motor transport.

With the proposal of linear industrial settlements, the issue of urban transport was not so much resolved as avoided. It was proposed people should live close to their work, not moving around very much, dwelling in residential areas with parks and socio-cultural amenities. However, direct pedestrian access provided no solution for the problem of urban accessibility and mobility, other than a modern imitation of an industrial village. For the general mobility of people, there was just the motor road, while for the movement of goods there were railways, canals and roads (Corbusier, 1981, p. 120).

This trend was in fact put in practice in almost all European countries. Most proposals were based on the widespread use of cars, some supplemented this with buses and trolleybuses, and there might be suburban commuter trains as a side issue. Any combination of trams and motor vehicles on public roads seemed impossible, unnecessary and unfashionable.

The ideas of Le Corbusier and other contemporary architects were expressed in the document that became the *Athens Charter* and other conclusions of the fourth *Congrès International d'Architecture Moderne* (CIAM), or International Congress for Modern Architecture, which met in 1933. However, these conclusions were "light", making no mention of a need for radical changes in existing urban structures (Gold, 1998, p. 235). Thus, it can be said that the 1930s was a period of maturing ideas and uncertainty in this respect, still without general acceptance in European countries. Despite this, in the 1930s these ideas were given consideration in countries such as Czechoslovakia, Germany and the USSR. Appreciable weight was assigned to traffic organization in large cities, although little attention was paid to any need to adapt small and medium cities for motor vehicles.

In Czechoslovakia, the proposals of Henri Descamps, Richard Neutra and André Lurçat were widely studied. Planners participated in CIAM meetings, and studied the French and German literature of Modern Movement (Zarecor, 2011, p. 2). The new solutions, expensive and reliant on the use of technology, seemed suitable

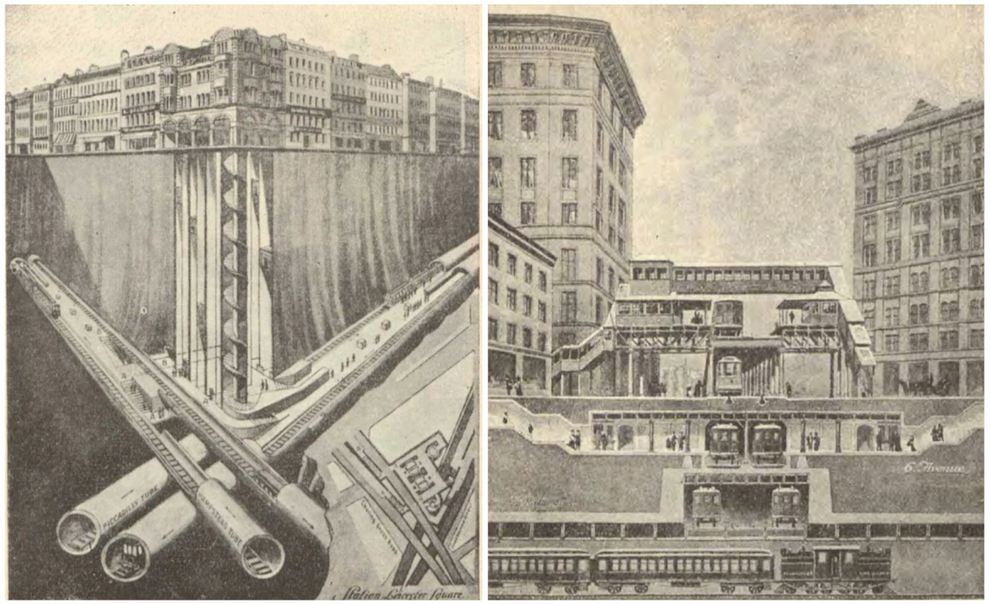


Fig. 12. Proposals for London and New York at the Berlin exhibition in 1910. Source: Dikanskii, M. G. (1915) Postroika gorodov, ikh plan i krasota, Petrograd: Izdanie N. P. Karbasnikova, p. 53, p. 54. These ideas were widely disseminated in Russian studies on city planning, with special attention to organisation, design and technologised construction of streets.

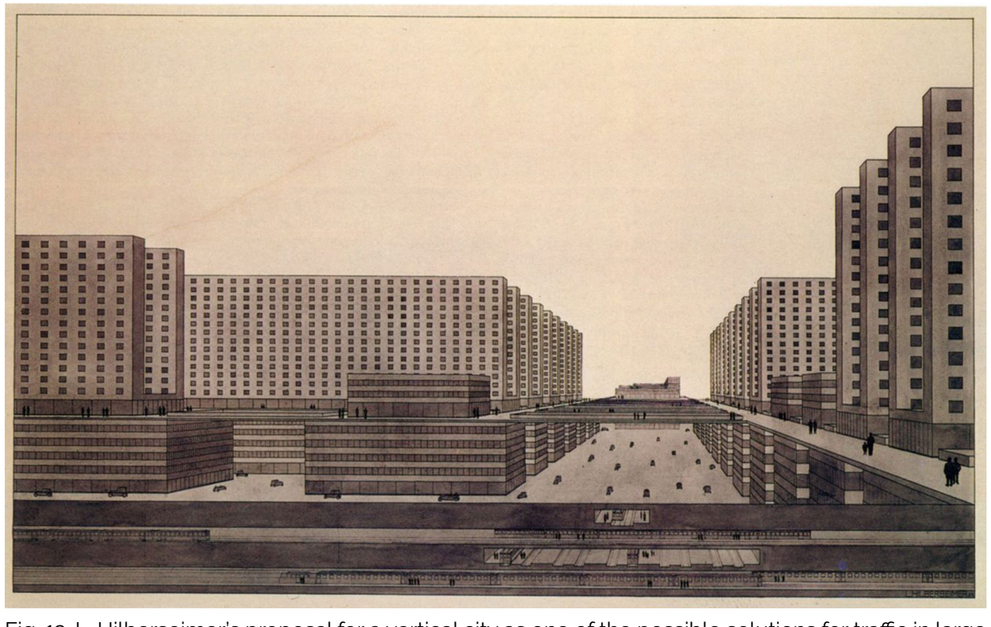


Fig. 13. L. Hilberseimer's proposal for a vertical city as one of the possible solutions for traffic in large cities. Source: Vaněček, M. (1934) Velkoměsto a vliv dopravy na jeho regulaci, *Architekt SIA*, XXVIII, p. 19.

only for new cities or fresh urban extensions, the chief barrier to adoption being financial constraints (Kysela, 1930). Modern models and principles were studied as possible solutions to be developed in the future (Fig. 14).

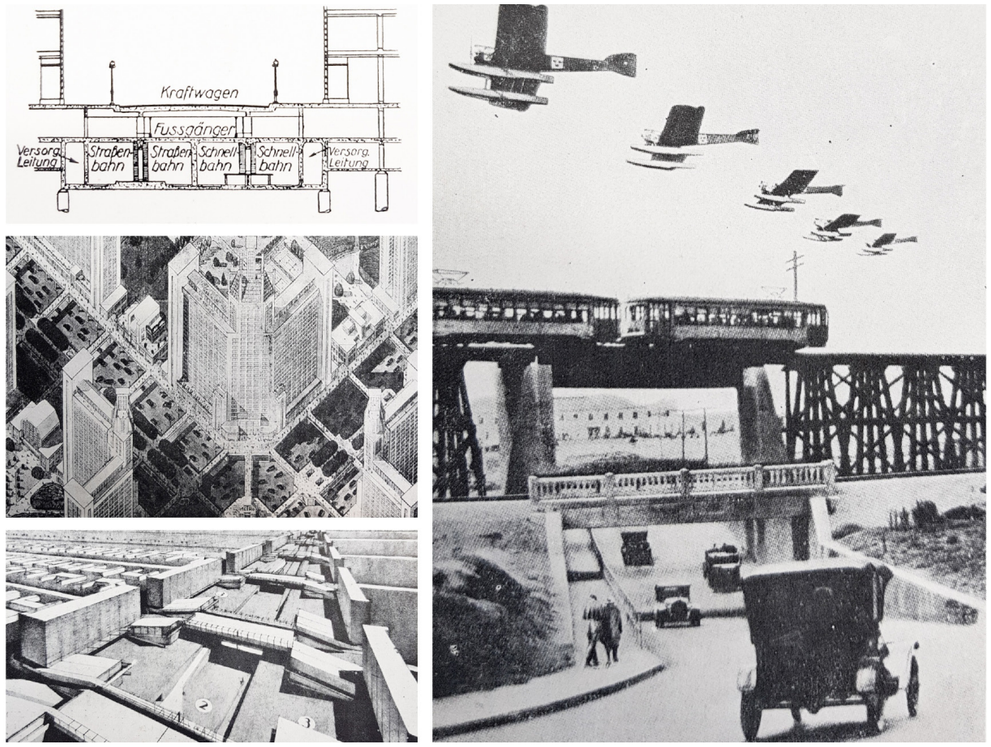


Fig. 14. Top right the favourable proposals for the solution of traffic in large cities published in Kysela, L. (1930) Krise velkoměst a návrhy na její řešení, *Stavba*, IX, pp. 1-6. Top left, H. Descamps' proposal for the extension of Paris, bottom left, R. J. Neutra's proposal. One can note the growing importance of the separation of levels of different types of urban traffic. Also, the importance of the organisation of space for the functioning of the automobile. Below right, the example of intervention in large cities "The multi-level street project in Chicago," published in the Czech-Slovak magazine (1931) Ulice Rychlé Dopravy a Městské Rychlé Dráhy v Severoamerických Velkých Městech, *Architekt SIA*, XXX, originally published in the German magazine Verkehrstechnik, 1931, p. 14.

In Germany, studies on urban transport planning methods, with the organization of space for motor traffic, were also prominent in the 1930s, especially for large cities. The problems of traffic congestion arising from motor vehicles were noted and stress was laid on the difficulty of reducing the proportion of means for mass public transport [*Massentransportsmittel*].

In the USSR, whilst Western ideas were decried as early as the 1930s, a similar line of thinking was followed in the study of new possibilities for the organization of urban transport. The transport solutions of London and Paris were prime examples for the Moscow plan. However, Western urban structures and models were not exemplified in Soviet studies. Rather, specific solutions relating to collective public transport policy and the separation of different types of urban traffic were discussed.

The ideas of Modern Movement about the organization of urban transport and traffic were studied as examples of scientific interest and sometimes as reference cases. Vertical separation and underground public transport in the city centre were considered as the most plausible modern solutions in large conurbations. The only point of difference was the tramway.

During the Second World War, various architects who had been at CIAM meetings and a number of urban scholars (such as Le Corbusier, Sert, Tripp, or Abercrombie) disseminated their ideas with striking publications which contributed to their post-war development. The main publication was Corbusier's *Athens Charter* in 1943, based on the 1933 document, whose positive reception was favoured by the post-war reconstruction of cities and political aspirations to demonstrate modern achievements in urban areas cities. A further publication of note was by another CIAM attender, José Luis Sert, with his work *Can Our Cities Survive?* published in 1944. The importance of this work lies in its closeness to the principles adapted in city planning in Communist countries. Sert highlighted relevant issues for the economics of cities. The main task was to establish short, direct connections between various urban functions. Long travel distances contributed to a waste of time and energy by the workers, the negative consequences of disorderly siting of workplaces and residential areas. This rational view of the city as part of the productive cycle, as a machine ordered by planners, stood very close to the ideology of Communist regimes. Among other relevant ideas of Modern Movement that were also developed in Socialist planning was the idea of minimizing urban traffic by creating residential areas with a full range of facilities, and by locating working and residential zones close to each other. Furthermore, the ideas of controlling urban growth, of planning cities as complete, integrated units, or of the proportional and parallel expansion of functional zones, which Modern Movement referred to as "controlled organic development" (Sert, 1944, pp. 224-226) was also viewed favourably.

Sert's ideas represented an attempt to respond to the problems of the contemporary city. One of his solutions was interaction between architects and other specialists. He spoke about the need for the organization of integrated works in order to be able to carry out the planning of large zones and to include a city in the related regional plan (Sert, 1944, p. 222). From this it can be concluded not only that a certain futuristic vision dominated, but also that there was a concern to respond to the problem of urban traffic congestion and the rapid growth of existing cities. With the unconditional triumph of motor vehicles and the demand for road space, this task was difficult. Collective progress on this issue was a long process, with many proposals and attempts. During this process of searching for adequate solutions, trams became the main enemy of modernity, entangling more and more European countries in this debate.

2.2.2. TRAMWAY ABANDONMENT AND MODERNIZATION IN THE 1920S AND 1930S

In the 1920s and 1930s two contradictory phenomena occurred. The first was the emergence of the view that tramways were to be seen as an obsolete means

of urban transport. The other was the idea of modernization of trams with improvements in capacity and speed, in other words proposals for fast and fully functional trams.

a. Tramways as an Obsolete Means of Transport

The tram crisis started in the 1920s in a number of wealthier countries such as the United States, the United Kingdom and France (Yago, 2006; Passalacqua, 2014; Petkov, 2020; Tennant, 2017; Boquet, 2017). There were several explanations for this. First, there was the promotion and perception of the motor car as the new universal means of urban transport, and its psychological and social sense of being strongly related to progress (Laterrasse, 2019, p. 48). Second, in liberal free-market economies the State and government generally had only a very marginal role in the organization of collective public transport. Rather, the focus was on allowing public services to organize themselves, but this in the end failed to respond properly to the needs of the majority. In contrast, in countries with a co-ordinated market economy State or local government involvement in the provision of public services in cities was striking (Kopper, 2013).

The choice of buses to replace trams in fact was justified mainly by a need to provide optimum conditions for motor traffic, rather than by any real advantages of buses over trams. Both electric and internal combustion engine transport were relatively new inventions (Foster, 1981, p. 4). However, motor buses, sharing as they did common road infrastructures, came to be considered as a modern, faster and more flexible means of transport. Meanwhile, their disadvantages, such as lower transport capacity and higher cost, were forgotten (Passalacqua, 2017, p. 8). Flexibility was closely related to the idea of modernity, which was seen as represented by motor buses, successors of the earlier horse omnibuses, but with new technology. The aim was to simplify traffic, without accepting any need to co-ordinate how it functioned, with the hope this would contribute to an increase in speed, but this was difficult to organize in conditions of priority for private interests. Flexibility was necessary not so much for collective public transport, as for unrestricted movements by cars, supported by propaganda from newly created lobbies (Fronneau, 2007; Boquet, 2017, p. 6).

The advantages of another means of public transport, the trolleybus, were also emphasized in certain circles. It was referred to as a silent tram or streetcar. Its advantages of speed, good ventilation and lighting, and comfortable seating were stressed (Electrical Engineering, 1945).

The new buses and trolleybuses were compared favourably with the old trams. It cannot be denied that there were certain advantages in motor buses and trolleybuses relative to trams, not surprising in that they were at least a decade newer in technology. There was some passenger preference for buses wherever trams were not modernized. Motor buses were more attractive because they were newer, but were also more versatile: they could offer routes that were more direct or better adapted to passengers' needs, with shorter distances between stops, no need for changing vehicles, and other benefits (Filarski, 2011, pp. 65-66).

Doubts about the role of trams in some European countries may also have had cultural roots, with trams seen as an alien intrusion into urban life, inflexible, noisy,

dangerous and aesthetically unpleasing. Trams had a life of their own in cities, forcing pedestrians and car drivers to adapt to their rhythms. Until the development of motorized transport, cities had only pedestrians, horse-drawn carriages, and trams. Both the need to, and the possibility of, combining and co-ordinating different means of transport constituted a new phenomenon, not initially recognized in many European countries. Freeing up the streets for motor traffic was seen as a logical and certainly more direct solution, since approaches combining various types of traffic had not previously existed. From this point of view, it is also understandable that decisions were taken to reserve streets for just one type of traffic, and clearly distinguishing roadways from pavements. In most cases, although the co-ordination of tram and bus operations was mooted, in practice it was limited to the retention and protection of existing tramway lines (Mulley, 1983; Filarski, 2011).

Modernization of the tramway system seemed impossible in many of the more advanced countries. However, this was because companies were reluctant to undertake capital investment. They relied on ticket sales for income, and lacked any public financial support. For some, the easiest thing to do was to convert themselves into bus companies. This made matters worse, as it gave the impression it was risky to invest long-term in tram infrastructure and rolling stock, urban transport being considered more of a commercial than a public service.

Private bus companies quickly established routes in competition with tram services. This was made possible by the lack of State and municipal intervention to maintain and modernize tram transport. In France, for example, trams were owned by the tramway companies until the early 1920s, and thereafter leased, although this did not bring about many changes in their operation (Larroque, 1989, p. 55). If in European countries the abandonment of tramways was a matter of political indifference, in the United States there was an actively hostile political attitude that made it difficult for tramway companies to operate. Even with the modernization of tramway rolling stock and the undeniable success of the new PCC tramcar, lobbies could not be convinced. Motor traffic flooded the streets, pushing trams into a marginal position (Fig. 15). While railway companies did receive some State support for their development, tramway companies received neither State nor municipal assistance. Tramway modernization was viewed as unnecessary, because technologically advanced means of transport such as buses and trolleybuses were already in operation.

Apart from any interplay of private vested interests, in general there was little understanding of transport planning and urban traffic. This was probably conditioned by a scarcity of transport studies and the superficial criteria adopted. Motor buses were assumed to be an excellent replacement for tramways, with no real examination of facts. In many countries there were hardly any detailed studies on the efficiency of motor buses (Schrag, 2000, p. 70) to match several undertaken in Germany, where trams and buses were compared in an objective way.[5] Often the advantages of buses were evaluated from the point of view of their novelty and lower investment requirements, but not from their efficiency, capacity and long-term effect on urban growth.

5 German researchers compared new trams and new buses on a specific route and distance in a specific city, which permitted a better understanding of both economic and transport issues.

Thus, in the UK in the late 1920s, decisions had already been taken relating to the obsolescence of trams and the need for their replacement, which started to be implemented in the 1930s (Petkov, 2020, p. 230; Ochojna, 1974, p. 119). Motor bus operations had been introduced in London as a stable service by the second decade of the twentieth century (Freeman, Aldcroft, 1988, p. 161), as indicated by Fig. 16. Between 1924 and 1935 the length of tramway infrastructures was reduced by a third (Blum, Potthoff, Risch, 1942, p. 94). This trend to abandon trams and replace them with buses and trolleybuses was supported by a Royal Commission on Transport and had a widespread influence in almost all British cities (Gunn, Townsend, 2019, p. 95). The logic was similar in other countries: the tram was obsolete and buses were flexible and modern (Pooley, 2016, p. 51). Meanwhile, trolleybuses became significantly commoner during the 1930s. However, it should be noted that this substitution of the tram had some exceptions, as a number of British cities retained and even modernized their trams (Brunton, 1992, p. 59).

The major European capitals were the first to reconsider tramway operations. Thus, in London trams were replaced by trolleybuses, in Paris by motor buses (Fig. 17), and in Rome their routes came to be restricted solely to the outskirts (Passalacqua, 2016, p. 4). Something similar to what had happened in Rome also occurred in Moscow in the 1930s. France quickly eliminated many of its trams from the 1930s onwards (Petkov, 2020, p. 54). This solution was adopted with hardly any prior debate, being a response to private vested interests (Larroque, 1989, p. 61).

In Belgium in the 1920s and 1930s bus operations had not yet been firmly established, so tramway operators had sufficient clout and capacity to be able to compete with buses (Weber, 2011). However, the public control of tramway companies did not always help in keeping them buoyant, since private interests related to land speculation, bus and car production, or the provision of energy resources came into play (Tennent, 2017, p. 404).

In Spain, stress was laid on the disadvantages of trams in terms of problems of manoeuvrability and the harm they did to the capacity for motor traffic, this leading to a ban on the granting of new concessions (Decree of 21 July 1933). On the other hand, the availability of hydro-electric power and the country's lack of oil resources had some influence in terms of a favouring of trolleybuses in preference to motor buses, as may be seen from the Law of 5 October 1940, which regulated administrative concessions to operate trolleybus lines in Spain. Rapid technological advances in motor vehicles coincided with slow developments in trams. In those places where the term of a concession was relatively close to its end, it was not in the interest of the tramway companies to invest in modernization (Hernández Marco, 2006, p. 7). Trolleybuses in Spain went through a similar evolution to what happened in the UK. In the central areas of large cities they replaced trams, whilst in smaller cities there was decommissioning of entire tram networks rather than any substitution.

Thus, even before the Second World War, some European countries were closing down their tramways or replacing them to a significant extent with buses and trolleybuses. Transport policies based on competition between modes of transport seemed to avoid a need for so much public attention. In such a scenario it was more difficult to achieve any integrated development between transport planning and urban planning, which indirectly influenced the loss of prominence by buses

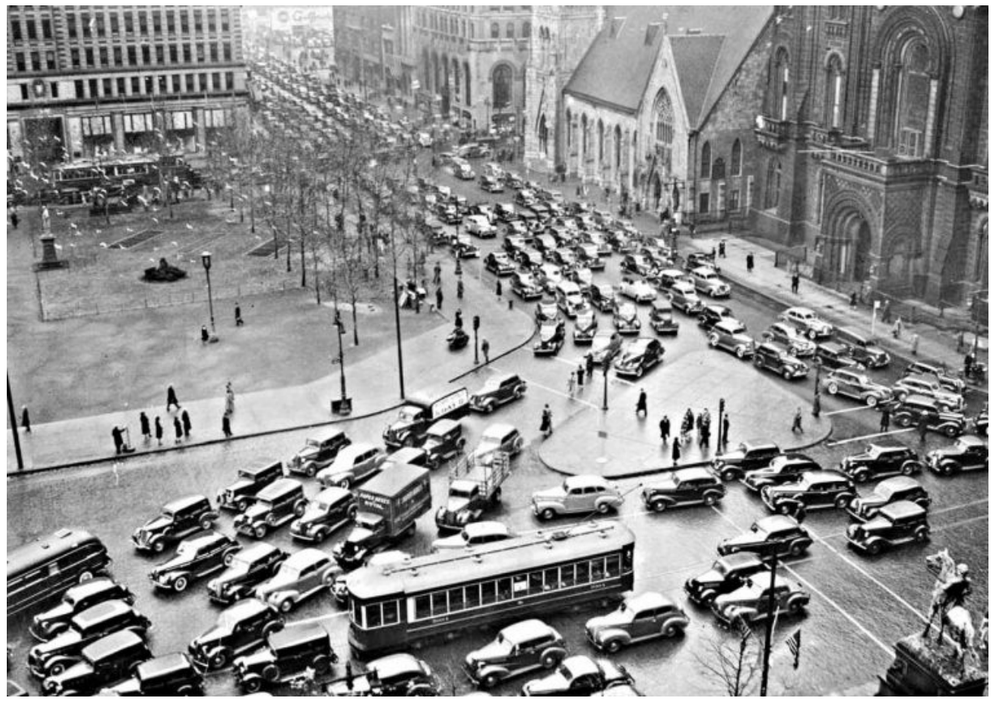


Fig. 15. Automobile traffic in Chicago in the 1930s. Source: http://theoldmotor.com/.

Fig. 16. Traffic in Oxford Street, London in 1930, Source: https://flashbak.com/Queues, Fumes, Crowds and Pickpockets – 100 Years of London's Oxford Street.

Fig. 17. Trams on a busy street in the Les Halles area of Paris in the 1930s. Source: Zbigniew, K.-M. (2014) Trams as Tools of Urban Transformation in French Cities, *Technical Transactions Architecture*, 10/A, p. 65.

and trolleybuses in favour of private transport after the Second World War. The propaganda of the modern image of the motor car was very powerful. Publications and proposals in the countries that abandoned their trams served as examples for other European States. However, they were not implemented universally because, among other reasons, the idea of the efficiency of trams relative to buses and trolleybuses was still retained in certain areas.

b. Proposals to Modernize Tramway Systems with Rapid Trams

The declining position of trams relative to buses and trolleybuses was becoming clear in many European countries by the 1930s. However, trams continued to operate in other countries such as Switzerland, Germany, Czechoslovakia, the Netherlands, Denmark, Sweden, and the USSR.

The separation of tramways from road infrastructure by means of segregated tracking began to develop in response to the process of re-organization of space on public roads. In some of the countries where tramways successfully resisted closure, tram undertakings had been municipalized and tried to be responsive to public needs. Bus operations were also in municipal hands or run under franchise. This public control facilitated the organization of a co-ordinated service and prevented the development of unwanted competition.

The idea of modernization of the tramway system was extensively developed in Germany after the Second World War as a solution for the optimization of economic resources. Segregated tracks were already in use by the second decade of the twentieth century in some residential areas of Berlin, and came to be employed in an increasing number of places.

One of the most comprehensive works on this subject was published by Erich Guise in 1917. He proposed the organization of rapid tramways in the outer areas of cities. It was an answer that might solve the problem of population concentration in Berlin (Fig. 18 and 19).

It did not seem possible to organize a sophisticated *Stadtbahn* [suburban train] system, but at the same time, conventional tramways were not a satisfactory solution (Guise, 1917, p. 86). Rapid tramways could provide a service that was both economical in capital investment and capable of higher speeds and capacities for passenger transport. They could give service cover in areas of lower density of population than would justify the costly construction of suburban trains.

In Switzerland, efficiency gains were also recognised in the modernization of trams. The cheapness of electric power was another factor. Tramway management techniques were adopted that allowed tramcars to be add or taken out of service in accordance with passenger demand, while maintaining safety and comfort of service. The long useful life of tramway infrastructures and rolling stock was also prized. Finally, tracks were considered to be safe for pedestrians (Bächtiger, 1940, p. 227). Consequently, by the 1930s experiments were already being made in Switzerland with longer, articulated trams, called *Großraumwagen* [literally, large space cars] with 85 to 100 seats in an open saloon layout.

In many European countries, the growth of the motor car fleet was much slower than in the USA, the UK, France or Germany. In 1930, Spain had a cumulative annual registration of more than 265.000 vehicles, six and a half times more than in 1922. Czechoslovakia had around 100.000 vehicles registered in 1930, ten times more than in 1922. Germany had a similar growth rate: between 1914 and 1930 the number of cars grew from 64.000 to 660.000 (Mikušković, 1933, p. 58). In the USSR, however, in 1931 registrations amounted to some 16.500 motor vehicles, of which about 7.500 were cars (Zadorin, 1931, p. 29).

In countries where the tramway was not abandoned, most residential extensions in large cities were supported by tram lines. It was not so much the question of eliminating trams that was considered, as the need to add motor bus services in urban areas with lower densities (Fig. 20).

The idea of tramway modernization grew in importance in the 1930s as the traffic problems in large cities became worse. An appreciation of the considerable efficiency of trams compared to the new motorized means of public transport put two types of urban area under the spotlight. These were city centres, where underground sections were suggested for tram lines, and certain areas on the outskirts of urban areas, to which the running of rapid trams was proposed. Urban and transport modernization was assessed in terms of combined improvements in both tram and motor traffic operations.

The USSR, for its part, was just beginning to develop public services in its cities. The idea of a collaborative exploitation of different means of collective transport formed the basis for making it possible to provide a cheaper, more efficient, more

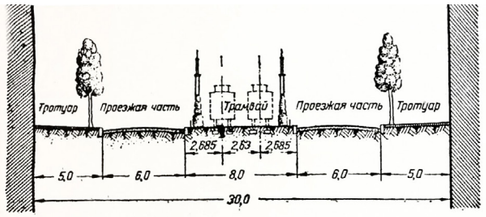


Рис. 54. Расположение трамвайного полотна по оси улицы

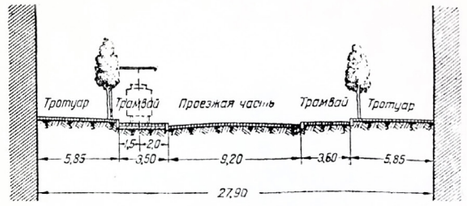


Рис. 55. Расположение трамвайного полотна по обеим сторонам центральной проезжей части

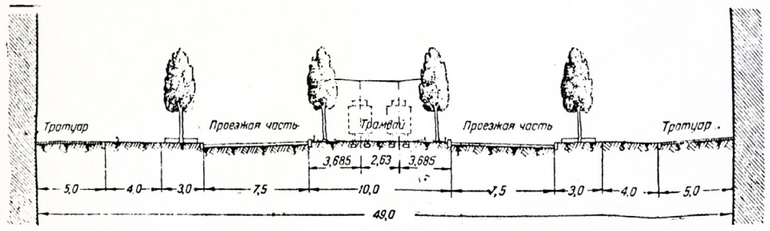


Рис. 56. Расположение трамвайного полотна в центральной полосе зелени

Fig. 18. Erich Guise's 1917 proposals for a reserved platform tramway published in Soviet literature. Source: Kurenkov, Kobzar, (1937) *Transport pri planirovke gorodov*, Moskva-Leningrad: Glavnaa Redakciia Stroitelnoi Literatury, p. 68.

convenient and more comprehensive public transport service (Petrov, Sosyantz, 1939, pp. 16-17). Theoretically at least, each means of transport could be assigned its scope of application or convenience depending on the objectives pursued: optimization of energy consumption, increasing frequencies and capacities, or minimizing the costs of constructing and operating a transport system. Trams were considered optimal in cities of medium size with stable, concentrated passenger flows. Trolleybuses were seen as better than buses in cities located near hydro-electric resources, in tourist areas (because they were quieter and less polluting) and in places with steep terrain (thanks to their traction capacity). However, motor buses had a major role as a consequence of their versatility and ease of organization. They could be applied in new urban areas where traffic had not yet stabilized, and in narrow streets where public and private transport could be combined (Zilbertal, 1937).

The Soviet transport engineer A. Zilbertal[6] emphasized in his work that rapid trams were the optimum means of transport (in terms of capacity, safety and passenger comfort) when roads had a sufficient width, in new residential areas and in new towns. Tramways should be the main means of transport in cities with a population exceeding some 80.000 to 100.000 inhabitants (Zilbertal, 1937, p. 234), which is an idea similar to that of German and Czechoslovakian planners. According to Zilbertal, the setting up of rapid tramways in medium sized cities with concentrated traffic and in large cities without a metro was one of the urgent tasks for the USSR in the following years.

6 Zilbertal was one of the first Soviet theoreticians in the 1930s; he devoted his works to the problems of the choice of urban public transport and the issues of development of tram transport in Soviet cities. One of his notable works was *Tramvainoe khozyaistvo,* Moskva-Leningrad: Gosudarstvennoe transportnoe izdatelstvo, 1932.

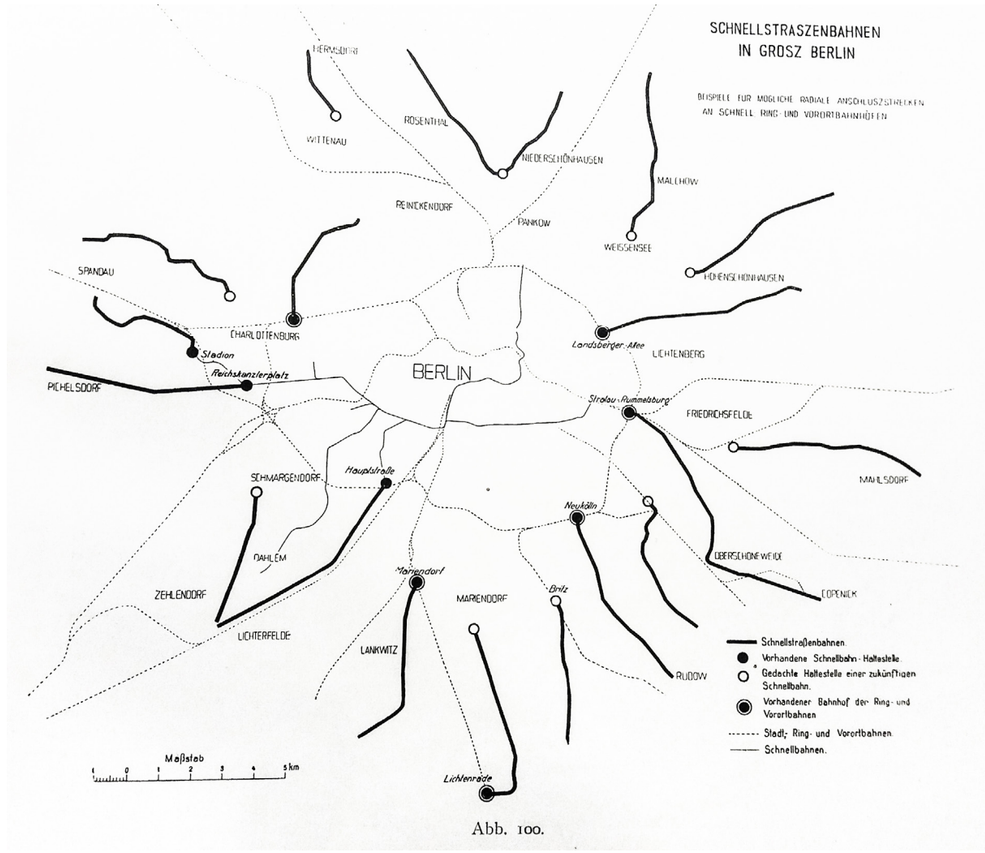


Abb. 100.

Fig. 19. Scheme of rapid tram lines in Grosz Berlin. Examples of possible rapid tram lines in the periphery. Source: Guise, E. (1917) *Schnellstraszenbahnen*, Berlin: Verlag von W. Moeser Buchhandlung, p. 85.

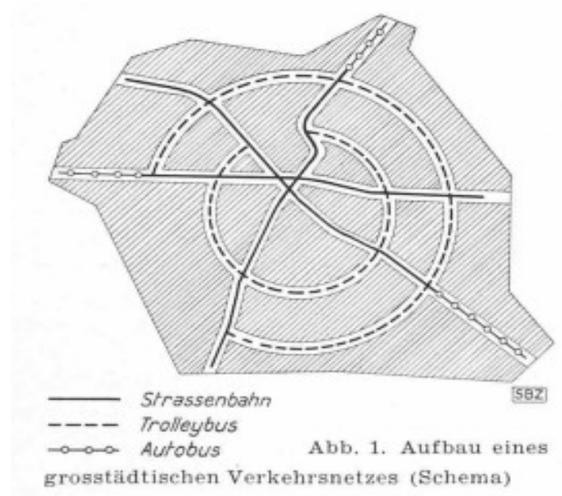


Abb. 1. Aufbau eines grosstädtischen Verkehrsnetzes (Schema)

Fig. 20. Theoretical scheme of the transport network of a large city. Souce: Bächtiger, A. (1940) Die moderne Strassenbahn als wirtschaftliches Transportmittel, Schweizerische Bauzeitung, 115/116 (20), p. 227.

At the same time, Western ideas were also being studied in the USSR. Among the most important books that compared the characteristics of land public transport were the books by Thomas Adams and his collaborators *Recent Advances in Town Planning* (1932) and by Henry Watson's *Street Traffic Flow* (1935). The main idea of these works was that tramways should be adapted to the needs of motor vehicle traffic, being replaced by buses in city centres (whether or not an underground railway might be desirable), and with vertical separation of road and tram infrastructures being established (Adams, 1935; Watson, 1938). These books were widely discussed by Soviet experts and served as a benchmark for future urban interventions. This can be seen in the 1937 work by Zilbertal, Kurenkov and Kobzar, and in the 1939 publication by Petrov and Sosyantz, which also proposed a large reconsideration of the role of the tramway so as to facilitate motor traffic and rationalize movements.

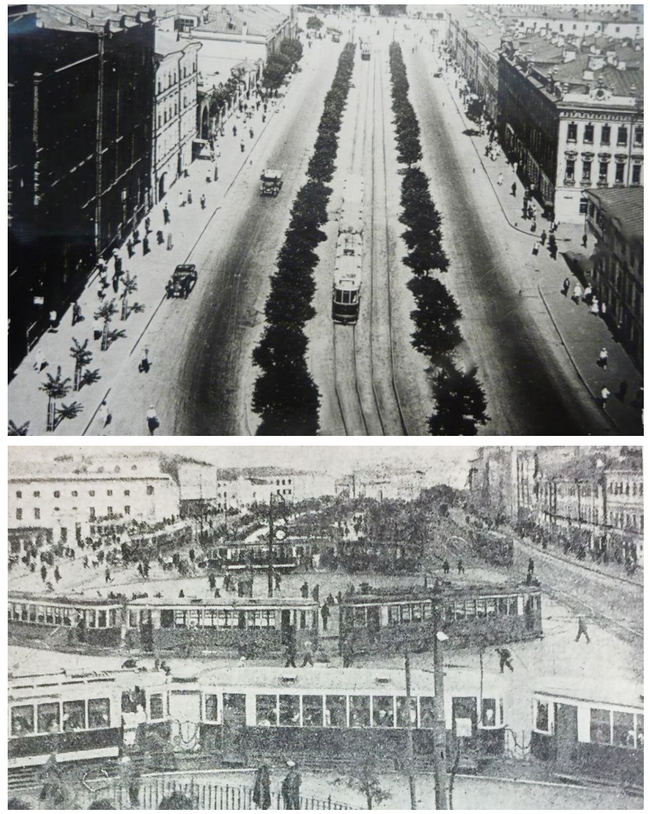
The 1935 Moscow plan also aimed at solving problems of urban traffic congestion. Trams had the major role in passenger transport with an 87% market share (Kurenkov, Kobzar, 1937, p. 201). The problem was not traffic congestion due to competition between motor transport and trams, but internal overloading of tramways. For this reason, in the 1930s, several tramway sections were constructed with segregated tracks in both Moscow and Leningrad (Fig. 21 and 22).

These solutions were preferably to be applied in the outskirts of cities and in new suburban areas (Kurenkov, Kobzar, 1937, p. 67). The rapid closing-down of tramways in London and Paris from the late 1920s onwards was seen as a guideline for urban transport planning in other European countries (Passalacqua, 2014, p. 203) and was taken as an example to be followed in Moscow and Leningrad. To solve the ensuing need for passenger transport, the first line of the Moscow metro was opened in 1935, and from 1934 motor buses were introduced for central and narrow streets.

In the text of the General Plan for the reconstruction of Moscow in 1935 (Kurenkov, Kobzar, 1937, p. 207) this idea was emphasized. The plan stated that with the development of the metro, and with buses and trolleybuses in the city centre, there was a need to remove tram lines from the most intensively used streets, shifting them to more peripheral areas.[7] Thus, it can be said that the trends to replace trams in the central areas of cities with buses and trolleybuses, or to move them to the outskirts, were already adopted in the Moscow urban plan. This was considered to be a good solution because it involved less cost, there being no need to build tram tunnels or cuttings, and simultaneously avoided unsightly cables and slow-moving tram traffic on iconic streets.

Although the USSR overall had a very large number of trams and lines in the 1930s, their operation was defective. Quantity did not mean quality. This was an outcome of moving them to peripheral and suburban areas, with a loss of continuity in networks and of connections to major areas within cities, and of the low quality of infrastructures and rolling stock. In that decade, new tramway systems were built in twenty cities, not a large number for a country as extensive as the USSR, but nevertheless running counter to the trend in most of Europe. The time assigned to

7 "В связи с развитием метро, автобусного и троллейбусного движения в центре города считать необходимым снять с наиболее напряженных улиц трамвайное движение с перенесением его на окраинные улицы города."



Top, Fig. 21. One of the interventions of the reserved tramway platform in Moscow on Neglinnaya Street, photo by Prekhner. Souce: Kurenkov, P. A., Kobzar, S. G. (1937) *Transport pri planirovke gorodov*, Moskva-Leningrad: Glavnaia Redakciia Stroitelnoi Literatury, p. 66.

Bottom, Fig. 22. Kolkhoznaia Square in Leningrad and traffic congestion with trams. Source: Kurenkov, P. A., Kobzar, S. G. (1937) *Transport*, p. 202.

developing of public collective transport in general, and of trams in particular, was rather short, and consequently the quality of service was extremely low. The main problems related to the modernization of rolling stock, the unification of infrastructures and the organization of tramway operations (Orlov, 2015).

Moreover, throughout the 1930s in the USSR the role of trolleybus was increasingly promoted over that of the tramway. Trolleybuses were hailed as a means of transport free of the disadvantages both of buses and of trams (Aleksandrov, Polyakov, 1936, p. 5). This view may be observed in the conclusions of the book Троллейбусы [Trolleybuses], (Fig. 23), published in 1936 (p. 182):

> *"The considerable deficiencies in the development of public transport networks in the cities of the USSR, particularly tramways, in recent years, along with the continuous growth of cities, on the one hand, and the difficulties of constructing extensive new tram lines, on the other, have encouraged a search for ways of serving new urban and suburban areas by means of public transport that does not require large investments but at the same time*

does meet the basic requirements for urban transport that is speedy, inexpensive, safe and convenient for passengers. In many instances, the trolleybus is the vehicle that meets all these needs."[8]

For many years this line of thinking determined the policy on collective public transport in the USSR. The reasons were purely economic. Trolleybuses, as compared to trams and motor buses, had lower initial investment and operating costs. Trams had difficulties negotiating intersections and required the renovation of worn-out infrastructures (Aleksandrov, Polyakov, 1936, p. 184). It is curious that in the USSR, the most liberal capitalist countries, the United States and the United Kingdom, served as examples for trolleybus development. However, there were different motives in these countries: the interests of privately owned public transport companies, the modern image of the trolleybus, and the potential it had to allow homogenization of urban transport infrastructures.

Interest in the trolleybus in the USSR arose at the end of the 1920s. Several articles were devoted to the advantages of trolleybuses, the vehicle sometimes being referred to as "tramway-type bus" [*avtobus tramvainogo tipa*].[9] Soviet trolleybus production was developed with the specific aim of allowing the replacement of trams. These vehicles began operating in 1933 in Moscow. Various studies were undertaken with an eye to increasing the capacity and performance of trolleybuses (Fig. 24).[10]

From all this, it can be grasped that from the very beginning tramways were not accorded much importance in the USSR as a principal means of urban transport, being seen as rather more suitable for city outskirts, and connecting suburban and industrial areas. The opinions of Soviet planners differed and there were uncertainties about the future of trams. On the one hand, it was felt to be crucial to develop and modernize trams as an efficient and economical means of transport. On the other, buses and trolleybuses were envisaged as new, modern means of public transport that could easily replace trams.

In contrast to the USSR, in inter-war Germany tramways always retained their importance as a principal means of public transport in cities. Despite some Nazi ideas of decentralization and planning of rural settlements, tram lines remained virtually unchanged and were supplemented by buses on the periphery of urban areas. The main criterion for evaluation was operating cost rather than capital investment. Moreover, buses often belonged to tram operators (Zilbertal, 1937, p. 46),

8 "Значительная задолженность в развитии сетей общественного транспорта в городах СССР, особенно трамвайных путей, за прошлые годы и продолжающийся рост городов, с одной стороны, и затруднительность осуществления строительства новых трамвайных линий в очень большом объеме в ближайшие годы - с другой, побуждают изыскивать способы обслуживания новых городских и пригородных территорий средствами общественного транспорта, при которых не требовалось бы больших капиталовложений и обеспечивалось бы в то же время удовлетворения основных требований, предъявляемых к городскому транспорту в отношении скорости, дешевизны, безопасности и удобства перевозки пассажиров. Во многих случаях таким транспортным средством удовлетворяющим в наибольшей степени поставленным требованиям, является троллейбус."

9 Among the publications, one can highlight the magazine Za rulem, which devoted several articles to the need to increase the use of trolleybuses to improve the use of public road space.

10 In the magazine *Za rulem* 1934, 2, p. 11 (Nadezhdin, M.), the intention to promote trolleybuses in the USSR was announced, see the article "Trolleibusy poluchaiut shirokoe rasprostranenie v SSSR" (Trolleybuses receive extensive dissemination in the USSR).

which eliminated competition between the modes of transport and allowed them to be combined. In the inter-war period, many German cities started to introduce segregated tracks for trams, instances being Cologne, Berlin and Hamburg.

In the book *Straßenbahn und Omnibus im Stadtinnern* [Tram and Bus in City Centres] by O. Blum, H. Potthoff and C. Risch, published in 1942 (Blum, Potthoff, Risch, 1942), the authors argued that the "new" type of motorized traffic should not negatively influence the existing public transport arrangements. They stressed that the trams should be supported as much as possible, thanks to their proven efficiency. Hence, they should be allowed to operate even on narrower streets (Blum, Potthoff, Risch, 1942, p. 6). Another advantage of the tramway was its infrastructure, which was independent of variable motor traffic (Blum, 1941, p. 40). The routes of buses and trolleybuses were uncertain and unreliable because they shared their infrastructures with other motor vehicles, so that speed and efficiency would worsen whenever there was congestion. Among other arguments in favour of trams was the possibility of coupling units together to provide at least two to three times the transport capacity of buses (Blum, 1930, p. 37). In addition, there were also favourable views on the place of trams in a militarized economy, an outcome of the financial impossibility of replacing trams with buses in the midst of the Second World War (Lehner, 1942, p. 337), not to mention that women could easily drive trams in the absence of male staff (Blum, 1941, p. 72).

Fig. 23 and 24. On the right, the cover of the book *Trolleibusi*. Source: Aleksandrov, A. P., Polyakov, A. A. (1936) *Trolleibusy*, Moskva: Akademiia Kommunalnogo Khoziaistva RSFSR. This book was one of the first publications explaining the advantages of trolleybuses over trams and buses. It emphasised the need for extensive application of trolleybuses in most Soviet cities. On the left, some early attempts to improve trolleybuses: three-axle, double-decker vehicles produced in the USSR in the 1930s. Source: Zilov, A. (1934), Pervii Sovetskii trekhosnii trolleibus v podarok XVIII Partsiezdu, *Za rulem*, 2, p. 12; Mikhailov, N. (1938), Pervii sovetskii dvukhyarusnii trolleibus, *Za rulem*, 13, p. 13.

In 1930 the Association of German Motor Transport Companies [*Verband Deutscher Kraftverkehrsgesellschaften*] carried out a comparative study on the finances of trams and motor buses, entitled *Selbstkostenvergleich Straßenbahn-Omnibus* [Comparison of the Intrinsic Cost of Trams and Buses). This detailed comparison came to the conclusion that trams were more economical. Two factors were considered crucial: the capacity of trams to be run in multiple-unit combinations and the availability of cheap hydro-electric power.

One of the measures to relieve traffic congestion in large cities was to limit the number of tram lines. In Berlin, for example, secondary lines were eliminated and main streets were reconstructed (Fig. 25). The rationale was the crucial criterion that direct connections should be established between the densest and most important urban areas (Thomas, 1934, p. 25).

During the Nazi regime, trams and buses in most cases were not in competition. The vital role of tramways in the functioning of Berlin was recognized, but further development continued to be a debatable matter. The final proposal was to concentrate traffic onto other rail modes and to replace trams to some extent with buses (Thomas, 1934, p. 37). Despite a focus on the development of motor transport, the essential role of trams was still recognized (Fig. 26).

Germany's economic situation in the 1920s and 1930s hindered modernization of transport systems, despite considerable expenditure on building infrastructure.

> *"The tram is the most inexpensive form of surface mass transport, and Germany is too poor to replace it prematurely with the much more costly motor bus. Moreover, in this matter as in all other cases any transition from the old must lead to the new, respecting the achievements of our forefathers, but taking care of the needs of the present and the future. It would not be in line with our National Socialist thinking, oriented towards a progressive philosophy, to demolish the old before the new can offer a real improvement, in other words, something more than a mere replacement of the old."*[11] *(Thomas, 1934, p. 38).*

The tramways maintained a strong presence not only in small and medium sized cities, but also in large conurbations such as Berlin. In this latter case, the principal solution for dealing with inner-city traffic was to put the sections of tramways that ran through town centres and in the most densely populated areas underground.

German and Czechoslovak planners were looking for rational and economical solutions for their large cities.[12] In comparison with tramways, suburban railways

11 "Die Strassenbahn ist das weitaus billigste Massenverkehrsmittel im Oberflächenbetrieb und wir sind zu arm, um es gegen den viel teureren Omnibus vorzeitig auszutauschen. Dazu kommt, dass uns in dieser Frage, wie überall beim Uebergang von altem zu Neuem, ebenso leiten muss die Achtung vor der Leistung unserer Altvordern wie die Sorge um die Notwendigkeiten der Gegenwart und der Zukunft. Es würde nicht unserem nationalsozialistischen, wachstummässigen Denken entsprechen, abzureisse, bevor nicht das Neue ein Besseres, also mehr ist als nur der Ersatz des Alten."

12 See the journal *Architekt SIA*, which was published in the 1930s and contains a variety of approaches to possible public transport solutions for Prague and Bratislava. After several competitions and studies, the modernisation of the tramway was chosen. Similar solutions can be found in German publications from the 1930s, e.g. in Niemeyer, R. (1941) *Städtebau und Nahverkehr*, Leipzig: K. H. Koehler., in the journal *Verkehrstechnik* and in conference proceedings of *Internationaler Verein der Strassenbahnen, Kleinbahnen und der Öffentlichen Kraftfahrunternehmen*.

and metros were too expensive. The adaptation of the trams to different urban conditions could and would be achieved in the form of an over-ground fast tramway [*Oberflächenbahn*] on the outskirts and of underground sections [*Unterpflasterbahn*] in the city centre (Niemeyer, 1941, p. 39). As Niemeyer (1941, p. 39) noted: "This will be a major step forward towards a real redesigning of local transport, offering cities a new potential to expand."[13] In Germany it was believed that trams could help to decentralize cities. Good connections between suburban areas and the various other parts of a city could lead people to live outside the central areas (Niemeyer, 1941, p. 23).

Thus, it can be seen that in the 1920s and 1930s German professionals were unanimous in their opinions regarding retaining and modernizing tramways. There was even some criticism of American planning and of the way in which the car had become a fetish, sometimes stated to be a consequence of psychological reasons, such as excitement about progress or the desire for novelty (Blum, Potthoff, Risch, 1942, p. 3). The crucial role of trams in the light of foreseeable future growth in urban traffic was stressed. Hence, tramways were a means of transport that could help to maintain connections to all urban areas as cities expanded, avoid any lack of accessibility of the city centre, augment passenger capacity and get around traffic congestion.

In Czechoslovakia, too, future planning for trams was a topic for heated debate. On the one hand, it was stressed that tramways should have priority because of their carrying capacity and economical operations, with their ability to be run on segregated tracks seen as a positive factor (Mikúškovic, 1933, p. 100), as seen in Fig. 27. Opinions were mostly similar to those in Germany, in that buses and trolleybuses were seen as a complement to trams in lower density urban areas. On the other hand, the dilemma of the co-existence of trams and buses in city centres was noted. For example, the study by Jaroslav Vaněček, *Stavba Měst* [The Construction of Cities], published in 1934, underlined the possibilities of replacing trams with motor buses in city centres (Vaněček, 1934, p. 79).

Moreover, the view held was generally that in the town centres it was usually not possible to set aside reserved areas for tracks, but at the same time there was no real way of replacing trams with buses, therefore they would have to continue to run along streets (Mikušković, 1933, p. 101). However, despite their advantages, rapid tram lines, termed *rychlé pouliční dráhy*, were considered as a choice that was not suitable for the hearts of cities in Czechoslovakia in the 1930s. Rather, they were a solution for peripheral areas (Mikuškovič, 1933, p. 103). Trams were also put in question because they interfered with the free flow of rapid motor traffic at intersections (Hruška, 1934, p. 63). Such Modernist views appeared from time to time, in the form of concerns about what would happen in the future.

Despite this, prevailing opinions favoured tramways. A traffic engineer, Mikuškovič, pointed out in 1933 that the replacement of trams by buses in urban centres was a mistake, since buses could not meet the needs of densely populated areas. Among other advantages of tram lines, he emphasized that they were economical of space, contrary to what was often claimed. Tramways should form a

13 "Damit wird ein wesentlicher Fortschritt in der wirklichen Neugestaltung des Nahverkehrs erreicht, der so der Auflockerung der Städte neue Möglichkeiten bieten wird."

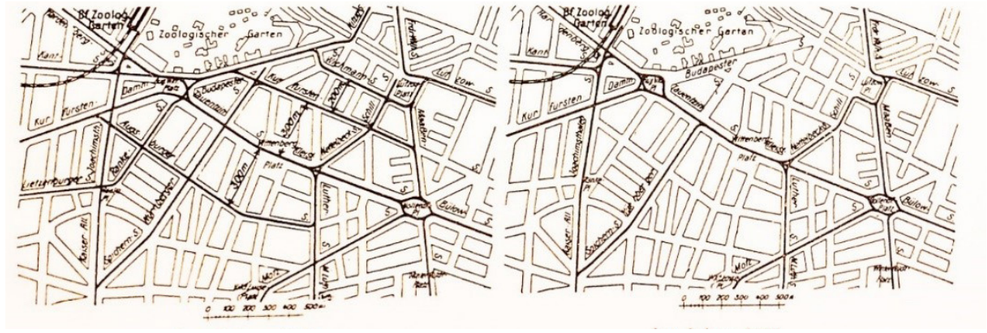


Fig. 25. The de-densification of tramway lines in Berlin between 1913 and 1933. Source: Thomas, G. (1934) Wirtschaft, Nahverkehr und Städtebau (gezeigt am Beispiel der Reichshauptstadt Berlin), *XXIV Internationaler Verein der Strassenbahnen, Kleinbahnen und der Öffentlichen Kraftfahrunternehmen*, p. 25.

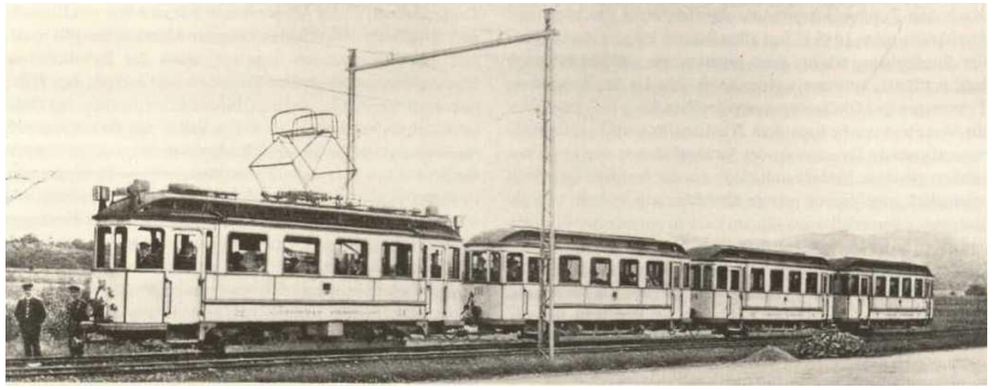


Fig. 26. Tramway with one motor car and three trailer cars in Darmstadt in 1935. Source: Hendlmeier, W., Slotta, H. (1993) Der städtische Nahverkehr, *ICOMOS – Hefte des Deutschen Nationalkomitees*, 9, p. 32. Despite the ideas of automobile development during the Nazi era, the tramway infrastructure was preserved.

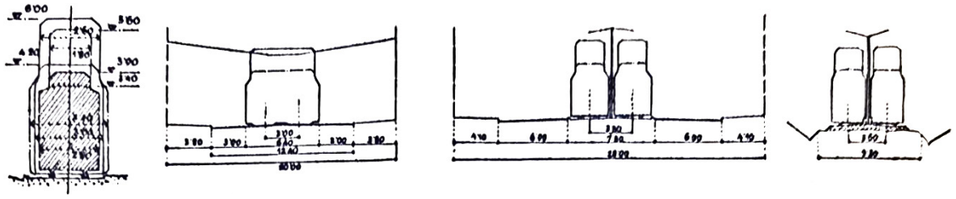


Fig. 27. Sections of streets with reserved tram platforms Hruška called this type of modernisation "Zrychlená elektrická dráha or Rychlé pouliční dráhy" (Accelerated electric railway or Fast street tracks) which had their value in their use only on the outskirts of cities, where they could be isolated on a separate platform. Source: Mikušković (1933) *Technika stavby měst*, Praha: Klub architektů v Praze, p. 21.

system connecting all the major zones in a city (Mikušković, 1933, p. 100). Similarly, there was no support for eliminating or changing the existing lines that already served most urban areas of importance (Vaněček, 1934, p. 30). These ideas were quite similar to more modern German thinking. It should be noted that in Czechoslovak theoretical studies, considerable attention was paid to German authors such as O. Blum, M. Wagner or W. Hegemann. Czechoslovak theories were inspired by German writings, while Anglo-Saxon and French ideas had less of an impact.

One of the first proposals for a rapid tramway in Czechoslovakia was developed for Prague in the early 1930s. At the establishment of the Greater Prague [*Velká Praha*] metropolitan area almost all planners considered modernization of the tram system as an efficient and convincing solution.[14] In the 1933 proposal, the idea was to modernize tramways by segregating lines, described as *elektrické dráhy na vlastním tělese* [electrified tracks in their own space], combined with running some sections underground, *podzemní dráha* [subsurface tracks] as shown in Fig. 28, 29 and 30. Furthermore, growth in the population of the peripheral and suburban areas that were being absorbed by the Prague municipality required fast connections to the core of the city, and this was to be achieved extending tram lines. In respect of some areas, this inter-war period has been referred to as the Golden Age of Prague Trams [*Zlatá éra pražských tramvají*].[15]

Despite the difficulties faced by the economy at the time, tram lines were extended not only in Prague, but also in other Czechoslovak cities (Vávra, 2014, p. 34). A rapid growth in tramways took place between 1920 and 1938 in cities such as Brno, Bratislava, Prague, Úští nad Labem, Olomouc and Ostrava (Jirsák, 1956, p. 20). This was a consequence of the consolidation of metropolitan areas and rapid industrialization.

From the discussion above, it may be concluded that technical views taken of tramways in Germany, Czechoslovakia and the USSR in the 1930s were different. On the one hand, the financial and technological difficulties facing any rapid development of motor buses, together with the advantages of trams for passenger transport, led to consideration of their possible modernization of tramways in national capitals and large cities. In the 1930s, opinions about motor vehicle transport were negative in Germany, Czechoslovakia and the USSR, on the basis of studies of the problems arising from it in America. Consequently, tramways and other means of transport based on rails retained their prime role in urban and suburban passenger transport.

In Germany and Czechoslovakia, tramways continued to run along the streets in central areas, mainly because they were economical and space-saving, and had a large carrying capacity, with fewer transfers needed to reach the city centre. In

14 See the article *Výsledek soutěže na vyřešení komunikačních spojů z vnitřního města do severozápadní a západní oblasti hl. města Prahy,* [The result of the competition for solving the communication connections from the inner area to the north-western and western areas of the city of Prague], which was published in the journal Architect SIA, 1938, XXXVIII, pp. 1-13 (Editorial Committee).

15 About the development of public transport in Prague in the interwar period see Vávra, R. (2014) *Rozvoj nových dopravních prostředků v pražské hromadné dopravě (1918–1939): realizované a nerealizované projekty*, Bakalářská práce, Univerzita Karlova v Praze.

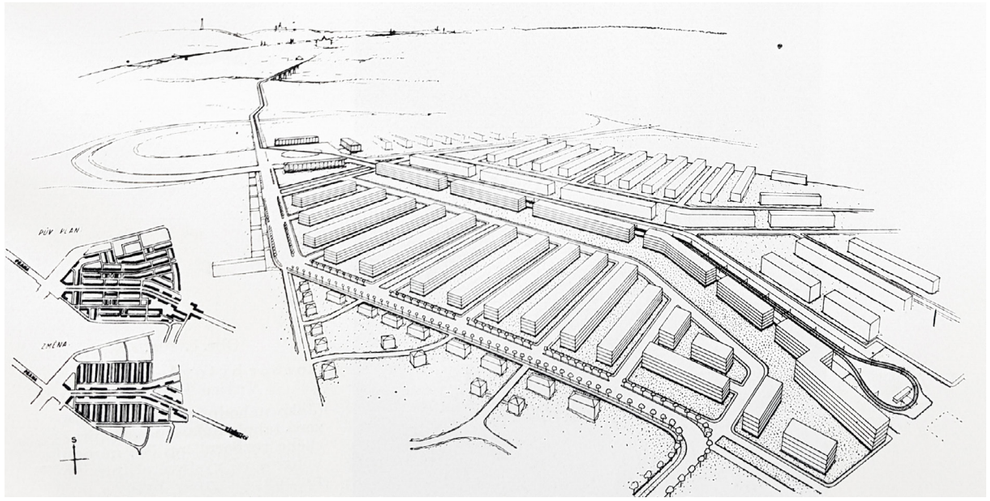


Fig. 28. The proposal for the residential area Pankrác-Michle, in Praga, published in 1936. Source: Hruška, E. (1936) *Nové Úkoly v Soudobém Urbanismu*, Praha: Česka Matice Technická, p. 18.

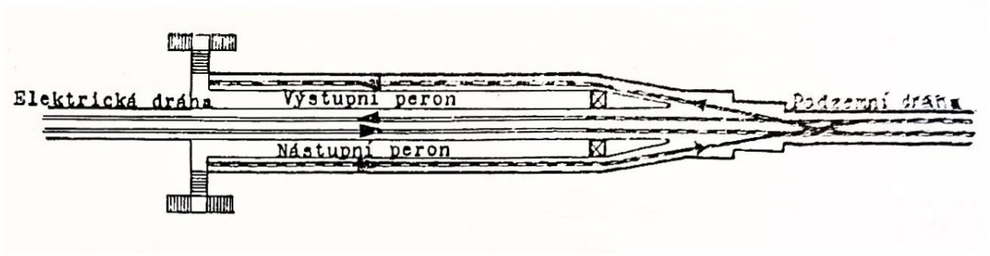


Fig. 29. The proposal for the modernization of tramway in Prague in 1933. Source: Lisková, J., Šula, J. (1933) Zásady dopravního řešení Velké Prahy, Soutěžný Návrh "Ve Třech Etapách", *Architect SIA*, XXXII, p. 68. The combination of tramway on reserved platform with underground sections.

both countries, buses and trolleybuses were mainly evaluated as complementary or secondary modes. Thus, in Berlin and Prague, the main solution was the modernization of existing tramway system.

In the USSR, although the tramways were modernized in Moscow, they declined in relative importance. Modernization was based on the separation of tramway lines from motor transport by running some sections underground or in cuttings, or establishing segregated tracks. This helped to improve both the circulation of urban traffic and tram speeds.

Moreover, in theoretical discussions new visions of the modern city were always present, apparently offering perfect, ideal solutions to the problems of urban traffic. The prominence of studies of new approaches to the organization of city traffic can be explained by the novelty of this issue. In the absence of a clearly reasoned and thoroughly investigated theory, this new literature was accepted uncritically. Despite the presence of proposals to modernize tram networks, urban transport policy had not yet really gelled. There were, as yet, doubts and uncertainties about the future of trams, and theoretical studies on urban traffic were still lacking. The latter

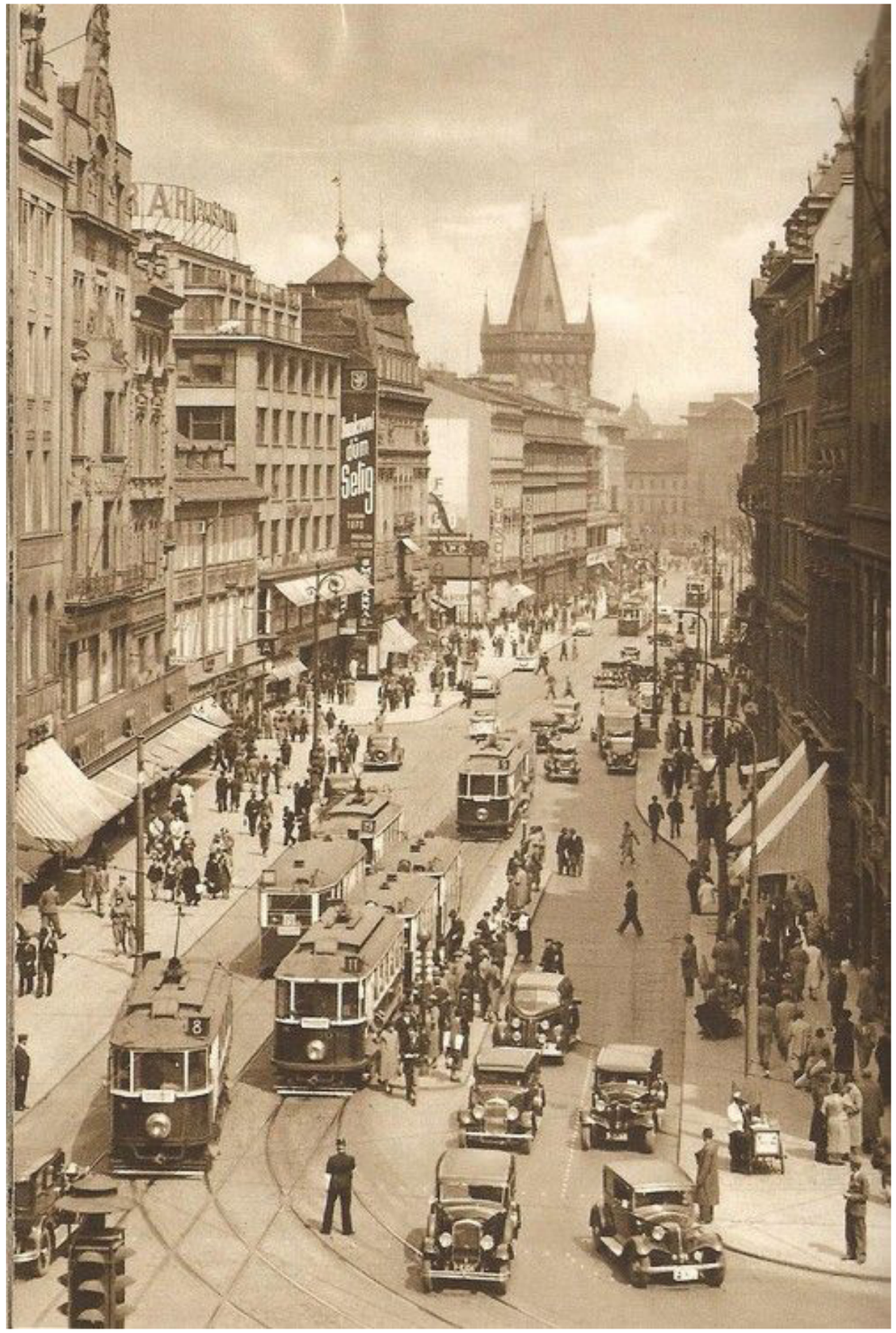


Fig. 30. The streets of Prague in the 1930s. It can be noted fluid urban traffic without congestion. Source: https://www.pinterest.com/.

were undertaken and consolidated in the post-war period on the basis of translations and studies of foreign literature from countries more advanced in these matters. One such work was Alker Tripp's *Town Planning and Road Traffic* (1943), which can serve as an example of Soviet planners' aspiration to acquire fresh knowledge of transport planning and will be discussed in the following sub-chapter.

2.2.3. TOWN PLANNING AND ROAD TRAFFIC: ALKER TRIPP'S IDEAS IN THE USSR

"The science of Road Design to meet the requirements of motorised traffic is still in its infancy."
Preface by Sir Patrick Abercrombie to Town Planning and Road Traffic

"Town planning, as we now know it, is a science of quite recent origin."
Town Planning and Road Traffic, Sir Alker Tripp

These two quotations reveal a pair of controversial ideas that appear in the same book, *Town Planning and Road Traffic*, by the London traffic control adviser, Alker Tripp, published in 1943. Whilst the first sentence of Tripp's work emphasizes the recent nature of town planning, the preface by a town planner, Abercrombie, leads with a sentence on the infancy of road design.

Abercrombie pointed out that the science of traffic was just beginning to be formulated and that traffic problems originated in the need for people to adapt to, and understand, the changes caused by motor vehicles. In contrast, Tripp laid stress on the fact that town planning was also a recently emergent science. Since it was not possible to change human nature, the problem of traffic lay in the inappropriate layout of streets, a general problem in town planning. It is curious and striking that there were such variations in viewpoint in the first sentences of different sections of the same work.

Neither Tripp nor Abercrombie fully recognized that both traffic engineering and town planning were in the process of consolidation, although they did clearly see that they needed a mutual and comprehensive approach.[16] They also referred to them both as sciences. Just as Abercrombie made great efforts to re-establish the discipline of town planning on a scientific and technical basis (Gravagnuolo, 1998), Tripp did the same with traffic engineering, and was also concerned with urban complexity and specificity.[17]

Despite this, the two theoretical and practical disciplines were not yet true sciences, and at that time were two worlds that turned their backs one to the other.

16 As Carme Miralles-Guasch pointed out at the beginning of the XXIst century, the questions of "how people should move in the city" and "how the city is structured" have to be understood as two sides of the same problem (2002).

17 Concern for these "scientific" qualities had a certain relevance in preventing sprawl and ensuring the suitability of the urban plan for road traffic in the new towns of England.

Traffic engineering developed its own concepts and criteria shaped by experience, whilst urban planning was more concerned with creating new urban structures based on standards.

In this context, Alker Tripp had the pioneering idea of taking the first steps towards a coherent concept of traffic within town planning. Although his priority was to cater for the needs of rapid traffic by establishing a hierarchy of streets, he also had the idea of improving people's everyday lives through the concept of precincts with differentiated functions.

Tripp's work thus made a considerable impact in its historical period. After the Second World War, during the period of city reconstruction, architects in the USSR began to study the relationship between traffic and town planning in an intensive way. The problems of capitalist cities served as a warning about the future, and the methods used to solve them gave a clue to how they might be prevented. In such a context, Tripp's book was quickly translated into Russian in 1947 and disseminated.

His work had a particular impact in the 1940s, both for the book being discussed here and his earlier work, *Road Traffic and its Control*, from 1938. His ideas influenced the plans for London and the planning of post-war New Towns in England. However, by the late 1950s, with dynamic socio-economic changes in Western European countries and the United States, traffic engineering research was becoming more intensive, and Tripp's work gradually started to look outdated. Nevertheless, his observations and planning methods reappeared in the Khrushchev "thaw" period, and did not lose their prominence in the USSR until the late 1960s.

The book in question here is not sufficiently well known and is rarely cited in academic literature, but it played a major part in the Soviet Union's urban practices. Tripp's idea was to find a way of reconciling traffic and the city, and constitute a starting point for an understanding of the period when a number of the principles of Soviet town planning were established. His work was dominated by the question of how to organize cities so as to meet the needs of road traffic, and how town planning could adjust to this necessity. This apparently scientific approach, with its techniques based on changing urban morphology, facilitated the transfer of his ideas to the USSR. As a result, his works influenced the development of the concept of the Socialist city in the 1950s and 1960s.

a. Traffic versus Safety

From the 1930s onwards, thanks to technological advances in motor vehicle production and a forceful strategy encouraging car use, the streets of England were filled with motor traffic. Cars made it possible to move people flexibly and comfortably, and attracted them with an image of modernity. All this increased the need to improve the road network to permit the circulation of motor vehicles. There was an urgent necessity to reconsider traditional models, scales and sizes of cities in relation to car speeds and people's safety.

It was in the United States and the United Kingdom that the question of traffic and its infrastructures first came to the fore. Perhaps because conditions were favourable for a new approach, perhaps because the country was a major manufacturer of motor vehicles, the British authorities were forced to put this issue on the table among the problems of the city. One of the major Fig. in traffic control

in England both before and after the Second World War was Alker, later Sir Alker, Tripp (1883 to 1954), who from 1932 to 1947 was the Assistant Commissioner responsible for traffic in the London Metropolitan Police. In an early article, in 1928, he addressed for the first time the new, thorny problem of motor transport policy, its outdated rules and its restrictions on society.[18] On this same theme, in 1938 Alker Tripp published his book *Road Traffic and its Control*, a reworked development of which would be published in 1943 as *Town Planning and Road Traffic*. Both books were devoted to the co-ordination and control of motor traffic and the requirements it imposed on town planning.

As noted above, the preface to the second work was written by the well-known Professor Abercrombie. It is very significant in its concept of the city, emphasizing that the main problem of town planning lay in the difficulty of changing the habits and lifestyles of people and planners. What had previously been suitable, the location of shops and housing along streets, became a potential threat to people's safety once motor traffic filled the roadway. He also pointed out that technical solutions for planning roads and major thoroughfares, such as flyovers and roundabouts, could not on their own solve the problem, the answer being to design streets in relation to human activities. In this way, he highlighted the need to address this question through the functional design of roads at the scale of a city as a whole.

Abercrombie indicated that the idea of an enclosed space or precinct was one of Tripp's outstanding contributions to town planning, which he himself adapted in the London plan of 1944, one of the aims of which was to eliminate dangers from road traffic in residential areas (Hall, 1982). Thus, expanding on Tripp's ideas, he established a hierarchy of three types of road, arterial, sub-arterial and local, combined with enclosed residential areas having their own open spaces. Interestingly, Tripp's ideas were not known in many countries, and were most probably brought to people's attention by Abercrombie's planning work.

Tripp's ideas were not entirely new. Some of his suggestions for reconsidering urban designs to enable the free circulation of vehicular traffic had already appeared before. There were parallels to these concepts such as E. Hénard's ideas on ring-roads with cross-routes (1908), C. Perry's suggestions for self-contained neighbourhood units (1923), C. Stein and H. Wright's proposals for residential cul-de-sacs in Radburn (1929), or the principles included in B. MacKaye's paper *The Townless Highway* (1930) and article "Townless Highways for the Motorist" (1931). However, Tripp brought these scattered ideas together into a single concept, considered them on the scale of a whole city and in relation to the different situations in existing conurbations.

In his book Tripp set out two main ideas. The first was that transport and traffic are different issues, although the terms are often used as if they were interchangeable: transport is the mode used for movement, while traffic is the interaction of movements as a whole. The second was an outcome from the first point, stating that thought should be given not only to the organization of the main streets, but rather of the whole road network. He suggested a solution, which was the application of a hierarchy of thoroughfares. He was one of the first to develop a classification of roads on these lines in accordance with their function and their rank in such a relational sequence. He divided highways into three groups: arterial routes, for circulation, sub-arterial roads, for distribution, which should not be related to amenities, and local streets, which were for access to buildings and could have various functions and different amenities sited on them.

18 The article "Police and Public: A New Test of Police Quality" was published in the first issue of The Police Journal: Theory, Practice and Principles, in 1928. It represented an early concern with the evolution of society and the need for development of restrictions on the regulation of motorised traffic.

For Alker Tripp, such a hierarchy in the road network would have no meaning without functional zoning. Thus, he criticized the practices in urban zoning at the time, this, according to him, being based on convenience and hygiene, without consideration of relationships between the functions of streets. As he saw it, zoning should be used as a tool in city planning to improve traffic circulation and safety. On this basis, Tripp concluded that functional zoning determined communications, but the principles of his proposal might also condition this zoning.

Similarly, the main roads in the city had to be integrated into the road network, which at the national level required to be related to the general system of communications. This emphasized the need to establish a co-ordinated plan on a national scale.

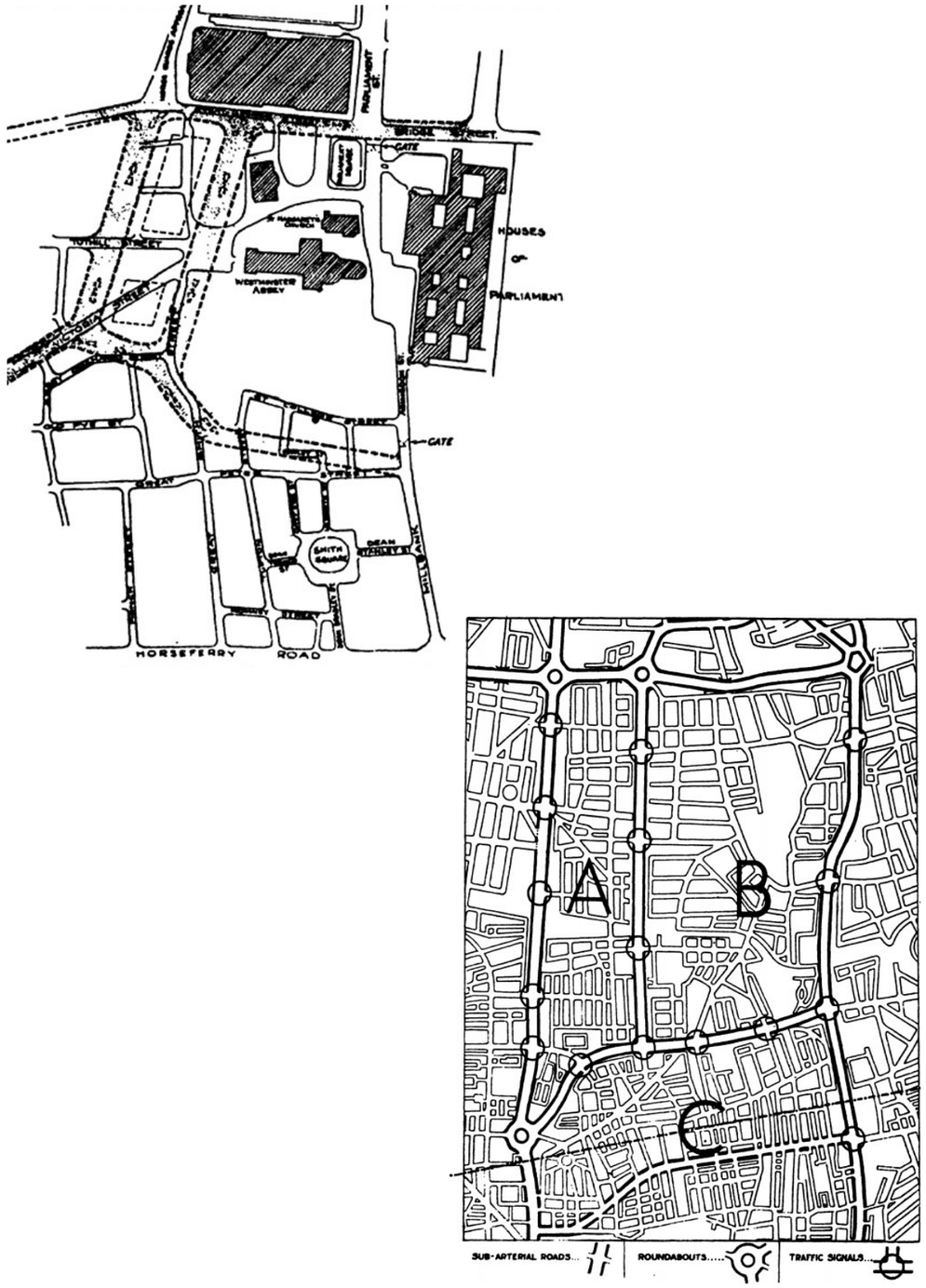
With regard to the planning of new cities and the reconstruction of existing zones, he offered several proposals, stressing the need for separation. He stated that, for pedestrians, the possibility for free movement must be created, and for transport the conditions for unhindered circulation must be established (Tripp, 1947, p. 86).

Tripp did not work out detailed proposals for new cities, since he perceived them as exceptional cases. Rather, he emphasized that they provided a good opportunity to think carefully about the hierarchical road network and its functional design in order to solve city-wide traffic problems from the outset. In contrast, the reconstruction of existing cities was Tripp's main concern. To this end, he proposed a complex revision of planning with a series of specific criteria. At the level of an urban area, to prevent traffic congestion he proposed two ring roads, one close to the city centre, and the other on the edge of the built-up area. Both were to provide through-transit facilities and were to pass through the city without contact with sub-arterial streets and with no facilities sited along them. The other, undetermined streets were to be reviewed according to the proposed hierarchy, each receiving its own special function.

The areas between arterial streets, termed "precincts", were also assigned functions relating to their individual characteristics as industrial, commercial, or residential areas, accommodating different human activities. Tripp insisted that such precincts had to become the "defining feature" of the city plan (Fig. 31).

However, the real problems began when referring to the city itself, and especially to its centre (Tripp, 1947, p. 81). Here, the struggle was between the opinions of a traffic expert and the existing urban environment, built as a response to architectural views, in which wide streets were dedicated only to serving transport flows. To tackle this problem, he applied the principle of spatial isolation (Fig. 32).

In town centres, he recommended complete isolation of the areas, and if this was not possible, traffic flows should be separated onto different levels or left at



Top, Fig. 31. The separation of residential, commercial and business areas from the main traffic flow. Source: Tripp, A. (1943) *Town Planning and Road Traffic*, London, Edward Arnold and Co, p.78.

Bottom, Fig. 32. The case of traffic isolation. The group of buildings of architectural merit does not have to be invaded with traffic. In quiet areas people can appreciate the architecture. Source: Tripp, A. (1943) *Town Planning and Road Traffic*, London, Edward Arnold and Co, p. 80.

ground level, but with pedestrians confined to walkways and bridges. He perceived urban complexity in city centres as the cause of uncontrolled traffic, resulting in a need to set public amenities apart, creating a service road if this was not possible. Thus, in every situation Tripp wished to maintain the isolation of one space from another, and he offered a variety of choices or compromises that from the point of view of traffic had to be convenient.

In concluding his theoretical proposals, Alker Tripp expressed a hope that his ideas would be implemented in the future. In addition to the impact on town planning in England in the post-war period, his ideas were influential elsewhere. The British engineer, Colin Buchanan, followed up some of Tripp's ideas in his famous 1963 work *Traffic in Towns*, which derived from a subtle philosophy of limited planning (Hall, 1996, p. 326) in which "precincts" were turned into "environmental areas". However, before this happened, Tripp's ideas were disseminated in the USSR through the translation of his book into Russian, and found a continuation in the theory of Soviet town planning.

b. Anticipating the Arrival of Road Traffic in the USSR

The USSR Academy of Architecture's editorial introduction to the Russian translation of *Town Planning and Road Traffic* in 1947 stated

> *"In the next few years, hundreds of thousands of new cars will flood the streets of our cities (...). The importance of Tripp's ideas justifies a presentation to Soviet architects of an interesting insight into the problems connected with the planning of cities and road traffic."*[19]

These words from the short preface of the Russian edition show what stress was laid on the problems of road traffic in the post-war period, even though this did not yet exist in Soviet cities, but was foreseen for the future. The reconstruction of cities, the continuation of the industrialization programme, the growth of urban populations and, as a result, increased movements by individuals, were seen as factors that would cause traffic congestion in the immediate future. Therefore, ways of organizing the movement of people, of ensuring the circulation of vehicles, and of preventing traffic problems in cities received specific attention from the authorities.

In the 1930s, Soviet research on transport and traffic in cities was quite intensive. Several authors made efforts to study this subject in depth, focusing mainly on public transport, while private transport was given little attention, probably because it was believed that it would not grow very much in the coming years. Important works, such as those by Abram Zilbertal and Georgi Dryubin, addressed such major issues as the characteristics of different modes of public transport and the influence of passenger movements on them. In 1935, a statistical study of passengers was organized, which for the first time included a differentiation of the motives for the movement of people (Dryubin, 1935), although this did not influence town planning.

19 "В ближайшие годы десятки и сотни тысяч новых автомобилей наводнят улицы наших городов (...) Важность затрагиваемых Триппом вопросов дает редакции основание считать весьма важным и полезным познакомить советских архитекторов и работников коммунального хозяйства с интересной точкой зрения большого специалиста на взаимосвязь вопросов планировки городов и уличного движения."

In the post-war era there was a short period when the influence of Stalinist ideology weakened somewhat. Soon after this began, architects started to aspire to be involved in the worldwide process of searching for methods of city reconstruction (Kosenkova, 2000). As a result, a debate arose as to whether town planning should continue on "artistic" lines or whether it should include "scientific" methods. However, some theoretical work done using scientific analyses were felt to be alien to Soviet town planning, being criticized even by "official" architects for not following the principles of Socialist realism.

On the issue of the relationships between traffic and cities, two important studies published in 1946 by the engineers Anatoli Yakshin and Georgi Sheleikhovsky are worth mentioning. Their main idea was to establish the relationship between the layout of towns and the configuration of their transport networks on the basis of statistics on traffic. In Yakshin's work, the accessibility of industrial zones and population densities in relation to the main centre defined the compactness of city plan and the convenience of transport network.

Sheleikhovsky's work on the composition of the city as a traffic problem attempted to use a mathematical method to define initial data such as the settlement and movement of people in relation to spatial characteristics like accessibility and distance. However, these proposals focused on traffic analysis for transport network planning and did not make any suggestions regarding changes in urban morphology. In addition to this analysis, in his work he foresaw private transport as increasing in the future. Streets ought to be designed with a fifty-year time horizon.

> *"When this sort of timeframe is involved, there is no cause to assume that cars will be only a limited means of transport. When a city is being designed, a check must first be made that the roads have a full capacity to cope with expected traffic."*[20] *(Sheleikhovsky, 1946, p. 69).*

Among the architects who favoured the scientific development of town planning was Andrey Burov. In a 1944 article, he evaluated Alker Tripp's proposals as an advance towards solving traffic problems. In this article, Burov looked at the statistics for road deaths in England and reached the opinion that it was not motor transport that caused this mortality, but old-fashioned city plans and street networks, which were not suitable for road traffic (Burov, 1944, p. 101). Consequently, cities needed to be changed to meet the needs of motor vehicles. Modernist ideas were triumphing all round the world.

After 1947, a process of strengthened controls and of breaking off relations with the West set in, so that certain architects who had tried to offer scientific methods for urban planning were criticized at this time. For example, the architect Burov was criticized for not believing in Soviet town planning, because he had stated that Tripp's work was of value (Kosenkova, 2000).

20 "А, имея дело с подобными сроками, мы не имеем никаких оснований для каких бы то ни было ограничений автомобиля, как средства передвижения. И проектируя город, мы обязаны проверить его магистрали на пропуск максимально возможного потока автомобильного движения."

The translation of Tripp's book arose from the attempts of engineers and architects to relate transport and traffic, with the related infrastructures, to town planning. Theoretical works show that knowledge of the relationship between traffic control and urban morphology was in its infancy and had not yet materialized in urban practice. In this context, Alker Tripp's ideas were quite novel, suggesting a safe city with fast-moving traffic based on practical methods for the functional design of road networks. This is perhaps why the translation of the book into Russian had such an impact. It was perhaps also because of the assumption that a period of development of urban science, and new ways and methods for town planning, were the only route to implement the mass construction of Soviet cities, as well as a fast, safe access to the progress to which the Soviet Union so greatly aspired.

c. On the Road to Progress

By the early 1950s, it was already possible to observe the results of the construction of cities after the Second World War. Many industrial conurbations grew rapidly, expanding beyond the size envisaged in urban plans. In connection with this, there was a need to intensify research into traffic and road networks. In 1953, the Soviet engineer Alexey Polyakov (1953) published a book on urban traffic, in which for the first time a proposal was made for a comprehensive classification of roads with defined parameters of speeds, intersections and scope of use. However, a hierarchical order was not yet proposed, and the connections between different classes of streets were mainly defined at an average distance of 330 to 400 metres. Along with road classification and the separation of flows at street intersections, for which several schemes by Tripp (Fig. 33) were suggested as examples, he put forward the idea of segregating vehicular and pedestrian flows. He also suggested that urban centres could be freed of traffic by the creation of a ring road, from which radial routes that did not enter the centre could run outwards. The author also expressed an idea he shared with Tripp: planners should design residential streets to ensure safety and quietness. However, he did not develop this in any detail. In general, Polyakov favoured the study of geometrical and technical characteristics of streets and roads, but did not clearly express any strong need for the separation of vehicles and people on foot.

The period of major changes in the planning of cities in Communist countries after 1954 began in response to an urgent need to find the ideal urban structure for the future Socialist city. Taking into account the mistakes of the past, the uncontrolled growth of cities occurring thanks to "artistic" methods, the crucial necessity for objective, inductively based techniques in town planning grew in prominence. As a result, a period of intensive research started in the search for an optimal, flexible structure for future changes. The basis of this major change was the planning of traffic and road networks integrated with the structure of cities.

One of the first studies on the new principles of town planning came in 1956, in a book on the planning and development of cities, published by the Academy of Architecture of the USSR. The part devoted to urban traffic was drawn up by Vasily Baburov, a forward-looking architect who participated in the debate on scientific methods in Soviet town planning that took place after the Second World War. Baburov proposed new methods of organizing urban traffic and planning road networks, closely related to Tripp's ideas, but also to the essentially functionalist ap-

proaches of Modern Movement. These ideas, similar to those of Le Corbusier and the Athens Charter, were not, however, cited in Soviet literature until the late 1950s, probably because they were presented in descriptive texts or in sketches, rather than in theoretical schemes for interventions in urban morphology. The author first criticizes streets with mixed functions and proposes the separation of vehicle from pedestrian flows. Thereafter he emphasizes the need to find new methods of city planning and development to meet urban transport and traffic requirements.

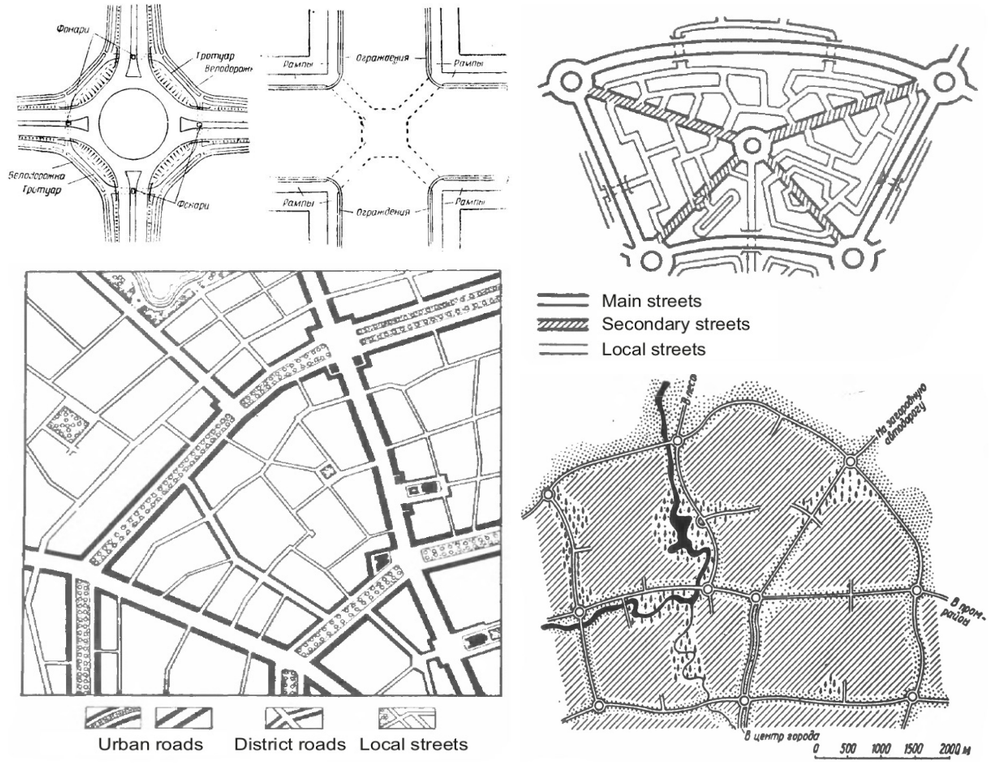
In order to solve what were considered the defects of mixed streets, a proposal was made for the classification of thoroughfares into arterial roads, neighbourhood streets and local streets, the latter still being directly connected to arterial routes (Fig. 34). Tripp's hierarchical classification for streets and ideas for residential precincts found a place as exemplification (Fig. 35). In connection with this scheme, Baburov (1956, p. 93) expressed the view that Tripp's theories on street networks were of great interest, stating that in the future a need would inevitably arise for the spatial separation of residential areas and public buildings from arterial streets. Hence, he concluded that daily life should take place in enclosed spaces, with public amenities isolated from traffic on residential streets.

Finally, Baburov proposed a scheme for large and medium cities, in which, as Tripp suggested, the number of junctions between local streets and main roads should be limited or arranged by means of ring roads (Fig. 36). Residential areas should be enclosed and public facilities should be sited on local streets, so as to ensure safe use and convenience, (Baburov, 1956, p. 93). Baburov felt that this scheme and these principles could also be used in the reconstruction of existing cities.

It is thus possible to state that Tripp's ideas were seen as pioneering methods for organizing road traffic and private transport in cities, and had a significant influence on the establishment of new town-planning principles in the USSR. For the first few years, these guidelines were applied in a more or less similar way in many different areas. At a later stage, there attempts started to be made to develop them more in relation to the Soviet context, with a stress on the importance of the idea of city integration and coherence. To understand this, it is worth comparing Tripp's ideas with the principles of the Socialist city model established and applied in the early 1960s.

Alker Tripp's first influential idea was the creation of a hierarchical network of streets. In the USSR such a hierarchy for road networks was laid down in the building standards of 1958, where thoroughfares were classified as arterial routes, main city streets, neighbourhood streets, local streets and park streets. This detailed hierarchy of thoroughfares was set up with an eyed to the parallel need for a hierarchy of residential areas, defined as the *microraion* or neighbourhood unit, the *raion* or district, and the *gorodskoi raion* or urban quarter, together with city amenities and green spaces.

One of the problems facing neighbourhood units in capitalist cities was their disintegration as coherent entities (Bocharnikova, 2014). In the Soviet case it was no longer a question of ensuring residential areas were isolated from traffic, with facilities sited in local streets, but rather a matter of integration of such residential zones with arterial routes and with amenities. For financial reasons, these facilities were to be shared between the neighbourhood unit and the district (*microraion*



Top left, Fig. 33. A. Tripp's schemes on the organisation of arterial street intersections with separation of transport and pedestrian flows. Source: Polyakov, A. (1953) *Gorodskoe dvizhenie i planirovka ulits*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu i arkhitekture, p. 240.

Bottom left, Fig. 34. Proposed hierarchisation of streets in the USSR. Source: Baburov, V. (1956) *Planirovka i zastroika gorodov*, Moskva: Gosudarstvennoe izdatelstvo literaturi po stroitelstvu i arkhitekture, p. 76.

Top right, Fig. 35. A. Tripp's scheme of the hierarchical system of the road network. Source: Baburov, V. (1956) *Planirovka i zastroika gorodov*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu i arkhitekture, p. 93.

Bottom right, Fig. 36. Proposed main street network for new and existing cities. Source: Baburov, V. (1956) *Planirovka i zastroika gorodov*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu i arkhitekture, p. 96.

and *raion*) and would be located along neighbourhood streets at distances of 400 to 800 metres. Citywide, roads were the articulating elements or centralities that integrated each urban sector or *gorodskoi raion* with the others to create a coherent urban structure.

However, Tripp's idea of enclosing residential precincts was intended to make them the scene for everyday life, with local streets having different functions and types of facilities. In contrast, Soviet architects aimed to integrate neighbourhood units into the city as a whole, creating amenities and green spaces at the intersections of district-rank streets leading to local streets. As a result, the local streets within neighbourhood units lacked any specific function.

In city-scale interventions, Soviet architects developed Tripp's idea of ring-roads. While he thought of a circular road just for traffic and having no facilities sited on it, the Soviet experts planned a ring route for traffic linking all the main centres in a city. Segregation of facilities from main streets was achieved by using service streets, which Tripp had proposed as a fall-back only for cases where the urban amenities had unavoidably to face onto main streets. Thus, the extensive siting of central facilities on main streets in the USSR comes from a representation of the image of the Socialist regime in the city.

Alker Tripp's ideas were probably perceived at that time as basic principles, susceptible of adjustment to respond to the complexities of modern cities. On the basis of these concepts, Soviet architects tried to find a way forward, formulating new guidelines for town planning that would be paramount until the end of the 1960s. Throughout his book, Alker Tripp discussed the solutions for two problems: road traffic circulation and pedestrian safety. In short, he emphasized the importance for traffic needs of providing more space for cars to circulate freely, with the idea of enhancing pedestrian safety taking second place. It is probable that his negative experiences on the streets of London resulted in a categorical vision of the impossibility of safely combining of car and pedestrian traffic, which left Tripp no room to think of other proposals, some of which were already being foreshadowed in the United States.

Despite all this, his decision was quite novel, since it was the first coherent proposal to relate town planning to road traffic after the appearance of great numbers of cars on the streets, with consequential growing traffic problems in English cities. It was thus very influential in urban planning for London and the English New Towns. In the USSR, although Tripp's book did not have an immediate impact, its ideas remained in the air as possible guidelines for future changes. It acquired a special prominence in the post-Stalin era, having a significant effect on the formation of the principles of road network planning. Although the Soviet Communist Party exerted its control over thinking even in town planning and architecture, at this stage both urban planning and traffic engineering were considered sciences or technical disciplines, so that their apparently non-ideological profile allowed for exchange of knowledge internationally. Therefore, town planning practices and approaches to urban structure and morphology were seen as a science, and thus was somewhat freer to develop.

Tripp's ideas of a coherent road network and functional design were adjusted in the USSR in connection with the dominant Socialist ideology. The integration of the population with the whole city became important, which was resolved by a fractal structuring of urban elements. The aim was to prevent future traffic problems, to provide for expected urban growth and to reduce the problems faced by conurbations, creating an image of progress and modernity in Socialist cities.

Although these principles of town planning were new, the answer to problems was in essence the same idea already present in the 1920s, in other words, to project the cities of the future in such a way as to avoid difficulties that could be foreseen as likely to arise. As Kopp (1974, p. 211) put it: "The Socialist cure for the ills of a city was prevention."[21] Thus, it can be stated that the nascent traffic engineering formulated

21 "La medicina socialista contra las enfermedades de la ciudad era la profilaxis"

by Alker Tripp was a technical milestone lasting at least until Colin Buchanan emphasized the fact that urban traffic should be considered a complex social problem, with pioneering ideas that represented a fresh perspective in this field.

2.2.4. POST-WAR PLANS AND PROJECTS: THE GROWING ROLE OF ROAD TRAFFIC, THE DEVELOPMENT OF TRAFFIC ENGINEERING AND DOUBTS ABOUT TRAMS

In the post-war period, there was intensified debate on the need to retain tramways. At the same time, there was growing interest in creating the best conditions for car traffic. All this took place in the context of the creation of new Communist regimes in Europe and the emergence of so-called Socialist town planning. It seems, nevertheless, that this contributed little to changes in solutions for collective public transport. The role of traffic engineering was still limited and methods for transport planning were quite diverse. As a result, trams held onto their prime role in most cities. Thus, three intertwining issues came into play: the new principles of Socialist town planning in the European Socialist countries, the development of traffic engineering and motoring, and mass public transport solutions as cities were built or rebuilt.

a. New Town Planning Policies in the Socialist Countries

The establishment of Communist dictatorial regimes in a number of European countries took place between 1945 and 1948 (Enyedi, 1990, p. 167). The new Socialist political systems in Central and Eastern Europe emerged under the Soviet aegis and each had its own characteristics. Among the main policies that they all shared there was the nationalization of private property and a top priority assigned to industrialization. The growth of the economies of these countries was due to a combination of several factors, primarily the introduction of technical innovations, the general mobilization of human resources and the concentration of investments in the productive sector (Hanson, 1990, p. 210). This also increased the level of urbanization through growth following principles based on the theory of Socialist town planning. Controlled urban planning was one of the apparently major ideas of Socialism. Thus, the restructuring of cities established a solid basis for a centralized economy, with a significant presence of heavy industry.

Urbanization grew in the Soviet Union, covering 45% of the population in 1951 and rising to 55% in 1961 (Pivovarov, 2001, p. 103), in Czechoslovakia the corresponding Fig. were 47.4% in 1950 and 51.8% in 1960,[22] while in East Germany the percentage rose from 70.6% in 1950 to about 72% in 1961.[23] The level of urbanization in the USSR grew more rapidly than in the CSR and the GDR. Despite attempts to site

22 The calculation based on data from the Czech and Slovak Republics in the 1950s and 1960s, Source: https://data.worldbank.org/; https://stats.oecd.org/ and United Nations (2012) World Urbanization Prospects: The 2011 Revision, New York, without formal editing, p. 146.

23 The calculation based on the dates from https://www.statista.com/ and Kosinski, L. A. (1974) Urbanization in East Central Europe after World War II, *East European Quarterly*, VIII (2), p. 135.

industries in small and medium towns, with fewer than 100.000 inhabitants, by the end of the 1960s almost 70% of industry was located in urbanized areas with more than 100.000 inhabitants (Lewis, Rowland, 1969, p. 792).

An important Soviet policy was the re-organization of the economy of the European countries in its sphere of influence, mainly based on nationalization, industrialization and extensive land development. In order to overcome the unevenness of spatial and social development, industrial distribution plans were established. In the post-war period East Germany and Czechoslovakia, in comparison with other Socialist countries, had a high level of industrialization (Krejčí, 1972, p. 1) and at the same time a centralized model of planning and administration (Enyedi, 1990, p. 170).

However, the northern part of East Germany and much of Slovakia in Czechoslovakia were less developed and urbanized. This became the main concern of the authorities, who aimed at the redistribution of manufacturing and the creation of new industries. As a result, the development of some Baltic cities like Rostock or Schwerin was boosted, although there was no great upsurge of new cities or major extensions to those already in existence. On the other hand, in Slovakia there was an intention to set up new industries, and settlements and cities where none had stood before. As the result of an extensive industrialization programme running over the thirteen years from 1948 to 1960, the proportion of the workforce in industry climbed to 38% (George, 1963, p. 146). The homogeneous location of the new industry on Slovak territory was part of a socio-economic policy that led to the development of several small towns and villages, such as Žilina, Ružomberok, Dubnica, Martin and others. One of the urbanization policies was the creation of new industrial and residential areas outside existing towns and villages with fast public transport connections (George, 1963, p.152).

On the other hand, in Soviet cities there was a strong orientation towards industrial and administrative functions (Musil, 1980, p. 56). This had implications for city structures, with emphasis being laid on concentrated locations for industrial areas, and on fast, direct connections. Most of the plans for building new cities and rebuilding old were related to this idea. They were based on proposals for the linear development of industries and cities, or on parallel extensions during urban development. This, however, was not a definitive criterion in other European Communist countries. The locating in close proximity of industrial and residential areas was not always possible. Hence, the main criterion adopted was to ensure adequate transport communication rather than geographically close locations. Because of their more highly developed urban and suburban transport structures, in these countries it was possible to plan more clearly to expand transport links. In the USSR, on the other hand, from the very beginning it was expected that policies should work to restrain the growth of cities, rather than envisaging possible expansions.

In addition, there were differences in the settlement structures of the Communist countries. In the GDR and the CSR, urban areas were denser than in the USSR (Musil, 1980, pp. 54-55). These variations may be seen as a result of differences in the historical development of cities. European Communist cities had a different heritage of territorial and urban structure from those of the USSR (Musil, 2005). The territories of Czechoslovakia and Germany were fairly strongly urbanized, with a relatively dense population and a prevalence of small and medium cities (Enyedi, 1990, p. 166). In contrast, in the USSR the level of urbanization was not high and

cities had lower densities, which was partially explained by the industrial development pattern (Fedor, 1975, p. 175). Most Soviet cities were isolated geographically and had less extensive metropolitan areas. Trams operated only within the central zones, having no suburban transport function. This situation was the outcome of transport policies oriented towards the short term, with motor buses and trolleybuses being used as the main means of urban transport. In contrast, in the GDR and the CSR, both trams and suburban trains had dense and ramified networks connecting towns and settlements with larger cities. This is likely to have influenced decisions on the choice of urban transport modes. In the GDR and the CSR, it was not easily feasible to reject trams because numerous settlements and localities were connected by tramways to main city centres, and this was considered to be an important criterion. In the USSR, on the other hand, cities had trams only within the urban core, which is likely to have made it easier to conceive of replacing them with buses.

Collective public transport was crucial for accessibility, social equality and the optimal functioning of cities in Communist countries and their industrial zones. This was one of the main factors behind the need to extend tramway infrastructures and to envisage large capital investments. However, this was not possible in the context of a weak Soviet economy, with investments concentrated mainly on industrial development. This is probably why the minimum population size for establishing tramway systems was of the order of 300.000 to 400.000 inhabitants. In the CSR urbanization mostly took the shape of small cities with up to 70.000 inhabitants (Kansky, 1976), while in the GDR what modest urban growth occurred was evenly distributed over large and medium cities.[24] Consequently, it can be argued that in the CSR and the GDR cities had less of a need for brand-new tram infrastructures and rolling stock, which subsequently favoured the retention of tramways. Thus, the level of development of the transport network was one of the determining factors in decisions about concentration or decentralization, about industrialization and urbanization, as well as in the formulation of new urban transport policies in the post-war period.

b. New Necessities in Traffic Engineering

During the earlier Stalinist era, urban planning solutions were restricted to artistic and formal methods in architecture, the creation of extensions to urban areas, with transformations of city centres and of iconic streets. A monumental image was achieved, but without attention being paid to various functional problems, and without account being taken of cities and their problems in an interrelated and integrated way. Stalinist neoclassicism was also applied in the GDR and Czechoslovakia, mainly in the first plans for new cities (Krivý, 2016, p. 76; May, 2003, p. 57; Spurný, Ladd, 2020, p. 2). Meanwhile, there was no clarity as to what to do and how to solve the problems of existing cities, especially those related to urban traffic.

The aftermath of the Second World War favoured an interest in previously unconsidered technical disciplines, such as construction and transport engineering (Kosenkova, 2000, p. 124). As had happened in Western countries, Socialist

24 See Grimm, F., Kroenert, R., Luedemann, H. (1974) Aspects of Urbanization in the German Democratic Republic, *Conference National Settlement Strategies East and West*, Schloss Laxenburg, Austria, December 1974, pp. 74-85.

town-planning theory was not prepared for the rapid urban traffic growth that occurred. Problem-avoidance techniques were applied, such as limiting the size of cities, planning satellite cities, controlling industrial growth, restricting the utilization of motor vehicles, and the like. The main strategy for solving urban transport problems was to limit the extent to which cars were used (Kosenkova, 2000, p. 144). Despite this, as has already been pointed out, scientific issues related to traffic engineering, such as differentiation of streets or organization of the road system, had a major role in the USSR.

Rationalization and modernization were considered a tool for restructuring society, this being a transnational phenomenon (Wakeman, 2014, p. 154). In the post-war period European countries had different strategies for rebuilding their cities, with some countries reconstructing what had existed previously, whilst others aspired to achieve modernity (Lundin, 2008, p. 259). In most countries where urban areas had suffered bomb damage, rebuilding was used a chance to correct the inherited structures. Whilst in Western Europe modern methods were crucial for the creation of an up-to-date image of the city, in the case of Socialist countries there was also a view that such approaches would help to improve productivity in urban areas.

Traffic engineering started to develop in the USSR from the 1930s onwards, when the first studies on urban traffic organization and planning were published. At that stage there were two urban research institutes, the first covering services and the second traffic. During the 1930s the traffic institute published several important studies.[25] However, after the Second World War this institute ceased to function. Its closure had negative implications, since the USSR never again set up a research body dedicated to urban traffic and transport studies.[26] As a result, in the post-war period there were many difficulties in the reconstruction and planning of cities, arising from a lack of specialists, of departments, of university courses or research, of theoretical studies, of books and journals, and of other requisites. (Polyakov, 1957). The theory of traffic and urban transport planning has not been sufficiently investigated. It had been studied for a short period, amounting to about a decade, and this had been interrupted by the Second World War. The urgent need for the rebuilding of cities in the post-war period stimulated interest in Western developments, and research into traffic engineering.

Thus, urban reconstruction and the possibility of expanding road and street capacities gave an enhanced role to traffic engineering. The complexity of the phenomenon of traffic congestion could be approached through specialized calculations. This was an opportunity to create all the infrastructure needful to provide space for motor vehicles. One of the principal criteria in traffic engineering was the provision of road and street capacity in order to ensure the fluid circulation of traffic. Traffic engineering was decisive in calling for a separation of functions in order to provide improved transport in general, and higher speeds in particular (Hebbert, 2005, p. 46). It may thus be stated that transport engineers determined the principles and criteria for urban plans.

25 Among these studies, we can highlight the work of Polyakov, A. A. (1935) *Tekhniko-ekonomicheskie voprosy gorodskogo dvizheniia*, Moskva-Leningrad: Gostransizdat; Bronshtein, L. A. (1940) *Organizatsiia dvizheniia gorodskogo passazhirskogo transporta*, Moskva-Leningrad: Gostransizdat.

26 In 1948, the transport sub-section was organised within the USSR Union of Architects, which had to deal with the problems of automobile traffic congestion (Kosenkova, 2000, p. 182).

The primacy of transport engineers in matters such as the emerging discipline of traffic studies and the possible threats it identified to good urban functioning gave them a larger part in town-planning decisions. This greatly diminished any possibility of critical analysis of such decisions, or of input from other disciplines. Streets and roads were to be planned exclusively to accommodate motor traffic. This was the logic of traffic engineering as viewed by experts in the 1950s and as it affected city planning in the 1960s. Motor traffic congestion was viewed as a difficulty caused by narrow streets, which was to be solved by widening them. This was a logic that was difficult to change because it was deeply rooted in the methods of the professionals involved.

The development of road infrastructure in Europe, as in the United States was a high-profile political issue. The US model for town planning spread to Western European countries after the Second World War. This was mainly an outcome of technical and educational development, and of American funding (Joch, 2014, p. 166). Thus, from the late 1940s through to the early 1960s there was an intensive period of development, learning from American traffic engineering ideas. The Americanization of planning techniques was very prominent in the post-war period (Wakeman, 2014, p. 154). In the first few years after the Second World War some Western European countries rebuilt tramway lines and actively started work on the modernization of their rolling stock, but this changed rapidly from the early 1950s onwards when a number started to receive financial support from the Marshall Plan. Marshall Aid was a powerful tool in imposing car-based mobility in European cities (Schipper, 2007, p. 212). This funding was probably one of the decisive factors in the closure of tramways in countries where this had not yet become dominant, such as West Germany, the Netherlands, Belgium, Denmark or Sweden. Apart from that, the Marshall Plan was a powerful influence in encouraging the massive use of petroleum products in Europe (Painter, 2009, p. 160).

Although, cities still had to be prepared for a growth in motor traffic and transport. Car production was already well established in Czechoslovakia: in the 1920s around 5.000 units were produced annually (García Ruiz, 2001, p. 136). The numbers started at a similar level in the post-war period, with 5.375 units produced in 1945, but this rose to 64.325 units in 1962 (Fava, 2011, p. 24). The mass production of cars in the GDR started only in the late 1950s, while in the USSR it began in the second half of the 1960s. Both production and use of cars grew throughout the 1950s in the USSR, CSR and GDR, specifically. In East Germany the rise in numbers manufactured was from 7.165 units in 1950 to 64.071 in 1960, in the CSR went from 24.463 to 56.211, and in the USSR from 64.000 to 139.000 total output (Pavlínek, 2008, p. 4). However, these numbers were insufficient to meet demand. This was a consequence of the Socialist policy of restricting individual ownership, giving priority to collective means of public transport. In spite of this, it was still felt that roads should be planned with a view to the growth of car traffic in the future. In 1953, the traffic engineer Polyakov stressed that the norm for car ownership was to be 30 cars per thousand inhabitants. In reality, the real Fig. were around three cars per thousand inhabitants in the USSR in 1950, eight in the CSR, and nine in the GDR in 1960 (Pucher, 1990, p. 281). The level of motorization was rather low, but at the same time theoretical works and urban practices laid considerable stress on an extension of road infrastructures.

Starting in the mid-1950s, a number of international congresses were held on the topic of road infrastructure planning. The most important of these were organized by the road association PIARC [Permanent International Association of Road Congresses]. These meetings were attended by delegations from the European Socialist countries, which were also interested in the issues of motor transport development, road infrastructure construction and traffic engineering. One of the chief goals of the association was to share knowledge about traffic engineering among European countries in order to promote large programmes of construction during the post-war period (Blomkvist, 2004, p. 281). The USSR started to participate in these congresses as early as 1955, and their proceedings were translated into Russian (Fig. 37). This serves to highlight the importance assigned to traffic engineering in Soviet town planning. In the post-war period, one of the objectives shared by European countries, whether capitalist or Communist, was the strengthening of road infrastructure construction.

The Communist countries followed a path similar to that of Western countries in the development of motor transport. Because this phenomenon was new, there were no studies or experiences to analyse, and there could not yet be a differentiated Communist point of view of the matter. In conditions of urgency and weakness in the development of traffic engineering, the best strategy was to learn from the mistakes of Western countries. In earlier years, however, it was more a case of uncritical assimilation. Traffic engineering ideas were seen as useful, and improving the capacity of streets and roads was a universal criterion for the rebuilding or new building of cities.

Fig. 37. The covers of the international congresses about streets and roads in Istanbul in 1955 and Rio de Janeiro in 1959. Source: Glavdorstroi SSSR (1957) *X Mezhdunarodnii dorozhnii Kongress*, Moskva: Avtotransizdat., Bass, M. G. (1961) *XI Mezhdunarodnii dorozhnii Kongress*, Moskva: Avtotransizdat. Translations into Russian could take up to two years. Nevertheless, learning foreign experience was very important.

Without an unambiguous concept of the Socialist city, or any really clear ideas on the topic, there could be no agreed vision of car transport policy. In the USSR the possibility of a growth in car traffic and the use of private transport was denied, but in Czechoslovakia, car ownership was not considered impossible or undesirable. An increase in car use was not susceptible of restriction, because it did not seem possible to control or stop the public's wish to have an individual means of motor transport (Vlček, 1957, p. 494). In these debates, it should be noted that a distinction always tended to be made between the needs for road infrastructures that would provide an acceptable circulation of motor vehicles, and macro planning that sought to provide unlimited capacity, sacrificing the existing urban fabric and tram infrastructures.

c. Tramways in Urban Reconstruction and the Building of New Cities

After the Second World War, countries such as the United Kingdom and France continued to abandon tramway lines in their cities, while other countries, such as Spain and Italy, started to follow the same route of getting rid of their trams.[27] Traffic plans began to play a decisive role in town planning. One factor was a search for solutions that would accommodate the planning and operation of public transport under conditions in which motor vehicles reigned supreme (Lundin, 2008, p. 273). The other factor was the growth of car production in Europe, especially in the countries mentioned above, each of which had a production of between one and three million units in 1965 (García Ruiz, 2001, pp. 134-136). It coincided with the planning and construction of road infrastructure, the increases in which coincided with a deep crisis in tram transport. This was mostly the outcome of declining revenues, the need for extensive repair and modernization if tramway systems were to continue to operate and a lack of public support (Buckley, 1989, p. 108). Old trams could not compete with modern buses.

It should be noted that trolleybuses also started to lose prominence starting in the early 1950s, and were gradually replaced by buses. Among the reasons for this were the perceived ugliness of overhead wiring, inflexibility of routes because of the need for such cables, the expense of maintenance and the cost of electric power (Brunton, 1992, p. 59). In Spain, after a few years of operation trolleybuses began to be considered expensive relative to trams and buses, and only limited use was recommended (Cano Rodríguez, 1943, p. 4; Spanish Official State Gazette, 1954). It seemed that flexibility was no longer a quality applicable to trolleybuses, which constituted a nuisance to motor traffic. Thus, the response was to rely exclusively on buses in the country as a whole, with metros in large cities, eliminating trams and often also trolleybuses.

With the extensive development of traffic engineering in most European countries, the role of tramways came more and more into question. In the 1930s the main problem discussed was the place of trams in the central areas of large cities,

27 The tramway declining took place after the WWII, in Spain, see Jesús Mirás, The Spanish tramway as a Vehicle for Urban Shaping: La Coruña, 1903-1962, *Journal of Transport History*, 26 (2), pp. 20-37; in some medium-sized cities of West Germany like Oberhausen and Saarbrücken, see Harmut H. Topp, Renaissance of Trams in Germany – Five Case Studies, *Proceedings of the Institution of Mechanical Engineers: Journal of Rail and Rapid Transit, Part F*, 212 (3), pp. 223-233; the rest of the UK cities, Pooley C. G., Turnbull, G. (2005) Coping with Congestion: Responses to Urban Traffic Problems in British Cities c.1920–1960, *Journal of Historical Geography,* 31, pp. 78–93.

Fig. 38. The city Kiel, West Germany, before World War II and after reconstruction. The preservation of trams combined with the extension of the street and the change of the urban fabric. Source: IUA (1958) *Stroitelstvo i Rekonstrukciia Gorodov 1945-1957*, Moskva: Akademiia Stroitelstva i Arkhitektury SSSR, pp. 48-49.

but in the post-war period it began to be asked if there was any need at all for trams in smaller cities. The idea of fluidity of road traffic was felt to be incompatible with tram movements. It is true that trams can cause problems at intersections and at their stops. However, a combination of car and tram traffic could be enabled by technological improvements and by giving lower priority to motor vehicle flows. It is striking that this idea was able to evolve only for a short period after the Second World War, when road traffic engineering was not yet widely accepted, the number of cars on the road was not very high, and economic difficulties favoured the need for modernization of tramway systems.

Among capitalist European States, only Nordic and Central European countries maintained a policy of keeping trams running and investing in them. The Federal Republic of Germany (FRG) was most prominent in this field, technological progress being directed towards articulated trams, with greater capacity and a single operative, the driver. West Germany was one of the first countries to modernize its tramcars after World War II (Fig. 38). Duewag was the leading tram manufacturer in the FRG. In collaboration with Rheinbahn and Hannover tramways it built its first four-axle *Großraumwagen* trams that could carry 120 passengers (Van der Gragt, 1968, p. 6). In 1948, it initiated studies for similar high-capacity vehicles, and these resulted in the production of a range of four-axle trams with the possibility of creating two-car trains. In relation to this, the first technical guidelines on the production of high-capacity tramcars were published in 1950 (Vossius, 1952, p. 15).

Thus, many cities in West Germany, Switzerland, Austria, Belgium, the Netherlands, Sweden and Italy moved forward with the idea of tramway modernization.[28] In the early post-war years, people could not afford to buy motor cars and road infrastructures were not highly developed, so that trams retained their prominence. The lack of sufficient amounts of petroleum-based fuel for the operation of motor transport was a further factor: for example, in West Germany, electricity was cheaper than petrol (Buckley, 1989, p. 110). Nevertheless, the deployment of buses and trolleybuses continued, and modernization of tramway infrastructures was often involved no more than the creation of segregated tracks (Fig. 39 and Fig. 40).

Transport policy aimed at the co-ordination and integration of different modes had been studied before, but became important after the Second World War as a tool for the rationalization of economic resources.[29] The decisive factors were public participation in the regulation of transport policies and the objective evaluation of the technical characteristics of each mode used.

The modernization of tramways was mainly in the form of the adoption of new types of rolling stock. Types were developed on the basis of the "PCC" (Presidents' Conference Committee) model of tramcar. Consequently, the renewal of tramways in Eastern Europe was clearly linked to rolling stock technologies, mostly inspired by the concepts in the American PCC vehicles, which were designed in the 1930s

28 See Barbara Schmucki (2010) Fashion and Technological Change Tramways in Germany after 1945, *Journal of Transport History* 31 (1), pp. 1-24.; M. R. Taplin (1984) *Light Rail Transit Today*, Milton Keynes: Light Rail Transit Association.

29 See also Heimes, A. (1956) Die Koordinierung im Verkehr, *Zeitschrift für Verkehrswissenschaft*, 2, pp. 74-80; Seidenfus, H. St. (1958) Rationale Verkehrspolitik, *Zeitschrift für Verkehrswissenschaft*, 4, pp. 187-197; Berkenkopf, P. (1950) Zur Frage der Koordinierung der Verkehrsmittel, *Zeitschrift für Verkehrswissenschaft*, 3, pp. 143-152.

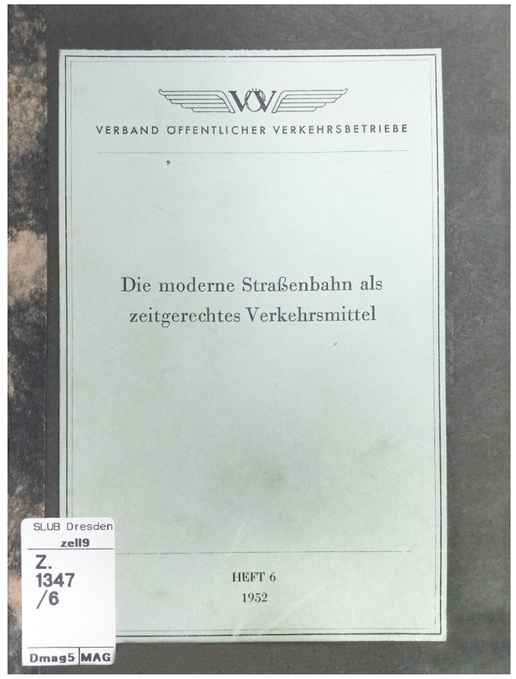


Fig. 39. Cover of the book *Die moderne Straßenbahn als zeitgerechtes Verkehrsmittel* (The modern tramway as a contemporary means of transport), published in West Germany in 1952. The book represented the idea of some Western European countries about the possibility of tramway modernisation after World War II. Within a few years the ideas of this book were considered outdated.

Fig. 40. New trams in the centre of Zurich in the 1950s. Source: ETH-Bibliothek Zürich, Bildarchiv/ PI_55-SCH-0023/CC BY-SA 4.0.

and had some success. The main objectives were to improve speed (by 10% or even 20%), enhance performance and substantially increase capacity, with four-axle cars seating approximately 100 passengers, all of which would ultimately help to minimize energy consumption and staff costs (Vossius, 1952, pp. 12-13; Vaerst, 1952, p. 29). All these improvements were crucial in the financial context of urban reconstruction in West Germany. Moreover, the upgraded designs of trams increased their attractiveness and modernity. Large tramcars were seen as the best tool for improving the circulation and speed of urban traffic (Sauder, 1952, p. 24).

From the mid-1950s onwards, these countries also started to think about the need at times to run trams underground, reserving road space for buses and trolleybuses. The change in public transport policy can probably be explained by the very rapid growth of car traffic in the late 1950s (Diefendorf, 1989, p. 154). The number of cars per thousand inhabitants rose significantly and uninterruptedly, with six-fold growth in West Germany and Austria, a four-fold increase in Sweden, and three-fold in Switzerland, Belgium, Denmark and the Netherlands.[30] This led to the introduction of metro and light rail solutions, with the abandonment of the updating of tramways. In parallel, bus and trolleybus modernization projects were carried out, but not so much with the aim of replacing trams as of providing for public transport needs[31] (Fig. 41).

This rapid change of approach can probably be explained by the swift development of traffic engineering from the early 1950s onwards. Various studies were published on road traffic and capacity improvement, among which American publications, for example the successive editions of the *Highway Capacity Manual* from 1950 onwards, were especially influential. With the gelling of the idea of providing capacity for motor traffic circulation, tramways were closed down in most Western countries. Barbara Schmucki, when investigating this change in West Germany, emphasized that this was an outcome of fashions in transport technology (Schmucki, 2010). In Sweden, too, the decision was taken in 1957 to abandon trams because they were considered incompatible with car traffic (Emanuel, 2012, p. 79).

Thus, from the mid-1950s onwards, these countries started to reconsider the role of their tramway systems. The principal issue raised related to the perceived impossibility of combining trams with other forms of transport in city centres. The traffic engineer Carl Pirath proposed in 1954 the that trams should be run underground in the centres of cities with a population of more than half a million but under one million. The main focus was on central zones, and sub-surface tramway sections were proposed in places like Zurich, Vienna, Bremen, Hannover, and elsewhere, leaving open the possibility of later conversion into an underground railway.[32] Such a solution was justified by traffic congestion and the conflicts on public roads between different types of traffic: trams, motor buses, trolleybuses, pedestrians, bi-

30 See Pucher, J. (1990) Capitalism, Socialism, and Urban Transportation Policies and Travel Behavior in the East and West, *Journal of the American Planning Association*, 56 (3), pp. 278-296.

31 See Saurer, A. (1948) Großer Omnibus für die Städtische Strassenbahn Zürich, *Schweizerische Bauzeitung*, 66 (15), pp. 210-211.

32 About underground tramway projects in German and Swiss cities in the late of the 1950s see Korte, J. W. (1959) *Stadtverkehr: Gestern, heute, morgen*, Berlin, Göttingen, Heidelberg: Springer-Verlag.

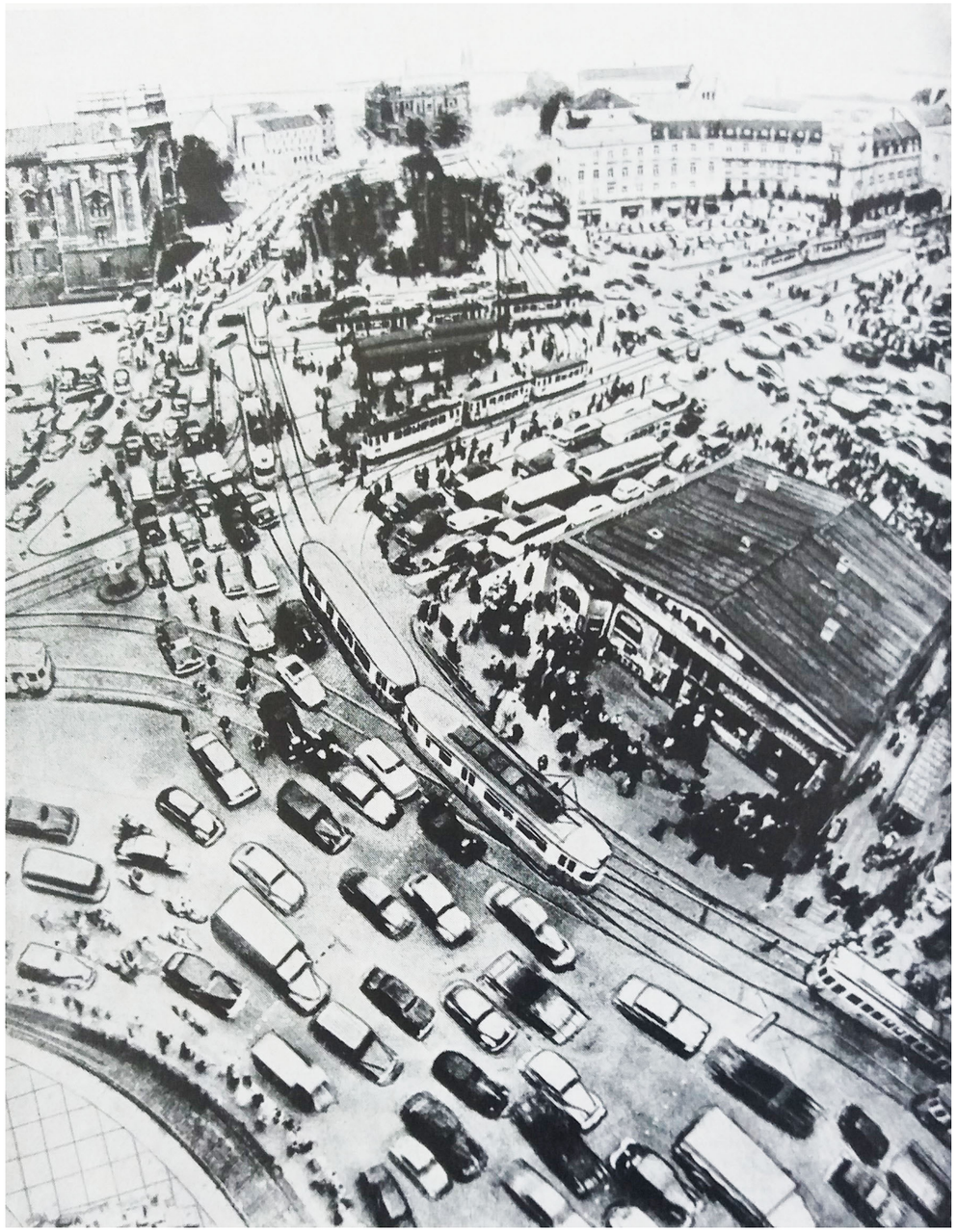


Fig. 41. Traffic on the Munich square in 1956. Source: Korte, J. W. (1959) *Stadtverkehr: Gestern, Heute und Morgen*, Berlin: Springer Verlag, p. 104. The mixture of automobile and tram traffic and the chaos on the streets of European cities prompted the decision to abandon trams.

cycles, and motorbikes.[33] Interest in the modernization of rolling stock began to decline, and instead spatial questions of modern transport operation received more attention. The closure of tramway lines in Western European countries speeded up as the 1950s came towards their end, with lines being abandoned not only in small but even in middling cities, such as Liège, Lausanne, Malmö, Uppsala, Wiesbaden, Aachen, Oberhausen, and elsewhere.[34]

It is noteworthy that, despite these changes, these same countries continued to retain tramway systems in their larger cities. This was due to a grasp of the fact that in these cities tramways could not be replaced by buses or trolleybuses, it was too expensive to construct a metro, population densities were not sufficient for an extensive suburban rail network, and any conversion from tramways to light rail was a gradual process. Public mass transit still had a crucial role in providing efficient use of surface area (Fig. 42), this leading to a balanced approach to urban transport policy. In these countries there were examples of how to accommodate motor traffic and at the same time ensure that the functioning of public transport remained compatible with it. The development of urban structures continued to depend on tram lines, organized around their stops, leading to better integration between land use and transport. Some projects and plans for New Communities were also based on rail or tram infrastructure in these countries, examples being Vällingby and Farsta in Stockholm, or Bergsjön and Kortedala in Gothenburg (White, 1974, p. 85).

In the European Communist countries, too, there were efforts to modernize trams in the 1950s. The main success was related to the Czechoslovak company *ČKD* (*Českomoravská Kolben-Daněk*), which bought a production licence for the "PCC" design and by the end of the 1950s was able to achieve a high level of modernization with its various "Tatra" models. In the GDR and the USSR, on the other hand, production continued to be mainly of two-axle units. After the Second World War, cities started to rebuild their tramway infrastructures quickly in order to provide some form of mobility for their citizens. During these years of great economic crisis, the rebuilding of tramways was seen as a strategic imperative. Later, when the most intensive and difficult period of reconstruction was over, by the middle of the 1950s, tramways began to be questioned and branded as an outdated means of transport.

During the reconstruction of large Soviet cities, the ideas of the 1935 Moscow Plan were applied: trams would be eliminated from central areas, being installed in more peripheral zones. In Moscow itself, the main means of transport were buses and trolleybuses (IUA, 1958, p. 40). Passenger movements by bus in Soviet cities increased considerably, from 3.826.000 in 1950 to 19.168.000 in 1956, representing a rise from 13% to 35.4% of total movements (TSU, 1957, p. 186). Moreover, trams played only a minor role as suburban transport, being concentrated in conurbations. In Leningrad, furthermore, they were eliminated or displaced from the main city streets, with the principal mode of transport in the city centre being trolleybus-

33 Pirath, C. (1954) Das Grundproblem des öffentlichen Personen Nahverkehrs in europäischen Großstädten und seine Lösungsmöglichkeiten, *Zeitschrift für Verkehrswissenschaft*, 4, pp. 290-308.

34 The differentiated character of the abandonment of trams in Western European countries in the period between 1945-1975 is explained in the article by Émangard, P.-H. (2012) Les tramways en Europe: une vision diachronique, *Groupement pour l'Étude des Transports Urbains Modernes, Transports urbains*, 1 (120), pp. 3-8.

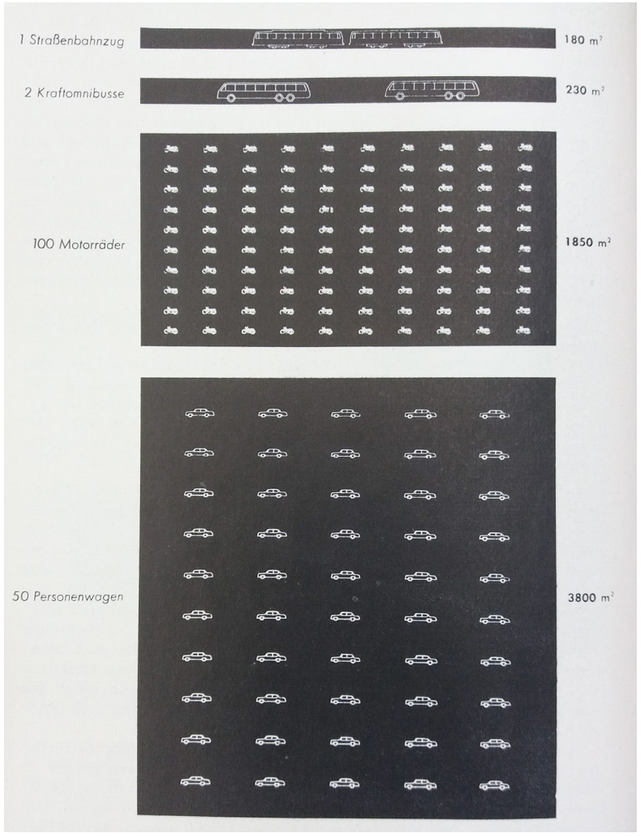


Fig. 42. The loading on the road space (public and individual transport). Source: Korte, J. W. (1960) *Grundlagen der Straßenverkehrsplanung in Stadt und Land*, Berlin and Wiesbaden: Bauverlag GMBH, p. 36. A distinction can be drawn between trams and buses in surface use. In addition, this scheme demonstrates the concern for the priority of collective public transport.

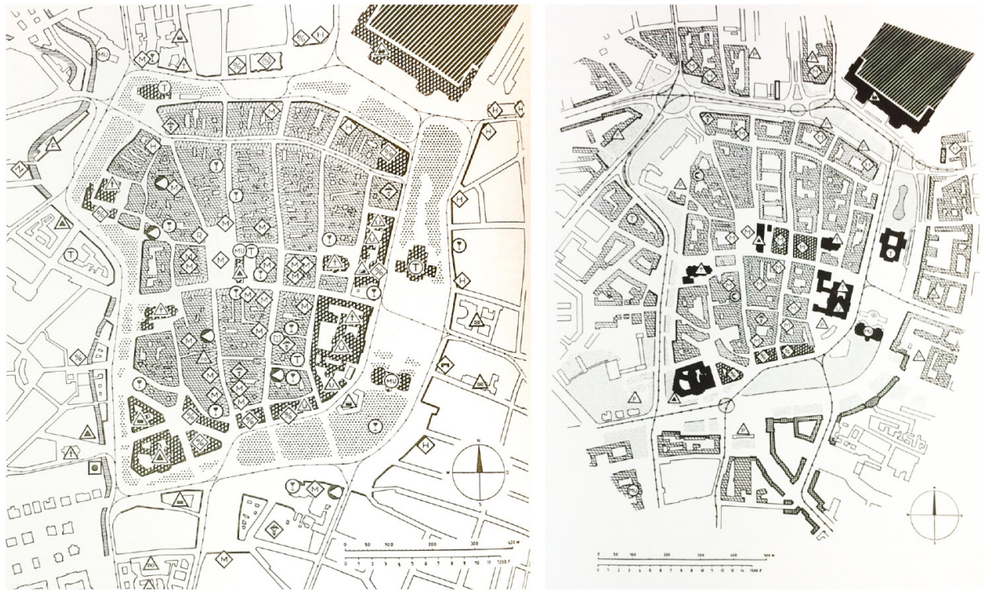
Fig. 43. In Kiev, on Kreshatik Avenue, the partial replacement of trams by trolleybuses began in the mid-1930s, but their complete replacement was carried out with the post-war reconstruction. Source: https://transphoto.org/.

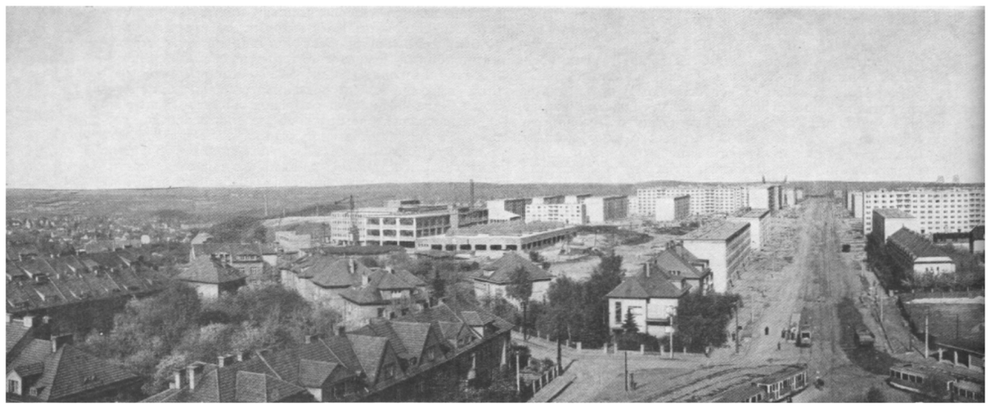
Fig. 44. Top: Große Frankfurter Straße in 1945 with its tram infrastructure. Source: https://fhzz.de/der-rabenstein-strausberger-platz/Friedrichshainer Zeit Zeiger. Bottom: Stalin Allee (later Karl-Marx-Allee), reconstructed according to 1952 town planning principles. Source: Federal German Archives (1967a) Bild 183-F0413-0013-001, photo by Koard Peter, 13 April 1967.

es. Similar examples of such a transport policy were to be noted in the reconstruction of cities such as Minsk, Stalingrad, Rostov-on-Don, Yerevan and others, with tramway routes removed from central streets and squares. This was probably also related to the idea of that a representative administrative and political centre should reflect the modernity of Soviet cities. In the reconstruction of the main avenues of Kiev, Minsk and Yerevan, tram lines were removed and replaced by trolleybuses (Fig. 43). In central streets with intense traffic, tram service could be provided only by using single four-axle cars, whilst any organization of trams into trains or use of two-axle models of car, with slower speeds, was not recommended, as this might hinder the circulation of motor vehicles and pedestrian traffic (Polyakov, 1953, p. 50).

Similar events occurred in the planning of certain main streets in East Germany and Czechoslovakia, countries which after the war began to follow the thrust of Soviet town planning. In Berlin's famous Stalinallee, formerly Große Frankfurter Straße and later Karl-Marx-Allee, the existing tramway lines were removed in order to attain a monumental image to represent the Communist regime (Fig. 44).

Despite this, trams remained an indispensable means of transport when it was necessary to provide of high capacities. In some countries such as East Germany, Czechoslovakia and Poland, petroleum products had to be imported, which restricted the development and use of motor transport. Moreover, these countries





Top, Fig. 45. On the left, plan of the centre of Leipzig with its tramway lines in 1939. On the right, reconstruction project of the destroyed city centre with the reconsidered tram lines. Source: International Union of Architects (IUA) (1958) *Construction and Reconstruction of Towns, 1945-1957*, Moscow: State Building and Architecture Publishing House, p. 11.

Bottom, Fig. 46. New residential area Petřín planned in 1955-1956 in the periphery of Prague. Source: Shvidkovskii, O. A. (1963) *Gradostroitelnaia kultura socialisticheskoi Chekhoslovakii*, Moskva: Izdatelstvo Akademii Nauk SSSR, p. 132.

kept their trams, since they were considered to be more economical to operate and more spacious than buses, and it was plausible they could be modernized to achieve compatibility with motor transport in the future. The elimination of tramways did take place in a restricted, albeit symptomatic, fashion. During city reconstruction, streets were expanded and new buildings were constructed, but tram lines were generally maintained in place.

In Warsaw, for example, most of the lines were rebuilt after the Second World War. Removal occurred only on some secondary streets in the centre, with the aim

of reducing the density of the tramway network. In Dresden, Magdeburg, Leipzig (Fig. 45) and other heavily bombed cities, similar processes occurred, with lines maintained in the main streets and squares of the urban centre.

In Czechoslovakia there was less need for reconstruction. In Prague (Fig. 46), Bratislava and Brno, tram lines were retained in city centre. Providing direct connections between the centre and the periphery was another major criterion that contributed to the continuance of tramways. In contrast, proposals for underground tramways, light rail or metros did not appear until the early 1960s.

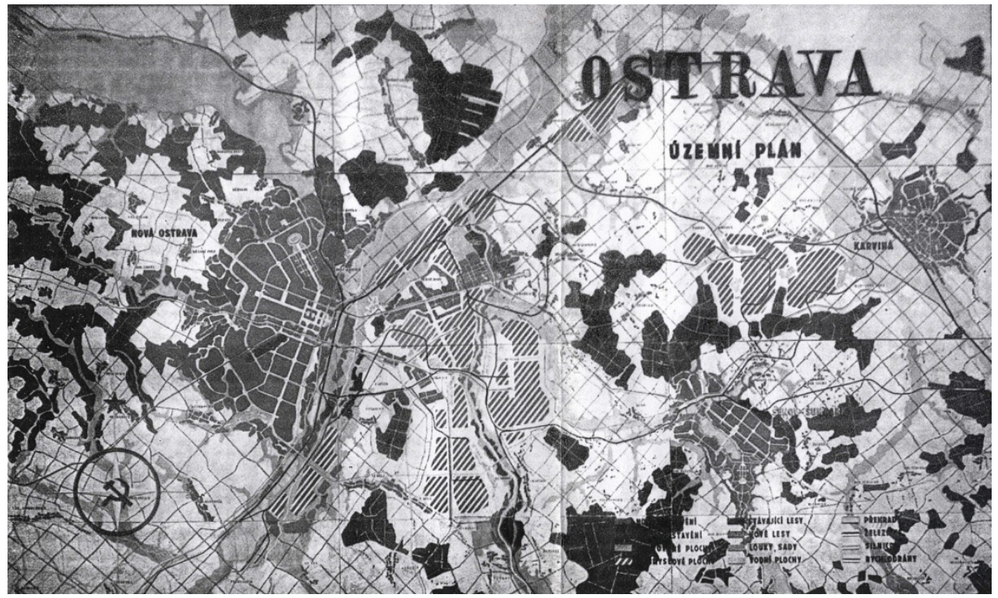
During the era of Stalinism there was planning for new cities and urban areas, but there was no definite policy on urban transport. Rather, emphasis was laid on the need for wide roads and streets, the requirement to reduce traffic in city centres, and the provision of capacity at intersections. Stress was put on the construction of new residential areas, iconic squares, monumental spaces, large avenues and the like, without addressing solutions for transport problems. The interrelationship between transport and town planning was not taken into account. This was similar in other European Communist countries, which in the early years followed Soviet practices.[35] About this process of Socialist transformation in European countries, Enyedi highlighted (1990, p. 165):

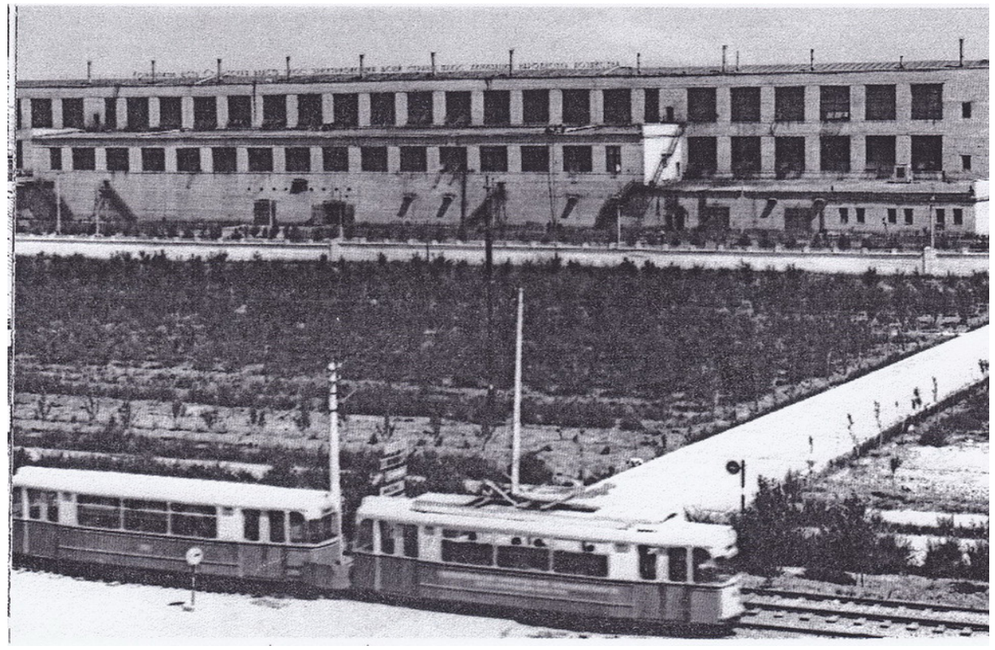
> *"Consequently, these societies followed Eastern (Soviet) patterns in formulating policy goals, and Western patterns in developing technical civilization in cities. But technology is not neutral: it expresses social relations, too. Western technical civilization is based on economic abundance and designed for differentiated individual consumption. Its adoption has had an effect on social differentiation in East-Central Europe."*

However, it should be noted that the ideas of the Soviet Stalinist era were fully implemented in new industrial towns in the early 1950s. There were fewer new towns in East Germany and Czechoslovakia, and those there were had a smaller size than in the USSR. Rather, large residential areas were planned which were connected to the existing city by collective public transport, mainly suburban rail, or rapid or conventional tramways. Trams were the preferred solution in smaller new towns located close to a large city, as was the case for Poruba or Bělský Les in Ostrava (Fig. 47 and 48). Other new towns such as Stalinstadt (now Eisenhüttenstadt) in the GDR, Nowa Huta in Poland and Dimitrovgrad in Bulgaria were smaller in extent, and relied exclusively on road infrastructures and motorized public transport.

One of the peculiarities of the new Soviet cities was their large size, ranging from 150.000 to 450.000 inhabitants. Existing industrial cities such as Magnitogorsk, Stalinsk (now Novokuznetsk), Prokopyevsk, or Zaporozhye retained their tramways. New cities like Angarsk (Fig. 49), Volzhsky (Fig. 50), Salavat or Temirtau were planned with tram lines incorporated. The prime role of tramways was explicable mostly in terms of the concentration of industrial and residential areas, with long distances between workplaces and homes. In contrast, trams were eschewed by some new linear industrial cities, where distances between residential and in-

35 See May, R. (2003) Planned city Stalinstadt: a manifesto of the early German Democratic Republic, *Planning Perspectives*, 18 (1), pp. 47-78, DOI: 10.1080/0266543032000047404; Zarecor, K. E. (2011) *Manufacturing a socialist modernity: The architecture of industrialized housing in Czechoslovakia, 1945–1956*, Pittsburgh: University of Pittsburgh Press.





Top, Fig. 47. Plan of the city of Ostrava 1950-1951, the city connected with suburban areas. Source: Špačková, E. (2015) *Ideální Lidé, Ideální Města, Plán krásného města na příkladu Nové Ostravy*, Brno: Časy Měst.

Bottom, Fig. 48. The tram stop Vozovna Poruba in 1962 connecting the new town of Poruba with Ostrava. Source: https:// transphoto.org. Se puede ver la aplicación temprana de tranvía modernizada de 4 ejes en tren de 3 vagones. This allowed a better service to be achieved at the peak hour.

Top, Fig. 49. The new Siberian city Angarsk and its first tramway in 1957. Source: https://transphoto.org.

Bottom, Fig. 50. The new town Volzhsky (near Stalingrad) and its tramway; image of the industrial area in the 1960s. Source: https://transphoto.org.

dustrial areas were short, for example in Tselinograd (now Nur-Sultan), Tayshet and Zima. In other cases, direct, effective links between industrial and residential areas were more relevant. Thus, some cities of 70.000 to 150.000 inhabitants developed a tramway system, such as the new industrial cities of Angarsk, Salavat, and Volzhsky mentioned above, or Osinniki, all built in the 1950s and early 1960s.

Large conurbations, such as Lviv, Leningrad, Kaliningrad, Riga or Minsk, rebuilt and developed their tramway lines. Nevertheless, standard practice in the USSR was based on the elimination of tram lines in squares and in city centres, with the aim of unburdening narrow streets of troublesome rail-based transport (Polyakov, 1953, p. 28). A complete elimination of trams was undertaken in smaller conurbations of 80.000 to 150.000 inhabitants, such as Kostroma, Mogilev, Kirovograd, Pskov, and others, where the tram networks was not rebuilt after damage during the Second World War. However, trams were sometimes retained and even expanded in smaller towns such as Liepāja with a population not above 100.000 inhabitants. In Tallinn, with some 180.000 residents, the decision was taken to close the tramway in 1948, but this did not happen as the years went by. Meanwhile, Daugavpils, with about 22.000 inhabitants, opened its new tramway system in 1946.

A number of historical cities that underwent major industrial development in the 1950s, such as Biysk, Novocherkassk, Cherepovets or Orsk, had their own tramways. The system in these cities usually had a single main line with a few branches connecting a large industrial area with residential districts.

Meanwhile, even though these countries had many efficient tram systems, the post-war period in the GDR and CSR was also one of the developments of trolleybus networks. In the CSR this led to the replacement of trams with trolleybuses in small towns such as Opava, České Budějovice, Jihlava or Mariánské Lázně, with populations in the range of 40.000 to 60.000 inhabitants. Tramway passengers decreased from a 94.4% share of urban public transport in 1946 to 72.6% in 1954 (Jirsák, 1956, p. 22). In the CSR the expansion in trolleybuses and buses started right after the Second World War, with passenger shares of 1.9% and 3.7% respectively in 1946, rising to 12% and 15% in the next decade (Jirsák, 1956, p. 22). In general, in the CSR the possibility of modernization of rolling stock and tramway infrastructures was widely accepted, with trolleybuses and motor buses introduced as a secondary means of transport complementing trams, or to create a complete system in small towns.

In the GDR, trolleybuses were introduced in the larger cities without any extensive replacement of trams. The abandonment of former tramway systems and the introduction of buses in the GDR took place in the 1960s and 1970s in a few small towns with fewer than 80.000 inhabitants, such as Staßfurt, Eisenach, Stralsund and Mühlhausen. From this it can be concluded that in the GDR and the CSR trams were mostly closed down in small towns, while they remained in large and medium cities. In both cases abandonment was probably conditioned by the necessity to optimize economic resources and by the difficulties of financing any development. This major difference between the GDR and the CSR, and the USSR in the 1950s can be explained by two main reasons. First, Western ideas in the post-war period about the conflicts with other traffic caused by tram lines were widely adopted in

the USSR. Second, the USSR did not have a developed tramway infrastructure with services that would act as an antidote to the overwhelming assumption that cars were the modern answer.

Finally, it can be concluded that in the post-war period tramways followed two diverging courses. First, trams were seen as an important means of transport in large cities, where proposals were made for the modernization of rolling stock. Second, they were regarded as a mode of transport that should be closed down or not developed in small cities, with the rationale of their financial implications. Lying uneasily between these two approaches, the solutions for medium cities were not clearly defined. Here, tramway systems might be maintained and even modernized, perhaps with some necessary eliminations of given lines, or they might be completely replaced by buses and trolleybuses.

2.2.5. CONCLUSIONS

Tramways enjoyed a period of general development in Europe from the introduction of electric trams through until the 1930s. Thereafter, the development and accessibility of motor transport radically changed urban transport policy and city planning. The emergence of Modernist principles that aimed at adapting the city to the needs of motor vehicles was a widely present phenomenon in Europe. The new discipline of traffic engineering began to gain prominence within town planning theory. New standards and planning methods circulated from country to country as universal recipes for dealing with present and future problems of urban traffic congestion. Progress and modernity were mantras that started to become the principal guidelines for future city developments. Acceptance of the new was accompanied by abandonment of the old. The modernization of tram systems was perceived as unnecessary, while the narrow and limited road spaces available were to be reserved for the circulation of motor vehicles. Nevertheless, it was a long and irregular process lasting from the 1930s to the 1950s, and shaped by various economic, social, political and cultural factors.

In the post-war period, trams were an effective and economical tool for supporting urban mobility. Western European countries modernized their systems without thought for any need for large extensions of streets and roads. However, this lasted only a few years, whereupon the more developed Western countries pointed the way, with their visions and new standards in traffic planning and engineering.

Even a Communist country supposedly closed to Western ideas like the USSR also paid attention to new methods of urban traffic planning. Although in the 1930s there was a significant development of tramway systems in response to the massive industrialization of cities and concentrated traffic flows, in large urban areas trams began to be replaced by trolleybuses in central areas and iconic streets. Meanwhile in Eastern Germany and Czechoslovakia, although the new means of transport, buses and trolleybuses, were introduced, trams were retained even in the central areas of big cities. Instead of any replacement of trams, modernization to underground running in city centres and the setting up of rapid tramways to the suburbs was considered. Furthermore, there were extensive improvements to tramway infrastructures in the form of segregated tracking.

In the post-war period, the USSR learned from Western countries in order to make progress in urban traffic planning. The translation of books into Russian was a shortcut. Early British ideas represented by Tripp, Watson and Adams served as an initial guide for organizing interventions in the reconstruction of cities. These ideas embodied the well-known trend in this period in the UK, the abandonment of trams overall and their removal from central areas in particular. This was closely akin to the practices of the Stalinist period, and of Socialism in general, where city centres and prestigious or iconic streets were kept free from heavy traffic, in order to demonstrate the modernity of cities in Communist countries and additionally to allow the organization of large Communist demonstrations. In the European countries where Communist regimes were established, although they were influenced by Soviet planning policy, its principles were not applied in a generalized way, affecting only certain main streets.

In the USSR, tramway operations were supported for functional reasons, providing accessibility to residential and industrial areas. New cities, although they could have done with trams, did not always get them. In the GDR and the CSR, tramways maintained their prominent role in medium and large cities, but they lost it in smaller cities. Despite these variations, trams were kept mainly because there was no possibility of replacing them with a means of transport of comparable capacity and operating economy.

The unchanging criterion of efficiency and the paradigm of modernity were relatively incompatible during the reconstruction process in the post-war period. Tramways had to adapt to the needs of motor transport. A common view was that conventional trams, running on the surface even in city centres and sharing space with motor traffic, were no longer compatible with the modern city. Each country had its variations in the level of acceptance of ideas, within the overall principle of priority for motor traffic. As the new decade of the 1960s began, Western European countries started the outright abandonment of trams or their conversion into light rail, while European Communist countries held contradictory ideas, trying various solutions, from complete abandonment and replacement, to maintenance, to modernization into rapid tram systems. However, the apogee of Modernist ideas in the 1960s once again put in question the very existence of tramways in cities, let alone any new development.

2.2.6. BIBLIOGRAPHICAL REFERENCES

Abercrombie, P. (1944) *Greater London Plan*, London: University of London Press.

Adams, T. (1935) *Noveishie Dostizheniia v Planirovke Gorodov*, trans. Perchik, L. M., Moskva: Izdatelstvo Vsesoiuznoi Akademii Arkhitektury.

Aleksandrov, A. P., Polyakov, A. A. (1936) *Trolleibusy*, Moskva: Akademiia Kommunalnogo Khoziaistva.

Anonymous (1945) Quiet Trolley Described Before Michigan Section, *Electrical Engineering*, 64 (3), p. 122.

Baburov, V. (1956) *Planirovka i zastroika gorodov*, Moskva: Literatura po stroitelstvu i arkhitekture.

Bass, M. G. (1961) *XI Mezhdunarodnii dorozhnii Kongress*, Moskva: Avtotransizdat.

Bächtiger, A. (1940) Die moderne Strassenbahn als wirtschaftliches Transportmittel, *Schweizerische Bauzeitung*, 115/116 (20), pp. 227-231.

Berkenkopf, P. (1950) Zur Frage der Koordinierung der Verkehrsmittel, *Zeitschrift für Verkehrswissenschaft*, 3, pp. 143-152.

Blomkvist, P. (2004) Transferring Technology-Shaping Ideology: American Traffic Engineering and Commercial Interests in the Establishment of a Swedish Car Society, 1945-1965, *Comparative Technology Transfer and Society*, 2 (3), pp. 273-302.

Blum, O. (approx. 1930) *Gutachten Inwieweit ist der Ersatz von Strassenbahnen im Stadtinnern durch Omnibus zulässig*, Hannover: Technische Hochschule Hannover.

Blum, O. (1941) *Städtebau*, second edition, Berlin: Verlag von Julius.

Blum, O., Potthoff, H., Risch, K. (1942) *Straßenbahn und Omnibus im Stadtinnern*, Jena: Verlag von Gustav Fischer.

Bocharnikova, D. (2014), *Inventing Socialist Modern A History of the Architectural Profession in the USSR, 1932–1971*, doctoral thesis, Florence, European University Institute.

Boletín Oficial del Estado (1940) *Ley de 5 de octubre de 1940 por la que se regula la concesión administrativa de líneas de transporte realizado por trolebuses*, 285, pp. 7.34 - 7039.

Boquet, Y. (2017) The renaissance of tramways and urban redevelopment in France, *Miscellanea Geographica – Regional Studies on Development*, 21 (1), pp. 5-18, DOI: 10.1515/mgrsd-2017-0005.

Bronshtein, L. A. (1940) *Organizatciya dvizheniya gorodskogo passazhirskogo transporta*, Moskva-Leningrad: Gostransizdat.

Brunton, L. (1992) The Trolleybus Story, *The Institution of Electrical Engineers Review*, 38 (2), pp. 57-61.

Buchanan, C. (1963) *Traffic in Towns: A Study of the Long-Term Problems of Traffic in Urban Areas*, London: H.M. Stationery Office.

Buckley, R. J. (1989) Capital Cost as a Reason for the Abandonment of First-Generation Tramways in Britain, *Journal of Transport History*, 10 (2), pp. 99-112.

Burov, A. (1944) Voina i Arkhitektura, *Znamia*, 9, pp. 100-114.

Busch, F. (1948) Transportation in Postwar Germany, *The Annals of the American Academy of Political and Social Science*, 260, pp. 80-89.

Cano Rodríguez, J. M. (1943) Construcción y explotación de trolebuses en España, *Revista de Obras Públicas*, 91 (2733), pp. 1-4.

Committee on Highway Capacity. Department of Traffic and Operations (1950) *Highway Capacity Manual: Practical Applications of Research*, Washington: US Government printing office.

Comité de redacción (1938) Výsledek soutěže na vyřešení komunikačních spojů z vnitřního města do severozápadní a západní oblasti hl. města Prahy, *Architect SIA*, XXXVIII, pp. 1-13.

Corbusier, L. (1946) *Propos d'Urbanisme,* Paris: Editions Bourrelier.

Corbusier, L. (1980) *A propósito del urbanismo*, trans. Roser Berdaqué, Barcelona: Poseidon.

Corbusier, L. (1981) *Los tres establecimientos humanos*, trans. Albert Junyent, Barcelona: Poseidon.

Corbusier, L. (2003) *Cómo concebir el urbanismo*, trans. Enrique L. Revol, primera edición en 1946, Buenos Aires: Ediciones Infinito S. R. L.

Dassbach, C. H. A. (1994) The Social Organization of Production, Competitive Advantage and Foreign Investment: American Automobile Companies in the 1920s and Japanese Automobile Companies in the 1980s, *Review of International Political Economy*, 1 (3), pp. 489-517.

Diefendorf, J. M. (1989) Artery: Urban Reconstruction and Traffic Planning in Postwar Germany, *Journal of Urban History*, 15 (2), pp. 131-158.

Dikanskii, M. G. (1915) *Postroika gorodov, ikh plan i krasota*, Petrograd: Izdanie N. P. Karbasnikova.

Divall, C., George, R. (2005) Cultures of transport: representation, practice and technology, *Journal of Transport History*, 26 (1), pp. 99-111.

Dryubin, G. (1935) *Metodologia planirovaniia gorodskikh transportnykh setei*, Leningrad: Nauchno-tekhnicheskii institut kommunalnogo i zhilizhchnogo khoziaistva i stroitelstva.

Emanuel, M. (2012) Constructing the cyclist: Ideology and representations in urban traffic planning in Stockholm, 1930–70, *The Journal of Transport History*, 33 (1), pp. 67-91.

Enyedi, G. (1990) Specific Urbanization in East-Central Europe, *Geoforum,* 21 (2), pp. 163-172.

Émangard, P.-H. (2012) Les tramways en Europe: une vision diachronique, *Groupement pour l'Étude des Transports Urbains Modernes, Transports urbains*, 1 (120), pp. 3-8.

Fava, V. (2011) The Elusive People's Car. Imagined Automobility and Productive Practices along the "Czechoslovak Road to Socialism" (1945-1968), in Siegelbaum, L. H. (ed.), *The Socialist Car: Automobility in the Eastern Bloc,* Ithaca and London: Cornell University Press, pp. 17-29.

Federal German Archives (1967a) Bild 183-F0413-0013-001, photo of Koard Peter.

Fedor, T. S. (1975) *Patterns of Urban Growth in the Russian Empire*, Chicago: The University of Chicago Department of Geography.

Filarski, R. (2011) The Emergence of the Bus Industry Dutch Transport Policy during the Interwar Years, *Transfers*, 1(2), pp. 61–82, doi: 10.3167/trans.2011.010205.

Flink, J. J. (1990) *The Automobile Age*, Massachusetts – London: The MIT Press.

Foster, M. S. (1981) *From Streetcar to Superhighway: American City Planners and Urban Transportation*, 1900–1940, Philadelphia: Temple University Press.

Freeman, M. J., Aldcroft, D. H. (1988) *Transport in Victorian Britain*, Manchester and New York: Manchester University Press.

Fronneau, M. (2007) La concurrence tramway-automobile au cours de l'entre-deux-guerres à Paris. Pour une relecture des représentations liées à la disparition des chemins de fer urbains, *Revue d'histoire des chemins de fer*, 36-37, pp. 279-303, http://journals.openedition.org/rhcf/155 ; DOI: 10.4000/rhcf.155.

García Ruiz, J. L. (2001) La evolución de la industria automovilística española,1946-1999: una perspectiva comparada, *Revista de Historia Industrial*, 19-20, pp. 133-163.

Gravagnuolo, B. (1998) *Historia del Urbanismo en Europa, 1750-1960*, trans. Calatrava, J., Madrid: Akal Arquitectura.

George, P. (1963) L'industrialisation de la Tchécoslovaquie, *Revue Géographique de l'Est*, 3 (2), pp.145-153, doi: https://doi.org/10.3406/rgest.1963.1818.

Glavdorstroi SSSR (1957) *X Mezhdunarodnii dorozhnii Kongress*, Moskva: Avtotransizdat.

Gold, J. R. (1998) Creating the Charter of Athens: CIAM and the Functional City, 1933-43, *The Town Planning Review*, 69 (3), pp. 225-247.

Grimm, F., Kroenert, R., Luedemann, H. (1974) *Aspects of Urbanization in the German Democratic Republic*, Conference National Settlement Strategies East and West, Schloss Laxenburg, Austria, December 1974, pp. 74-85.

Guise, E. (1917) *Schnellstraszenbahnen*, Berlin: Verlag von W. Moeser Buchhandlung.

Gunn, S., Townsend, S. C. (2019) *Automobility and the City in Twentieth-Century Britain and Japan*, London: Bloomsbury Academic.

Hall, P. (1982), *Great planning disasters*, Los Angeles, University of California Press.

Hall, P. (1996) *Ciudades del mañana: historia del urbanismo en el siglo XX*, Barcelona: Ediciones del Serbal.

Hanson, P. (1990) The Soviet Union, in Graham, A., Seldon, A. (eds), *Government and Economies in the Postwar World: Economic Policies and Comparative Performance, 1945-1985*, London and New York: Routledge.

Hebbert, M. (2005) Engineering, Urbanism and the Struggle for Street Design, *Journal of Urban Design*, 10 (1), pp. 39-59, DOI: 10.1080/13574800500062361.

Heimes, A. (1956) Die Koordinierung im Verkehr, *Zeitschrift für Verkehrswissenschaft*, 2, pp. 74-80.

Hendlmeier, W., Slotta, R. (1993) Der städtische Nahverkehr, *ICOMOS – Hefte des Deutschen Nationalkomitees*, 9, pp. 28-32.

Hernández Marco, J. L. (2006) *La derrota provisional de los ferrocarriles urbanos frente al automóvil: la eliminación del tranvía y el triunfo del autobús en España a mediados del siglo XX*, IV Congreso Historia Ferroviaria, Málaga, 20 – 22 de septiembre.

Hruška, E. (1936) *Nové Úkoly v Soudobém Urbanismu*, Praha: Česka Matice Technická.

International Union of Architects (IUA) (1958) *Construction and Reconstruction of Towns*, 1945-1957, Moscow: State Building and Architecture Publishing House.

Jirsák, Z. (1956) *Plánování Rozvoje Dopravy*, Praha: Dopravní Nakladatelství.

Joch, A. (2014) 'Must our cities remain ugly?' – America's urban crisis and the European city: transatlantic perspectives on urban development, 1945–1970, *Planning Perspectives*, 29 (2), pp. 165-187, DOI: 10.1080/02665433.2013.873732.

Kansky, K. J. (1976) Urbanization under socialism in Czechoslovakia, *Ekistics*, 42 (249), pp. 121-129.

Kopp, A. (1974) *Arquitectura y urbanismo soviéticos de los años veinte*, Barcelona: Editorial Lumen.

Kopper, C. (2013) Mobile Exceptionalism? Passenger Transport in Interwar Germany, *Transfers* 3(2), Summer, pp. 89–107.

Korte, J. W. (1959) *Stadtverkehr: Gestern, heute, morgen*, Berlin, Göttingen, Heidelberg: Springer-Verlag.

Korte, J. W. (1960) *Grundlagen der Straßenverkehrsplanung in Stadt und Land*, Berlin and Wiesbaden: Bauverlag GMBH.

Kosenkova, Y. L. (2000) *Sovetskii Gorod 1940 i pervoi polovine 1950 godov: ot Tvorcheskikh Poiskov k Praktike Stroitelstva*, PhD thesis, Rossiiskaia Akademia Arkhitektury y Stroitelnykh Nauk, Moskva.

Kosinski, L. A. (1974) Urbanization in East Central Europe after World War II, *East European Quarterly*, VIII (2), pp. 129-153.

Krejčí, J. (1972) *Social Change and Stratification in Postwar Czechoslovakia*, London and Basingstoke: The Macmillan Press Ltd.

Krivý, M. (2016) Postmodernism or Socialist Realism? The Architecture of Housing Estates in Late Socialist Czechoslovakia, *Journal of the Society of Architectural Historians*, 75 (1), pp. 74–101.

Krpec, O., Hodulák, V. (2018) Industrial Policy in Relation to Automobile Production after the Founding of Czechoslovakia: A Case of Support for an Emerging Sector, *Ekonomický časopis*, 66 (1), pp. 81 – 104.

Kurenkov, P. A., Kobzar, S. G. (1937) *Transport pri Planirovke Gorodov*, Moskva-Leningrad: Glavnaia Redakciia Stroitelnoi Literatury.

Kysela, L. (1930) Krise velkoměst a návrhy na její řešení, *Stavba*, IX, pp. 1-6.

Larroque, D. (1989) Apogée, déclin et relance du tramway en France, *Culture Technique*, 19, pp. 54-63.

Laterrasse, J. (2019) *Transport and Town Planning: The City in Search of Sustainable Development*, London: John Wiley and Sons, Inc.

Lehner, F. (1942) Straßenbahn und Omnibus im Stadtinnern, *Verkehrstechnik*, 23 (23), pp. 337-339.

Lewis, R. A., Rowland, R. H. (1969) Urbanization in Russia and the USSR: 1897-1966, *Annals of the Association of American Geographers*, 59 (4) pp. 776-796.

Lisková, J., Šula, J. (1933) Zásady dopravního řešení Velké Prahy, Soutěžný Návrh "Ve Třech Etapách", *Architect SIA*, XXXII, pp. 65-70.

Lundin, P. (2008) Planning Experts and the Making of the 'Car-Friendly' City, in Hard, M., Misa, T. J. (eds.), *Urban Machinery: Inside Modern European Cities*, Cambridge and Massachusetts: The MIT Press, pp. 257-279.

MacKaye, B. (1930) The Townless Highway, *The New Republic*, March 12, pp. 93-94.

May, R. (2003) Planned city Stalinstadt: a manifesto of the early German Democratic Republic, *Planning Perspectives*, 18 (1), pp. 47-78, DOI: 10.1080/0266543032000047404.

Mikhailov, N. (1938), Pervii sovetskii dvukhiarusnii trolleibus, *Za rulem,* 13, p. 13.

Mikuškovič, A. (1933) *Technika Stavby Měst*, Praha: Klub architektù v Praze.

Ministerio de obras públicas (1933) Decreto de 21 de julio de 1933, *Gaceta de Madrid*, 206.

Miralles-Guasch, C. (2002) *Ciudad y transporte: el binomio imperfecto*, Barcelona, Ediciones Ariel.

Mirás, J. (2005) The Spanish tramway as a Vehicle for Urban Shaping: La Coruña, 1903-1962, *Journal of Transport History*, 26 (2), pp. 20-37.

Mulley, C. (1983) The Background to Bus Regulation in the 1930 Road Traffic Act: Economic, political and personal influences in the 1920s, *Journal of Transport History*, 4 (2), pp. 1-19.

Mumford, L. (1963) *La Carretera y la ciudad*, trans. Williams, M., Buenos Aires and Barcelona: Emecé Editores.

Musil, J. (1980) *Urbanization in Socialist Countries*, New York: M.E. Sharpe.

Musil, J. (2005) *Why Socialist and Post-socialist Cities are Important for Forward Looking Urban Studies*, European Science Foundation Conference, Forward Look on Urban Science, Helsinki, 26-28 May.

Nadezhdin, M. (1934) Trolleibusy poluchaiut shirokoe rasprostranenie v SSSR, *Za rulem*, 2, p. 11.

Neutra, R. J. (1931) Ulice Rychlé Dopravy a Městské Rychlé Drâhy v Severoamerických Velkých Městech, *Architekt SIA*, XXX, originalmente publicado en la revista alemana Verkehrstechnik, 1931.

Niemeyer, R. (1941) *Städtebau und Nahverkehr*, Leipzig: K. F. Koehler Verlag.

Ochojna, A. D. (1974) *Lines of Class Distinction. An economic and social history of the British tramcar with special reference to Edinburgh and Glasgow*, PhD Thesis, University of Edinburgh.

Orlov, I. B. (2015) *Kommunalnaia Strana: Stanovlenie Sovetskogo Zhilishchno-Kommunalnogo Khoziaistva (1917-1940)*, Moskva: Vysshaia Shkola Ekonomiki.

Painter, D. S. (2009) The Marshall Plan and Oil, *Cold War History*, 9 (2), pp. 159-175, DOI: 10.1080/14682740902871851.

Passalacqua, A. (2014) Reluctant Capitals: Transport Mobility and Tramways in London and Paris 1830-1950, *The Town Planning Review*, 85 (2), pp. 143-154.

Passalacqua, A. (2016) *Trolleybuses and the European cityscape: energy choices under environmental pressure (London, Paris, and Rome, 1930s)*, Greening History, Society for Environmental History, Versailles, France. ffhal-01374133ff.

Passalacqua, A. (2017) *De Quoi Parle-T-On Lorsque L'on Parle De Tramway En France? Cahiers géographiques de l'Ouest*, Université d'Oran, pp. 5-19.

Pavlínek, P. (2002) Restructuring the Central and Eastern European, Automobile Industry: Legacies, Trends, and Effects of Foreign Direct Investment, *Post-Soviet Geography and Economics*, 43 (1), pp. 41-77.

Pavlínek, P. (2008) *A Successful Transformation? Restructuring of the Czech Automobile Industry*, Berlin: Physica-Verlag Heidelberg.

Petkov, D. (2020) *Tramway Renaissance in Western Europe. A Socio-technical Analysis*, Wiesbaden: Springer VS.

Petrov, V. K., Sosyantz, V. G. (1939) *Gorodskoi Transport*, Moskva - Leningrad: Izdatelstvo Narkomkhoza RSFSR.

Pirath, C. (1954) Das Grundproblem des öffentlichen Personen Nahverkehrs in europäischen Großstädten und seine Lösungsmöglichkeiten, *Zeitschrift für Verkehrswissenschaft*, 4, pp. 290-308.

Pivovarov, Y. L. (2001) Urbanizatsiia Rossii v XX veke: predstavleniia i realnost, *Obshestvennye nauki i sovremennost*, 6, pp. 101-112.

Polyakov, A. A. (1935) *Tekhniko-ekonomicheskie voprosy gorodskogo dvizheniia*, Moskva-Leningrad: Gostransizdat.

Polyakov, A. (1953) *Gorodskoe dvizhenie i planirovka ulits*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu i arkhitekture.

Polyakov, A. A. (1957) *Voprosy razvitiia vnutrigorodskikh putei soobsheniia v bolshikh gorodakh*, Moskva: AN SSSR.

Pooley C. G., Turnbull, G. (2005) Coping with Congestion: Responses to Urban Traffic Problems in British Cities c.1920–1960, *Journal of Historical Geography,* 31, pp. 78–93.

Pooley, C. G. (2016), Balancing social justice and environmental justice: mobility inequalities in Britain since circa 1900, in Divall, C., Hine, J., Pooley, C. (eds.), *Transport policy: learning lessons from history*, Farnham: Ashgate, pp. 47-64.

Pucher, J. (1990) Capitalism, Socialism, and Urban Transportation Policies and Travel Behavior in the East and West, *Journal of the American Planning Association, 56* (3), pp. 278-296.

Sauder, B. (1952) Ein Großraum -Vierachser einfachster Bauart, seine Einsatzmöglichkeit und seine Wirtschaftlichkeit, in Verband Öffentlicher Verkehrsbetriebe (ed.), *Die Moderne Straßenbahn als zeitgerechtes Verkehrsmittel*, 6, pp. 21-27.

Saurer, A. (1948) Grosser Omnibus für die Städtische Strassenbahn Zürich, *Schweizerische Bauzeitung*, 66 (15), pp. 210-211.

Schipper, F. (2007) Changing the face of Europe: European road mobility during the Marshall Plan years, *The Journal of Transport History*, 28 (2), pp. 211-228.

Schmucki, B. (2010) Fashion and Technological Change: Tramways in Germany after 1945, *Journal of Transport History*, 31 (1), pp. 1-24.

Schrag, Z. M. (2000) The Bus Is Young and Honest: Transportation Politics, Technical Choice, and the Motorization of Manhattan Surface Transit, 1919-1936, *Technology and Culture*, 41 (1), pp. 51-79.

Seidenfus, H. S. (1958) Rationale Verkehrspolitik, *Zeitschrift für Verkehrswissenschaft*, 4, pp. 187-197.

Sert, J. L. (1944) *Can our cities survive? An ABC of urban problems, their analysis, their solutions,* Cambridge: The Harvard University Press.

Sheleijovsky, G. (1946) *Kompozitsiia gorodskogo plana kak problema transporta*, Moskva: Giprogor.

Shvidkovskii, O. A. (1963) *Gradostroitelnaia kultura socialisticheskoi Chekhoslovakii*, Moskva: Izdatelstvo Akademii Nauk SSSR.

Spanish Head of State (1954) Decreto-ley de 16 de junio de 1954 por el que se faculta al Ministerio de Obras Públicas para autorizar la transformación de las concesiones de tranvías en otras equivalentes de autobuses durante el plazo de vigencia de aquéllas, *Boletín Oficial del Estado,* 177, pp. 4330-4331.

Spurný, M., Ladd, B. (2020) The Stifled Renaissance of Urbanity: Urban Preservation and the Collapse of Czechoslovak and East German Socialism, *Journal of Urban History*, pp. 1-17, DOI: 10.1177/0096144220908882.

Špačková, E. (2015) *Ideální Lidé, Ideální Města, Plán krásného města na příkladu Nové Ostravy*, Brno: Časy Měst.

Tennent, K. D. (2017) Profit or utility maximizing? Strategy, tactics and the Municipal Tramways of York, c. 1918-1935, *Journal of Management History*, 23 (4), pp. 401-422, DOI 10.1108/JMH-05-2017-0026.

Thomas, G. (1934) *Wirtschaft, Nahverkehr und Städtebau (gezeigt am Beispiel der Reichshauptstadt Berlin)*, XXIV Internationaler Verein der Strassenbahnen, Kleinbahnen und der Öffentlichen Kraftfahrunternehmen.

Topp, H. H. (1998) Renaissance of Trams in Germany – Five Case Studies, *Proceedings of the Institution of Mechanical Engineers: Journal of Rail and Rapid Transit, Part F*, 212 (3), pp. 223-233.

Tripp, A. (1928) Police and Public: A New Test of Police Quality, *The Police Journal: Theory, Practice and Principles*, 1 (4), pp. 529-539.

Tripp, A. (1938) *Road Traffic and its control,* London: Edward Arnold & Co.

Tripp, A. (1943) *Town Planning and Road Traffic*, London, Edward Arnold and Co., London: Edward Arnold and Co.

Tripp, A. (1947) *Planirovka gorodov i ulitchnoe dvizhenie*, Moskva: Izdatelstvo Akademii Arkhitekturi SSSR.

TSU (Tsentalno-statisticheskoe upravlenie pri Sovete Ministrov SSSR), (1957) *Transport i sviaz*, Statisticheskii sbornik, Moskva: Gosidarstvennoe statisticheskoe izdatelstvo.

United Nations (2012) World Urbanization Prospects: The 2011 Revision, New York: without formal editing.

Vaerst, (1952) Abfertigungsmethoden in Großraumwagen und im Einmann-Betrieb, in Verband Öffentlicher Verkehrsbetriebe (ed.), *Die Moderne Straßenbahn als zeitgerechtes Verkehrsmittel*, 6, pp. 29-35.

Vaněček, J. (1934) *Stavba Měst*, Praha: České vysoké učení technické v Praze.

Van der Gragt, F. (1968) *Europe 's greatest tramway network: tramways in the Rhine-Ruhr area of Germany*, Leiden: E. J. Brill.

Vávra, R. (2014) *Rozvoj nových dopravních prostředků v pražské hromadné dopravě (1918–1939): realizované a nerealizované projekty*, Bakalářská práce, Univerzita Karlova v Praze.

Verbandes Deutscher Kraftverkehrsgesellschaften (1930) *Selbstkostenvergleich Straßenbahn-Omnibus*, Dortmund: Verlag Fr. Wilh. Ruhfus.

Vossius (1952) Vereinheitlichungsmöglichkeiten von Straßenbahn-Großraumwagen, in Verband Öffentlicher Verkehrsbetriebe, in Verband Öffentlicher Verkehrsbetriebe (ed.), *Die Moderne Straßenbahn als zeitgerechtes Verkehrsmittel*, 6, pp. 11-20.

Vlček, I. (1957) Sítě Komunikaci Motorické a Hromadné Dopravy ve Městě, *Architektura ČSR*, XVI (9), pp. 494-496.

Wakeman, R. (2014) Rethinking postwar planning history, *Planning Perspectives*, 29 (2), pp. 153-163.

Watson, H. (1938) *Ulichnoe Dvizhenie*, trans. Reshetnikov, N. V., Sheremetievskii, M. P., Moskva-Leningrad: Gostranstechizdat.

Weber, D. (2011) Road against Rail. The Debate on Transport Policy in Belgium, 1920–1940, *Transfers* 1(2), pp. 83–104.

White, P. R. (1974) The Comparative Study of Transport Systems: Swedish Urban Transport Policy and its Application in Britain, *International Journal of Transport Economics*, 1 (1), pp. 78-91.

Yago, G. (2006) *The Decline of Transit. Urban Transportation in German and US Cities 1900-1970*, Cambridge: Cambridge University Press.

Yakshin, A. (1946) *Planirovanie gorodskikh transportnykh setei*, Moskva: Gosudarstvennoe arkhitekturnoe izdatelstvo.

Zadorin, N. I. (1931) *Avtotransport i ego mesto v narodnom khoziaistve*, Moskva: Transpechat NKPS.

Zarecor, K. E. (2011) *Manufacturing a socialist modernity: The architecture of industrialized housing in Czechoslovakia, 1945–1956*, Pittsburgh: University of Pittsburgh Press.

Zarecor, K. E. (2013) Infrastructural Thinking: Urban Housing in Former Czechoslovakia from the Stalin Era to EU Accession, *Architecture Publications*, 9, pp. 57-78.

Zbigniew, K.-M. (2014) Trams as Tools of Urban Transformation in French Cities, *Technical Transactions Architecture*, 10/A, p. 65.

Zilbertal, A. (1932) *Tramvainoe khoziaistvo*, Moskva-Leningrado: Gosudarstvennoe transportnoe izdatelstvo.

Zilbertal, A. (1937) *Problemy passazhirskogo transporta*, Moskva: Gosudarstvennoe transportnoe izdatelstvo.

Zilov, A. (1934), Pervii Sovetskii trekhosnii trolleibus v podarok XVIII Partsiezdu, *Za rulem*, 2, pp. 12-13.

Internet sources:

http://theoldmotor.com/

https://flashbak.com/Queues, Fumes, Crowds and Pickpockets – 100 Years of London's Oxford Street.

https://www.pinterest.com/

https://data.worldbank.org/

https://stats.oecd.org/

https://www.statista.com/

https://transphoto.org/

https://fhzz.de/der-rabenstein-strausberger-platz/Friedrichshainer Zeit Zeiger.

2.3. DE-STALINIZATION, THE CRISIS IN SOCIALIST TOWN PLANNING AND THE RATIONALIZATION OF URBAN STRUCTURES AND OF PLANNING FOR MOTOR VEHICLE AND TRAM INFRASTRUCTURES

From the middle of the 1950s onwards, de-Stalinization opened up a new field for rational and scientific development of so-called Socialist town planning. In the USSR, a programme of rationalizing architecture and city plans was initiated, with reconsideration of existing planning principles and intensive study of the experience of Western European countries. Scientific advances in traffic engineering and transport development brought new possibilities, methods and demands for changes in urban form and structure. For a centralized economy, zoning, geometrical order and rationalization of urban structure became the main tools for attaining political and economic goals. The understanding of the concept of urban structure was mainly related to zoning and road networks, while any inclusion of the planning of public transport systems was still a novelty.

There was a tendency to base public transport policies on road infrastructure planning, with the consequence that trams were seen as having and deserving only a marginal status. Emphasis was often laid on the importance of urban traffic circulation patterns and the popularity of the car in road plans (Schmucki, 2010, Beyer, 2011, Bernhardt, 2017). At the same time, however, it was held that trams could be seen as matching the paradigms of Modern Movement (Schmucki, 2001). Nevertheless, in the end the so-called Socialist city was oriented towards the implementation of a double objective: a city for the motor car and for public transport. A street grid was the preferred urban structure, to be combined with collective public transport lines. The main point arising was whether or not to maintain conventional tramways, raising new questions for planners.

Discussions about conflicts and priorities between road and tram infrastructures were not homogeneous, nor were the outcomes. The involvement of Modernist principles in Socialist town planning also cast into doubt, once again, new development of tramways, especially in central areas and heavily used streets, with an increased role envisaged for the more flexible motor buses and trolleybuses. Trams had two conflicting roles in Socialist town planning. They were sometimes regarded as an outdated mode of transport that hindered fast traffic speeds and spoilt the modern image of Communist cities. At other times they were accepted as an efficient means of transport, enhancing the productivity of cities.[36] This two-fold status had a background of some difficulty in the production or modernization of tramway rolling stock, especially in the USSR.

Whilst the new principles of rationalization of urban structure were quite clear, the answer to the question of combining motor and tram traffic was far from obvious. Consequently, there were differing solutions in the planning of collective public transport in the European Socialist countries, such as the GDR, the CSR and the USSR. This can be seen in the varying options adopted in each country and the

36 The importance of trams for the economic development of cities with the transportation of mass flows of people can be found in the following publications: Peshekerov, P. K., Bondarevskii, D. I. (1936) *Tramvainyi Spravochnik*, Moskva: OGIZ-Gostransizdat, p. 24; Baburov, V. (1956) *Planirovka i zastroika gorodov*, Moskva: Literatura po stroitelstvu i arkhitekture, p. 72.

weakness in generalization of theoretical ideas. Town planning had more or less consolidated principles, but this was not the case for urban transport plans. There was a diversity of socio-economic criteria in the selection of modes of transport, their infrastructures and spatial planning solutions, as well as a variegated range of interpretations of the principles of Modern Movement.

The task of this chapter is to understand the theoretical and professional change in Socialist urban planning and its implications for urban mass public transport planning. For this purpose, the political context of the decision to change and the most important historical milestone is analysed: the congress on urban planning in the USSR and its dissemination, as well as the new principles based on the triumph of the automobile city, zoning and its link with public transport networks, and the formation of a new public transport policy. It is clear that, because of the strong need to increase production in the cities, the principles of Modern Movement fitted well into the policy of the Communist regimes. Tramway solutions in the cities were quite diverse, sometimes adapting to this new vision of urban planning, sometimes resisting it and recognizing its economic and social efficiency.

2.3.1. THE CONGRESS ON URBAN PLANNING IN THE USSR IN 1960: THE RATIONALIZATION OF URBAN STRUCTURE AND AUTOMOBILE TRAFFIC

The de-Stalinization of Soviet planning principles was initiated by Nikita Khrushchev in 1955. Khrushchev's main concern was the quick and economical construction of residential buildings. This was a decision contrary to Stalinist planning practices with their monumental and even elitist vision. There were diverse opinions among Soviet planners about the implications of these changes for the professional development of Soviet architecture and town planning (Bocharnikova, 2014, p. 76). Questions about reconciling the old and the new, little mentioned during the preceding several decades of Communist rule, once again faced Soviet planners. Initially the main thrust was to standardize types and norms in architecture, but later, at the end of the 1950s when the first experimental plans were put into practice (Fig. 51), the question became one of entire cities. Rapid changes of ideas in town planning were encouraged by the aspiration to beat capitalism in economic competition through urban rationalization.[37] As optimized productivity was sought, a search for an appropriate structure and size for cities became the principal task in this period. Rationality was identified with the functional correspondence of areas and with road infrastructure capacity.

A paradigm shift in town planning did not occur instantaneously, because it took time to adapt to the new principles, to carry out the first experimental projects and to evaluate the results. Despite the initial changes starting in 1955, there was still no unanimity in planners' visions. The need for wide application and dissemination of new scientific knowledge in Socialist town planning gave an impetus to the organizing of an All-Union Congress on Town Planning [*Vsesoiuznoe Soveshchanie po Gradostroitelstvu*] in the USSR in June 1960. This Soviet meeting was attend-

37 See Collein, E. (1963) Grundsätzliche ideologische und politische Probleme in Städtebau und Architektur, en 7. Plenartagung, *Ideologische Fragen des Städtebaues und der Architektur*, Berlin: Deutsche Bauakademie.

ed by 2.500 individuals, including participants from the GDR, the CSR and Poland (Deutsche Bauakademie [GDR Building Academy], 1960a, p. 5). At the congress, the main directions in rationalizing the structure of cities in Communist countries were announced (Fig. 52 and 53).

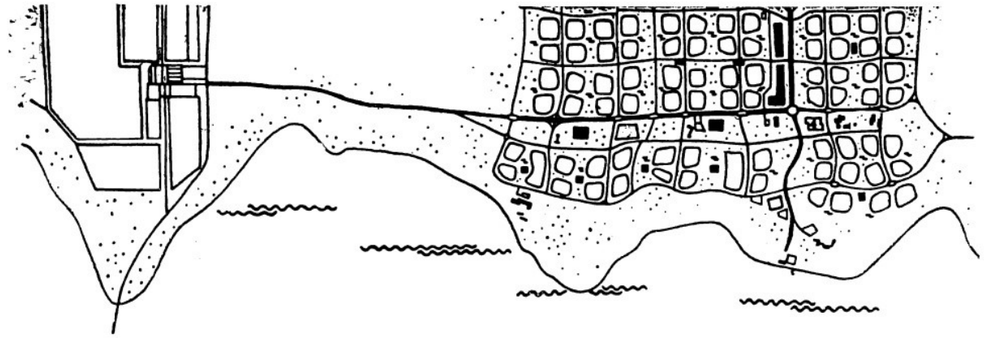
These new town planning principles were mainly based on the experience and rationalist ideas of Modern Movement. The creation of favourable conditions for the rapid movement of motor vehicles also became a major objective. The widespread application of these principles in American and British cities in the post-war period was accompanied by continuous debate and criticisms of them, which intensified from the early 1960s onwards. The European Communist countries did not consider these to be fresh debates in their new planning principles, relying instead on old know-how from Modern Movement.[38] What was learnt from these Western ideas was based on experiences such as the London plan, the reconstruction of the city centre of Coventry and the British New Towns of the 1940s and 1950s. Furthermore, various fundamental works such as the edition of the *Highway Capacity Manual* of 1965 also served as a scientific-looking guide for the extension of road infrastructures (Kulakov, Trofimenko, 2016, p. 12). Other publications were also translated into Russian from the late 1950s onwards. The main interest was not so much in planning theory, but in practice and examples that could serve for rapid urban interventions. There was no attention to studies and criticism of the Western experiences, in particular of solutions for mass public transport and the conflict between motor and tram transport.

At the Moscow Congress on Town Planning, information on these topics was therefore scarce. Kucherenko, the head of the State Committee of the Council of Ministers of the USSR on construction issues, stressed the importance of locating residential and industrial areas so as to create short, convenient connections between them (1960, p. 26). In the approaches taken to city traffic, the main concerns were the separation of flows, road infrastructure construction, pedestrian isolation, arrangements for parking, and the like. In order to ensure rapid circulation of vehicles, special emphasis was laid on avoiding "corridor" street planning. The best solution to cater for the growth of motor traffic would be the construction of wider streets. The urban fabric of historic centres was to be reconstructed, or in other words fundamentally reconsidered, in order to provide space for road traffic movements.

Discussions also addressed the need to develop metros and services combining buses, trolleybuses and trams. With regard to the necessity to plan city public transport networks, Kucherenko mentioned only the intended locations for fresh urban building for the years 1960 and 1965, with a proposal to develop in addition public transport lines connecting to these new city areas (Kucherenko, 1960, p. 33).

His statement was rounded out with a report from N. V. Baranov, the leading researcher at the USSR Academy of Construction and Architecture, who made the significant declaration that the safety and speed of urban traffic and modern means of transport were not compatible with the centuries-old tradition of setting up networks of streets and squares, interpreting them as having universal functionality

38 Similar idea was also expressed by Yakushenko, O. (2016) Soviet Architecture and the West: The Discovery and Assimilation of Western Narratives and Practices in Soviet Architecture in the late 1950s–1960s, *Laboratorium*, 8 (2), pp. 76-102.



Top, Fig. 51. One of the variants of the functional separation of a city for 250.000 inhabitants. Source: Hrůza, J. (1971) *Teoriia goroda*, trans. Mostovaya, L. B., Moskva: Izdatelstvo Literaturi po Stroitelstvu, p. 169.

Bottom left, Fig. 52. In the conference hall of the Grand Kremlin Palace during the Congress of Urban Planning. Source: Sovet Ministrov SSSR (1960) *Vsesoiuznoe soveshchanie po gradostroitelstvu*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu, arkhitekture i stroitelnym materialam, p. 33.

Bottom right, Fig. 53. The speech of Kucherenko, chairman of the State Building Committee of the USSR at the Congress of Urban Planning, 7 June 1960. Source Sovet Ministrov SSSR (1960) *Vsesoiuznoe soveshchanie po gradostroitelstvu*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu, arkhitekture i stroitelnym materialam, p. 17.

(1960, p. 123).[39] Hence, an elimination of corridor streets was a relevant issue, in addition to the organization of car parks, the planning of express roads and the segregation of motor traffic from pedestrian. All these criteria were announced as new methods of progress in town planning and construction, and yet they had been clearly explained almost twenty years previously by Alker Tripp in his book *Urban Planning and Road Traffic* (1943), translated and published in the USSR quite soon after its appearance.

The last report, which discussed urban transport planning, was prepared by A. E. Stramentov, an expert in this field. He highlighted a need for the creation of a scientific institute dedicated to urban transport planning issues, stressing once again the importance of safety and speed on urban roads and streets. According to Stramentov, cities should not grow above a certain size, with urban expansion taking the form of satellite cities.

It can be noted that the congress in general did not adequately address the issues of public transport planning. It continued with the same approaches used decades earlier. The main concern was to contain urban development within forms that could function without high-speed public transport, relying mainly on the operation of motor buses, trolleybuses and conventional trams sharing space with other road users. The distribution of functional areas, short direct connections, or the size and extent of passenger flows to and from zones were considered the main criteria for defining and controlling transport links (Krüger, Richter, Stuhr, 1962, p. 207).

These Soviet ideas were disseminated in the participating European Communist States (the GDR, the CSR and Poland), through the translation of publications, and seen as the main directions to be followed in the construction of Socialism in these countries.[40] At a first conference on city planning theory held in the GDR in October 1960 with the title *Probleme des Städtebaus und der Architektur im Siebenjahrplan* [Problems of Town Planning and Architecture in the Seven-Year Plan], the new approaches and their application in the future development of cities in the GDR were widely discussed. Cities were supposed to fulfil functional tasks. The ideas announced at the planning congress in Moscow were seen as a new stage in Socialist town planning.

In the GDR, Wolfgang Weigel published the book *Verkehr in der modernen Stadt* [Traffic in the Modern City] in 1962, which was influenced by the Moscow Congress. The author raised the problem of integration between town and transport planning, which could be resolved by better co-ordination between the various specialists. A further problem was related to the rationalization of traffic in terms of the functional division of labour of the different modes of urban transport.

39 "Безопасность, быстрота городского движения и современные виды транспорта не совместимы с многовековой традицией формирования сети улиц и площадей, с универсальной трактовкой их функционального назначения."

40 The results of the congress were published in the RDA and CSR as the important questions on the way to a centrally planned urban development. Deutsche Bauakademie (1960b) *Städtebau in der Sowjetunion. Materialen der Allunionkonferenz zu Fragen des Städtebaus*, Berlin: Institut für Gebiets-, Stadt- und Dorfplanung; V. A. Kučerenko (1961) Základní cesty rozvoje urbanismu v SSSR, *Architektura ČSR*, 6, pp. 411-417.

In the CSR the results of the Moscow planning congress were published in the journal *Architektura ČSR* [Czechoslovak Architecture] in 1961 as a benchmark of excellence for future planning in the CSR. The goals of transport plans were increased safety, economic efficiency, and fast, smooth traffic flows (Pavlíček, 1960, p. 428). This new direction in planning was termed principles of progressive city transport solutions[41] (Vlček, 1960, p. 403). Thus, a division of cities into separate zones linked by rapid transport lines also grew in prominence in the CSR.

The European Communist countries still lacked any sound technical methodology for road traffic and infrastructure planning. The spatial relationships between urban areas (location, function and form) and the road network (capacity, classification, location) were what was considered integrated planning, a novelty in the practices of these countries. The adaptation of cities for motor traffic and providing all the infrastructures necessary for its future use became the main objectives of Socialist town planning. It should be noted that the planners' idea was not to promote car-free urban areas but to look for ways of combining motor traffic with pedestrians and public transport (Logan, 2015, p. 83). However, this search ended up mostly in an application of already existing Western solutions, limited to the adaptation of collective public transport to the needs of motor traffic. General mobility and shared public transport were always the main objectives of Socialist policy, with cars a privilege restricted to an exceptional or limited group of people. As Lewis Siegelbaum (2009, p. 2) has noted:

> *"The Socialist Car thus can be situated at the point of convergence between the State and the private sphere. It embodied aspirations for overcoming the gap in technology between the capitalist and Socialist worlds, as well as for enhancing personal mobility, flexibility, and status in the latter."*

Among the European Socialist countries, East Germany, Czechoslovakia and Hungary were the largest producers of cars and trams. These three countries had well-established automobile industries, which contributed to their development after the Second World War (Gatejel, 2011, p. 124). However, other countries also aspired to develop such an industry, but faced great difficulties.[42] Car ownership was associated with the notion of modernity and progress. This impression was heightened from the middle of the 1960s onwards by the growth of motor vehicle production. The pre-eminence of motor transport could be explained by several reasons:

- Large, complex road infrastructures were part of the Communist parties' imagery as a symbol of progress and modernity (Fig. 54). The fierce competition with the West for world domination required a show of technological progress and its spatial applications in the building of such extensive, complicated road networks.

- The increasing part played by traffic planners in town planning may be seen as another motive. Such planners were treated as technicians who could deal with the complexities of plans for traffic through the use of mathematical calculations and models. They thus had a decisive voice in town planning. A logic rooted in en-

41 Zásady progresivního dopravního řešení měst.

42 See Siegelbaum, L. H. (2011) *The Socialist Car: Automobility in the Eastern Bloc*, Ithaca: Cornell University Press.

Fig. 54. One of the paradigmatic examples of the implementation of a car-oriented city with oversized dimensions: Dresden, GDR, in 1971. The elimination of the bombed-out urban fabric for the extension of the street can be seen, as well as the tramway adapted to the needs of road traffic. Source: Dresden Stadtmuseum, SMD_D_1971_11.1_Stadtaussichten, Ph 787_05.

gineering arguments, such as a concern to ensure the maximum capacity of road infrastructures, with potential for future expansion, became the fundamental principle of traffic engineering.

- Furthermore, Socialist regimes' preoccupation with circulation and accessibility, such as to guarantee the efficient functioning of cities and the national economy, may also be cited. In the post-war period most cities had no classified and functionally specialized network of streets. Order and functionality were strongly associated with productivity. Slow access and wasted time meant a loss of economic benefits. Therefore, road construction and a rationalization of the existing street structure became a prime task.

This heightened role for motor transport influenced the preference for rectangular grid models in the planning of new cities from the late 1950s onwards. In the 1960s the trend was continued in the plans for new cities, as in the cases of Tolyatti, Novolipetsk, Nizhnekamsk, and others. Similar ideas also appeared in studies of rectangle or gridiron layouts in the UK in the 1960s. Rectangular configurations in linear form received attention, being perceived as the most appropriate solutions for motor traffic, although the possibility of public transport use was also underlined. However, a grid structure was not optimal for the operation of rapid public transport, which required a different spatial organization logic.

Finally, it can be concluded that the change, direction and pace of the development of theory and of professional discussions in Socialist town planning was a political decision driven by ideological and economic objectives. The importance of the ideas of Modern Movement can be explained by the fact that they provided a quick, simple, well-studied and extensively applied solution in Western European countries, which also facilitated a growth in the productivity of cities. One of the tools for the rapid implementation of this idea was zoning.

2.3.2. ZONING AND URBAN MODELLING

It is well known that zoning emerged in Germany at the end of the nineteenth century as a modern urban planning instrument to ensure public health by avoiding the proximity of incompatible functional activities. Zoning was integrated into town planning as a modern tool related to the improvement of hygiene in cities, but it also proved to be a very powerful instrument for various purposes not truly related to planning. Franco Mancuso (1980) explained with great critical clarity the extent to which zoning was a very successful method for control, both economic, guaranteeing the stability of real estate investments, and social, segregating different groups.

Zoning is closely related to models of cities and to the most prominent concepts in town planning, including those related to accessibility and mobility. It has therefore been used as an integral part of town planning, but also as an instrument in large unplanned urban interventions.

From the 1950s onwards, zoning appeared to be an easy-to-use, modern instrument, but was often simplistic and utilized without sufficient technical justification, in cities of both the capitalist and the Socialist world. In short, the simplicity of zoning contrasted sharply with its effectiveness. Whilst in the West it was primarily a way to stabilize the land market, in the Socialist cities it was a rigorous form of control over land use.

In the USSR, zoning appeared as part of the process of industrialization and urbanization in the avant-garde period in the proposals of N. Milyutin, L. Ladovsky and others. Later, at the peak of the Stalinist period, such a technique was not precisely identified and there was thus no clear functional zoning. Distinctions were made, but mostly in terms of zones for construction, for protection or retention untouched, and for agriculture. Zoning had a direct connection to the sense of territorial organization through divisions into separate areas. However, this was related to various goals, such as the suitability of the land for different uses, the sequence and type of construction, special protection zones, and the like (Organov, 1933, pp. 76-77). During the Khrushchev period, the heightened importance of rationalization of urban structure, related to the goals of industrialization and the visible lack of rapid connections between work and living spaces, led to a return to pure and strict single-use zoning.

Meanwhile, in the countries of Central and Eastern Europe, the inter-war period was characterized by the implantation of Modernist ideas and by the application of zoning in town planning practice. It was a period of achievement of plans and projects, something which did not occur in the USSR, and that may explain the critical

attitude towards zoning in the post-war period in these Socialist countries. Zoning was a tool to be applied in relation to the existing conditions in cities in order to avoid abstract solutions (IUA, 1958, p. 10). However, it can be said that in these countries zoning continued to function as a rigid tool for determining urban structures in new cities and in the reconstruction of existing cities. The power of this tool can be seen in its influence over changing urban structures, and the shaping of urban transport infrastructures in relation to activities.

The most important spatial relationship was between residential and working areas. As was stated at the 1960 Soviet All-Union Conference on Town Planning, the main conditions for successfully solving problems of urban traffic were seen as requiring the creation of convenient connections between home and workplace (p. 122). Planning of these two zones has a bidirectional link: the location of residential zones had its effect on the siting of industrial zones, and vice versa. In linear models these links were transverse and possible tram lines had to have a linear or ring configuration. In radio-concentric models, residential areas were located close to industrial areas and connected by tram lines, which might or might not be associated with passenger flows from the city centre. Such periphery-to-centre and return flows complicated urban traffic and required the building of additional tram lines on city outskirts.

The announcement of a fresh direction for industrialization in the Communist countries required the development of a new Socialist town planning theory. From the very beginning, it was recognized that the problems of transport and housing in cities were the two most vital issues in such planning. The question was how to separate, while still at the same time linking, land use and urban transport infrastructures. To this end, the concept of a scalar hierarchy of land and transport infrastructures was proposed in the late 1950s and was widely disseminated in town planning, since it offered a clear mechanism for spatial relationships and the distribution of traffic. Experimental research projects therefore aimed to test the relationships between separate urban elements. One of the approaches adopted in order to accelerate this transition to rational planning was the exchange of ideas through visits, lectures and the translation of works on town planning practice, paying special attention to the issues of the spatial organization of traffic and transport infrastructures, the siting of different uses of land, relationships between industrial and residential areas, and the distribution of passenger flows.

Starting in the 1950s, the USSR underwent an intensive learning process. The book by the American planner Harland Bartholomew *Land Use in American Cities* (published in 1953) was translated in 1959. The principal value of the translation was that it did a good deal to address questions of the proportions of different areas in cities, statistical calculations which were not available at that time in Eastern European countries. Bartholomew[43] was a prominent Fig. in the establishment of zoning in the United States and had worked on this topic since 1912 (Berton, 2017, p. 199). One of the criteria in his zoning method was scientific planning based on abstract models and rigid calculations of the proportions of different zones. In the preface

43 Harland Bartholomew was the American engineer, planner of the city of St. Louis between 1915 and 1953. In his methods he calculated the proportions and quantities of demographics, land uses, transportation and street utilisation. His main concern was the economic optimum through planned urban planning according to calculations that should ensure beneficial results (Berton, 2017).

of the Russian edition, it was stated that zoning was significant for Socialist town planning because of the opportunity it offered to establish a balance in the development of cities, in spatial relations, and in the proportions of functions, supply and demand. According to E. Y. Volfenzon, the two main objectives of zoning were the establishment of rational planning, and organic development (Bartholomew, 1959, p. 7). In short, the main reason for translating this book was the chance it gave to get early results and derive economic benefits from land use calculations. Thus, single-use zoning, with the idea of specifying internal processes, was quite similar to the concepts of the Athens Charter of 1933, applying the similar divisions into types of functions, with residential, industrial, transport and recreational areas.

Similarly, in D. Dorotjak's text[44] (1969, p. 39) zoning was also explained from a biological and physiological point of view envisaging a need to give human life a harmonious rhythm and avoid situations of conflict. Taking all this into account, such similarities despite different political and economic systems make it of interest to understand the reasons for the application of zoning, with the following being some of the possible motives for its use:

- First, there was the simplicity of zoning as a tool. The scale of the Socialist urbanization process was enormous; the urgency of planning and building with little time for lengthy meditation made zoning crucial. This may well have been an outcome of its status as an efficient tool in preventing mistakes and obtaining the expected results from a development. Zoning did not require planners to think extensively, was understandable for administrators, and was apparently quite effective. The uses of given pieces of land and their compatibility could be set out or adjusted according to criteria of accessibility using urban transport, the needs of industry, connectivity with the city centres, and the like.

- Zoning was a convenient way to avoid social imbalances, one of the most important postulates in the search for a Socialist city on the basis of establishing spatial uniformity and homogeneity in urban areas. Whilst in capitalist countries zoning was related to socio-spatial segregation and economic control of land use, in countries with Communist regimes it was not intended to isolate and distinguish social groups, but rather to balance the distribution of land use so as to achieve equal access for all. This idea of spatial equality and homogeneity was widespread, prior to translations and research projects by Chorley and Haggett (1971b), and Merkulova (1972), which presented spatial inequality as an unavoidable feature of town planning.

- Finally, the idea of efficient, productive movements of population in cities was prominent. Le Corbusier's idea of the machine-city[45] triumphed in the dictatorial regimes of Socialism because it responded to the needs of industrial production. As Le Corbusier pointed out in his project *La Ville Radieuse*, 1935: "In town planning, there is a problem at one precise point, which is how to reduce the dead time be-

44 Function according to D. Dorotjak meant a relative, contingent and specialised activity. According to him: "For the analysis of the city function it is necessary to learn about the functions of people. The segregation of functions makes people's work more rational, more efficient, better controlled" (1969, pp. 40-42).

45 About the ideas of Le Corbusier see the book of Monteys, X. (1996) *La gran máquina. La ciudad en Le Corbusier*, Barcelona, Ediciones del Serbal.

tween two core functions, being at home and going to work" (quoted in Monteys, 1996, pp. 44-45). These ideas fitted perfectly with the new policy of rationalizing town planning in order to achieve efficient, rapid industrialization.

One of the important documents in this exchange of ideas was the report emerging from the Fifth Congress of the International Union of Architects held in Moscow in 1958. In it most of the questions in interviews referred to solutions for urban structure, land use and town traffic, and not so much to issues of heritage, landscape or urban design. It is interesting to compare the responses of the USSR, GDR and CSR in this report in respect of their zoning principles. The similarities between these countries lay in the fact that there was an abstract and not particularly well-defined understanding of types of zones, their proportions and spatial relationships. Despite this, it was recognized that priority should be given to the problem of links between residential zones and work zones, which should be located close to one another and have rapid, dedicated access. The major difference between these countries would be that in the case of the CSR and the GDR, concern was expressed about the rigidly schematic nature of zoning and a need to get around this by relating it to accommodate existing conditions in cities (IUA, 1958, p. 10). It is likely that this softer and more flexible notion had an influence at a later stage in the shape of avoidance of the dominance of zoning in urban modelling solutions in these countries.

Finally, it can be concluded that zoning reached its peak during the 1960s. It was a powerful and manageable tool ensuring control over changes in cities, especially from the perspective of industrial settlements. It then became an instrument for urban planning with precedence over others in defining the development of cities and urban transport. Direct connections and rapid accessibility, linking areas generating and absorbing traffic, determined the spatial solutions in almost all town planning. In the countries under consideration, single-use zoning and car-oriented planning were widely used. The functional city and the concept of modernity might go hand-in-hand, but their practical, socio-cultural and everyday significance was very different.

2.3.3. TRAFFIC ENGINEERING AND IDEOLOGICAL QUESTIONS AS DETERMINANTS OF THE PLANNING OF PUBLIC TRANSPORT NETWORKS

The relationship between public transport planning and zoning did not become properly established until the late 1960s. In order to keep cities compact, avoiding suburban sprawl, and ensure their homogeneous development, the course proposed was to control the configuration of public transport networks.[46] This was also useful in limiting urban growth as a whole, or in re-organizing existing urban spaces. To this end, it would be necessary to control the quantities and directions of traffic flows. These solutions were based on traffic engineering criteria and the scientific

46 See a study on the interrelationship between urban form and the configuration of infrastructure networks by Herce Vallejo, M. (1995) *Las formas de crecimiento urbano y las variantes de carretera*, tesis doctoral, Universitat Politècnica de Catalunya.

nature of its concepts. The topological characteristics of the areas to be served and financial profitability were predominant features in proposals for the layout of public transport networks.

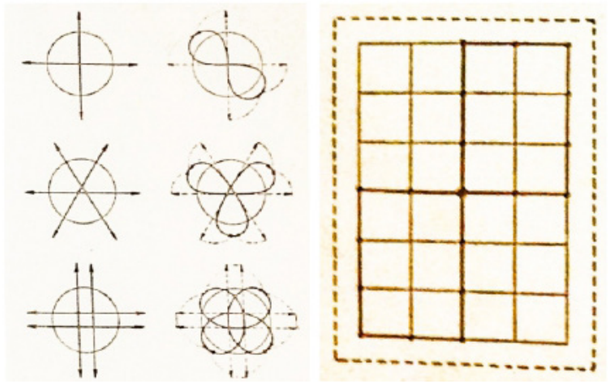
Among proposals of note were the views of Orest Kudryavtsev in the book *Problemy Sovetskogo Gradostroitelstva* [The Problems of Soviet Town Planning], published in 1963. According to Kudryavtsev, the main objective of research into configurations for rapid public transport networks was to ensure users travelled the minimum possible distances by creating a range of varying departure and arrival points (1963, pp. 38-39). The desirability of a balanced distribution of passenger flows, and of reducing modal interchanges and waiting times, drew attention to geometric shapes suitable for networks. Configurations such as circles, Fig.-of-eight or Fig.-of-nine shapes, loops and their variations were termed *closed curvilinear systems*. In that period, areas were defined as having a stable and determined location and were connected to each other with transport networks with varying layouts (Herce Vallejo, 2009, p. 53).

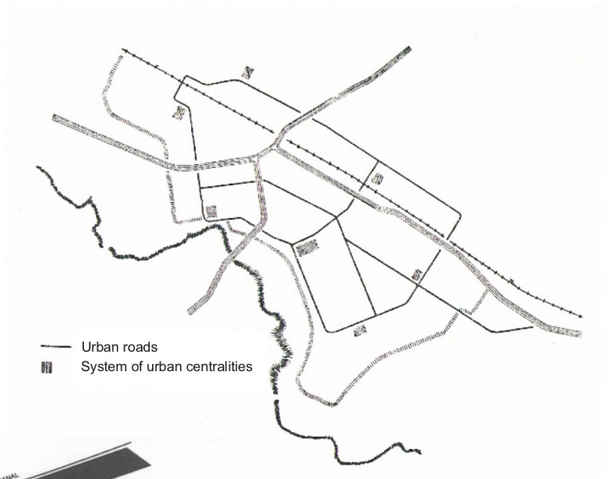
The term "system" was first applied in these studies as a result of an aspiration to convert the discipline of town planning into a science, on the lines adumbrated by Karl Popper and Ludwig von Bertalanffy. General systems theory aimed at establishing applicable principles for many disciplines. The inherent complexity of certain activities sometimes required them to be considered with this scientific approach based on open and dynamic systems. In the case of Kudryavtsev's proposal the systems were not truly such, because they were not parts of other structures, nor were they composed of elements, but rather they were transport schemes with associated land uses linked to the geometrical qualities of transport network configurations.

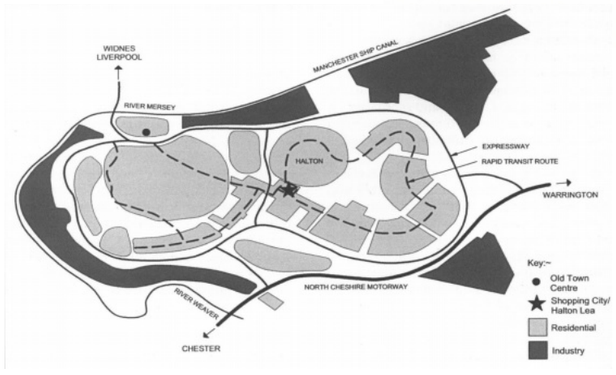
These curvilinear layouts are likely to have been considered as a result of the disadvantages in flexibility of other commonly used configurations, such as radial, radius-centric, or rectangular. Although not widely studied and applied in urban practice, this type of network may sometimes have arisen from the possibility of connecting existing land uses, adapting to the topography of sites and minimizing the extent of indirect routes. While understanding the difficulty of implementing these configurations, Kudryavtsev put forward several examples of how they might be applied in an existing city, where street lines could be rounded to create a loop configuration or adapted to a rectangular configuration for the motor transport network (Fig. 55).

However, as these ideas were difficult to put into practice in existing cities, they were mainly employed in the planning of new cities. Among the applications of these ideas in the USSR, there was the new city of Tselinograd, with an intended population of 350,000 inhabitants, initiated in 1963 (Fig. 56). The intention was to implement a closed configuration for an express bus network that provided connections to the city centre. This created the possibility of organizing a public transport route in the form of eight. The express buses ran on reserved road space alongside motor vehicles.

Another example was to be found in the UK, the expanded town of Runcorn, which in 1965 was envisaged as eventually having 202,000 inhabitants (Fig. 57), and from the start had the intention of limiting the use of private transport. The Runcorn project was one of the first New Towns in England to achieve a balance between







Top, Fig. 55. Left: The schemes for transforming rectangular and radial systems into closed curvilinear systems. The possibility of converting existing cities into a compact urban model. Right: The scheme of superimposing the "figure eight" network configuration on the existing rectangular system. Adaptation of the public rapid transit network to the motorised transport network to limit changes in the urban structure. Source: Kudryavtsev, O. K. (1963) O structure transportnykh setei, in Akademiya Stroitelstva i Arkhitekturi SSSR (ed.), *Problemy sovetskogo gradostroitelstva*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu, arkhitekture y stroitelnym materialam.

In the middle Fig. 56. Diagram of the Tselinograd plan, early 1960s, a paradigmatic example of the new town model in the USSR. Source: TSNIIP Gradostroitelstva. (1964), p. 54. One of the interpretations of circular or eight shape of the bus network in the rectangular urban structure.

Bottom, Fig. 57. Scheme of the Runcorn town, UK, implemented in 1966, with the organisation of a closed network of express busses. A very similar idea with the USSR emphasised the importance of balanced traffic distribution. Source: Couch, C., Fowles, S. (1978), p. 91.

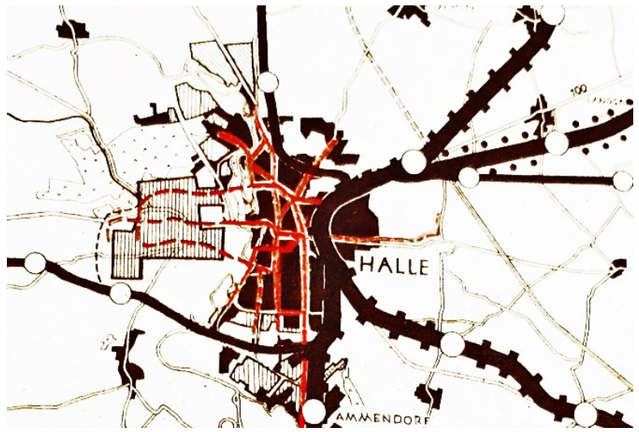
private and public transport by splitting flows of the two on a half-and-half basis with the implementation of an express bus network independent of other motor traffic (Runcorn New Town, 1967, p. 70). Also of note in this project were the variations in the closed configurations proposed and the specialization by function of the different express bus routes.

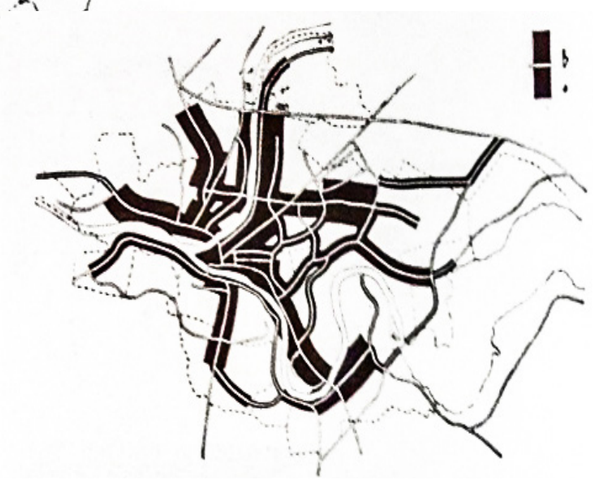
Despite the futurism and utopian quality of his ideas, Kudryavtsev's proposals were given continuity in a fundamental Soviet work, *Principy Sovetskogo Gradostroitelstva* [Principles of Soviet Town Planning], published in 1966 by the Central Research and Design Institute [ЦНИИП or TSNIIP] for Town Planning of the USSR. The advantages of closed configurations with the potential for organizing a bidirectional service, principally connecting with industrial zones, were emphasized, as well as the balanced distribution of traffic for cities with a size of more than 100,000 inhabitants (Central Research and Design Institute, 1966, p. 366). At the same time, in the case of urban development with closed configurations, the possibility of extending transport lines was considered.

It should be noted that in the CSR and GDR there were no similar solutions for public transport networks. This was probably because it was accepted that city space is not homogeneous and traffic cannot be balanced. This contrast demonstrates the highly radical solutions proposed in the USSR. Nevertheless, one example was to be seen in the GDR, in Halle and its new part Halle-Neustadt, planned in 1963. The main idea of this project was the balanced redistribution of traffic between the old and new sectors of the city by creating a compact urban model through a public transport network with a ring configuration. This was, however, almost a foregone conclusion given the conditions and needs of the urban structure of Halle (Fig. 58).

After a few years it became clear that such solutions could not be applied in existing cities. In this respect, the article by V. Sheshtokas "Opredelenie parametrov perspektivnoi transportnoi seti goroda" [A Definition of the Parameters for a Future Urban Transport Network] in 1968 was influential. Closed configurations were recognized as simplistic in their interpretations, as leading to an increase in the length of transport infrastructures and as triggering separate trips for different reasons (Sheshtokas, 1968, p. 47), as indicated in Fig. 59. Attention had to be paid to the impact of urban structures on traffic and the layout of the transport network. It was also necessary to consider a new factor, the characteristics of different modes of collective public transport.

Thus, in the 1960s, traffic engineering and a search for scientific techniques in town planning determined the solutions adopted in urban plans. In the USSR there were a large number of radical and abstract solutions which favoured experimentation in town planning, whilst in the GDR and the CSR there was continued development of radial configurations for the public transport network.





Top, Fig. 58. Traffic survey of the city of Halle carried out in 1961. Source: Federal German Archives (1961) *Gebietsplanung Bezirke Halle*, DH 2/21466. A circular network organisation to connect the new town with the city centre.

Middle and bottom, Fig. 59. Proposal by V. Sheshtokas for the model of the Lithuanian city Kaunas. Source: Sheshtokas, V. (1968) Opredelenie parametrov perspektivnoi transportnoi seti goroda, *Arkhitectura SSSR*, 4, 1968, p. 47. There was an intention to redistribute activities and their location in a balanced way along the rapid public transport network (like redistribution of productive spaces). As an example, Sheshtokas studied the Kaunas plan where by comparison priority was given to radial configurations. These intentions were explained by the motivation to rationalise resources and not to build infrastructure where it would not be cost effective.

2.3.4. URBAN-METROPOLITAN GROWTH MODELS AND RAPID PUBLIC TRANSPORT

Starting in the 1960s, research into future types of city growth was encouraged. Particular attention was paid to rapid transit systems, which had an influence on urban models. Despite the similar political and economic organization of these countries, models of cities in Communist countries were far from homogeneous. There was also a fundamental difference in the understanding of policies for containing urban growth. In the USSR, a radical vision of restraint was developed, while in the GDR and the CSR, some urban sprawl was considered tolerable. However, other factors such as urban economics, whether views were more modern or less radical, geographical features and city sizes also had some influence on decisions.

In the CSR, small and some medium cities tried to maintain a compact urban model. However, it was not believed possible to retain this compact form in large and other medium cities. Expansion in places like Prešov and Košice was developed on the basis of a linear urban design originally. The solution for urban growth in larger cities lay in decentralization, with the creation of clustered settlements that were divided one from another by green spaces. After the compact planning of Prague, Bratislava and other cities in the late 1950s and early 1960s, their urban models were extensively reconsidered.

One of the first to follow this line was the Czechoslovak architect Jiří Hrůza in 1965, who defended the inevitability of some urban sprawl and proposed a new model for growth.[47] The Modernist view of ways of expanding cities was highly developed in the CSR. The prototype for this form of growth in the CSR may have been the *Copenhagen Finger Plan* (1947) or the ideas of Doxiadis[48] and the importance of ecological issues in urban development. These were ideas relating to the necessity of bringing the population closer to nature. As Hrůza (1965, p. 242) noted in his book *Teoriia Goroda* [Theory of the City]:

> *"The city of the future can thus be envisaged as a system of links and functional zones clustering around centres of public life, and simultaneously providing excellent connections between homes and workplaces. Various individual areas will be separated by green belts and connected by high-capacity transport lines."*[49]

Two other influential CSR planners, E. Hruška and J. Štván,[50] also pointed out the need to transform the existing urban model (Fig. 60):

47 This idea was also developed in the seventies, see Zalčík, T. (1973) Príspevok k formirovaniu struktury mesta, *Architektura a Urbanizmus*, 2, p. 31. This was one of the first proposals to increase the complexity of the city through classification and dispersion of working areas.

48 The importance and efficiency of Doxiadis' ideas as a possible model for intervention in the traditional radiocentric models was mentioned in the journal *Architecktura ČSR* in 1967, see Štván. J. (1965) Doxiadis-Ekistika, *Architecktura ČSR*, XXIV (3), pp. 154-159.

49 "Поэтому будущий город можно себе представить в виде системы функциональных звеньев и зон, сгруппированных вокруг центров общественной жизни и обеспечивающих в то же время хорошую связь жилья и работы. Отдельные звенья будут разграничены зеленью и взаимосвязаны мощными транспортными линиями."

50 Štván emphasised that the existing urban structure would not be stable under the new conditions of societal development. See Štván, J. (1960) K otázce přestavby městské struktury, *Architektura ČSR*, XIX (4), pp. 266-268.

"The target under the conditions affecting us is neither a compact city nor dispersed satellite settlements, but the transformation of communities into a larger-scale unit, a regional city. In the core parts of the city centre, there should be limitations on layout and composition, but these can be freed up in associated townships, so that their function becomes one of residential or production satellites. A regional city will be a complex organic unit combining production, housing and recreation, and connected to the countryside by public transport."[51] (Hruška, 1966, p. 51).

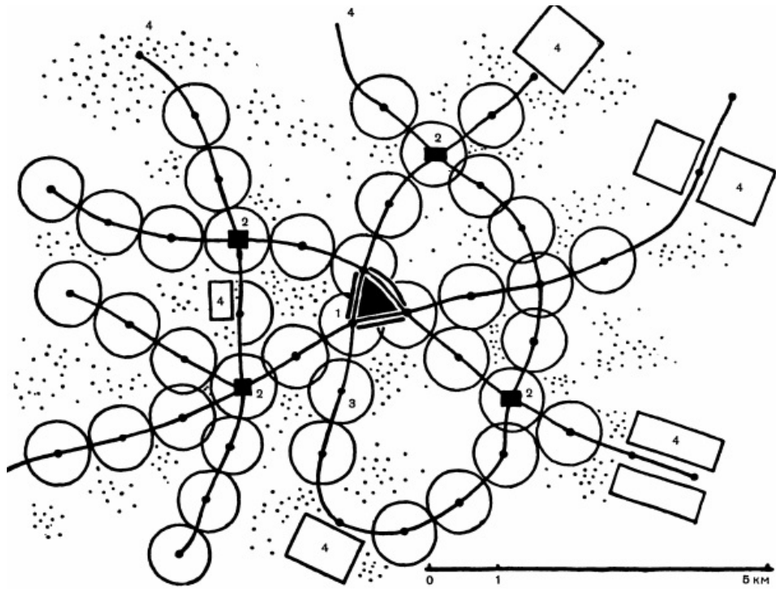
It can thus be highlighted that an important criterion in CSR urban models was access to green spaces, which was considered to be an organic development for cities. The idea was to modernize and change the existing model of large urban areas in order to improve the balance between nature and city life.

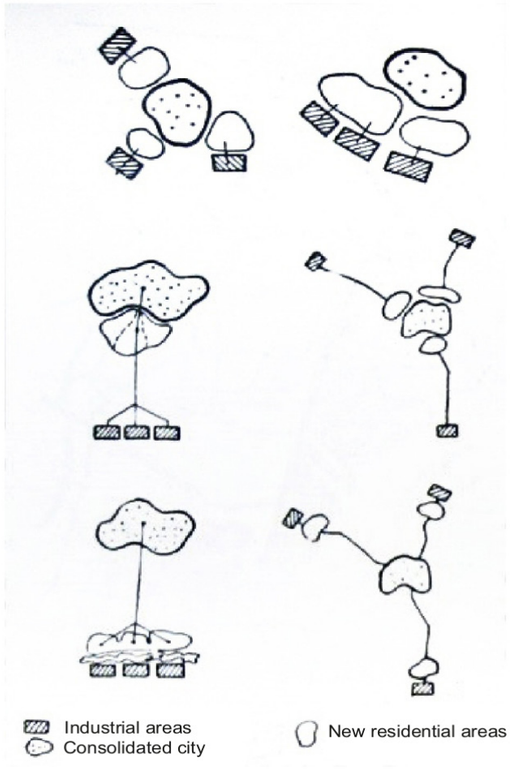
In the case of the GDR, there was a more traditional approach. Small, medium and large cities kept their existing radio-concentric or linear urban models. It should be noted that the territorial structure of settlements in Germany was already well developed. A growth in the existing urban pattern was achieved through the addition of new urban areas to the existing city structures, but without leaving green spaces in between. Developments were carried out by new construction along the directions that led towards vacant land in a proportional way, with expansions kept compact and dense. Residential areas were located on rapid transit lines with few green areas retained between them. Compact linear or grid structures were to be connected to existing cities (Deutsche Bauakademie, 1971a, p. 11). Smaller cities such as Magdeburg, Erfurt or Rostock were further transformed into linear settlements. In other cities of middling size, such as Cottbus or Halle, the concentrated radial pattern was maintained. Growth in these cities was compact in nature.

This was probably related to a belief that locating new residential areas close by would help to save space and travel time. This idea was mentioned in the case of the urban development of Leipzig described as the best functional organization of an urban region with the most economical use of land (Brause, 1965, p. 496). Any higher speeds attained by rapid public transport were not seen as having potential to allow the areas of cities to expand. Compactness was the main criterion, with greater speed merely serving to achieve enhanced accessibility between new urban areas and the consolidated cores of cities. Thus, the main idea in the GDR was to maintain the existing urban structure and model. The idea was not to modernize or change the model of a city, but to complement it with functional areas and to balance development with accessibility.

In case of the USSR, the development of the urban growth pattern was strongly related to fast, direct accessibility between residential and industrial areas (Fig. 61 and 62). Solutions for urban traffic problems were also associated with limitation or

51 "Naším cieľom v našich podmienkach nie je ani mesto kompaktné, ani rozptyl do satelitov, ale pretvorenie našej sídelnej štruktúry na vyššie celky regionálnych miest. Viazaná kompozičná schéma materského centra, voľná kompozičná schéma pridružených sídiel (meniacich svoju funkciu v akési sídelné a výrobné satelity). Regionálne mesto — komplexný organický sídelno-výrobný a rekreačný útvar spojený dopravou do krajinnej jednotky."





Top, Fig. 60. The city for one million inhabitants based on rapid public transport. Source: Hrůza, J. (1972) *Teoria goroda*, trans. Mostovaya, L. B., Moskva: Izdatelstvo literaturi po stroitelstvu, p. 236.

Bottom, Fig. 61. Schemes of possible location of residential and working areas. Source: Polyakov, N. K. (1964) *Osnovy proektirovaniia planirovki i zastroiki gorodov*, Moskva: Stroiizdat, p. 178. The aim was to cover all possible geographical situations to create pre-established relations between existing city, new residential and industrial zones.

stabilization of the mobility of people within a city.[52] The Soviet architect M. Sukholutsky, for example, explained that such movements were a factor destroying rational relations in urban transport. It was claimed that increased movement by people had negative effects on the economy, because this wasted energy that could have been devoted to work and social activities (1966, p. 36).

Concentrated models, satellite cities and linear cities, with the parallel development of functional zones, were responses to this criterion. According to Davidovich's analysis (1960, p. 48), the majority of Soviet cities had a compact urban model with a single city centre (926 cases), the second commonest format being satellite cities (266 cases). There were instances of twin city centres, effectively one for the core and another for the settlement on its outskirts (225 cases), of linear cities (177 cases) and of conurbations of cities (77 cases). From this it can be appreciated that cities lacked multiple urban centres with developed settlement around them, so that they had little need for public transport services to urban cores on the outskirts. Moreover, the extension of some medium cities was achieved through compact directional development, preferably on two, or at most three, axes, in order to avoid additional costs in the organization of urban infrastructures, examples being Yaroslavl, Ivanovo or Bogodukhov.[53]

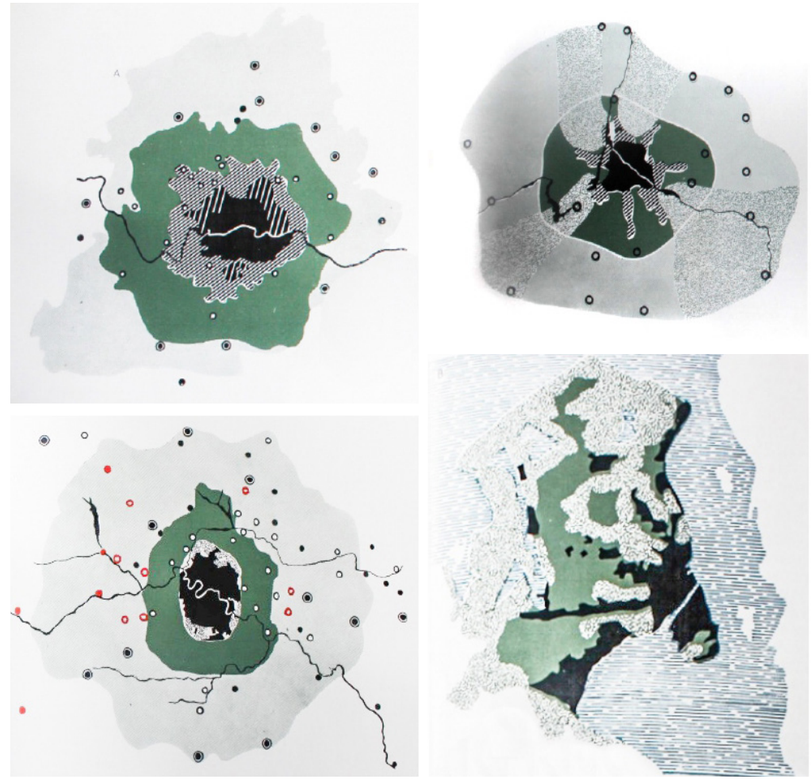
In medium and large consolidated cities, the aim of restraining urban growth was pursued through the creation of green belts and satellite cities. This type of model was understood to be a progressive settlement solution (TSNIIP, 1966, p. 84), although at the same time it was considered a static urban structure (Bocharov, Kudryavtsev, 1971). The benchmark urban model was the London plan of 1944, which served as a guideline for Moscow, Leningrad, Riga, Gorky, Minsk, Donetsk and Alma-Ata.

The similarity of British and Soviet ideas in the development of satellite settlements was noted by P. White in 1980, also stressing the differences in their implementation objectives.[54] It is likely that the containment policy for existing cities, apart from any economic reasons, was related to the aim of leaving the existing urban structure and creating innovative, modern cities with features desired by the new Socialist regime. In satellite cities it was easy to organize quick access between residential and industrial areas. Other models for urban growth involving extensions to peripheral areas were similarly criticized (TSNIIP, 1966, pp. 94-95), (Fig. 63).

52 Mobility of people was divided into two types: general mobility and mobility with urban transport (Goltz, 1981). Mobility meant a quantitative indicator of the intensity of movements (Efremov, Kobozev, Yudin, 1980, p. 170), which did not include different motives in people's movement. Instead, the purpose of movements was planned according to the established functional zones. Therefore, the mobility of people here can be explained as the planned organisation and distribution of the amount and direction of people's movements. This in general could be called "planned movement of people."

53 Possible types of new urban models were studied and presented by Bocharov, Y. and Kugryavtcev, O. K. in 1971 in the book *Planirovochnaia struktura sovremennogo goroda* (The urban structure of contemporary city).

54 See the comparison between the British and Soviet urban planning systems in White, P. (1980) Urban Planning in Britain and the Soviet Union: A Comparative Analysis of Two Planning Systems, *The Town Planning Review*, 51 (2), pp. 211-226.



Top, Fig. 62. Scheme of the extension of functional zones in relation to city size. Source: Polyakov, N. K. (1964) *Osnovy proektirovaniia planirovki i zastroiki gorodov*, Moskva: Stroiizdat, p. 176.

Bo, Fig. 63. The different models of urban growth. On the top left the London model and on the bottom left the Moscow model. These two examples of the satellite model were more appropriate according to Soviet planners. While the other examples, such as Berlin, continuous growth (on the top right), and Copenhagen (on the bottom right), fragmented growth, were considered as inappropriate. Source: Source: TSNIIP Gradostroitelstva SSSR (1966) *Principy Sovetskogo Gradostroitelstva*, vol. 1, Moskva: Stroiizdat, pp. 88-89.

Choice of a satellite city model was facilitated by the absence of settlements in close proximity to cities. This was a major feature of the sparse structure of territorial settlement in the USSR. Nevertheless, a few urban agglomerations were retained, such as Novosibirsk, Sochi and Sverdlovsk. The creation of concentrated suburban areas split off from the core city seemed an unlikely scenario.

In contrast, modern, flexible, dynamic, urban models referred to the possibility of proportional, parallel growth of all functional zones with the maintenance of stable relations between them. Something similar had been suggested by a member of the Soviet avant-garde L. Ladovsky (1932), and also by Doxiadis in his dynamic city (1959). However, the novel Soviet model was developed only in new cities, application of this idea to existing cities with a radio-concentric urban structure being considered impossible. The first attempt to put it into practice was in the new city of Tolyatti in 1967.

From this comparison between the three Communist countries under consideration, it can be concluded that the models they adopted for urban growth from the middle of the 1960s onwards were very different. Rapid public transport was important for re-organizing structures and for urban models, but there were also other issues such as the continuity of ideas and traditions of city planning. In the CSR, these has been related to a trend towards organic Modern Movement that had arisen before the Second World War,[55] in which a vision of the balance between nature and built-up areas prevailed. Thus, a separation of urban areas by siting green spaces between them was seen as both natural and modern. When it came to the GDR, the views in its town planning tradition had resisted the influence of some Modernist concepts, and this continued to be the case. Compact urban expansion was seen as the preferred solution. This idea was applied to urban models in small, middling and large cities. Finally, in the USSR, concepts were strongly related to the economic optimization of urban growth. Limiting urban sprawl was perceived as the main answer that would maintain the orderliness and simplicity of urban structures. Complexity in cities was understood to bring chaos, spontaneity and waste. This avoided a need to respond to the phenomenon of the conversion of cities into great metropolises.

Although these studies and concepts relating to urban models had a major part to play, the USSR, the GDR and the CSR also had to face another difficult dilemma: the choice of public transport for urban growth. The roles and interrelationships of car and tram transport had not yet been clearly defined, and it was necessary to find a compromise.

2.3.5. CONFLICTUAL DEVELOPMENT: DEBATES ABOUT TRAM AND ROAD INFRASTRUCTURE

Although tramways had already started to decline in importance in the 1950s in Socialist countries, greater conflict between tram and motor transport arose as a repercussion of the Moscow All-Union Congress on Town Planning. As mentioned above, this congress did not provide any solution to this problem. Both the needs

55 See Dostalík, J. (2017) The organicists: planners, planning, and the environment in Czechoslovakia 1914–1949, *Planning Perspectives*, 32 (2), pp. 147-173.

for road infrastructure and the possible efficiency of tramway operations were discussed. The new ideas on smooth urban traffic circulation did not favour retention of slow, ageing trams, but the possibility of modernizing tramway infrastructures and rolling stock was hardly considered. Rather, metros were discussed as the ideal solution, fulfilling Modernist principles. These futuristic, maximalist visions did not really contribute to the solution of practical problems, so cities responded to their transport problems in varying ways.

Some of the principles of tramway planning had previously been set out during the Congress of the International Union of Architects in Moscow (1958), dedicated to sharing experiences in urban reconstruction and new build in the period 1945 to 1957. The congress report pointed out the differences in public transport solutions. In the GDR, for example, the main means of public transport for cities with 80.000 to 300.000 inhabitants were conventional tramways, while rapid tram lines were used in cities having between 300.000 and 750.000 inhabitants (IUA, 1958, p. 12). In the CSR, cities with a population size of more than 100.000 were seen as needing trams (IUA, 1958, p. 26), whereas in the USSR the number of inhabitants was not clearly defined. It rather depended on functional conditions and preference was given to tramways only when there was a clear need for industrial function. Trolleybuses were considered to be the principal means of transport for cities with a population of 80.000 to 250.000 inhabitants. The advantage of trolleybuses was basically their greater manoeuvrability compared to trams. In relation to this, in the USSR, a reduction of tram use brought a decline in its passenger share from 85.6% in 1940 to 43.6% in 1956 (IUA, 1958, pp. 28-29).

Another aspect in the comparison of transport policy between these countries is be related to the volume of travellers carried, which was a decisive criterion in the selection of urban surface transport. In the GDR, the use of trams was acceptable even with passenger flows of fewer than 5.000 per hour and was the prime means of transport for hourly flows of 5.000 to 14.000 (Krüger, Richter, Stuhr, 1962, p. 212). In the USSR, in contrast, a flow of under 5.000 passengers per hour would be covered only by buses and trolleybuses, whilst movements of between 5.000 and 15.000 an hour would fall to trams, articulated trolleybuses and motor buses. Only when flows exceeded 15.000 to 25.000 passengers per hour would fast trams be applied. This explains the relatively insignificant role of trams in the planning of Soviet cities in comparison with the extensive reconstruction of tramway infrastructures in the cities of the GDR and CSR.

These planning trends relative to trams continued into the 1960s. Nevertheless, the predominance of the principles of Modern Movement led to reconsideration of a range of previous ideas. It is of interest to grasp what opinions were put forward, since no developed theory or disciplined ideas about public transport planning in cities had so far gelled. Such a lack of a single defined line of thinking led to several different approaches, interpretations and solutions in urban traffic and transport planning in the USSR, GDR and CSR. In these a number of factors intervened, as noted below.

a) The Prime Role of Modern Movement.

There was a more radical approach to the reconstruction and adaptation of cities to the principles of Modern Movement in the USSR than in the GDR and the

CSR. The main reason is likely to have been the widespread belief in the USSR that existing cities were the result of the capitalist period, whose logic for planning, principally the location of different land uses, had to be abandoned. This made it harder to achieve pure functionality and a high level of productivity in cities. The preference for trolleybuses in the 1960s was triggered by the fact they could be operated on ordinary roads without needing track to be laid (Efremov, 1969, p. 15). In the GDR and CSR, conventional tram operations at low speeds and with limited capacity were felt to be undesirable because this did not correspond to any image of modernity, especially when running in city centres, and so such operations were questioned in the 1960s (Beyer, 2011). In both the GDR and the CSR opinions were expressed against the further development of tramways (Fig. 57). This was related to their negative visual impact, because overhead wiring for trams was seen as old-fashioned. Moreover, any mixing of different types of transport, whether on roadways or at intersections, was undesirable, since slower types of vehicle hindered the movements of those moving more rapidly. In discussions on the role of private and public transport, the primary criterion was the intensity of traffic flows at intersections. In the assessments made, trams were seen as the main obstacle preventing the rapid circulation of motor traffic (Vlček, 1956, p. 454). This led to thought being given to the possibility of replacing trams with buses and trolleybuses.[56]

However, tramways in the GDR and CSR continued to be considered as the chief tool for providing collective mobility of people in large and medium cities. In view of the extent of existing tram networks and an understanding of their efficiency, it seemed that the issue was one of improvement through the gradual modernization of both rolling stock and infrastructures. Moreover, there were other planning criteria in the CSR and the GDR that to some extent favoured trams, such as the proximity of mass public transport stops to areas with concentrations of people (Vlček, 1957, p. 494). Another consideration was the saving of space that ensued from the possibility of transporting more passengers than in other means of public and private transport. Finally, due weight was given not only to capital investments required, but also to operating costs.

b) Limitations in Tram Production and Modernization.

Different capacities to build tramway infrastructures or to produce and modernize trams also influenced the diversity of solutions. The most modern trams were produced from the 1950s by the Czechoslovak company *ČKD*, which also manufactured metro trains and electrical equipment for trolleybuses built by the Tatra and Škoda enterprises. *ČKD*'s "Tatra T1" model had a top speed of 60 kilometres per hour (kph) and capacity for 95 passengers. Its "Tatra T2", "Tatra T3" and "Tatra T4" models had a maximum speed of 65 kph, a relatively high speed, suited to the transport needs of industrial outskirts of cities. Their capacities were 95 to 110 passengers for the T2 and T3, and 117 passengers for the T4. *ČKD* was the largest tram manufacturer in COMECON, supplying Czechoslovakia, the USSR, where the T3SU model was in service in more than thirty cities, the GDR, with the T3D model

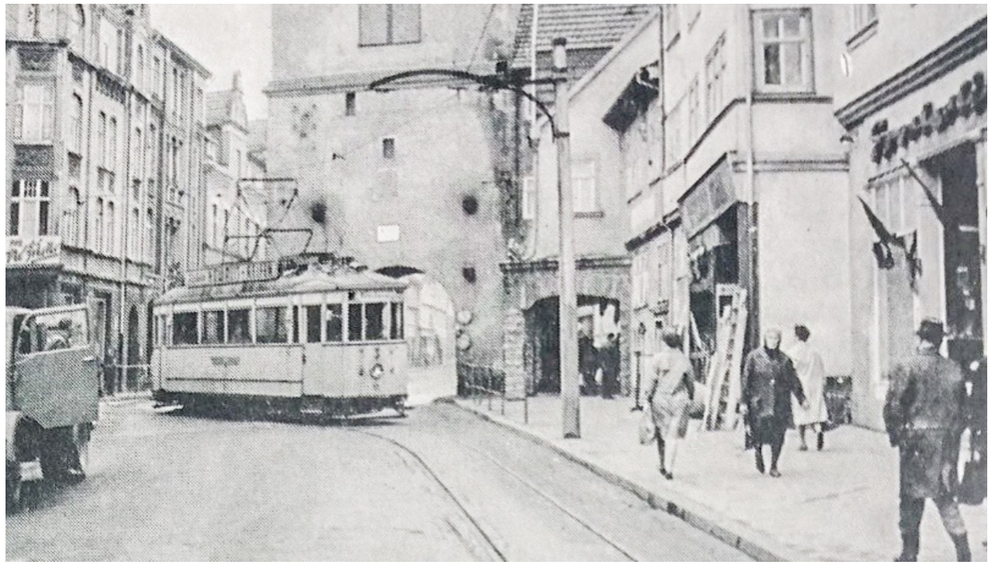
56 To understand the contradictions and doubts between tram and car transport, see the discussions in the early 1960s in Czechoslovakia, Vlček, I. (1956) Město a automobilová doprava, *Architektura ČSR*, XIX (8), pp. 452-455; Vlček, I. (1957) Sítě Komunikaci Motorické a Hromadné Dopravy ve Městě, Architektura ČSR, XVI (9), p. 494-496; Pavlíček, M. (1960) Zlepšení dopravního vybavení československých měst, *Architektura ČSR*, XIX (6), pp. 428-429.

operating in Dresden from 1965 onwards, followed shortly afterwards by the adoption of the T4D model in Dresden, Leipzig and Magdeburg from 1968, Romania and Yugoslavia. These trams permitted the coupling of motorized tramcars and trailer cars. Such a combination was called a *Großzug* [large train] in the GDR, normally comprising two motor cars and one trailer car. T3 trams were used for the first time in Košice to connect the city with an industrial area thirteen kilometres away. This type of fast tram was able to run at speed outside the city. These trams could reach maximum speeds of up to 78 kph, although they normally ran at around 30 kph, thus being able to cover sixteen kilometres in thirty-one minutes (Price, 1967, p. 80), as shown in Fig. 64.

Meanwhile, in the GDR during the post-war period there was no significant modernization of rolling stock, with most trams continuing to be models first produced in the 1930s (Walker, 1972, p. 156). Over the course of the 1950s the *Gothaer Waggonfabrik* [Gotha Wagon Factory], which was soon nationalized and renamed *Waggonbau Gotha* [Gotha Wagon Construction], made some attempts to modernize its models. However, these were no more than a handful of experimental types, a few developed later (Walker, 1972, p. 161). In the late 1950s it produced an experimental four-axle tram with 232 seats (Ladewig, 1960, p. 490). The main efforts this factory went into redesign and improvement of the carriage body, with little done to enhance technical characteristics (Fig. 65). The modernization of rolling stock and possible use of rapid trams were both technically difficult to implement in the GDR. The limited capacity of two-axle trams was mostly palliated by running three-car trains. In the mid-1960s, after an agreement was reached with *ČKD*, the production of trams by *Gothaer Waggonfabrik* came to an end. From then on, *ČKD* was fully responsible for the supply of trams to the cities of the GDR, producing the T3D and T4D models and their trailers.

At the same time, similar co-operation between *ČKD* and the USSR was not well organized. There were difficulties with the integration of the "Tatra" models into Soviet cities, especially in respect of repair services and spare part supplies, which is likely to have had a negative influence on their more widespread use. The production of tramcars was also a crucial issue in the USSR. This was a challenge for the USSR, as it was lagging behind other rolling stock producers in its practices (Shpakov, Zyuzin, 2016, pp. 61-68). From the 1950s onwards, several new models of tram began to be manufactured, but nevertheless still had problems with operational reliability. Among tram manufacturers, the most powerful in the USSR was *Ust-Katav* [*Ust-Katavskii vagonostroitelnii zavod imeni S. M. Kirova*, the Ust-Katav Kirov Wagon-Works], the main function of which had become the production of trams. The best known Ust-Katav models were the KTM-1 (produced between 1947 and 1961) and the KTM-2 (in production 1958 to 1969), but especially the later KTM-5 (manufactured between 1969 and 1992), the most widely used tramcar in the whole country. Another manufacturer, although more oriented towards the production of railway trains, was the Riga Wagon-Building Factory [*Rizhskii vagonostroitelnii zavod*], which produced the two-axle RVZ-6 model with modest characteristics. There were also tram and trolleybus factories in Leningrad and Kiev, but they had little tramcar production capacity and were oriented primarily towards supplying vehicles for Leningrad and Kiev only.

During the 1950s and 1960s several attempts were undertaken to modernize the rolling stock. Hence, production of KTM-1/2 models, with their matching KTP-



Top, Fig. 64. One of the four stops of the Tatra rapid tramway on the outskirts of Košice, 1959. Source: Price, J. H. (1967) Europe's Fastest Tramway, *Modern Tramways and Light Railway Review*, 30 (351), p. 80. The possibility of improved connection to relatively remote areas was possible with the rapid tramway developed by the Czechoslovaks since the late 1950s.

Bottom, Fig. 65. Two-axle Gotha trams in Waltershausen, 1965. Rolling stock modernisation had not yet reached the GDR. Source: Walker, P. J. (1967) An East German Survey, *Modern Tramways and Light Railway Review*, 30 (351), p. 386.

1/2 trailers, and the RVZ-6 continued in the USSR, although none of these had a large carrying capacity or scope for improving performance. It was not until the late 1970s that it became possible to improve tram production with new models of rolling stock (Shpakov, 2013, pp. 212-214). Consequently, the 1950s and 1960s were very difficult for tramway planning in Soviet cities. Some of the difficulties were of a technical nature.

> *"In the Soviet Union there were major problems in developing new types of tram. For more than seven years, between 1950 and 1957, there was constant trouble with the latest RVZ tramcar, which did not meet the need for simple, reliable operation. The complexity of this vehicle's equipment and a lack of qualified mechanics to diagnose and fix glitches often led to jamming brakes that slowed movements. The first prototype 'RVZ-57' was built in 1950 but throughout the 1950s there was constant tinkering in an attempt to simplify its electrical and mechanical fittings. After very nearly a decade of testing, it was finally decided to put the 'RVZ-57', 'KTM2' and 'KTP2' tramcars into production, alongside the 'ZIU-5' trolleybus."*[57] *(Gosudarstvenii Arkhiv Rosiiskoi Federatsii or GARF, The State Archive of the Russian Federation 1959).*

The obstacles to tramway modernization were still present at the end of the 1960s, and were mentioned in a report by the Central Committee of the Council of Ministers of the USSR in 1967:

> *"There are problems with the vehicle fleets for urban public transport. Models are antiquated and have inadequate speeds, besides being noisy. Many trams have been in use for thirty or forty years. There a poor base for vehicle repairs, a lack of spare parts, frequent breakdowns and delays in dealing with them."*[58] *(GARF, 1967a).*

The agreement with *ČKD*, an enterprise which from 1959 on specialized in the production of trams for Member States of the Council for Mutual Economic Assistance or COMECON (Dawson, 2015, p. 300), was intended to resolve these technical difficulties in the USSR. From 1957 onwards the USSR imported the T-1 model, from 1962 on the T-2 version, and from 1963 T-3 trams. In contrast, the manufacturer's six-axle articulated K2SU trams saw virtually no service in Soviet cities (Ponomarev, Ieropolskii, 1981, p. 11). However, demand for trams was high because of rapid urbanization and the increased number of middling cities. Despite the agreement with ČKD, purchasing, or exchanging goods for, Czechoslovak trams was costly and thus limited.

57 "В СССР существовала большая проблема по разработке нового типа трамвайных вагонов, более 7 лет с 1950 по 1957, постоянно были проблемы с новым вагоном РВ3, который не удовлетворял необходимость простого функционирования, надежного функционирования, сложность оборудования и недостаток квалифицированного персонала для обнаружения проблем, часто буксуются, торможение, что замедляет движение. Первый опытный вагон РВ3-57 был построен 1950 году, необходимость упрощения электрического и механического оборудования. После испытательных работ, длившихся почти 10 лет, решением было ввести в серийное производство РВ3-57, КТМ2 и КТП2 и 3иу-5."

58 "Имелись проблемы по подвижному составу городского общественного транспорта – старотипные конструкции, скорость, шумовой характеристики, трамваи эксплуатируются старые зачастую 30-40 летней давности, плохая обеспеченность ремонтной базой подвижного состава, необеспеченность городского транспорта запасными частями, выходят из строя и не ремонтируются вовремя."

c) Diversity in Collective Public Transport Planning Principles.

There were variations in technical approaches to transport economics and engineering that continued into the Communist period. The difference in policies for urban public transport among the three countries under consideration can be explained not only by their own socio-economic needs, but also by differences in their approaches to technical criteria when choosing means of public transport. In the 1960s, the development of the passenger-carrying capacities of buses, trolleybuses and trams became the main driving factor in Socialist urban planning. It is also important to differentiate the existing conditions of collective public transport infrastructures, since a common policy in these countries was to choose solutions with the lowest possible investment cost (Plicka, Vandas, 1965a; Stramentov, Fishelson, 1963, pp. 32-40). In the GDR and the CSR, where a sufficient infrastructure of tramways was already in place, operating expenses and modernization of the tramway system were necessary considerations, while the trolleybus system would require further development.

Thus, the modest capital investment needed for enhancing tramway infrastructures, on the one hand, and their low operational costs, especially outlays for power and personnel, on the other, explains why trams were given priority in the GDR (Krüger, Richter, Stuhr, 1962, p. 212). Trolleybuses were regarded as an exceptional means of transport, slated for use only in areas with steep relief and to be replaced by buses in some medium and large cities (Jansa, 1967, p. 247). This was principally an outcome of the larger investments needed to buy trolleybuses and to provide the concomitant electrical installations, in comparison with the costs for other means of public transport (Plicka, Vandas, 1965a). Consequently, it was decided to opt for tramways and to complement them with buses. In comparison, in the USSR a full initial investment would be required, whether it was for a tram or for a trolleybus system. One of the decisive arguments was that trolleybuses needed a smaller upfront capital outlay than did trams, as they did not require the construction of tracks. Thus, the general decision in the USSR was to develop a combination of trolleybuses and buses.

In the USSR the success of buses and trolleybuses was related to the idea that the vehicular transport capacity was quite manageable, while in the GDR and CSR there was a more elaborate view based on long-term development. A 1963 book by A.E. Stramentov and M.S. Fishelson, *Gorodskoe Dvizhenie* [Urban Traffic] evaluated public transport policy in the GDR and the FRG as relying on a tram-bus combination. Their conclusion was that in the case of the USSR it was unnecessary to follow this established tram-bus mix unthinkingly, as there was a need to bring together modes of transport so as to achieve rational and sequential solutions (Stramentov, Fishelson, 1963, pp. 32-40).

In the context of road infrastructure development, it was necessary to increase the capacity of public transport on the roads in the USSR. To this end, a "trolleybus train" project was implemented in 1966. This was based on the coupling of two vehicles to achieve a capacity of 170 to 220 passengers, which allowed flows to be increased up to 12.000 per hour. In comparison, the two-car T3 tram could accommodate between 250 and 300 people and could provide service for as many as 18.000 passengers an hour (Honzik, 1967), which was somewhat more than the capacity of the "trolleybus-train." This type of trolleybus running was often adopted

in Soviet cities, as it could be readily organized on the existing road infrastructure. However, it was not implemented in the GDR and the CSR, where preference was given to the extensive introduction of articulated trams using existing infrastructures.

There were also differences in the understanding of how best to implement bus services. The use of surface area was a key factor in organizing public transport on roads and on rails. In the CSR and the GDR, wide streets were considered essential for the fluid movement of road traffic (Jansa, 1967, p. 247). Future possibilities of an increase in car traffic and a consequent reduction in bus and tram speeds was taken carefully into account. In this context, trams had comparative advantages because they were better suited to narrow streets, could carry more people and used less space. In the CSR and the GDR, the prevailing view was that there was no other viable solution for higher volumes of movements than the tram system.[59] In the USSR, as noted above, the opposite line was taken: trolleybuses and buses were the most versatile means of transport.

In short, Soviet planners were particularly concerned with modernity in traffic planning, but in part were limited in having virtually no ability to provide their cities with up-to-date trams. This discrepancy between the constraints of reality and the planners' vision of a modern city was the driving force behind their rejection of trams. In fact, buses and trolleybuses proved quite successful in almost all Soviet cities from 1960s onwards. This was similar to what happened in Western European countries, notably in the UK, France and Spain, but there it was in response to the needs of the car. In contrast, in the GDR and the CSR there was also an aspiration to modernize urban transport and traffic, but this took into consideration the efficiency of tramways and the actual possibility of providing their cities with modern trams. This was aided by that fact that the demand for tramcars was manageable, as compared to the large number of middling cities in the USSR simultaneously demanding them.

2.3.6. DISCUSSION AND CONCLUSIONS

Khrushchev's decision brought radical changes to the concepts of architecture and city planning.[60] It was a new and uncertain, but necessary path. It seemed to be the beginning of a period of hope for a scientific revolution and utopian proposals, because the need for a relationship between the artistic and the technical was not initially recognized. Novel transformations were to be based on a paradigm of modernity: the principles of Modern Movement and the "car city" concept. The idea of the socialist city, as the automobile city, is extensively accepted by some research-

59 See the work of Honzik, A. (1967) *Mezinárodní Konference o Vývoji Městské a Příměstské Kolejové Dopravy po roce 1970*, Praha: ČKD Praha, where the author made a comparison of the technical and economic characteristics of all means of public transport, emphasising the importance and advantages of maintaining and developing the tramway system. Among GDR planners there was also a similar opinion, e.g., Hans Glissmeyer (1969) Der städtische Verkehr - eine Schwerpunktaufgabe für Forschung und Praxis, *Die Strasse*, 10 (1), p. 68, where it was underlined that the replacement of the traditional tramway has to be realised with the fast tramway or in some cases with suburban rail, and only in exceptional cases with buses.

60 As Werner, H. (1967, p. 48) pointed out, the socialist economy was an "improvised economy", which explains a constant change in socialist urban planning methods.

ers, Schmucki (2003), Logan (2015) and Bernhardt (2017), and has been explained as the intention to plan the modern city, on the basis of large road infrastructures and urban traffic. In this subchapter it has been shown that there was also an explanation related to the economic efficiency of the city functioning, where fast urban traffic was related to time-saving for workers. The rationalisation of the urban structure was key to the economic progress of the countries of real socialism.

It has also corroborated the idea of Paden (2003) about the importance of scientificisation as the solution to avoid mistakes in urban planning. This idea was very important in communist regimes considered it possible to learn from Western solutions related to transport technology and scientific planning. Despite the critical attitudes expressed with regard to ideas coming from the capitalist world, in reality, for the most part, these solutions were adopted and applied. The organization of road infrastructures to meet the demands of cars became a principle of Socialist town planning.

In consequence, functional zoning was seen as an important tool, even if it sat uneasily with the assumptions of collectivization and progress in social relations. Zoning became the main tool of the new theory and practice of so-called Socialist town planning from the middle of the 1950s, because it responded to various political and economic motives of the State. This became obvious in its predominance over the supposed social aspects of the Communist city. The main reason was the crucial need to make industrial areas accessible, which basically defined the patterns of tram networks and of movements of people, along with the planning process.

However, the designing of public transport networks was not well linked to zoning. An emphasis on the prominent part to be played by scientific methods and even concepts from other disciplines, sometimes lacking any clear relation to reality, led to dubious and inefficient solutions. Urban development and urgent requirements for rapid public transport increased the necessity for physical connections between functional areas and the transport system.

It has also been possible to confirm Beyer's (2011) idea about the importance of the Urban Planning Congress held in Moscow in 1960 in announcing new methods of urban planning, and its influence in other European socialist countries. In this subchapter it has been defined that the policy of collective public transport, and especially tramways, was poorly defined. In the urban models, public transport planning still remained without a defined policy. The role of trams was then understood with their rapid operation without disturbing other types of urban traffic being carried out through adjustments and re-planning methods. In general, the role of trams in mobility and urban planning was weak and their future was undefined. Strengthening the priority of tram systems still required a change in urban structure and limitation of motorised traffic and its infrastructure.

As Siegelbaum (2009) has mentioned, this policy, oriented towards both road infrastructure and public transport, conditioned several contradictions and confusions that remained unresolved over the period. In this connection, this subchapter has developed the idea that this undefined relationship between car and public transport was one of the important conditions for the development of differences within the European communist countries.

This analysis has also verified the idea of Crouch, who in 1979 pointed out the idea that there was a weak tramway policy in the USSR and underlined the surprising denial of the tramway in Soviet cities. In this subchapter the explanations, criteria and discussions on this issue have been developed and contrasted with the ideas of other countries of real socialism. For example, it has been demonstrated that there are differences in the principles and criteria for planning tramway lines, in terms of the size of the city, the number of passengers, the policy of development, maintenance and enclosure, the technical criteria for the selection of means of public transport, and the level of provision and modernisation of tramway rolling stock.

Despite similar planning principles, based mainly on compactness and savings in travel time and financial resources, the development of urban growth models had differing characters in the three countries under consideration. This was explained by several factors upon which more stress was laid in the case of the USSR, especially the essential nature of fast, direct links between workplaces and homes, and the maintenance of spatial order. In the GDR, more weight was given to economical use of land, the accessibility of city centres and the coherence of urban models. In the case of the CSR, the key aims were an aspiration to modernize urban layouts and to organize direct access to green areas.

Such dissonances between transport and city planning worsened from the mid-1960s onwards. On the one hand, plans to expand residential and industrial areas in cities, and the need for further savings and rationalization of resources played a part. On the other hand, the crystallizing of critical views of Western experiences and a further development of research institutes contributed to the questioning of integrated planning. Collective public transport was a key instrument for improving the condition of the economic system, but it had to be interrelated not only with the territorial centres of production and consumption, but also with the functionality of urban spaces. This was an important issue that urgently needed to be given more attention. The simplistic, sectoral vision did gradually begin to change with the arrival of Brezhnev in 1964.

2.3.7. BIBLIOGRAPHICAL REFERENCES

Bartholomew, H. (1959) *Ispolzovanie territorii v amerikanskich gorodach*, trans. Volfenzon, E. Y., Moskva, Gosstroiizdat.

Bernhardt, C. (2017) Längst beerdigt und doch quicklebendig. Zur widersprüchlichen Geschichte der "Autogerechten Stadt," *Zeithistorische Forschungen/Studies in Contemporary History*, 14 (3), pp. 526-540.

Berton, M. (2017) Saving the City: Harland Bartholomew and Administrative Evil in St. Louis, *Public Integrity*, 20 (2), pp. 194-206.

Beyer, E. (2011) Planning for Mobility Designing City Centers and New Towns in the USSR and the GDR in the 1960s, in Siegelbaum, L. H. (ed.), *The Socialist Car Automobility in the Eastern Bloc*, Ithaca: Cornell University Press, pp. 71-91.

Bocharnikova, D. (2014), *Inventing Socialist Modern A History of the Architectural Profession in the USSR, 1932–1971*, PhD thesis, Florence, European University Institute.

Bocharov Y., Kudryavcev, O. (1972) *Planirovochnaia struktura sovremennogo goroda*, Moskva: Izdatelstvo literatury po stroitelstvu.

Brause, G., Jacob. R., Löber, J., Schrödl, E. (1965) Die Stadtregion Leipzig und ihre städteplanerische Entwicklung, *Deutsche Architektur*, XIV, pp. 496-499.

Chorley, R. J., Haggett, P. (1971b) *Modeli geografii: sbornik statei*, trans. Barlas, V. Y., Moskva: Progress.

Collein, E. (1963) Grundsätzliche ideologische und politische Probleme in Städtebau und Architektur, en 7. Plenartagung, *Ideologische Fragen des Städtebaues und der Architektur*, Berlin: Deutsche Bauakademie.

Couch, C., Fowles, S. (1978) Britain: Runcorn. A Tale of Two Centres, *Built Environment*, 32 (1), pp. 88-102.

Davidovich, V. G. (1960) *Rasselenie v promyshlennikh uzlakh*, Moskva: Gosudarstvennoe izdatelstvo literaturi po stroitelstvu, arkhitekture i stroitelnim materialam.

Dawson, A. H. (2015) *Planning in Eastern Europe*, New York: Routledge Revivals.

Deutsche Bauakademie (1960a) *Probleme des Städtebaus und der Architektur im Siebenjahrplan*, erste theoretische Konferenz, Berlin: Deutsche Bauakademie.

Deutsche Bauakademie (1960b) *Städtebau in der Sowjetunion. Materialen der Allunionkonferenz zu Fragen des Städtebaus*, Berlin: Institut für Gebiets-, Stadt- und Dorfplanung.

Deutsche Bauakademie (1971a) *Entwicklung des sozialistischen Städtebaus und der sozialistischen Architektur in der Deutschen Demokratischen Republik*, Berlin: Deutsche Bauakademie.

Dorotjak, D. (1969) Mesto a jeho funkcné vztahy, *Architektura a Urbanizmis*, 2, pp. 39-49.

Dostalík, J. (2017) The organicists: planners, planning, and the environment in Czechoslovakia 1914–1949, *Planning Perspectives*, 32 (2), pp. 147-173.

Dresden Stadtmuseum (1971) SMD_D_1971_11.1_Stadtaussichten, Ph 787_05.

Efremov, I. S. (1969) *Trolleibusy. Teoriia, Konstrukciia i Raschet*, Moskva: Vysshaia Shkola.

Efremov, I. S., Kobozev, V. M., Yudin, V. A. (1980) *Teoriia gorodskikh passazhirskikh perevozok*, Moskva: Vysshaia Shkola.

Federal German Archives (1961a) *Gebietsplanung Bezirke Halle*, DH 2/21466.

GARF (Gosudarstvenni Arkhiv Rosiiskoi Federatcii) (1959) *Dokumenti po razrabotke, ispitaniyu i vnedreniyu novoi tekhniki, Sovet Ministrov SSSR*, A-314, 3, 4743.

GARF (1967a) *Perepiska CK KPSS i Sovet Ministrov RSFSR po voprosam tramvaino-trolleibusnogo khozyaistva*, vol. 3, A - 314, 3, 8589.

Gatejel, L. (2011) The Common Heritage of the Socialist Car Culture, in Siegelbaum, L. H. (ed.), *The Socialist Car: Automobility in the Eastern Bloc,* Ithaca: Cornell University Press, pp. 143-156.

Glissmeyer, H. (1969) Der städtische Verkehr – eine Schwerpunktaufgabe für Forschung und Praxis, *Die Strasse*, 10 (1), pp. 68-72.

Goltz, G. (1981) *Transport i rasselenie*, Moskva: Izdatelstvo Nauka.

Herce Vallejo, M. (1995) *Las formas de crecimiento urbano y las variantes de carretera*, doctoral thesis, Universitat Politècnica de Catalunya.

Herce Vallejo, M. (2009) *Sobre la movilidad en la ciudad. Propuestas para recuperar un derecho ciudadano*, Barcelona: Editorial Reverté.

Highway Research Board, National Academy of Sciences (1965) *Highway Capacity Manual*, Washington.

Honzik, A. (1967) *Mezinárodní Konference o Vývoji Městské a Příměstské Kolejové Dopravy po roce 1970*, Praha: ČKD Praha.

Hruška, E. (1966) Problémy súcasného urbanizmu, Bratislava: Vydavatel'stvo Slovenskej akadémie vied.

Hrůza, J. (1965) *Teorie města*, Praha: Nakladatelství Československé akademie věd.

Hrůza, J. (1972) *Teoriia goroda*, trans. Mostovaya, L. B., Moskva: Izdatelstvo literatury po stroitelstvu.

IUA (International Union of Architects) (1958) *Construction and Reconstruction of Towns*, 1945-1957, Moscow: State Building and Architecture Publishing House.

Jansa, F. (1967) *Městské Dráhy Elektrické*, vol. 2, Bratislava: Vysoká Škola Dopravná v Žiline v Slovenskom Vydavateľstve Technickej Literatúry.

Krüger, H., Richter, K.-J., Stuhr, R. (1962) *Der Städtische Nahverkehr in der DDR*, Berlin: Transpress, VEB für Verkehrswesen.

Kucherenko, V. A. (1960) O sostoyanii i merakh uluchsheniia gradostroitelstva v SSSR, in Sovet Ministrov SSSR (ed.), *Vsesoiuznoe soveshchanie po gradostroitelstvu*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu, arkhitekture i stroitelnim materialam, pp. 7-83.

Kučerenko, V. A. (1961) Základní cesty rozvoje urbanismu v SSSR, *Architektura ČSR*, 6, pp. 411-417.

Kudryavcev, O. K. (1963) O strukture transportnykh setei, in Akademiya Stroitelstva i Arkhitekturi SSSR, *Problemy sovetskogo gradostroitelstva*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu, arkhitekture y stroitelnym materialam.

Kulakov, A., Trofimenko, K. (2016) Transport Planning and Transport Modeling, in Blinkin, M. and Koncheva, E. (eds.), *Transport Systems of Russian Cities. Ongoing Transformations*, Cham: Springer International Publishing, pp. 1-37.

Ladewig, D. (1960) Untersuchung und Bewertung der Einsenbahnmöglichkeiten von Straßenbahn, Kraftomnibus und Obus, *Deutsche Eisenbahn Technik*, 8, Berlin: VEB Verlag Technik.

Logan, S. (2015) *Modernist Urbanism in the Age of Automobility: Producing Space in the Suburbs of Toronto and Prague*, doctoral thesis, York University.

Mancuso, F. (1980) *Las experiencias del zoning*, Barcelona: Gustavo Gili.

Merkulova, Z. (1972) Prostranstvennaia neravnomernost gradostroitelnykh uslovii kak factor, opredeliaiushchii territoriiu, potrebniiu dlia dvizheniia, in Bolonen-

kov, G., Smykovskaia, G. (eds.), *Transport v planirovke goroda*, Moskva: Gosudarstvenni Komitet po grazhdanskomu stroitelstvu i architekture pri Gosstroe SSSR, pp. 85-102.

Monteys, X. (1996) *La gran máquina. La ciudad en Le Corbusier*, Barcelona, Ediciones del Serbal.

Organov, L. I. (1933) Raionirovanie i zonirovanie v planirovke naselennykh mest i raionov, in Popov, V. F., Efremov, N. D., Borshevski, A. M. (eds.), *Pervaia Vsesoiuznaia konferentsia po planirovke i stroitelstvu gorodov*, pp. 76-81.

Paden, R. (2003) Marxism, Utopianism, and Modern Urban Planning, *Utopian Studies*, 14 (1), pp. 82-111.

Pavlíček, M. (1960) Zlepšení dopravního vybavení československých měst, *Architektura ČSR*, XIX (6), pp. 428-429.

Peshekerov, P. K., Bondarevskii, D. I. (1936) *Tramvainii Spravochnik*, Moskva: OGIZ-Gostransizdat.

Plicka, I., Vandas, J. (1965a) *Betreffend Stadtverkehrsmittel – Straßenbahnen und Obusse*, Internationales Symposium, 19-27 Juni, Prag.

Polyakov, N. K. (1964). *Osnovy proektirovaniia planirovki i zastroiki gorodov*, Moskva: Stroiizdat.

Ponomarev, A. A., Ieropolski, B. K. (1981) *Podvizhnoi sostav i sooruzheniia gorodskogo elektrotransporta*, Moskva: Transport.

Price, J. H. (1967) Europe's Fastest Tramway, *Modern Tramways and Light Railway Review*, 30 (351), pp. 77-81.

Runcorn Development Corporation (1967) *Runcorn New Town*, Nottingham: Hawthornes of Nottingham limited.

Schmucki, B. (2001) *Der Traum vom Verkehrsfluss: Städtische Verkehrsplanung seit 1945 im deutsch-deutschen Vergleich*, Frankfurt: Campus.

Schmucki, B. (2003) Cities as Traffic Machines: Urban Transport Planning in East and West Germany, in Divall, C., Bond, W. (eds.), *Suburbanizing the Masses. Public Transport and Urban Development in Historical Perspective*, Burlington: Ashgate, pp. 149-170.

Schmucki, B. (2010) Fashion and Technological Change: Tramways in Germany after 1945, *Journal of Transport History*, 31 (1), pp. 1-24.

Sheshtokas, V. (1968) Opredelenie parametrov perspektivnoi transportnoi seti goroda, *Architektura SSSR*, 4, pp. 44-48.

Shpakov, I. V. (2013) Istoriia proektirovaniia otechestvennykh sochlenennykh tramvainykh vagonov na Ust-katavskom vagonostroitelnom zavode imeni S. M. Kirova., *Gramota*, 4 (71), pp. 212-214.

Shpakov, I. V., Zyuzin, P. V., (2016) Sostoianie otrasli gorodskogo elektrotransporta v RSFSR v kontse 1980: Problemy i perspektivy, in Tretyakov, A. (ed.), *Kraevedcheskie zapiski. Sbornik statei*, Kursk: Investsfera, pp. 61-68.

Siegelbaum, L. H. (2009) On the side: Car culture in the USSR, 1960s-1980s, *Technology and Culture,* 50 (1), p. 1-23.

Sovet Ministrov SSSR (1960) *Vsesoiuznoe soveshchanie po gradostroitelstvu*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu, arkhitekture i stroitelnym materialam.

Stramentov, A. E. (1960) Intervención en el congreso, en Sovet Ministrov SSSR (ed.), *Vsesoiuznoe soveshchanie po gradostroitelstvu*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu, arkhitekture i stroitelnim materialam, pp. 370-374.

Stramentov, A. E., Fishelson, M. S. (1963) *Gorodskoe Dvizhenie*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu, arkhitekture i stroitelnim materialam

Sukholutsky, M. (1966) Raschety passazhiropotokov v gorodakh, *Architektura SSSR*, 3, pp. 36-39.

Tripp, A. (1943) *Town Planning and Road Traffic*, London, Edward Arnold and Co., London: Edward Arnold and Co.

TSNIIP Gradostroitelstva (1964) *Tselinograd. Opyt proektirovaniia*, Moskva: Izdatelstvo literatury po stroitelstvu.

TSNIIP Gradostroitelstva (1966) *Principy sovetskogo gradostroitelstva*, vol. 1, Moskva: Stroiizdat.

Vlček, I. (1956) Město a automobilová doprava, *Architektura ČSR*, 19 (8), pp. 452-455.

Vlček, I. (1957) Sítě Komunikaci Motorické a Hromadné Dopravy ve Městě, *Architektura ČSR*, XVI (9), p. 494-496.

Vlček, I. (1962) Progresívni řešení dopravních cest ve městě, *Architektura ČSR*, 21 (6), pp. 403-409.

Walker, P. J. (1967) An East German Survey, *Modern Tramways and Light Railway Review*, 30 (351), pp. 379-389.

Walker, P. J. (1972) East Germany - Last of the Small Tramcar Builders, *Modern Tramways and Light Railway Review*, 34 (406), pp. 156-161.

Weigel, W. (1962) *Verkehr in der modernen Stadt*, Berlin: Transpress VEB Verlag für Verkehrswesen.

Werner, H. (1967) *Das Transportation in Eastern Europe: Development and Design in Comecon*, Cologne: Verlag Wissenschaft und Politics.

White, P. (1980) Urban Planning in Britain and the Soviet Union: A Comparative Analysis of Two Planning Systems, *The Town Planning Review*, 51 (2), pp. 211-226.

Yakushenko, O. (2016) Soviet Architecture and the West: The Discovery and Assimilation of Western Narratives and Practices in Soviet Architecture in the late 1950s–1960s, *Laboratorium*, 8 (2), pp. 76-102.

Zalčík, T. (1973) Príspevok k formirovaniu struktury mesta, *Architektura a Urbanizmus*, 2, pp. 29-33.

2.4. THE VARIETY OF SOLUTIONS FOR TRAMWAY NETWORKS IN THE 1950S AND 1960S: CASE STUDIES OF MAGDEBURG, OSTRAVA, OREL AND SIMFEROPOL

One of the objectives of Communist regimes in terms of cities was the deployment of principles based on the theory of Socialist town planning, in which idea was that urban public transport was essential in the provision of accessibility, social equality and the optimal functioning of Communist countries' cities and their productive spaces. However, the actual deployment of public transport was decided under different conditions and with divergent methods, tramways being an element about which there was debate and uncertainty. A common objective was maintained in all urban transport policy: the provision of accessibility and public services had to be achieved with the lowest possible capital outlays and running costs, and to this end the choice of specific means of collective transport, whether metros, trams, trolleybuses or buses, had to be modulated.

Beliefs about how crucial the part to be played by tramways was, or even if they had any role at all, were dissimilar when it came to rationalizing the use of existing transport infrastructures. Moreover, public transport was often not perceived as an instrument for productive efficiency and the general good, but as a mere service, condemned to follow where industry and housing led. Owing to the difficulties of financing an obviously costly transport tool, any development of tramway systems was mostly confined to the economically more developed Communist countries.

Among the issues that shaped these variations, some had greater relative weight in the decision-making process. One problem was the different capacity to build and maintain trams. Thus, in contrast to the pre-existing consolidated tramway infrastructures in the GDR and the CSR, the cities of the Soviet Union either lacked, or had only partial, tramway networks. This concurred with the country's limited capacity to build tramcars and other needful tramway equipment. A second conditioning factor was that Modern Movement did not have the same influence in the three countries of reference. On the one hand, tramways could be a major factor for conflict, mainly relating to function, but also to aesthetics. On the other hand, trams could constitute a major means of public transport, and this required reconsideration of their priority in urban space. In the GDR and the CSR there was a long-standing and well-established culture of tramway planning, based on the techniques and knowledge they had acquired in transport economics and engineering. A third major factor was the differing levels of influence enjoyed by politicians and professionals, leading to different choices under similar circumstances.

These differences and contradictions raised several questions. How were conflicts between tramway, as opposed to purely road, infrastructures to be resolved? How did the idea of prioritizing urban public transport develop in practice? There were certainly divergent solutions in urban transport planning in the European Communist countries, which shows not only that there was a gap between theory and practice, but also that these issues were not as clear-cut as they might seem. In order to prove this with concrete case studies, Magdeburg, Ostrava, Orel and Simferopol were investigated.

The selection of these cities was an outcome of the intention to exemplify the variety of situations in the planning of tram infrastructure. The initial selection criteria were medium demographic size (between 200.000 and 500.000 inhabitants) and different choices relating to the role to be played by the tramway system in the city or its parts. This meant analysing whether trams were used throughout the urban area, in the consolidated city centre or core, on the urban periphery, or nowhere at all, because the tramway system was completely replaced by other means of public transport. All four cities had been bombed during the Second World War, which was a factor of some prominence in decisions for complete or partial reconstruction, as well as in triggering potential changes to the tramway network. The four cases present different dynamics in terms of urban growth and industrial development during the period studied, which facilitates comprehension of the relationship between town planning and urban transport planning.

2.4.1. MAGDEBURG. A THRIVING PRE-EXISTENT TRAMWAY SYSTEM AND DISCUSSIONS ABOUT TRAMS IN THE CITY CENTRE

Magdeburg is an instance of a medium city with a well-developed tram network which was completely rebuilt with hardly any changes after being destroyed during the World War II. Similar cases to Magdeburg were those of Dresden, Bratislava or Cottbus.

In Magdeburg the infrastructure and rolling stock were almost completely ruined, and all the city's bridges were destroyed (Magdeburger Verkehrsbetriebe [Magdeburg Transport Corporation], 1977, p. 34), preventing rapid reconstruction of the tramway system. Before the Second World War, the population of the city was around 340.000 inhabitants, but after the destruction of almost 80% of the city's buildings during the war, the population dropped to 100.000 inhabitants, growing again after rebuilding to a total of 250.000 (Stadtplanungsamt Magdeburg [Magdeburg City Plannning Office], 1998, p. 35). The tramway network had been completely re-instated by 1948 and was one of the main means of transport for the inhabitants of a city that had itself still not been fully rebuilt.

The most prominent public transport development plans and projects included the 1952 plan (Fig. 66 and 67), which proposed an extension to the tramway system by adding new lines connecting existing radial axes. This proposal for the development of tram infrastructures was ambitious, with the intention to connect areas on the outskirts and to lengthen tramway lines, as well as creating new bus routes. These enhancements could be supported by modernization of the rolling stock. The city had the possibility to bring in four-axle articulated trams (*Gothawagen G4-61*) with a capacity of about 150 passengers (Bauer, 1986, p. 48), making it easier to keep the tramway network in being. On the other hand, this was also the start of a period of growth in motor buses and trolleybuses, planned mainly for the periphery of the city.

However, from the early 1960s Modern Movement's influence began to increase and there was a slowing down in development of the tramway. Discussions arose initially in respect of the role of the tramway in the central area of the city. A first step was the removal of the tram line from Erzberger Straße, leaving this street for

car traffic only, while the parallel Breiter Weg was reserved exclusively for tram and pedestrian movements. On other central streets, however, the tram lines remained in place (Fig. 68)

This decision did not bring the tram controversy to an end. During the reconstruction of the residential area near Jakobstraße, one of the proposals was to remove the tram tracks in order to leave the street for residential use only (Anonymous, 1961). As a result of such proposals, several tram lines connecting the northern part of the city with the rest of the urban area were eliminated (Kaleschky, 1998, p. 46). Furthermore, in the inner-city development proposal developed by the Magdeburg Town Planning Department [*Büro für Stadtplanung Magdeburg*] in 1965, a distribution node was created near the railway station, and the tram tracks running along a central street, the Otto-von-Guericke Straße was also removed. However, this did not mean any major limitation to the operation of the tramway system. In the split of public transport between modes, trams continued to have a very considerable share of 74.5% (Magdeburg Municipal Archives, 1969, p. 6), with buses, trolleybuses and urban rail having the remainder (Fig. 69).

The Fourteenth Plenum of the Socialist Unity Party of Germany [*Sozialistische Einheitspartei Deutschlands*], the East German Communist party, in 1966 devoted itself to studying and proposing to the Council of the Ministers of the GDR [*Ministerrat der Deutschen Demokratischen Republik*] arrangements for the provision of transport in East German cities by means of general urban transport plans (Stadtplanungsamt Magdeburg [Magdeburg Town Planning Office] 1998, p. 63). In 1966, the suggestion was made to draw up such a plan for Magdeburg, and this was implemented in 1969. The plan did not propose radical changes to the collective public transport system, incorporating some lengthening of tram routes both northwards and southwards. However, at this time a period of rethinking on how to restructure the city had begun. In connection with this, there was a need to reflect on the model of urban growth and the development of public transport networks. The solution was seen as lying in an expansion of the road network or the modernization of the tram infrastructure (Municipal Archive of Magdeburg, 1969, p. 8). The main thrust in the model for the city was an extension on a north-south axis, developing a linear configuration (Stadtplanungsamt Magdeburg, 1998, p. 60) and having two industrial areas, Buckau-Südost and Nord-Rothensee at the extreme ends of this urban growth (Fig. 70).

In a period of urban growth, the dilemma was whether to continue with the tramway system or to replace it with motor buses and urban trains (Michalk, 1969, p. 52). The city architect Heinz Michalk, who started working in 1966, was one of the most prominent technical experts who advocated and achieved maintenance and modernization of the tramway system. It should be noted that the actual updating of the tram infrastructures in Magdeburg did not take place until the end of the 1960s.

A detailed analysis of modes of transport revealed that over a distance of seven and a half kilometres travel times by suburban train and by tram were similar, at forty minutes, while Magdeburg was four kilometres in length (Michalk, 1969, p. 53). Suburban trains required longer distances between stops, which made them less convenient for passengers. Hence, the conclusion was that trams, even though they had a dilapidated infrastructure, should not be replaced by buses or suburban

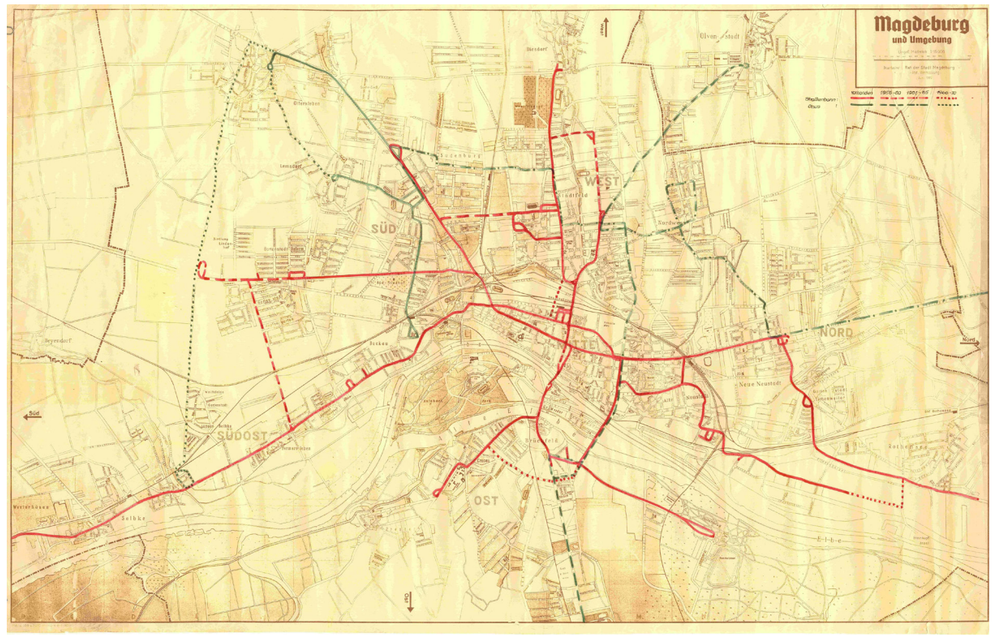


Fig. 66. The development plan for Magdeburg's public transport system, elaborated in June 1952 by the Magdeburg City Council: maintenance of the existing lines and opening of several tram lines on the outskirts of the city. Source: Magdeburg Municipal Archive.

Fig. 67. The functioning of the tramway in the centre of Magdeburg in 1953. Source: Stadtplanungsamt Magdeburg (1998) *Städtebau in Magdeburg. Planungen und Dokumente*, Magdeburg: Landeshauptstadt Magdeburg, Büro für Öffentlichkeitsarbeit und Protokoll, p. 44.

trains. The Magdeburg tramway system was defended in recognition of its functional role, as it had a good carrying capacity, a dense network and a close spatial relationship to the urban structure.

The city centre received special attention. It was found that rapid trams used less road surface than did other modes of urban transport (Magdeburg Municipal Archive, 1969, p. 8). Despite the widespread belief that city centres should be kept free of any mode of public transport, there was positive discussion in the GDR during this period about the utility of employing trams not only to connect to the rest of

Fig. 68. Trams on Karl Marx Strasse, Magdeburg's central avenue with pedestrian and tram traffic in 1968. Source: Federal German Archives, 183-G0613-0008-001, photography of U. Richter.

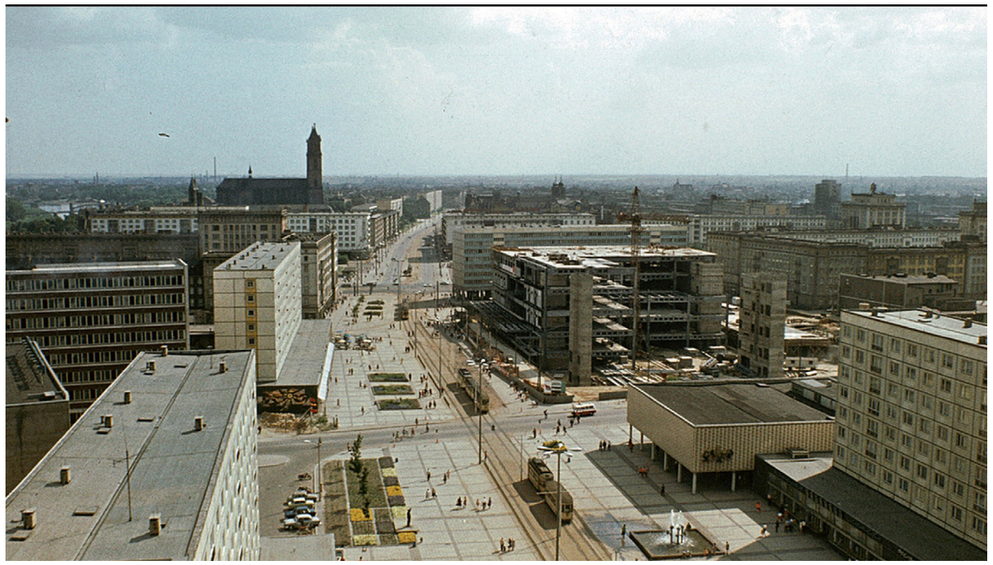


Fig. 69. The centre of Magdeburg in 1969 with trams in operation. Source: https://www.mdr.de/ photography of Wolfgang Schmidt.

the city, but also to provide services within the city centre (Deutsche Bauakademie, 1967, pp. 83-84). This criterion appears to have been decisive in encouraging GDR planners to retain and modernize tramway systems in central areas.

However, in general in the 1950s and 1960s tram systems were retained, while bus routes were extensively developed, especially in peripheral areas of cities. Tramways were kept in place in the more central, consolidated city areas, but there was no overall growth in networks. This can be explained by the prevalence of a city containment policy resulting in very limited residential and industrial expan-

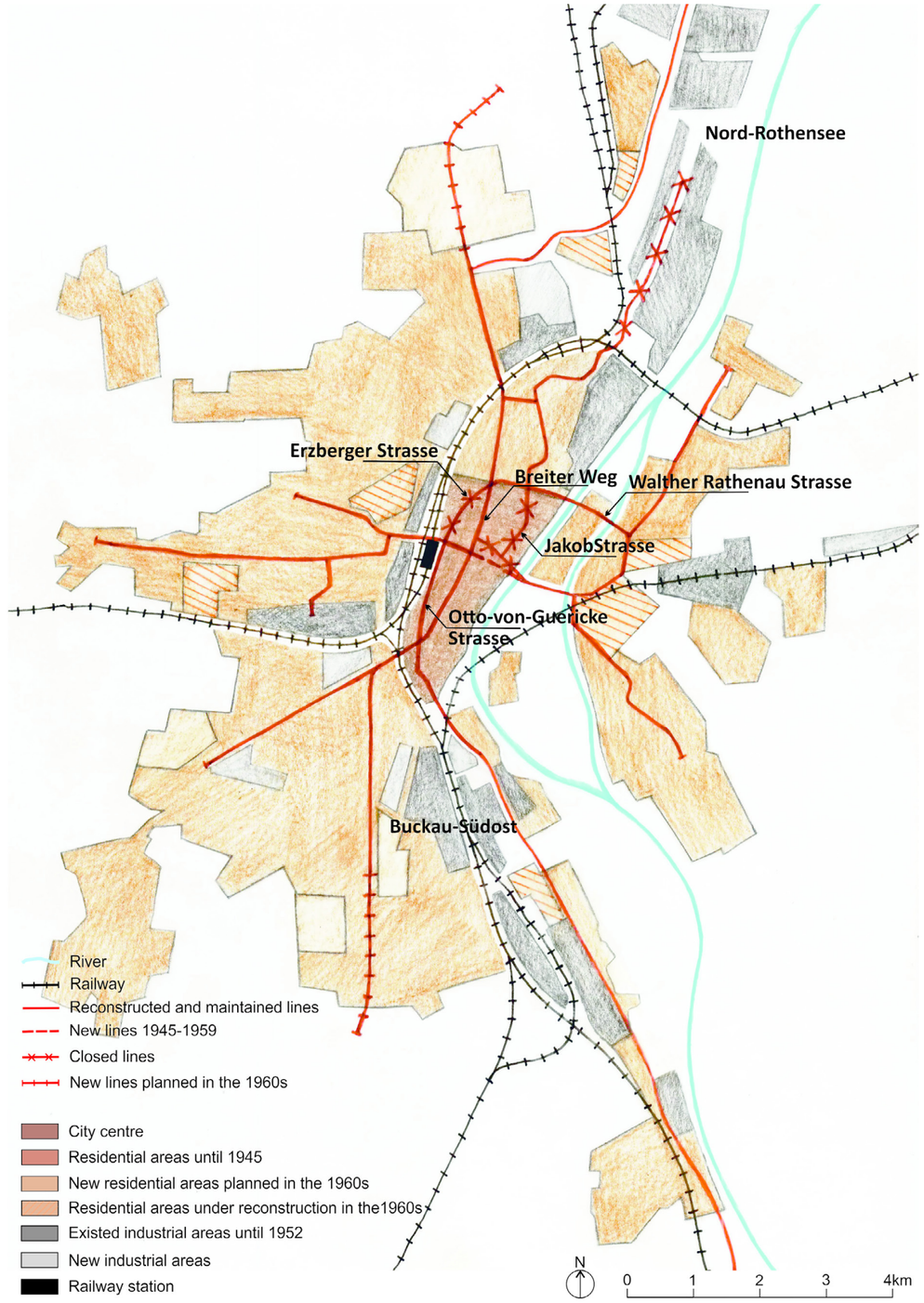


Fig. 70. The Magdeburg plan in the late 1960s with the major changes in the city centre and some extensions in the periphery. Author's elaboration based on the urban and transport plans of the 1950s and 1960s.

sions in the 1960s. Lines were kept in being, with this being accompanied by some changes intended to improve the fluidity of tram traffic and selective replacements by buses in city centres to improve motor and pedestrian movements.

From the case of Magdeburg, several features can be seen. Tramways held their place because of the capabilities of the extensive pre-existing network and the unequivocal decision to rebuild lines. Modifications to the tramway network in the city centre were related to rationalist ideas of urban planning. Finally, the recognition of the major role of trams at the end of the 1960s encouraged their development and modernization in the 1970s.

2.4.2. OSTRAVA. TRAMWAYS FOR THE CENTRAL CITY AND FOR NEW RESIDENTIAL AND INDUSTRIAL EXTENSIONS

The city of Ostrava is an instance of the retention of a tramway network both in the core of a city and in the peripheral areas into which it grew. Other similar cases were Košice, Smolensk and Pyatigorsk.

Ostrava is an industrial city located in the north-east of the CSR, in the Moravian-Silesian region at the point where the rivers Ostravice and Opava flow into the Oder. In the nineteenth century the town had already become a major mining centre with iron and steel works, which led to the formation of a fragmented urban structure. Tramways played a significant role in ensuring the accessibility of industrial areas. With the establishment of the Communist regime, the city continued to develop its heavy industry, becoming an industrial centre of importance for the economic development of the country as a whole.

There were simultaneous processes of reconstruction and urban growth after the Second World War. The intense development of industrial activities caused problems of insufficient amounts of housing (Zarecor, 2013, p. 73). In this relationship between home and workplace, the need to provide rapid, direct connections through an enhanced public transport system was identified immediately. In the light of their significance for the economic development of the whole country, Ostrava's industries received special attention from all levels of government. Apart from the requirement to establish these transport connections, the development of a coherent, integrated urban layout was also considered vital. This was a challenge, as the city had a fragmented and poorly distributed structure (Zmija, 1967, p. 9). The aim was to form concentrated urban areas, with specialized functions and well connected by public transport lines. Hence, in the post-war period intensive industrial development was accompanied by a matching growth in residential areas and of collective public transport. Tramways were of great use not only as a means of transport, but also for organizing a compact distribution of urban areas.

Ostrava had a radio-centric tramway system connected to the city centre. The main extensions of the tramway lines ran out to industrial and residential areas, such as Vítkovice, Zábřeh, or Hrabová, southwards of the city (Zmija, 1967, p. 5). The burgeoning of the tramway system can be further explained by the early modernization of rolling stock in the CSR as a whole. From the middle of the 1950s to the early 1960s, Ostrava received *ČKD* trams of the T2 and T3 models with increased capacity, improved technical characteristics and the possibility of multiple-unit use.

In the 1950s the prime role of the tram was already widely recognized in Ostrava, mainly because of its passenger capacity, as several units could be coupled into a single train capable of carrying up to 300 people (Wolný, 1955, p. 41). Thus, the city plan of 1955 and the transport plan of 1964 assumed that trams should be the main means of public transport, it being plausible that it could be further modernized in the shape of rapid tramways. Therefore, the tram lines in Ostrava served to connect concentrated, densely populated areas at some distance one from another, and the decision taken was to retain the relevant infrastructure as a consequence of its main advantage, the possibility of accommodating large passenger flows (Fig. 71).

Various changes were seen in the south and west of the city, where the orientation of lines was adjusted to fit the planning needs of the new residential areas. The residential area Poruba in the west of the city was located on the main axis, the Gottwaldova [Gottwald] thoroughfare. That route had several functions, providing connections between the industrial area of Kunčice and recreational areas in the east of the city and to the centre. Hence, a new tram line was proposed that would run parallel to the Gottwald axis and connect directly to the centre. The new industrial area of Nová hut' in Kunčice was an extension of this axis that connected directly with Poruba.

The other residential development towards the southern part of the city in the 1950s was in Hrabůvka, which was also supported by extensions to tram lines. However, the main extension began in the early 1960s with the building in the residential districts of Zábřeh, Výškovice, Dubina and Bělský Les, matched by the expansion of tramways. Unsatisfactory railway connections between these residential areas and the city centre necessitated the installation of tram lines (Zmija, 1985, p. 303). Public transport connections were mainly aimed at improving links between industrial and residential areas, and not so much with the urban centre (Zarecor, 2013, p. 62). The city centre was less important for the planners than areas with industrial functions. The location of industrial zones in Vítkovice and Nová huť was a principal focus in decisions on the siting of new residential areas.

The necessity for urban growth intensified the requirement for a comprehensive urban transport plan. The first project of this sort was produced relatively early, between 1960 and 1964, with the objective of aiding urban development plans.[61] It was based on the results of a complex and extensive study of Ostrava's urban transport, carried out by the Brno-based State Institute for the Design of Transport Structures [*Státní Ústav pro Projektovaní Dopravních Staveb v Brně*], which proposed a significant extension of the tramway network running through until 1970. Ostrava transport planner Karel Zmija was one of the advocates of trams. In comparisons of modes of public transport for Ostrava in the context of future urban development, buses and trolleybuses, because they shared the roads with private vehicles, were seen as neither stable nor attractive in the event of increases in car traffic. At that time, the prospect of a growth in private vehicle traffic was not ruled out, as was the case in the USSR, it being assumed, however, that its future expansion would result in a conflict of interests between private and public road transport (Zmija, 1967).

61 A wide range of public transport maps can be found in the Ostrava City Archive (*Archiv města Ostravy*).

This approach was in stark contrast to many of the proposals made in that period in other Communist countries, when a continuing presence of tramways was put in question, not only in central but even in peripheral areas[62] (Fig. 72 and 73).

Concerns about motor traffic congestion during the operation of collective public transport can also be noted in the discussions about Poruba's connections to the city. Poruba had a single access via the Gottwald axis, which also served to provide links to the centre, to the industrial area in Kunčice to the east, and residential zones in the south. Thus, the connection of Poruba by buses alone would increase the traffic along the Gottwald route (Zmija, 1967, p. 47), so that tramway services were the preferred choice.

Ostrava was one of the European cities where the separation of activities into zones was radical, avoiding any mixing of functions. The role of tramways in getting over the problem of distances between zoned and fragmented urban areas was recognized from the very beginning. Reliance on the retention and development of the tramway system meant that the idea of reorganizing city structures through a functional separation of urban areas was fully realised. Trams served both the consolidated city and its peripheral areas.

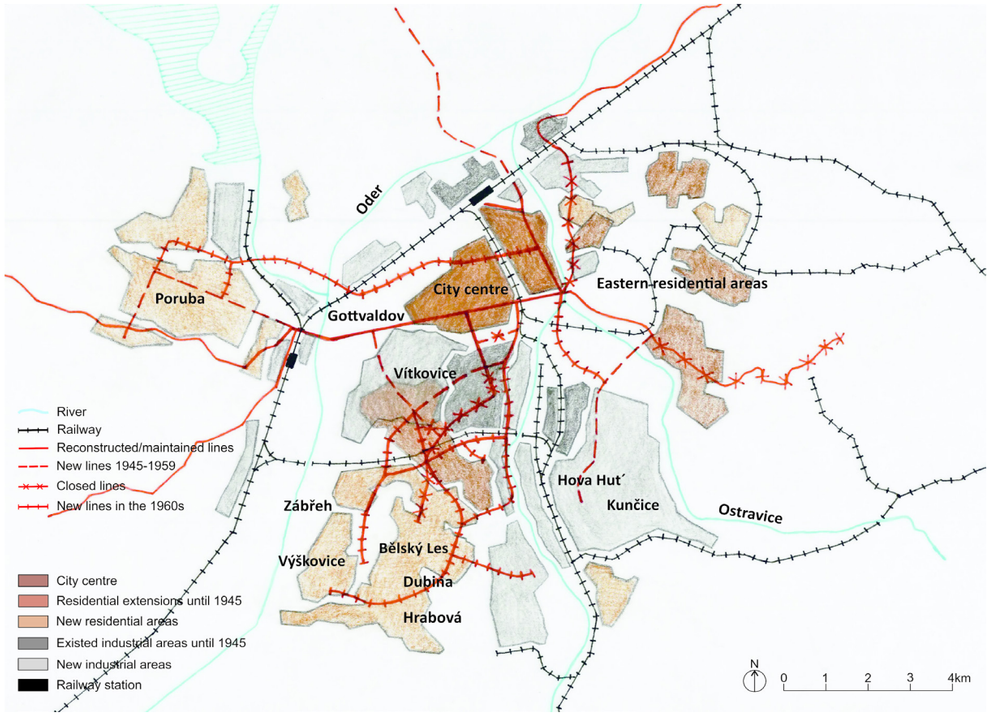


Fig. 71. Residential and industrial development in Ostrava in the 1950s and 1960s supported by the extension of tramway lines. Source: Author's elaboration based on urban and transport plans of the 1950s and 1960s.

62 One of the most widespread ideas in the USSR was "reasonable limitation" of the number of automobiles (Sovet Ministrov SSSR, 1960, p. 121, Cherepanov, 1964, p. 5), which implied that there should be no problems in the shared operation of the road infrastructure by automobiles and by buses and trolleybuses.

Fig. 72. Tatra T3 tram on the streets of Ostrava in the 1960s. Source: Dopravní Podnik Města Ostravy (1969) *U Divadla Zd. Nejedlého, k 70 výročí založení městké dopravy v Ostravé,* Ostrava: DPMO.

Fig. 73. Tramway in the urban centre in 1966. Source: https://transphoto.org/. Combining tram and pedestrian traffic.

Fig. 74. Tramway on the central street Lenina in 1957. Source: https://transphoto.org/.

Fig. 75. KTP-1 and KTP-2 trolleycars on Komsomolskaya Main Street in the mid-1960s before their replacement by trolleybuses. Source: State Archive of Orel region, 7081, *Ulica Komsomolskaya v seredine 60-kh*.

2.4.3. OREL. TRAMS FOR THE CENTRAL CITY AREA WITH URBAN EXTENSIONS SUPPORTED BY TROLLEYBUSES

Trams in the Russian city of Orel exemplify the solution of retaining the tramway system alongside the development of trolleybus infrastructures. A similar situation was also found in cities like Yaroslavl, Sumgait or Tula.

The city of Orel had a tramway from 1885 onwards, which underwent major developments in the 1920s and 1930s. However, the city's tram system was not a consolidated network, as it did not connect all urban areas. It consisted of four radial axes that came together at the riverside. In the post-war period, the city, which had been bombed, needed to rebuild its tramway lines. The reconstruction of the tramway system also marked the beginning of the period of its development in the 1950s. Its length was significantly extended, from 12.3 kilometres in 1944 to 26.8 kilometres in 1957 (Archive of the Orel region, 1959), as may be seen from Fig. 74. However, despite this rebuilding of a number of lines, the layout of the network was oriented in such a way as to limit its operation to the more central streets of the consolidated city. Thus, the line running along on Komsomolskaya Street, which connected with the industrial area, was not reconstructed and a new tramway was planned along Sacco-and-Vanzetti Street. In 1953 a plan was put forward for the system, which provided for the extension of lines and the development of new directions in the north-western part of the city, with no existing lines being eliminated.

From the beginning of the 1960s started the period of change of this policy. The location of the new steel rolling mill [*Staleprokatnii*] in Orel in 1961 implied urban population growth, with the 150.000 inhabitants of 1959 to increase to 230.000 (Orel Region State Archive, 1961). This necessitated a decision as to whether the tramway network should be extended and connected to the new residential areas, or whether a new mode of transport, such as the trolleybus, should be introduced. This period of decision coincided with the publication of a plan for the development of collective public transport in the cities of the Russian Soviet Federative Socialist Republic (RSFSR) for the period running from 1966 to 1975, in which a decision was announced that tramway expansion would be halted, with provision for intensive trolleybus development (GARF, 1967a).

In this period the focus was more on the issues of improving the quality and capacity of rolling stock than on the actual reconstruction of the tramway network (State archive of the Orel region, 1959). Despite this, the introduction of four-axle trams did not take place until the early 1970s, and two-axle trams had poor performance. In the 1960s the city operated trams of the KTM-1 model with a speed of 40 kph, and the KTM-2 with a maximum speed of 45 kph and capacity for 123 passengers, with eight per square metre, (GARF, 1959), as indicated in Fig. 75. Only in the early 1970s was the four-axle KTM-5M3 tram with doubled capacity introduced to the network (Tarkhov, 1998, p. 192). The production of new two-axle trams in the 1950s and 1960s was insufficient, even with old tramcars from the 1930s kept in use there was an absolute shortage. The rolling stock available was assigned by prior-

Fig. 76. The opening of new trolleybus line in 1972, the trolleybus triumph in the central part of Orel. Source: https://transphoto.org/.

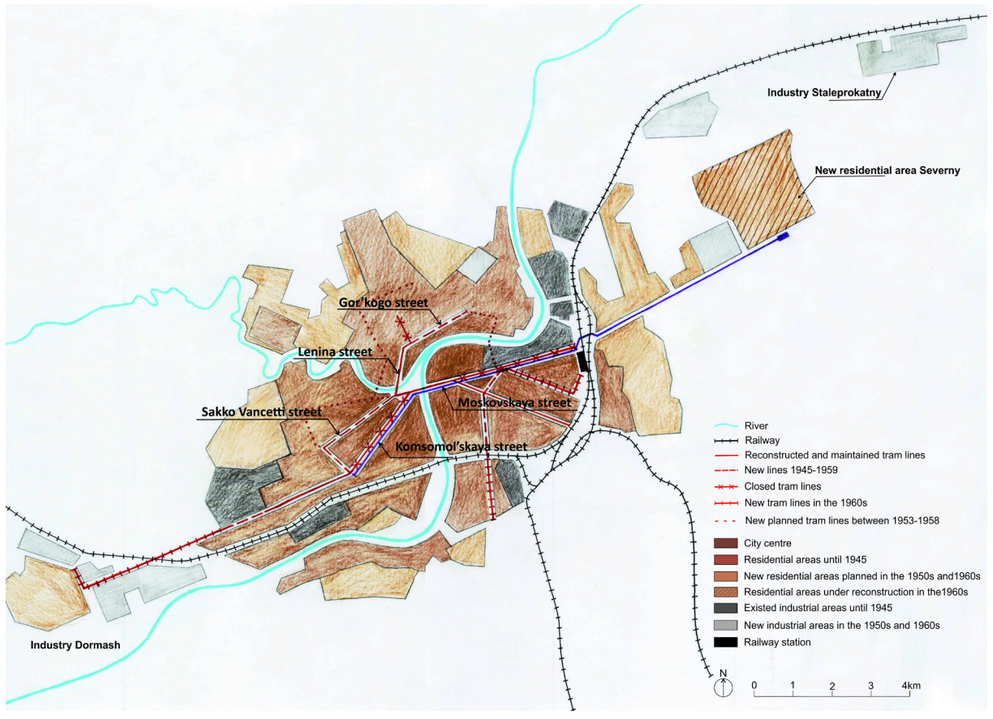


Fig. 77. Changes in the tramway system in Orel in the 1950s and 1960s. Source: Author's elaboration based on transport diagrams, urban plans and bibliography on city development.

ity to larger cities such as Moscow or Leningrad, and in middling cities such as Orel there was a resultant lack of tramcars,[63] which hindered both the operation of the system and future planning for its infrastructures.

Starting in 1968, the ZIU-5 model of trolleybus, with space for 122 passengers, began to compete with trams. However, plans for using trolleybuses emerged at the beginning of the decade, when a trolleybus garage and workshop were built in the new Severny residential area which had 70.000 inhabitants, near steel industry installations. At the end of the decade, after favourable technical development of these vehicles, this residential district was connected to the city via a new trolleybus line.

On the other hand, the idea of removing tram lines from the city centre was also adopted in Orel. The most prestigious streets, Komsomolskaya, Moskovskaya, Lenina and Gorkogo, where the principal administrative and cultural buildings were located, were to be freed of tramways, as this was seen as giving them a bad image (Fig. 76). In 1960, the City Council took the decision to remove the tram lines from the railway station square and from Moskovskaya Street, explaining this as a part of reconstruction works (Tarkhov, 1998, p. 177). Moreover, the proposal to eliminate trams from the city centre in order to relieve traffic congestion came in 1963 from the chief architect of the city, S. Fedorov (State archive of the Orel region, 1963). Consequently, in Moskovskaya Street the tramway was replaced by a trolleybus service with a changed route, but keeping the railway station as the terminus destination (Fig. 77).

The mass public transport project in Orel was not implemented until the end of the 1970s, this being explained by the smaller size of the city. In the USSR, cities with fewer than 250.000 inhabitants had no general public transport plans, and it was only in 1978 that the decree requiring such schemes for all cities was approved.

The tram lines were extended westwards and northwards in 1967 to connect to the new residential areas. No completely new tram lines were built and the existing residential zones in the south and east were connected to the trolleybus system. The tramway was retained in the consolidated core of city, but with the lines moved from main to secondary streets. There were several explanations for this. One was the old-fashioned look of trams as opposed to trolleybuses, which had a newer, more modern appearance in comparison.[64] Another was the limited functionality or poor social profitability of the tramway in Orel (GARF, 1967b). A third was the impossibility of modernization arising from a lack of State funding (GAE, 1963)

63 "To provide tram service on Pushkinskaya, Volodarskogo, Vokzal-Botanika lines there are 24-25 trams. This number of vehicles during peak hours is insufficient (...) To relieve the situation by using additional trams is not possible because of their shortage" (State archive of the Orel region, 1956, p. 101).

64 In 1968 the newspaper Orlovskaya Pravda published an article about the start of trolleybus operation, in which the modernity of the new means of transport is explained: "The first trolleybus goes from one stop to another. The passengers waiting for the bus don't understand what is happening. And then, excited, they enter a large, bright trolleybus hall and take comfortable seats" (Orlovskaya Pravda, 1968, 31 October).

Fig. 78. Tram and trolleybus in the centre of Simferopol in 1968. It can be seen that the tramway rolling stock was archaic compared to the new trolleybus. Source: https://visualhistory.livejournal.com/1313095.html.

Fig. 79. The dismantling of tram lines on Pobeda Avenue in 1971. Source: GUP RK Krymtrolebus, www. transphoto.org.

2.4.4. SIMFEROPOL. TRAMWAY NETWORK REPLACED BY TROLLEYBUSES

Instances of complete abandonment of the tramway system and its replacement by trolleybuses occurred in several Soviet cities of medium size. Examples were Kishinev, with 215.000 inhabitants in 1961, Chernovtsy, having 150.000 inhabitants in 1967, and Simferopol with a population of 247.000 in 1970.

Rebuilding of Simferopol's tramways started in 1944 and continued over the following years, with some lines being moved to parallel streets, an instance being the central Pushkina Street tramway that was moved to the parallel Kirova Street in the early 1950s. The city faced problems with the supply of rolling stock and material for track construction, with much of this being shipped from other cities (Kaliningrad, Sevastopol, and Leningrad) as they abandoned either complete tram systems or some lines. Almost no new lines were built. There was an intention to connect the Zavodskoi industrial area to the city in 1951, but this was not done because the Ministry of Finance of the RSFSR did not support it (Tarkhov, 1998, p. 109).

Between 1964 and 1966 there were plans to build new lines, approximately eleven kilometres in length (Tarkhov, 1998, p. 110), but these did not materialize because of the growing prominence of trolleybuses in that period. As a result, tram lines began to be replaced by trolleybus routes. In the period between 1966 and 1970, all four tramway lines in Simferopol disappeared and trolleybuses became the main means of urban public transport (Fig. 78, 79, 80).

Among the possible reasons for the elimination of the tramway system, several have been noted above. There was additionally the decrepitude of tram infrastructures and vehicles from wear and tear, together with the possibility of using the tram repair shops for trolleybus maintenance and operation (Tarkhov, 1998, p. 111).

Fig. 80. Sovetskaya Square in Simferopol in 1965. Source: photography by Tereshenko Valeri Sergeevich, www. transphoto.org. Exclusive trolleybus operation in the city centre.

The tramway functioned relatively well despite some internal problems, and despite its being felt to create congestion problems for road traffic. However, the network required major infrastructure investments, in particular to allow conversion from narrow gauge to standard gauge and modernization of the rolling stock. Under conditions of low population density (Sheshtokas, 1984, p. 9), and moderate urban growth, this was considered an uneconomical and irrational course to take.

2.4.5. CONCLUSIONS

A comparative analysis of European Communist countries' policies in this matter has scarcely been addressed hitherto but provides a crucial perspective (Feindt, 2018, p. 139). The analysis conducted here allows an understanding of the differences in transport policies in the USSR, the GDR and the CSR as an outcome of differing assessments of economic, technical and cultural issues relating to particular cities. The continuation and planning of tramway networks, as well as a grasp of conflicts, technical solutions and spatial priorities constitute a much more complex and diverse historical problem than has previously been thought. In the planning solutions, the influence of national and local conditions, logics and characteristics prevailed over the specific principles related to the ideology of the Communist regimes.

The ways of assessing the social profitability of tramway systems were different. The pre-existence of extensive infrastructure in the GDR and Czechoslovakia, as well as the presence of a specialized industry capable of producing rapid tramcars, made it possible to maintain and develop tramway networks in the cities of those countries. In the USSR, on the other hand, both the quality of the infrastructure and the level of development of the lines was relatively low. Furthermore, the production of rolling stock was a slow process in the USSR, which hindered improvements in the performance and speeds of tramway operations, and shifted the attention to cheaper and more modern means of transport, such as trolleybuses and buses.

The role of the tramway in general began to decline from the early 1960s with the strengthening of the policy of rationalization of urban traffic and the triumph of the ideas of Modern Movement in European Communist countries. The degree of acceptance of, or resistance to, Modernist ideas was also different. In general, in comparison to the GDR and Czechoslovakia, the USSR was more willing to adopt the ideas of Modern Movement. The urban planning logic in place there was more radical and eschewed continuity of inherited solutions. Tramways were seen as a functional tool that had to transport large flows of passengers, without greatly disturbing the road traffic. This explains the practices of eliminating trams in city centres, replacing them with trolleybuses and buses, moving lines to more secondary streets and the limited development of networks as a whole. There was a certain reluctance in the USSR to invest in tramways relative to the more industrialized European countries in its imperial orbit.

The case studies of middling cities bombed during the Second World War offered here show both similar and partly different logics in the solutions for tram network planning. The difference between Magdeburg and Orel lay in the degree of development of the tramway system. If in the case of Magdeburg, the network

did not expand, this did not imply that it was no longer a well-connected and established system. In the case of Orel, in contrast, the tramway network still needed to be developed and plans for connections to certain urban areas had still not been put into practice in the 1950s and 1960s. It seemed easier to maintain an existing tramway system than to build a new one. In Ostrava trams were strongly supported by the local government and planners, as they had a strategic importance in establishing effective connections between residential and industrial areas. Ostrava, like Orel, experienced urban growth in the 1960s, although the tramway decisions were different. Ostrava opted to develop trams, while Orel went for trolleybuses.

The differences between the three Communist countries remained strong and visible. The main issue separating these States was not just the existence of collective public transport, but the pace of its spread (Costa, Fernandes, 2012, p. 281), its distribution, and the intensity of its use, especially in areas where interests were in conflict. In the GDR and Czechoslovakia, trams retained their prominence, both because of their stable, reliable service and because there was an understanding of their advantages in terms of carrying capacity and of the possibility of increasing speeds through modernization. In the USSR, however, any updating of tramway systems was a dubious and unclear matter, firstly because of financial and technical difficulties, and secondly because of radical views on the modernity of urban transport and traffic in Soviet cities. This left its mark on the subsequent development of trams in these countries in the 1970s and 1980s. The CSR and the GDR were able to continue with the modernization and development of tramway systems, whilst in the USSR, this tended to be no more than a selective, one-off type of intervention.

2.4.6. BIBLIOGRAPHICAL REFERENCES

Anonymous (1961) Streit um die Strassenbahn in der Jakobstraße, *Volksstimme*, 8th of November.

Bauer, G. (1986) *Straßenbahn Archiv: Raum Cottbus, Magdeburg, Schwerin, Rostock*, Berlin: Verlag für Verkehrswesen.

Cherepanov, V. A. (1964) *Transport v Gradostroitelstve*, Moskva: Izdatelstvo Literatury po Stroitelstvu.

Costa, A., Fernandes, R. (2012) Urban Public Transport in Europe: Technology Diffusion and Market Organization, *Transportation Research Part A: Policy and Practice*, 46 (2), pp. 269-284.

Dopravní Podnik Města Ostravy, (1969) *U Divadla Zd. Nejedlého, k 70 výročí založení městké dopravy v Ostravé,* Ostrava: DPMO.

Federal German Archives, 183-GO613-0008-001, photography of U. Richter.

Feindt, G. (2012) Making and Unmaking Socialist Modernities: Seven Interventions into the Writing of Contemporary History on Central and Eastern Europe, in Lutz, R., Anselm, D.-M. (eds.), *Nach dem Boom: Perspektiven auf die Zeitgeschichte seit 1970*, Göttingen: Vandenhoeck & Ruprecht, pp. 133–154.

GAE (Gosudarstvennyi Archiv Ekonomiki), (1963) *Proekt Postanovleniia Soveta Ministrov SSSR ob Uluchshenii Obsluzhivaniia Naseleniia Gorodskim Transportom*, 5, 5, 69.

GARF (Gosudarstvennyi Arkhiv Rosiiskoi Federatsii) (1959) *Dokumenty po razrabotke, ispytaniiu i vnedreniiu novoi tekhniki*, Sovet Ministrov SSSR, A-314, 3, 4743.

GARF, (1967a) *Perepiska TK KPSS i Sovet Ministrov RSFSR po voprosam tramvaino-trolleibusnogo khoziaistva, vol. 3,* A - 314, 3, 8589.

GARF, (1967b) *Perepiska TK KPSS i Sovet Ministrov RSFSR po voprosam tramvaino-trolleibusnogo khoziaistva, vol. 4,* A - 314, 3, 8590.

Kaleschky, W. (1998) *Magdeburger Verkehrsanlagen*, Magdeburg: Stadtplanungsamt.

Magdeburger Verkehrsbetriebe (1977) *100 Jahre Magdeburger Straßenbahn*, Magdeburg: Magdeburger Verkehrsbetriebe.

Michalk, H. (1969) Einige Probleme der Generalbebauungsplanung in Magdeburg, in Deutsche Bauakademie (ed.), *Generalbebauungsplanung de Städte der DDR*, Berlin: Deutsche Bauinformation.

Municipal Archive of Magdeburg (1952) Plan Magdeburg und Umgebung, KS_I_277.

Municipal Archive of Magdeburg (1969) *Generalverkehrsplan Magdeburg*, Büro für Verkehrsplanung des Rates des Bezirkes Magdeburg, 46_02326, 6.

Sheshtokas, V. V. (1984) *Gorod i Transport*, Moskva: Transport.

Sovet Ministrov SSSR (1960) *Vsesoiuznoe soveshchanie po gradostroitelstvu*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu, arkhitekture i stroitelnym materialam.

Stadtplanungsamt Magdeburg (1998) *Städtebau in Magdeburg 1945-1990. Planungen und Dokumente,* Magdeburg: Landeshauptstadt Magdeburg, Büro für Öffentlichkeitsarbeit und Protokoll.

State Archive of Orel region (1956), *Spravka o Rabote Tramvaia v Gorode Orle*, P-15, 2, 41.

State Archive of Orel region (1959) *O Razmeshchenii v Plane Orla Stroitelstva na 1959–1965 gody*, P-2577, 1, 359.

State Archive of Orel region (1961) *Upravlenie Glavnogo Arkhitektora Goroda Orla*, P-2577, 1, 450.

State Archive of Orel region, 7081, *Ulitsa Komsomolskaia v seredine 60-kh*.

State Archive of Orel region (1963), *Zonalnoe Soveshchanie po Voprosam Perspektiv Razvitiia Goroda Orla,* 2577, 1, 457.

Tarkhov, S. (1998) *Istoriia Orlovskogo Tramvaia*, Orel, not published book.

Wolný, W. (1955) *Směrný Plán Města Ostravy: Doprava*, *(1958-1960)*, Archivo municipal de Ostrava (Archiv města Ostravy), Městský Národní Výbor Ostravy, 154.

Zarecor, K. E. (2013) Infrastructural Thinking: Urban Housing in Former Czechoslovakia from the Stalin Era to EU Accession, *Architecture Publications*, 9, pp. 57-78.

Zmija, K. (1967) *Reshenie Problemy Gorodskogo Transporta v Ostrave v Budushchie Gody*, International Conference about the Development of Urban and Suburban Transport in the period after the 1970, Praha: ČKD Praha.

Zmija, K. (1985) Doprava a Komunikace v Ostravě, in Bartoš, J., Dohnal, M. (eds.), *Ostrava: Sborník Příspěvků k dějinám a výstavbě města*, Ostrava: Profil.

Internet sources:

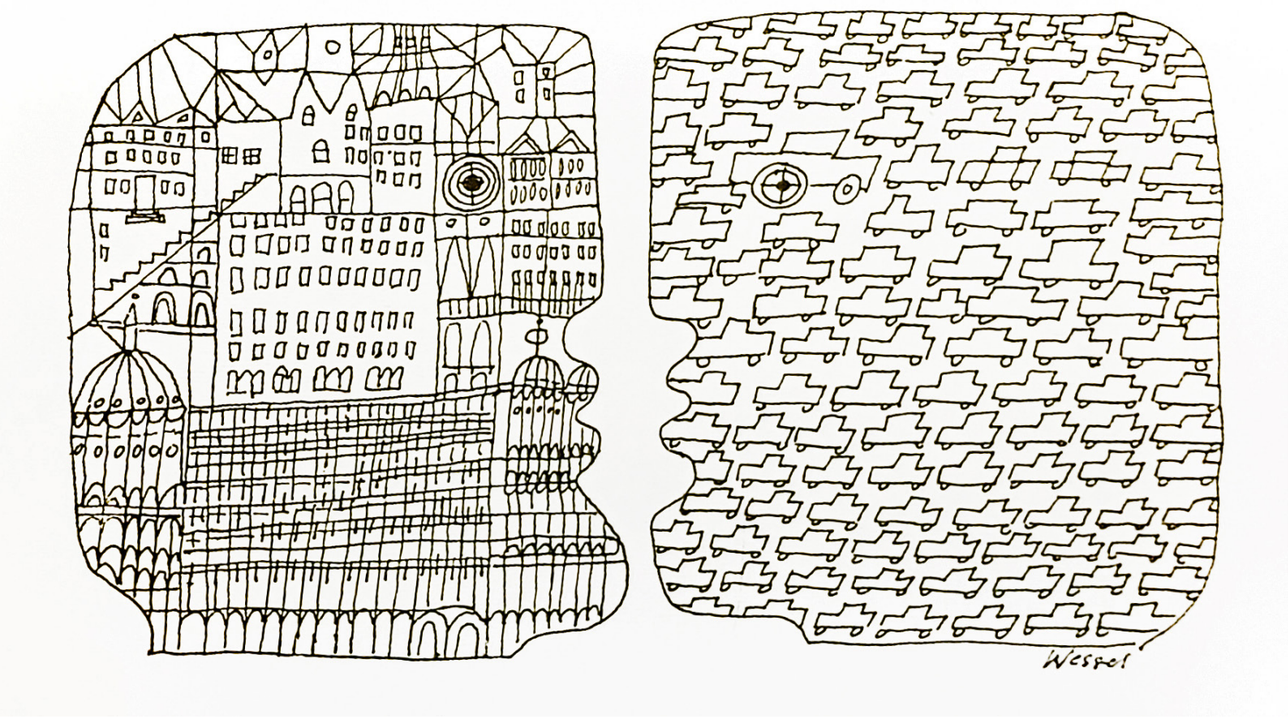
https://www.mdr.de/photography of Wolfgang Schmidt.

https://transphoto.org/.

https://visualhistory.livejournal.com/1313095.html.

https://transphoto.org/ Tereshenko Valeri Sergeevich.

https://transphoto.org/ GUP RK Krymtrolebus.



Source: Wessel, G. (1985) *Urbanitäten, Cartoons*, Berlin: Verlag Eulenspiegel, p. 69.

III. TRANSPORT AND THE CITY, 1964-1982: THE NEED TO INTEGRATE TOWN PLANNING WITH URBAN TRANSPORT PLANNING

Following the second chapter, dedicated to the relationship between transport and the city in the European socialist countries in the period 1945-1964, where urban reconstruction was marked by a tramway crisis. The aim of this third chapter is to address the period 1964-1982, which could be understood as a step from planning for functioning of city for automobiles to the necessary enhancement of the role of collective public transport. For this it is considered necessary to study the most important aspects of this change: political, professional and theoretical-technical, and those related to the exchange of ideas and internal criticism of the experience, which helped to advance theoretical-practical methods of collective public transport planning.

As the previous chapter studied the tramway system and its conflicts with road infrastructure planning in the context of the triumph of the Modern Movement, this chapter continues with the recognition of the problems of the principles of previous city planning, as well as the development of new objectives, criteria and planning methods based on the idea of integrated transport and city planning, which should resolve all kinds of economic, social and environmental problems.

It starts with a subchapter 3.1 dedicated to the context (political, economic and professional) of the emergence of the concept of integrated planning in communist and western countries. Next subchapter 3.2 is devoted to the study of institutes and the great scientific and technical work that began in the early 1970s. The concept of integrated planning and the development of public transport was developed in parallel also in the Western countries, which was proven by the international congresses. Subchapter 3.3 examines this exchange of technical knowledge between the West and the East. The European socialist countries were interested in these discussions which could helpconsequently to advance urban planning knowledge. Finally, subchapter 3.4 analyses the practical application of the abovementioned ideas, trying to understand their changes and evolution in general transport plans of the late 1960s and 1970s.

This structure of analysis is intended to address the change in transport planning principles in the city, with the strengthening of urban collective public transport, especially the tram system. Following this, the detailed study of tram planning principles and methods in socialist city planning developed in the 1970s can be better addressed, which is presented in chapter five.

Summary of the chapter III:

3.2. Paradigm Shift of Socialist Urban Planning in the 1970s. New Theoretical Approaches to Integrated Planning.

3.3. International Congresses on Urban and Transport Planning in the 1960s and 1970s. Advance and Interchange of Knowledge between European Capitalist and Communist Countries.

3.4. Integrated Planning Practice in the 1960s and 1970s. Case Studies: Dresden, Bratislava and Yaroslavl.

3.1. RAPID URBANIZATION AND PROBLEMS WITH PUBLIC TRANSPORT IN THE CONTEXT OF THE INTEGRATED OR COMPREHENSIVE PLANNING OF TRANSPORT AND CITY

In the 1960s, with the urban growth of socialist cities, what was then named the rationalization of the urban structure was no longer sufficient to solve the accessibility and growing movement of people. The integration between the disciplines of urbanism and transport planning was then the main response to the efficient use of existing resources to reach a satisfactory transport service for all cities. This was not a clear-cut decision, nor was it carried out quickly, but was gradually deployed throughout the 1960s in congresses, meetings, research, etc.

The first changes came in the wake of Brezhnev's rise to Soviet power and his policy of "complex rationalization" involving the reuse of resources to improve the national economy. In this policy, the main tool was the change in urban transport planning through several decrees between 1965 and 1969, on the planning or organization of the integrated operation of collective public transport and urbanism. In contemporary studies integrated planning of urban public transport and urban structure and form has been perceived as a well-developed and homogeneous phenomenon in communist European countries as it is often considered as a feature directly related to the centralized economy, political control and ideological concept of an integrated socialist city. However, despite the renewed centralized economy and the political decisions mentioned above, integration remained difficult to realize in socialist urban practice.

It was a long-standing aspiration of the communist regime. From the 1920s and 1930s, politicians and planners in the USSR developed the idea that the Soviet city should be a complex and well-integrated body. This goal was announced by the Central Executive Committee and the Council of People's Commissars of the USSR in 1933 (Kosenkova, 2000, p. 35). The integration of this urban structure was explained as a characteristic of the socialist city that did not exist in the capitalist city, but it had several advantages related to the quality of urban space and social integration. In short, integrated planning seemed to have a solid argumentative base and ideological objectives related to the transformation and control of society through the spatial organization of cities. With Stalin, this integrated organism was worked on through the creation of urban-architectural ensembles and representative streets and buildings. While during the Khrushchev era, with the beginning of the rationalization period, the integration of the urban structure began to have importance. In both cases, the physical implementation was much more important than the organization of the integrated planning process.

As mentioned by german traffic planner Hans-Dieter Künne (1996, p. 8), in the post-war period it was not possible to think about integrated planning, as urgent issues prevailed and methodological studies were lacking. Specialist training was insufficient, study institutes and research projects were underdeveloped and could not make a significant contribution to urban planning. Apart from this, the problem of the difficulty of understanding between the two disciplinary fields, as well as a lack of experience and normative basis for the implementation of integrated planning, also remained in the communist regimes. The understanding of integration was superficial, related rather to organizational issues in transport, and continuing with the dominance of zoning methods and preference for private motor traffic.

In the 1960s there was a process of change in thinking about city planning for car traffic that led to the strengthening of collective public transport. The solution to urban traffic problems was based on locational land use decisions to provide short and direct connections, and thus, order the flow of passenger traffic. Urban planning was adapted to sectoral decisions. Ideas were developed on rolling stock, zoning schemes, road infrastructure, urban traffic calculations and models, etc. With compact urban development, transport issues were resolved with car transport and bus service. However, when the time limit on travel times was reached due to urban growth, sectoral decisions could no longer provide an acceptable urban transport service. There was a need to think more broadly and openly, especially by including public transport planning in urban planning, something that was neglected for several decades.

The need for greater urban growth, increased travel times and the lack of resources for improving transport infrastructure and services led to the idea of better rationalisation of existing resources. Integrated planning was one of the important solutions to address this problem. The new State policy was related to this. The main objective was to spatially visualise the division of traffic on the urban plane, and not so much to think about the necessary integration between collective public transport and the city. This implied a detailed division of work between different means of collective public transport, as well as a compaction and concentration of the passenger traffic on the lines of rapid public transport that should be coordinated through integrated plans. Also, the inevitable use of an expensive system such as rapid public transport made it necessary to reflect on its characteristics in urban planning and structure.

All these complexities in initiating integrated urban public transport and city planning lead to several questions: How and why were integrated transport and city planning initiated? How was integrated planning interpreted among academics, politicians and planners in the context of communist and capitalist countries? And were there differences in the development of this phenomenon in the three communist countries, the GDR, the CSR and the USSR? The hypothesis of this subchapter is that the idea of integration between transport and city was a political decision of the communist regimes for a better rationalization of existing resources, which, however, had different interpretations and different levels of development in the debates of planners in the three countries. Apart from that, it is also assumed that integrated or comprehensive planning had more possibilities of developing in the context of the communist countries. Therefore, the main task of this sub-chapter is to give an account of the context of the emergence of integrated planning, an idea

that was much sought after in the European communist countries. And, the second objective, is to evaluate the understanding of this concept by communist or Western planners.

This subchapter is in turn organized into four sections after this introduction. The first explains the urbanization and the political-economic change that marked the need to change the methodology of urban transport planning. The second focuses on political decisions and legal documents that gave the impetus for integrated planning and for sectoral planning. The third opens the discussion on the first theoretical studies and the contradictions between the disciplines in the context of socialist urban planning. The last section compares this socialist context with Western debates.

3.1.1. RAPID URBANISATION AND POLITICAL-ECONOMIC CHANGE

The 1960s was a period of political and economic change in European communist countries. The new economic policy developed in the 1960s was geared towards finding solutions to the crisis in the centralized economy and increasing industrial production. Discussions started on possible reforms to improve the efficiency of the Soviet economy through "profit-oriented management" and elimination of deficiencies in some sectors such as engineering and technology with the application of scientific methods (Hanson, 2003, p. 91, p. 96). Despite starting these discussions during the Khrushchev period, no decisions were made on economic reforms in the country. Economic policy was initiated and developed during the first 4 years of Brezhnev's term (1964-1968) which also involved certain changes in urban planning. Though, in some communist countries economic reforms were developed before, for example in Poland (1953), in the GDR (1963), in Hungary and in the CSR (1968) (Hanson, 2003, p. 102).

Some reforms in the face of social and economic problems, with a certain liberation from political control in the context of de-Stalinization, resulted in several political reforms. The Soviet communist state interpreted them at one time as the result of the development of new ideas in economic reforms, to end up holding them back abruptly and violently. However, this policy was eventually perceived as a threat to the power of the communist state because it diminished political control over society. Therefore, this reform in the USSR only worked for a few years and did not develop further (Latov, 2015, p. 432). As a result, in the European communist countries, after the initial changes in some countries, state control was eventually strengthened by Soviet design. Thus, the unresolved economic problems returned to the previous solutions of centralized economy.

In this context, the main economic policy since the early 1970s was intensive development of industry, increasing propaganda and bypassing reforms (Karpenkova, 2016, p. 135). In the absence of reforms, the economic base continued to develop mainly in relation to the increase in heavy industry production and the extraction of natural resources. However, it should be noted that in the GDR and the CSR on the one hand, because they were not oil and gas producers, and on the other hand,

because they had a relatively sophisticated industrial base, a process of industrial and technological development was initiated, not forgetting medium and small industries.

Nevertheless, in both cases, the nature of city development remained similar. Both large industrial corporations and small industrial societies were concentrated in two or three urban areas. The formation of entire residential districts accompanied by small industry was rather an exceptional case, developed in the urban periphery as a pilot project. Thus, in the structural formation of the USSR cities, the role of large industrial zones remained very important in the late 1960s and 1970s. While industrial development in the GDR had different dynamics with the modernisation of existing industry (Heinzmann, Karrasch, 1990, p. 197) and with a period of transition in the 1970s to intensive production. Thus, in the CSR and the GDR a significant percentage (44% and 54% respectively) of the machinery was produced within European communist countries (Balassa, 1992, p. 5).

Despite the variety of ideas on the need for proximity between industry and residences, the idea of having small factories close to residential areas to reduce urban traffic did not take hold. Rather, residential areas were planned as close as possible to existing, sometimes very large, industrial zones linked to large corporations (Davidova, Gromenko, 2014a, p. 23).

The process of urbanization had different dynamics in the three socialist countries. However, in all cases urbanization was the result of strong industrialization, declining agricultural employment and rural-urban migration. In some cases, the less urbanized territories received special attention both because of the need to balance territorial development and because of the strategic decision to extract natural resources. This affected the policy of population distribution in the territory and the development of small and medium sized cities. For example, in the GDR, there was a significant population increase in cities of between 10.000 and 50.000 inhabitants (Musil, 1980, p. 101) because cities of this size were small.

The proportion of the urban population in the GDR increased from 67.7% in 1946 to 73.7% in 1970, while in the CSR it grew from 37.4% in 1946 to 48.3% in 1970 (Blazek, 1975, p. 29) and in the USSR from 39% in 1950 to 56% in 1970 (Musil, 1980, p. 46).

Migration processes and natural population growth were not as active in the GDR and the CSR as in the USSR. It was stressed at the time that in European communist countries the role of the industrial sector in urbanization was even less relevant than the role of the services and the context of readjustment of the primary sector (Musil, Link, 1975, p. 52). In the GDR and the CSR, the proportion of workers in industry remained around 47-50% throughout the 1960s, 1970s and 1980s, while the service sector grew and agricultural employment fell sharply. State policies in the primary sector were not effective, and their failure, for example, in the USSR, resulted in a policy of eliminating the villages considered as useless, up to 200.000 villages (Davidova, Gromenko, 2014b, p. 79).

On the other hand, the phenomenon of commuters appeared, which became significant due to the strengthening of the role of industry and the lack of residential supply in nearby urban areas. In the rural population most of them were engaged in non-agricultural activities, what Goldzamt called "the professionally urbanized population", reaching 43.6% in the CSR in 1971, while in the GDR almost half of the

rural population was employed in the industrial sector (1980, pp. 116-117). Therefore, in order to bring the population closer to work, one strategy was the construction of new residential areas on the outskirts of the cities, while another strategy was the construction of rapid transport infrastructure. Both solutions required "measuring well" decisions on the construction of new urban-suburban transport infrastructure. This was possible through integrated planning between transport and the city.

The level of urbanization in the three countries was different; the GDR and the CSR had a consolidated network of cities, while the USSR was in a period of rapid urbanization. Hence possibly the different concerns, especially in the initial period of integrated planning development. In the GDR, having a consolidated public transport infrastructure network, more attention was paid to modifying and integrating existing infrastructure. In the USSR and most of Slovakia there was a low level of integration between cities and villages (Musil, 1980, p. 46, 72), where the idea of integrated planning was accompanied by a difficult and costly process of forming transport infrastructure. This difference in the pre-existing transport infrastructure may have been fundamental in the formation of principles and methods of urban transport planning within communist countries, as well as in political decision-making.

Despite this, the three countries had common problems, such as the continuing development of heavy industry in cities and the continuation of rapid urbanization, the need for transport for workers in suburban areas and the construction of new residential areas, the maintenance of the idea of urban functionality in terms of travel times, especially for the workforce, and the rapid movement of traffic. However, these problems did not seem to involve the technological development of transport systems, but rather the intensified use of existing infrastructure and technological resources. Integrated planning was an important economic tool and therefore received political support from the communist state from the mid-1960s.

3.1.2. POLITICAL DECISION AS AN IMPETUS FOR INTEGRATION BETWEEN PUBLIC TRANSPORT AND TOWNS

The control of spatial order in cities was very important in the communist regimes as it provided functionality and productivity for the national economy. When order was broken, the principles and methods of urban planning had to be reconsidered. The urban spatial growth and the increase in the mobility of people and their travel times resulted in concern for politicians. The implementation of an expensive transport system, such as rapid public transport, needed to be assessed very carefully in terms of its application to urban planning. Therefore, integrated planning was considered by politicians as a scientific approach that could facilitate savings by calculating social returns and ultimately provide better targeting of public investments.

Urban planning in these dictatorships involved limited initiative from planners, so political decision making was very important in achieving legislative momentum. In Khrushchev's time this did not seem possible because he concentrated mainly on the most urgent issues such as the industrialization of construction and the

rationalization of the urban structure, and experimental projects and plans. With Brezhnev's coming to power, a more complex and deeper rationalization of work related to the scientific integration of various disciplines was initiated.

Political decisions on integrated planning were developed in the three countries concerned at a meeting of the Communist Party in 1966. The XXIII Congress of the Communist Party of the USSR took several decisions related to the development of urban transport: the provision of conditions for fast and safe circulation of automobiles, on the one hand, the provision of significant development of urban electric transport (Kollektiv avtorov, 1966, p. 351). The policy decision on the integration between urban transport and territorial development in the GDR was adopted also in VIIth Communist Party reunion in 1966. Walter Ulbricht stressed the importance of scientific methods and integration of urban transport planning (SED, 1967).

Problems with collective public transport existed before, but there was not the necessary political guidance to enable changes in city planning methods, i.e., a process as complex and new as integration between transport and city. On the other hand, this process could not start right away, because the theoretical basis, research and joint work between different departments was missing. Integration was considered an easy matter to achieve, mainly because of the belief that the centralized planning of the communist regime and the integration of planning objectives could resolve the integration process by itself.

In fact, a political decision was not enough, since it was necessary to organize joint work between urban planning, transport economics and traffic engineering, to understand the interrelation and factors between the two disciplines, and to develop the relationships between the different types of planning. Transport experts H. Saitz from Erfurt and K. Ackermann from Leipzig, for example, pointed out the problem of the lack of attention to collective public transport studies, which were "only based on studies of transport tickets and priority of relations between residence and industry" (2001, p. 64, p. 175). From this it can be noted that there was some continuity of planning with the previous methodology, where the allocation of passenger flows to functional areas predominated. There are several explanations for this, because the state in its political guidelines did not provide explanations on the principles and criteria of planning, that is, on the organization of integrated work. In addition, it was easier for planners to follow up on previous ideas. Due to the limited economic conditions, attempts were made to develop the most urgent issues for the economy first.

However, in order to facilitate integrated work, several provisions were adopted in the USSR. The first decree adopted by the Council of Ministers of the USSR was *O merakh po uluchscheniiu obsluzhivaniia naseleniia gorodskim passazhirskim transportom* [Measures for the improvement of urban passenger transport services], (26 December 1967, No. 1152). The decree was more related to the issues of organization and management of public transport functioning, such as production of rolling stock, introduction of new technologies, improvement of work of repair shops, provision of materials for construction automation of transport systems, and improvement of working regime of service personnel, etc. In this decree only point no.18 was dedicated to the issue of coordinated planning, which was short and not very suggestive, but opened the possibility for planners to realize the so-called "General schemes of collective public transport" [*Kompleksnaia transportnaia skhe-*

ma vsekh vidov gorodskogo passazhisrskogo transporta]. It should be noted that the integration of collective public transport schemes with urban plans was still an undefined issue:

> "To the Councils of Ministers of the Union Republics:
>
> - to consider the question of the formation of the executive committees of cities in which there are several types of urban passenger transport, departments of urban passenger transport, with the assignment of their responsibilities for the coordination of the work and the development of all types of urban passenger transport.
>
> - to develop, in coordination with the State Planning Committee of the USSR and to approve until 1970 for all cities with a population of more than 250.000, the complex schemes of development of all types of urban passenger transport, for a period of 10 - 15 years, with assignment of the first stage of works for 5 years and with definition for these years of volumes of engineering and transport constructions. The construction and reconstruction of urban passenger transport facilities in these cities had to be carried out in strict accordance with the approved plans"[1] (USSR Council of Ministers, 1967).

From this text it can be concluded that the main concern was the organisation and operation of public transport systems, and not as much the definition of integrated planning principles. It was only the beginning.

After this decree two guideline documents were published at the end of the 1960s in the USSR that developed the idea of general plans of urban public transport. The aim of these two documents was to facilitate the joint work of planners and provide the principles and guidelines for integrated planning. The first document was *Metodicheskie ukazaniia po proektirovaniiu setei obshestvennogo transporta, ulits i dorog.* [Methodological guidelines for the planning of mass public transport networks, roads and streets] published in 1968 by the USSR Institute of Urban Research and Planning, where the first attempt was made to explain the content and steps of the realisation of general urban transport plans for cities with more than 250.000 inhabitants. The complex planning of urban transport consisted of three plans: 1. preliminary urban transport plan, which was intended to serve as a basis for transport calculations and for urban structure planning, involving joint work between transport operators and architects (TSNIIP, 1968, p. 13). 2. Transport scheme at the general urban plan stage for 25-30 years. 3. First phase of transport development for 10 years.[2]

1 "Советам Министров союзных республик:

- рассмотреть вопрос об образовании в составе горисполкомов в городах, где имеется несколько видов пассажирского транспорта, отделов городского пассажирского транспорта, с возложением на них обязанностей по координации работы и развитию всех видов городского пассажирского транспорта;

- разработать и по согласованию с Госпланом СССР утвердить до 1970 года для всех городов с населением более 250 тыс. жителей на расчетный срок комплексные схемы развития всех видов городского пассажирского транспорта на 10 - 15 лет, с выделением первой очереди работ на 5 лет и с определением на эти годы объемов работ по строительству инженерных и дорожно-транспортных сооружений. Строительство и реконструкцию сооружений городского пассажирского транспорта в этих городах производить в строгом соответствии с утвержденными схемами."

3.1.3. NECESSARY INTEGRATION AND SECTORIALITY: THE THEORETICAL DEBATES AMONG PLANNERS OF THE COMMUNIST EUROPEAN COUNTRIES IN THE 1960S

The theoretical discussion between transport planners and architects in the USSR, the CSR and the GDR during the 1960s was full of contradictions, variations and uncertainties. This was due to sectoral views in both disciplines, with little understanding between transport specialists and urban planners, as well as contradictions in the objectives set by politicians. On the one hand, there was a need for integration between transport and urban plans, on the other hand, there was the growing importance of transport issues and the decision for a separate transport plan. The organisation of a joint project between planners was not an easy issue to solve. Probably because it was still the initial period and competitive ideas prevailed among specialists with little desire to work together. Also, each discipline focused more on the solution of its urgent problems, such as, in urban planning, the development of new proposals for urban development, or the organization of coordinated operation between various means of transport. Nevertheless, after the theoretical discussions it was possible to arrive at the notion of the importance and necessity of integrated planning.

In the USSR integrated planning was not the subject of debate until the late 1960s. Instead, great effort was made to define a Soviet planning theory in the first major monographic work *Principy Sovetskogo Gradostroitelstva*. [Principles of Soviet Urbanism] in four volumes, which was developed by the USSR's Central Institute for Urban Research and Planning between 1966 and 1969. A chapter of this work was devoted to *Gorodskoe Dvizhenie i Transport.* [Urban Traffic and Transport] The idea of integrated planning emphasized the improvement of the urban structure based on the close proximity of work and living areas (TSNIIP, 1966, p. 314). In this project, however, they continued with the ideas of zoning, without developing anything related to integrated planning. Their main focus was on technical development, the configuration of rapid public transport networks and the configuration of city plans. Among the ideas on the consideration of transport and city planning, only the idea of avoiding closed configurations of rapid public transport lines in the direction of urban development can be highlighted (TSNIIP, 1966, pp. 366-367). Nor was anything explained about the interactions between urban structure and form with collective public transport planning.

The fundamental Soviet work on urban planning theory continued with the ideas as outlined by the 1960 Congress on Urbanism. Priority was given to formal issues, such as the optimal location of functions or the possibility of a direct connection, as well as to the development of collective public transport speeds and the optimal configuration of its lines in relation to urban form and structure. The rationalis-

2 See Gosplan SSSR (1969) Ukazaniia po razrabotke kompleksnykh skhem razvitiia gorodskogo passazhirskogo transporta dlia gorodov s naseleniem 250.000 i bolee.

tic principles and methods developed since the mid-1950s had to be defined and summarised. Thus, the urban planners of the USSR focused on the need to improve the urban structure: the creation of an ideal urban model and structure in terms of distances between functional areas to provide "short and comfortable transport relations" (Polyakov, 1964, p. 178).

On the other hand, most transport planners in the USSR followed a sectoral view in their theoretical publications, being concerned with the planning of urban transport systems and their coordination for "the discovery of hidden reserves" (Cherepanov, 1964; Polyakov, 1967, 1967; Stramentov, Fishelson, 1964, Komarov, 1966). The role of collective public transport planning and its integration with the city was weak, based mainly on zoning and technological solutions for the organization and management of urban traffic (signal control, electronic applications).[3]

Despite this, there was also an approach to the influence of rapid public transport planning on the urban structure, which was carried out by transport expert O. K. Kudryavtsev (1963). His idea was based on the consideration of traffic characteristics such as speed, capacity and topology in urban restructuring. However, his proposals related exclusively to theoretical/mathematical structures that were not adapted to the conditions of existing cities. The other major transport expert, Kominarov (1966, p. 21), stressed the lack of theoretical work related to coordination between different urban transport modes. The importance of the general urban traffic plan was emphasized, which should be related to the urban plan. Moreover, the issues of urban planning and organization of road and pedestrian traffic had to be considered in a coordinated manner (Stramentov, Fishelson, 1964, p. 20).

In general, it seems that among the Soviet planners there were no internal contradictions. The organization of the planning process was not the concern in the USSR until the late 1960s. Rather, theoretical disquisitions were devoted to the spatial integration of transport infrastructure and land use. The general transport plan was seen as the solution for a coordinated operation of the urban transport system.

However, after the government's political decision, these ideas began to be reconsidered. An attempt was made to bring order to the urban planning process by introducing the preliminary plan that should provide for the integration of objectives and solutions between city and transport. The main problem was the incomplete and later development of transport solutions in the urban plan, which later led to the disintegration between transport and city (TSNIIP, 1968, p. 11). To solve this situation, developing a preliminary transport and traffic plan which should be developed together with the urban plan and later serve for the implementation of the general transport plan was proposed. In this preliminary transport plan, transport engineers and architects should work together while carrying out the urban composition (TSNIIP, 1968, p. 13), (Fig. 81)

In comparison with the USSR, in CSR during the 1960s, there were intensive discussions on integrated planning. First, transport specialists in their discussions tried to resolve the issues of transport system operation, with coordination between different means of collective public transport and its relation to road traffic (Jansa, 1967; Plicka, Vandas, 1965b; Kousal, 1965; Smykal, 1965). The study formed by the Ministry of Transport of the CSR in 1967 *Koncepce rozvoje mestke hromadne dopravy do roku 1980* [The concepts of development of collective public transport until the 1980s] exposed the need for integration between collective public transport and the city, emphasizing the issues of coordination between private transport and public transport, as well as between urban and suburban public transport. However, the main objective was to define the economic and technical issue of selecting appropriate means of transport and developing various public transport systems, rather than their integration with urban planning.

3 See Davidovich, V. G. (1968) *Rasselenie v gorodakh*, Moskva: Mysl, [Settlement in cities] which was dedicated to rational location of labor and residential áreas, with the adaptation of transport decisions to these locational decisions. From this, it could be noted that from the late of the 1960s in the USSR continued with the priority of zoning, while transport planning was not considered in urban planning.

J. Hrůza in his work *Teorie města* [Town Planning Theory] announced a new type of city, the "city of rapid public transport roads" (1965, p. 238). He stressed the importance of integration between collective public transport planning and urban planning, and the need to address rapid public transport needs in urban structure and organisation. In this regard, Hrůza had an advanced and well-defined idea of the influences of transport on urban structure, density and the structuring of cities and their spatial relations. Later, among the few city planners who analyzed integrated planning in the 1970s, Hrůza recognized early on, in comparison with other city planners, the importance of considering transport system characteristics:

> *"The organization of transport work and the type of transport influences the formation of the entire urban settlement structure. The solution of transport problems is achieved through the organization of urban structure" (Hrůza, 1965, p. 238).*

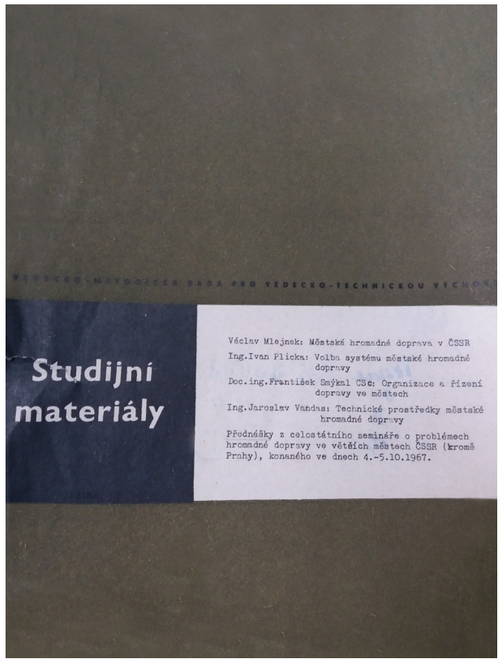
However, the organization of joint work between city planners and transport specialists was also discussed. Thus, architect E. Hruška in *Problémy súčasného urbanizmu* [Problems of Contemporary Urbanism] emphasized the importance of architects in final decisions (Fig. 82):

> *"Transport and its measures should not outgrow and exceed the creative concept of planners and urban planners. A transport planner cannot create an urban transport network and bring it into line with other needs of public life, nor can urban planning solve all the complex problems of urban transport, where the main role belongs to the bearer of the urban concept"*[4] *(Hruška, 1966, p. 215).*

On the other hand, transport specialists stressed the importance of transport planning in urban planning. For example, V. Mlejnek stressed that transport issues were not sufficiently considered in urban plans (Ministry of Transport of the CSR, 1967), (Fig. 83):

> *"The construction and development of the existing transport network was generally based on the actual needs and requirements in certain areas of urban settlements without considering their functional role, their long-term development and connection to the city centre. In all major cities, the gradual development of traffic planning plans has been carried out within the*

4 "Doprava a jej opatrenia nesmú prerastať a nadraďovať sa nad tvorivý koncept plánovateľa a urbanistu (...) Nie je možné, aby dopravár zostavil dopravnú sieť mesta a aby ju urbanista stvárňoval a zosúladil s ostatnými potrebami spoločenského života, ani nie je prakticky možné, aby urbanista sám rozriešil všetky zložité problémy mestskej dopravy. Územné plánovanie je úlohou kolektívnou — team-work — kde vedúcu úlohu má nositeľ urbanistického konceptu."



Left, Fig. 81. The cover of Methodological guides on the planning of public transport networks, roads and streets [Metodicheskie ukazaniia po proektirovaniiu setei obshestvennogo transporta, ulits i dorog], TSNIIP Gradostroitelstva, 1968. The first manual that proposed an order of realisation of urban plans and transport plans.

Right, Fig. 83. The cover of the publication *Městská hromadná doprava v ČSSR* [Collective public transport in CSR], edited in 1967 by the Ministry of Transport of the CSR, *Prednášky z celostátního semináře o problémech hromadné dopravy ve větších městech ČSSR (kromě Prahy)*. It highlighted the importance of transport planning within urban plans by transport specialists.

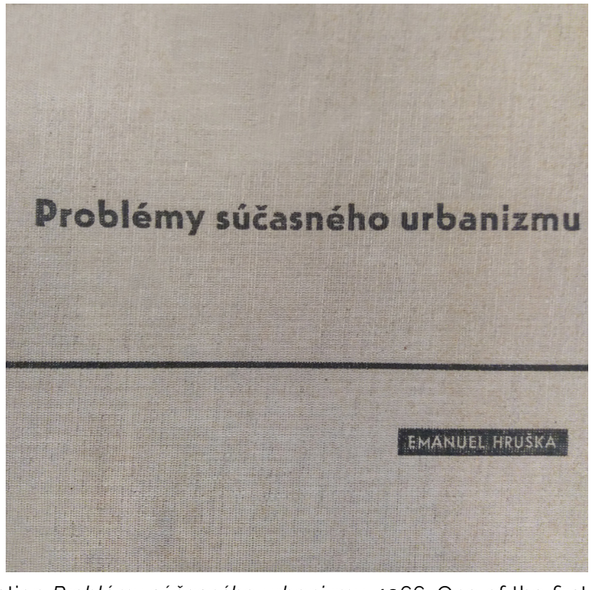


Fig. 82. The cover of E. Hruška's publication *Problémy súčasného urbanizmu*, 1966. One of the first publications to address the order and roles of transport planners and urban planners in the CSR.

> *framework of indicative land use plans, which are gradually replacing simple traffic surveys. However, it would be a mistake to assume that this development of transport solutions adequately solves transport problems"*[5] *(Mlejnek, 1967, p. 5).*

From this it can be seen that there was a disagreement between urban planners and transport planners in the division of functions, in the organization of the planning process and the solutions of interrelations between both disciplines. Some transport specialists, such as Ivan Vlček, insisted on the important influence of transport planning on urban growth and its long-term effect and its intimate interrelationship with urban planning: "(...) it is sometimes difficult to determine which factor is more important, whether the growth of a place or part of a locality, or the improvement of transport routes and service"[6] (Vlček, 1965, p. 23). In general, the studies in the CSR noted that there was an understanding that urban public transport should be involved in land use planning (Plicka, Vandas, 1965b, p. 41), pointing out the importance of the functional role of collective public transport and the role in the long-term development of cities. These ideas were not without academic disquisitions in different conferences dedicated to the determination of future concepts of collective public transport in the cities of the CSR.[7]

The transport experts from the GDR had similar discussions as those from the CSR and the USSR. The emphasis was on the development of coordinated urban transport plans (Krüger, Richter, Stuhr, 1962). The 1960s can be considered as a period of practical or operational transport development and a period of sectoral decisions in the area of transport planning based only on traffic engineering principles (Hensher, 1979, p. 97). Therefore, although there was a discussion about the need for integrated planning, no one had a good understanding of what it was. For example, W. Weigel in his 1962 work, spoke about integrated planning between public transport and city, Modern Movements ideas on city for automobile circulation also maintained their importance. Meanwhile, collective public transport continued to have a very limited relationship with urban structure. The factors considered were city size, travel time and the direction of city growth, which in the end were related more to urban form than to urban structure. On the other hand, Weigel emphasized the need for joint work between city planners and experts in traffic engineering and transport economics, in order to establish common objectives in city planning, which was a novel issue in the context of sectoral planning in the early 1960s.

5 "Výstavba a rozvoj stávající dopravní sítě vycházel zpravidla z okamžitých nároků a požadavků v dílčích oblastech městského osídlení bez přihlédnutí k funkční úloze i jejich delšímu rozvoji a návaznosti" na městské centrum. Z toho důvodu bylo přikročeno ve^všech větších městech k postupnému zpracování dopravních generelů jako součásti směrných územních plánů, jež postupně nahrazují nekomplexní dopravní studie. Bylo by však omylem domnívat se, že. zpracováním dopravních řešení je otázka vhodné dopravy vyřešena."

6 "(...) nelze pak někdy ani dobře určit, který z faktorů je primárnější, zda růst sídla, popřípadě části sídla, nebo zdokonalení dopravních cest a zkvalitňování dopravní obsluhy".

7 Between 1964 and 1967 there were organised various conferences in the CSR dedicated to the problems of public urban transport organised by *Československá vědecko-technická společnost* (Chechoslovac Association of Science and Technology) where transport planners realized several approaches in the selection of collective public transport means, in the analysis of the state of urban public transport in the cities, and on the basis of it make the proposals on the future development of the public transport systems. See *Konferencia O Dôsledkoch Rozvoja Dopravy Na Vývoj Miest v ČSSR* (Praha, 1962), *Zásady řešení městské hromadné dopravy* (Praha, 1964*), Vývoj osobní dopravy v ČSSR* (Praga, 1965), *Nové Metody odbavování cestujících v městské hromadné doprav* (Praha, 1965), *Současní Problémy Řešení Dopravy v Mestech* (Praha, 1967).

However, since the mid-1960s, integrated planning has become important not only in the theoretical debate but also in legal regulations. In 1966, the first work *Stadtischer Verkehr* [Urban Transport] by the Department for Urban Transport () of the GDR Ministry of Transport was published (Fig. 84), *Grundsätze für die Entwicklung des Verkehrs in den Stadten der DDR*. [Principles for transport development in the GDR cities] the first principles of transport planning, developed together with the Ministry of Construction. The aim was to develop urban transport networks and to relate them "organically" to the development of urban and metropolitan territory (1966, p. 4).[8] In this work the importance of integration was recognized:

> *"It is intended that the principles should have an active influence on the main direction of transport development, and that transport should also have a significant interaction with territorial, economic and urban planning development"*[9] *(Ministry of Transport of the GDR, 1966, p. 2).*

The other document developed by the Ministry of Transport on the need for coordination of land use with the collective public transport system was *Basisstruktur der Verkehrsanlagen, Dresden, Leipzig, Rostock und Magdeburg*. [Basic structure of transport facilities Dresden, Leipzig, Rostock und Magdeburg] 1968, report of the Central Working Group for Research and Technology, Ministry of Transport of the GDR. The main conclusion of this document was (1968, p. 5):

> *"The design of a successful transport system requires a traffic-oriented development of the urban structure based on a reasonable framework. The effect of traffic does not only refer to urban issues but has to be present at a much earlier point in time when the fundamental decision on the location and extent of the new areas is initiated."*[10]

It can be seen from this that in the GDR special importance was attached to integration as a simultaneous planning process between urban plan and transport plan, as well as to the interaction between transport and city needs and possibilities. However, this idea was still weak and not widely accepted throughout the country. At the seminar *Verkehr und Städtebau* [Transport and Urban Planning] organized by *Hochschule für Architektur und Bauwesen Weimar* [Weimar University of Architecture and Civil Engineering], in 1966 between 15 and 17 June (Fig. 85), there was a certain variety of study topics, such as pedestrian traffic, parking, roads, water and air transport, minus the planning of collective public transport. The idea of integration continued to reside in the relationship between traffic/transport and functions/activities. In general, the work concentrated on the analysis of the state of private and public transport in the GDR cities between 1950 and 1967. The importance of urban planning in public transport solutions continued to prevail in the

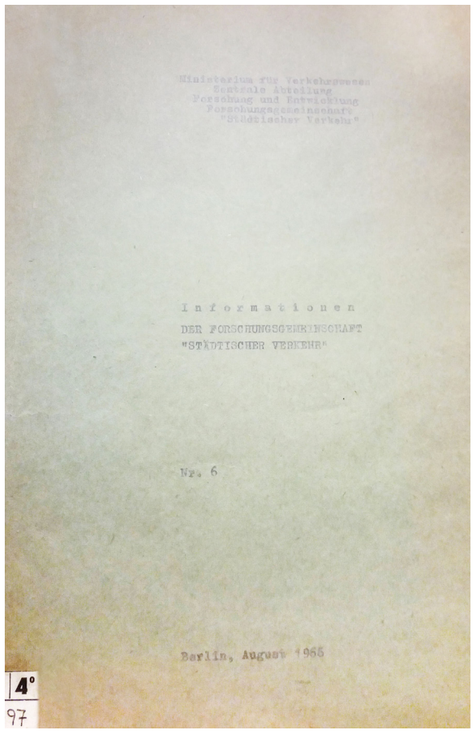
8 The idea about the importance of evitation of partial and local en urban public transport planning and its organic development with urban planning were also expressed in UITP congressos in 1965.

9 "Die Grundsätze haben eine aktive Einflußnahme auf die Grundrichtung der verkehrlichen Entwicklung zum Ziel, wobei der Verkehr auch in sinnvoller Wechselwirkung Einfluß auf die territorial-ökonomische Entwicklung und den Städtebau nehmen muß."

10 "Die gestaltung eines funktionierenden verkehrssystems erfordert eine auf den verkehr in einem vernunftigen rahmen abgestellte entwicklung der stadtstruktur. Die wirkung des verkehrs bezieht sich dabei keinesfalls nur auf stadtebauliche fragen, sondern muss zu einem wesentlich fruheren zeitpunkt nämlich bei der herbeifuhrung der grundsatzentscheidung uber lage und umfang der neuen gebiete vorliegen."

discussions. However, the raising of these questions created a good basis for differentiating between road and tram infrastructure. This can be seen in the discussions where the importance of priority provision for the development of public transport speeds with high passenger capacity was highlighted.

As can be seen from these discussions, there was no clear understanding of how public transport and the city should be integrated. The theoretical discussions between the communist countries were also not homogeneous. It can be noted that compared to the GDR and the CSR, in the USSR the discussions were more sectorial in nature between traffic engineers and urban planners. This view changed mainly with the important political arrangement in the mid-1960s. Although in the disquisitions of that time the need for classification of road infrastructure and adequate distribution of functional areas was still stressed, the need for integrated planning was mentioned. Although it was clear that collective public transport planning was considered important, its role and implications on urban structure and planning were still weak. In addition, the proposal for joint work between planners and coordination of transport and urban plans was insufficient.



Left, Fig. 84. Cover of the publication of the Ministry of Transport of the GDR, *Städtischer Verkehr* [Urban Transport], 1966. One of the first official publications in the GDR devoted to the subject of the interaction between transport and city.

Right, Fig. 85. Cover of the proceedings of the *Städtebauseminar* [Seminar on Urban Planning] held by the School of Architecture and Construction in Weimar, [*Institut für Gebietsplanung und Städtebau der Hochschule für Architektur und Bauwesen Weimar*], 1966. The objective was to discuss several urgent and short-term issues on urban transport.

Although it seemed that the Soviet state had all the conditions for the implementation of integrated planning, it was much more complex than one might think. As Horst Siegel, the architect of the city of Leipzig, noted:

> *"This complex planning of a city must be based on the structural policy of our national economy as well as on social forecasting and summarize the general development plan, the general traffic plan, as well as the plan for the development of the construction industry as a unit. At this stage, the fundamental issues should also be discussed with all the planners involved"*[11] *(Siegel, 1969, p. 55).*

Since the mid-1960s it has been understood that in order to provide effective and efficient urban development, integrated planning between transport and the city must be provided. The theoretical discussions among planners served to form a more coherent idea of the objectives, principles and needs of integrated planning. However, these difficulties and concerns were not only relevant to socialist urban planning, capitalist countries also aspired to integrated or comprehensive planning.

3.1.4. THE DIFFICULTIES OF INTEGRATED PLANNING IN THE DEVELOPED CAPITALIST WORLD: GERMAN FEDERAL REPUBLIC, UNITED KINGDOM, UNITED STATES

In capitalist countries the advantages of separating the transport plan from the urban plan lay in the possibility of avoiding overlapping or contradictory solutions and rationalization of investments. The differentiation of general transport plans made the idea of integration of transport and urban planning difficult. Several Western planners stressed the contradictory nature of transport planning and integrated or comprehensive planning (Hall, 1973, Gareth, 1973). There was a clear understanding that this separation reduced overall efficiency and produced negative environmental effects (Gareth, 1973, p. 417). The difficulties were similar to those of the European socialist countries, with multiple departments, a separate planning culture, the difficulty of creating interprofessional groups and the integrated evaluation of sectoral plans. Integrated planning had a similar meaning to that of the communist countries and was based on "consistent values and reflects a fundamental agreement between all parties involved in the production of the plan" (Friedmann, 1971, pp. 315-316).

The theorization of integrated planning was also poorly defined. Sometimes the concept of comprehensive planning was applied as a political tool to shield public expenditures. Something similar happened in communist countries, when in the 1960s integrated planning was the subject of propaganda (Saitz, 2001), to demonstrate the strength of the communist state and the provision of social welfare in cities. However, despite having common elements, the communist countries presented more possibilities for integrated planning. Among other conditions, it was easier to reach common goals and to provide public land, apart from the absence of interventions by private interests.

11 "Solche komplexen Planungen einer Stadt müssen auf der Strukturpolitik unserer Volkswirtschaft sowie der Gesellschaftsprognose aufbauen und den Generalbebauungsplan, den Generalverkehrsplan sowie den Plan zur Entwicklung des Bauwesens als Einheit zusammenfassen. In dieser Phase müssen auch die Grundsatzfragen mit allen Partnern ausdiskutiert werden."

In the Federal Republic of Germany, integrated planning between transport and urbanism was an important issue. West Germany can be considered one of the first countries to advocate the need for comprehensive transport plans for cities as a way of integrating transport with urban planning. In 1961 at the UITP congress in Copenhagen, the West German traffic engineer F. Lehrer proposed the need for transport master plans. Lehrer explained the general transport plan as a comprehensive plan where all urban and suburban transport systems are planned, which should be developed in parallel with the urban plan and based on consultations between transport and urban planners. One of Lehrer's key phrases in his report was

> *"Only through cooperation between urban and traffic planning can the close relations between urban development and traffic be controlled in the sense of an optimal solution for the entire urban body"*[12] *(Lehrer, 1961, p. 67).*

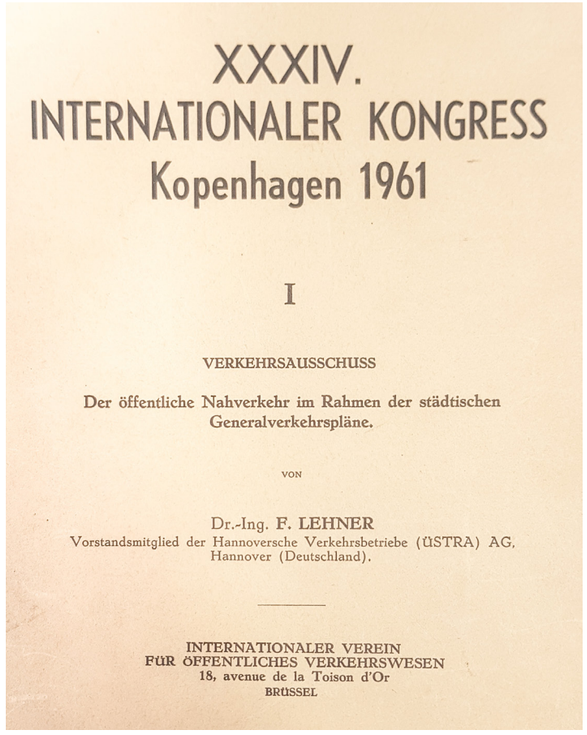
It is important to stress that the main task of the overall transport plan, according to Lehrer (1961, p. 68), was to find a balanced ratio between car and rail traffic, between private and public transport (Fig. 86).

The transport planner Leibbrand, in his 1964 book, also mentioned the need for a comprehensive urban plan which should integrate both collective public transport and private transport issues. Leibbrand was one of the proponents of "transport planning science", making it equivalent to urban planning (Diefendorf, 2014, p. 37). The differences and competition between transport engineers and urban planners were not continuous, and in a few years a certain degree of joint work could be established between them.

Integrated planning in Germany had its own interpretation. One peculiar idea was the adaptability of transport to urban issues and the adaptability of urban planning to transport needs, which was called "balanced planning", (Leibbrand, 1964, p. 89). Peter Hall (1981) also highlighted the German differential interpretation of Buchanan's ideas, where the integration between public rail transport and urban planning was a major issue in order to address the problem of traffic congestion and to provide the quality of urban environment. The attempt to organise public rail/road transport and motorised transport traffic was one of the main motivations for the development of general transport plans in the FRG.

Studies of general transport plans (with the inclusion of collective public transport) began in the mid-1950s. Later, in the early 1960s, the issues of pedestrian traffic and parking were included. Before that, transport plans were not used for systematic analysis-diagnosis (Künne, 1996, p. 18). Barbara Schmucki, in her comparison of the experiences of the FRG and the GDR, stressed the similarity of the idea of general transport plans (Schmucki, 2001, p. 151). It seems that the implementation of the general transport plans was conditioned by the importance of the application of scientific methods. Through the general transport plan the possibility of organising the operation of public and private transport was considered, as well

12 "Nur durch die Zusammenarbeit zwischen Stadtplanung und Verkehrsplanung können die engen Wechselbeziehungen, die zwischen Städtebau und Verkehr bestehen, im Sinne einer optimalen Lösung für den gesamten Stadtorganismus gesteuert werden."


XXXIV.
INTERNATIONALER KONGRESS
Kopenhagen 1961

I

VERKEHRSAUSSCHUSS

Der öffentliche Nahverkehr im Rahmen der städtischen Generalverkehrspläne.

VON

Dr.-Ing. F. LEHNER
Vorstandsmitglied der Hannoversche Verkehrsbetriebe (ÜSTRA) AG, Hannover (Deutschland).

INTERNATIONALER VEREIN
FÜR ÖFFENTLICHES VERKEHRSWESEN
18, avenue de la Toison d'Or
BRÜSSEL

Fig. 86. Cover of the F. Lehrer's report *Der öffentliche Nahverkehr im Rahmen der städtischen Generalverkehrspläne*, [Public transport within the framework of the urban general transport plans] presented in the UITP Congress in Copenhagen, 1961.

as providing for the future integrated development of the entire urban transport system. The consideration of transport planning as a science then seemed necessary in order to effectively deal with traffic congestion.

The need felt for general transport plans was also enhanced by the importance of the coordinated operation of all modes of transport, especially the coordination of the operation of rail transport in the city and in the metropolitan area. The cooperation of public transport companies at the metropolitan level was approved in Germany in 1964 and by 1967 it had already started to be verified in Hamburg (Buehler, Pucher, Dümmler, 2018). Something similar happened in the GDR, where since the mid-1960s, general transport plans were mainly applied to organize railway lines and motorized traffic. In addition, it was understood that master plans were necessary as a tool for planning capital investments by the State (Schaefer, Cromme, Pach, Wegmann, 1971, p. 3), and the division of tasks between different modes of transport was important (Fichert, 2017, p. 18). These general plans had advantages in economic planning and in the control and development of their forecasts. This is probably why this tool also started to be important in the European communist countries.

Evaluating this experience of integrated planning, Kurt Leibbrand, in the mid-1970s, noted that "a uniform philosophy" in urban and transport planning was yet to come. The exchange of ideas between urban and transport planners was not

sufficient to arrive at truly integrated planning (Leibbrand, 1975, p. 13). The method to overcome the isolation of urban and transport plans was to break down overly powerful sectoral visions.

In the United Kingdom, discussions on integrated planning between transport and cities also began in the 1960s, in a context of decoupling of objectives and planning institutes. In 1967, the Ministry of Transport emphasized the importance of the implementation of general transport and traffic plans by local authorities.[13] The transport plan was implemented with the objectives of anticipating the change in travel demand and investment needs for its realization (Puvanachandran, 1982, p. 100). At the same time, the Royal Institute of British Architects RIBA expressed the concern that general transport plans could become a major player in urban decisions. To prevent this, it recommended the publication of manuals on joint work and integrated assessment between the Ministry of Transport, the Ministry of Housing and the City Council, as well as the creation of interprofessional groups (RIBA, 1968, p. 1367).

"The Town and Country Planning Act 1968"[14] provided for integration between urban structure plans and transport plans. Despite the legal intention, joint work between transport planners and town planners was difficult to organise. Sometimes comprehensive planning was understood as coordination between all modes of transport (Starkie, 1973, p. 15), sometimes as physical integration between transport and land use. Especially in the United Kingdom, many studies had been carried out in the 1950s and 1960s on the relationship between transport and urban structure or land use, which served for the planning of new cities and even for the design of urban form. This physical relationship between transport and land use was more commonly understood as integrated planning.[15]

However, the concept of integrated planning continued to suffer from a lack of definition in the West, where the real need for joint work between planners was not considered. The role of transport planners continued to be decisive in urban planning decisions (Puvanachandran, 1982, p. 380) through the so-called sectoral plan for transport policies and programmes. Since different public and private interests continued competing in transport and urban planning, the problem of the lack of coordinated and comprehensive planning also continued persisting in western European countries. Land use planning and transport planning continued to be sectoral issues, despite proposals to create a unified department of urban and transport planning (Hall, 1976, p. 58) and to prepare a transport plan as part of the structural urban plan (Puvanachandran, 1982, p. 440). However, one of the most extensively developed ideas in the United Kingdom between 1964 and 1974 was the spatial relationship between land use and transport, which was based on the attempt to understand "the dynamic relationships" between them (Bruton, 1983, p.

13 See Ministry of Transport of United Kingdom (1967) Rescuing Public Transport to Improve the Environment, *The Architects' Journal*, December 13, 146 (24), p. 1497. Se subrayaba la importancia de realización de los planes de transporte, donde debían preverse la planificación de sistema de buses y trenes suburbanos.

14 See the documents and legal ordinances edited by Ministry of Transport in 1966 "Transport White Paper", in 1967 "Transport Act".

15 See Jamieson, G. B., Mackay, W. K., Latchford, J. C. R. (1967) Transportation and Land Use Structures, *Urban Studies*, 4 (3), pp. 201-217.

100). Buchanan's report was interpreted in different ways around the world (Hass-Klau, 1978, p. 7), but it initiated understanding and concern about the intimate relationship between transport and urban environment.

However, there were some exceptional cases where joint work between planners was possible, such as the conurbation plans of Merseyside, Tyneside, West Midlands and Liverpool. These plans were more oriented towards the integration of different modes of transport, especially private and public transport (bus and rail). This type of integration involved members of local government and road and public transport planners (Starkie, 1973, p. 29). The most complete integration between urban planning and transport planning has only been realized realized since the early 1980s when common objectives for urban structure planning and collective public transport planning were considered, for example, in the cases of Merseyside and Greater Manchester (Fischer, Smith, Sykes, 2013, Nickson, Batey, 1978). This was the result of the change in city planning ideas in the 1970s, which started to be oriented towards the provision of planning scenarios and alternatives considering long-term city development.

In the case of the United States of America, the separation between urban and transport planning was initiated in the mid-1950s when road planning was most important (McGrath Jr., 1973, p. 405). On the other hand, the weakness of the federal administration in organizing integrated planning contributed to separate and contradictory planning. There were debates about the need for integrated planning between transport and city, however, in the 1960s only a few attempts could be realized in the coordinated planning of the public mass transport system. In this period the issue of integrated planning was discussed not only as a question of physical integration between transport and city, but also as an integrated legislative and administrative issue (Brown, 1966, p. 13).

As to the reasons for the failure of integrated planning, the lack of common planning regulations was highlighted, which opened the way for various private interests, the change of plans according to "external conditions and forces", the lack of central coordination of the integrated planning process, the need to adapt to changes in order to organise the work of institutes, the lack of consistent demands and adaptability to urgent needs (Friedmann, 1971, p. 317-318). The main difficulties were the conflicts between public and private interests, the difficult control and evaluation of integration, the great weight of road and traffic departments, the absence of collective public transport interests and the disparity between urban and metropolitan planning.

Common dynamics between communist and capitalist countries can therefore be noted. In both, there were several limitations that marked the weak points of integrated planning. In the communist countries it was evident that there was a lack of criticism in the theory and practice of integrated planning, especially in relation to the consideration of social factors. In the capitalist countries, in spite of having this critical capacity, there was no possibility of organizing the integrated planning process in a consistent and widespread way (coordination, institutes and manuals, establishment of common objectives etc.).

On the other hand, the issue of coordination between different modes of transport was the problem that was considered most relevant for urban planning in the West since the early 1960s: the search for solutions to the difficulties of different

transport companies, to the segregation between transport and city planning, and to the problem of traffic congestion. However, in socialist central planning these issues did not appear as a problem before the Western debates.

3.1.5. DISCUSSION AND CONCLUSIONS. THE COMPLEXITY OF INTEGRATING PUBLIC TRANSPORT AND CITY, AND NEW CHALLENGES FOR PLANNERS

It has been confirmed the idea of Zmija (1985), Ackermann and Johne (2001) and Saitz (2001) that general transport plans were important for the national and local economy. They were applied as tools to rationalise, optimise and coordinate urban transport, especially public collective transport services. This study has shown that the idea of general transport plans was a partly contradictory decision. The emphasis on transport issues as opposed to urban planning issues and their separation into a sectoral plan led to difficulties in the implementation of integrated plans. The advantages of the general transport plans were based on the possibility of rationalisation and better study of transport issues that were previously not well developed, below the urban plan. The main objective was to develop the general transport plans and to resolve a number of issues related to the state of infrastructure and rolling stock, the management of their service and traffic studies. In this context of solving urgent problems, the interaction between the two plans was not well exposed in the theoretical discussions. The order, meaning and concerns of politicians and planners were vague. The views among traffic engineers and urban planners were dissimilar, with some week ideas on the need and importance of integrated planning, but no clear-cut proposals and principles. Most planners continued with their sectoral vision.

The concept of integrated planning was a tool of varied use in some European countries, both in the West and in the East. Its development began in the 1960s as a response to the problems of traffic, rapid urban growth and the increasing complexity of the urban structure. The integration or comprehensive vision was presented as a scientific advancement and an excellence of urban planning, both in countries of capitalist and communist regime. Integration was only a tool to be able to consider the interrelationship of transport and urbanism factors and issues, and to measure investments well. It was a tool for the rationalisation and scientificisation of urban transport planning. It was also a political tool to demonstrate coordinated and effective planning that resulted in social welfare.

In the early years, politics and planners had quite limited understanding of integrated urban planning. The influence of public transport on city planning was only related to urban form and did not consider structural changes. General urban public transport plans remained as schemes that were developed with priority for location, density and compactness of functional areas. Of some importance, however, were issues devoted to physical interrelationships and interdependencies between land use and transport. Thus, the transfer between urban structure planning and integrated city-transport planning was not fully realized in the 1960s. The theoretical basis for both urban and public transport planning was still missing, as well as a vision to integrate two disciplines.

This study has also provided an insight into the historical events that contributed to the development of integrated or comprehensive planning: 1- the need for urban extension coupled with budget shortages, especially in collective public transport, 2- the internal and external debates of academics and planners to overcome the problem of road traffic and to achieve efficient urban transport planning, 3- the political decision that enabled the initiation of the integrated planning process.

In the theoretical debates on integrated planning, differences between the GDR, CSR and the USSR can be noted. In the GDR and the CSR, the discussions took place throughout the 1960s before the corresponding political decisions were made. In the USSR, ideas on integrated planning between public transport and the city started to develop from the early 1970s, at least after the 1967 decree. This gap can be related to two Soviet differences. First, with the weakness in the development of transport planning theory: Soviet planners did not have research, planning and management institutes for urban transport, which led to the continuity of sectoral visions. Second, with the weakness of the development of tram and rail infrastructure, which made the difference between rapid public transport (suburban trains and rapid trams) and road public transport (buses and trolleybuses). It was precisely the differential existence of these two modes of public transport that marked the need for their integration with urban planning.

Despite the similarities in the application objectives of integrated planning in the countries of the East and the West, the latter had more difficulties in its development and implementation. Except in the FRG, the difficulty of enhancing collective public transport, coordinating means of transport at different planning scales and organizing integrated planning was noted in the United Kingdom and the United States. In most western countries, the theoretical contributions were not very coherent and the cases of implementation were exceptional.

Finally, it is curious that the two German states successfully applied this tool and were able to organize the joint work of transport planners and urban planners almost from the beginning. However, in the other developed countries, communist and capitalist, they had more difficulties and took longer to implement. Probably in the FRG and the GDR there was a confluence of several conditions in their city planning, such as the early development of transport planning theory, the importance of the role of rail transport, the pre-existence of the practice of cooperation between transport companies and between planners, the early formation of theoretical ideas about the intimate relations between transport and city, etc.

The implementation of integrated planning was a difficult process in Germany and in all European countries. Both in the West and in the East, the importance of traffic and transport study was emphasized with the separation of urban planning. The need for integration between transport and city at legislative, organizational and administrative levels in order to provide long-term solutions was mainly felt in the 1970s and later. In the 1960s there was a gradual shift from rationalisation of the urban structure to the strengthening of collective public transport and finally from the 1970s to integrated planning, which never ceased to have deficiencies.

3.1.6. BIBLIOGRAPHICAL REFERENCES

Ackermann, K., Johne, G. (2001) 50 Jahre Stadtverkehr und Stadtverkehrspolitik in Leipzig, in Archiv für die Geschichte des Strassen und Verkehrswesens (ed.), *Strassen und Verkehrsgeschichte deutscher Städte nach 1945: Dresden, Leipzig, Halle, Chemnitz, Erfurt*, 16, Bonn: Kirshbaum Verlag, pp. 57-103.

Balassa, B. (1992) Economic Integration in Eastern Europe, *Structural Change and Economic Dynamics*, 3 (1), pp. 3-15.

Blazek, M. (1975) Tendentsii urbanizatsii v socialisticheskikh stranakh Evropy, in Sumnik, Z. A. (ed.), *Urbanizatsiia i rasselenie*, Moskva: Statistika.

Brown, R. G. (1966) *The integration of Metropolitan Transportation Planning with a Comprehensive Development Policy: A Coordinated Approach*, Master Thesis, University of British Columbia, April.

Bruton, M. J. (1983) The Traffic in Towns Philosophy: Current Relevance, *Built Environment*, 9 (2), pp. 99-103.

Buehler, R., Pucher, J., Dümmler, O. (2018): Verkehrsverbund: The evolution and spread of fully integrated regional public transport in Germany, Austria, and Switzerland, *International Journal of Sustainable Transportation*, 13 (1), pp. 1-15.

Davidova, Y, A., Gromenko, V. V. (2014a) Dinamika promyshlennogo razvitiia SSSR v 1960 – 1970-e gody, *Ekonomika*, 5, pp. 22-24.

Davidova, Y, A., Gromenko, V. V. (2014b) Ekonomicheskie reformy v period zastoia, 1964-1985, *Teoriia i praktika obshestvennogo razvitiya*, 7, pp. 1-5.

Davidovich, V. G. (1968) *Rasselenie v gorodakh*, Moskva: Mysl.

Diefendorf, J. M. (2014) Urban transportation planning influences and legacies: Kurt Leibbrand, Germany's acclaimed postwar traffic planner, *The Journal of Transport History*, 35 (1), June, pp. 35-56.

Fischer, T. B., Smith, M., Sykes, O. (2013) Can less sometimes be more? Integrating land use and transport planning on Merseyside (1965–2008), *Urban, Planning and Transport Research*, 1 (1), pp. 1-27.

Fichert, F. (2017) Transport policy planning in Germany - An analysis of political programs and investment masterplans, *European Transport Research Review*, 9 (2), pp. 1-12.

Friedmann, J. (1971) The Future of Comprehensive Urban Planning: A Critique, *Public Administration Review*, 31 (3), Special Symposium Issue: Changing Styles of Planning in Post-Industrial America, May - June, pp. 315-326.

Hanson, P. (2003) *The Rise and Fall of the Soviet Economy: An Economic History of the USSR from the 1945*, London: Pearson Education Limited, p. 91.

Hall, P. (1976) Kadry i obrazovanie, in Cowan, P. (ed.), *Budushchee planirovki,* trans. Yaroshevskii, B. E., London: Heinemann, pp. 56-74.

Hall, P. (2003) The Buchanan Report 40 years on, *Transport*, 157(1), pp. 7-14.

Hass-Klau, C. (1986) Environmental Traffic Management in Britain — Does It Exist? *Built Environment*, 12 (1/2), pp. 7-19.

Heinzmann, J., Karrasch, P. (1990) Spatial Patterns of Technological Change in the GDR, *Geoforum*, 21 (2), pp. 193-201.

Hensher, D. A. (1979) Urban Transport Planning – The Changing Emphasis, *Socio-Economic Planning Sciences*, 13 (2), pp. 95-104.

Hruška, E. (1966) *Problémy súčasného urbanizmu*, Bratislava: Vydavatel'stvo Slovenskej akadémie vied.

Hrůza, J. (1972) *Teoriia goroda*, trans. L. B. Mostovaya, Moskva: Izdatelstvo literatury po stroitelstvu.

Institut für Gebietsplanung und Städtebau der Hochschule für Architektur und Bauwesen Weimar (1966) *Städtebauseminar: Verkehr und Städtebau*, 15 – 17 June, Erfurt: Fortschritt Erfurt, Zweigwerk Arnstadt.

Jamieson, G. B., Mackay, W. K., Latchford, J. C. R. (1967) Transportation and Land Use Structures, *Urban Studies*, 4 (3), pp. 201-217.

Jansa, F. (1967) *Městské Dráhy Elektrické*, vol. 2, Bratislava: Vysoká Škola Dopravná v Žiline v Slovenskom Vydavateľstve Technickej Literatúry.

Karpenkova, T. V. (2016) Iz istorii reformirovaniia ekonomiki SSSR v 1970kh i 1980kh godakh, *Vestnik MIEP*, 3 (24), pp. 131-139.

Kollektiv avtorov (1966) *XXIII Siezd Kommunisticheskoi Partii Sovetskogo Soiuza*, Moskva: Politizdat.

Kominarov, A. V. (1966) *Voprosy sovershenstvovaniia kompleksnoi ekspluatatsii transporta*, Moskva: Transport.

Kosenkova, Y. L. (2000) *Sovetskii Gorod 1940 i pervoi polovine 1950 godov: ot Tvorcheskikh Poiskov k Praktike Stroitelstva*, PhD thesis, Rossiiskaia Akademiia Arkhitektury y Stroitelnykh Nauk, Moskva.

Kousal, M. (1965) Jednotná dopravní soustava., in *Vývoj Osobní Dopravy v ČSSR*, Celostátní conference, 12-14 October, Brno: Československa Védecko-Technickä Společnost.

Krüger, H., Richter, K.-J., Stuhr, R. (1962) *Der Städtische Nahverkehr in der DDR*, Berlin: Transpress, VEB für Verkehrswesen.

Kudryavcev, O. K. (1963) O strukture transportnykh setei, in Akademiia Stroitelstva i Arkhitektury SSSR (ed.), *Problemy sovetskogo gradostroitelstva*, Moskva: Gosudarstvennoe Izdatelstvo literatury po stroitelstvu, arkhitekture i stroitelnym materialam.

Künne, H.-D. (1996) Stuttgart – 50 Jahre Verkehrsplanung im Für und Wider, in Archiv für die Geschichte des Strassen und Verkehrswesens (ed.), *Strassen und Verkehrsgeschichte deutscher Städte nach 1945: Stuttgart, Aachen, Bayreuth*, 10, Bonn: Kirshbaum Verlag, pp. 7-49.

Latov, Y. V. (2015) Kosygin's reform — a missed opportunity of the Soviet society, *Journal of Economic History & History of Economics*, 16 (3), pp. 424–439.

Lehrer, F. (1961) *Public Transport within the Framework of Urban General Traffic Plans*, 34th UITP International Congress, Copenhagen.

Leibbrand, K. (1964) *Verkehr und Städtebau*, Basel: Birkhäuser.

Leibbrand, K. (1970) *Transportation and Town Planning*, trans. Seymel, N., London: Leonard Hill.

McGrath Jr., D. C. (1973) Appropriate Relationships between Comprehensive Planning and Transportation Planning for the 1970s, *Transportation*, 1 (4), pp. 403–418.

Ministry of Transport of the GDR (1966) Grundsätze für die Entwicklung des Verkehrs in den Stadten der DDR, Berlin.

Ministry of Transport of the GDR (1968) Basisstruktur der Verkehrsanlagen, Dresden, Leipzig, Rostock und Magdeburg, Berlin.

Ministry of Transport of United Kingdom (1967) Rescuing Public Transport to Improve the Environment, *The Architects' Journal*, 146 (24), p. 1497.

Ministry of Transport of the CSR (1967) *Koncepce rozvoje mestke hromadne dopravy do roku 1980,* Federal Archive of Czech Republic, Odbor dlouhodobého plánování, Praha.

Ministry of Transport of the CSR (1967) *Prednášky z celostátního semináře o problémech hromadné dopravy ve větších městech ČSSR (kromě Prahy)*, Praha.

Mlejnek, V. (1967) *Městská hromadná doprava v ČSSR*, in Prednášky z celostátního semináře o problémech hromadné dopravy ve větších městech ČSSR (kromě Prahy), Praha, pp. 1-26.

Musil, J., Link, J. (1975) Urbanizatsiia v Chekhoslovatskoi Sotsialisticheskoi Respublike i nekotorie ee osobennosti, in Sumnik, Z. A. (ed.), *Urbanizatsiia i rasselenie*, Moskva: Statistika.

Musil, J. (1980) *Urbanization in Socialist Countries,* New York: M.E. Sharpe. Inc.

Nickson, J. V., Batey, P. W. J. (1978) The Analysis of Transport within a Metropolitan County Structure Plan: The Greater Manchester Experience, *The Town Planning Review*, 49 (3), pp. 285-295.

Plicka, I., Vandas, J. (1965b) Provozně technické řešeni městské hromadné dopravy – zásady, in Sborník příspěvků z celostátního semináře, *Zásady řešění městské hromadné dopravy*, Praha: Československá vědecko-technická společnost.

Polyakov, N. K. (1964) *Osnovy proektirovaniia planirovki i zastroiki gorodov*, Moskva: Stroiizdat.

Polyakov, A. A. (1967) *Transport krupnogo goroda,* Moskva: Znanie.

Puvanachandran, V. M. (1982) *The Viability of British Urban Transport Planning in the Post Buchanan Period*, PhD Thesis, University of Warwick, Department of Civil Engineering, December.

RIBA (1968) Warning on Traffic and Planning, *The Architects' Journal*, 147 (25), p. 1367.

Saitz, H. H. (2001) 50 Jahre Stadtverkehrsplanung in Erfurt, in Archiv für die Geschichte des Strassen und Verkehrswesens (ed.), *Strassen und Verkehrsgeschichte deutscher Städte nach 1945: Dresden, Leipzig, Halle, Chemnitz, Erfurt*, 16, Bonn: Kirshbaum Verlag, pp. 173-204.

Schaefer, H., Cromme, D., Pach, G., Wegmann, U. (1971) *Methodological Studies for the Establishment at the National and Regional Level of Overall Transport Plans,* Report of the Fifteenth Round Table on Transport Economics, Paris, 8-10 December.

Schmucki, B. (2001) *Der Traum vom Verkehrsfluss: städtische Verkehrsplanung seit 1945 im deutsch-deutschen Vergleich*, Frankfurt: Campus Verlag.

SED (Sozialistische Einheitspartei Deutschlands), (1967) *Begrüßungsansprachen der Vertreter der Bruderparteien und Grußschreiben an den VII. Parteitag der SED*, Berlin: Dietz.

Siegel, H. (1969) Strukturmodellen als Kernstück der Einheit von Generalbebauungsplan, Generalverkehrsplan und Plan zur Entwicklung des Bauwesens am Beispiel der Stadt Leipzig, in Deutsche Bauakademie (ed.) *Generalbebauungsplanung der Städte der DDR*, Berlin: Deutsche Bauinformation, pp. 54-57.

Smýkal, F. (1965) Koordinace Řízení Dopravy ve Městě, *Doprava*, 4, pp. 247-250.

Sovet Ministrov SSSR (1967) O merakh po uluchscheniiu obsluzhivaniia naseleniya gorodskim passazhirskim transportom, N1152.

Starkie, D. N. M. (1973) *Transportation planning and public policy*, Oxford: Pergamon Press.

Stramentov, A., Fishelson, M. (1964) Generalnyi plan gorodskogo dvizheniia, *Arkhitektura SSSR*, 4, pp. 15-20.

TSNIIP Gradostroitelstva (1966, 1967, 1968 y 1969) *Principy sovetskogo gradostroitelstva*, Moskva: Stroiizdat.

TSNIIP Gradostroitelstva (1968) Metodicheskie ukazaniia po proektirovaniiu setei obshestvennogo transporta, ulits i dorog, Moskva: Stroiizdat.

Vlček, I. (1965) Doprava ve vztahu k sídelní struktuři, in Československa Védecko-Technickä Společnost (ed.), *Vývoj Osobní Dopravy v ČSSR*, Celostátní conference, 12-14 October, Brno: Československa Védecko-Technickä Společnost.

Weigel, W. (1962) *Verkehr in der modernen Stadt*, Berlin: Transpress VEB Verlag für Verkehrswesen.

Zmija, K. (1985) Doprava a Komunikace v Ostravě, in Bartoš, J., Dohnal, M. (eds.), *Ostrava: Sborník Příspěvků k dějinám a výstavbě města*, Ostrava: Profil.

3.2. PARADIGM SHIFT IN THE SOCIALIST URBAN PLANNING IN THE 1970S: THE NEW THEORETICAL APPROACHES TO INTEGRATED PLANNING

"We are too eager to follow the different modes, and we do not care much about learning the nature of the phenomena around us."[16]

(J. Hrůza, 1970, p. 54).

In the early 1970s in the European countries under communist rule, a great effort was made to carry out research on "integrated planning" of urbanism and urban transport. The policy of "complex rationalisation", mainly oriented towards saving resources, implied the consideration of a great variety of factors from different fields in order to arrive at supposedly rational solutions in city planning. The need to reconsider urban transport planning in terms of urban structure and planning was already recognised. This was related to new ideas about the need for long-term, multidisciplinary urban planning, with an enhanced role for rapid public transport. The enhancement of the role of collective public transport required the reconsideration of planning methods related to a new urban structure and hierarchy. However, this idea did not have an easy practical solution, since the paradigm of priority for private traffic was still very strong. Traffic specialists still focused their major concerns on the provision of accessibility and capacity building of road infrastructure, while city planners tried to have some control over urban traffic through their decisions on the location of land uses. All this was done in a context of difficulty in organizing joint work between official study centers. The organisation of theoretical studies was a difficult task because it required joint work between transport specialists, town planners and political decision-makers, as well as the need to develop a new methodology, new spatial concepts and integrated planning tools. For this purpose, it was necessary to organise theoretical research to better understand and define the factors of interaction and influence between collective public transport and the city.

This process took place not only in the professional sphere, but also in the political one. On the one hand, there was the concern for the technical-economic criteria, on the other hand, there was a professional interest in disciplinary progress through the characterization of the factors of relationships between the duality of traffic engineering, transport economy and urbanism, especially with regard to the need for planning. Integrated planning could be a tool to serve political-economic interests as well as ideological and propagandistic ones. There was a specific focus by the communist party to be able to "use the achievements of science" or "the additional potential of science" in city planning (Saitz, 2001, p. 197). This was explained by the economic importance of the structural changes in many cities, where the rapid and continuous operation of urban traffic had to be achieved. However, in order to achieve rapid economic results, the Soviet communist regime tended to simplify the understanding of the concept of urban structure, which was interpreted as the rational organization of interrelations between functional areas and transport net-

16 "Příliš horlivě sledujeme různé módy, a málo se soustřeďujeme na poznávání podstaty jevů, které nás obklopují."

works (Shkvarikov, 1970, p. 12). The construction of the public transport system required the concentration of passenger flows on a very limited number of transport lines as a means of achieving efficiency (Leiser, 1969, p. 59). This also simplified the understanding of the idea of integrated planning between transport and the city.

The theoretical studies had to solve several questions: how to grow by keeping maximum travel times in the 30–40-minute range; how to grow by taking advantage of the existing transport infrastructure as much as possible; how to grow by effectively providing connectivity and accessibility to the most important functional areas; how to streamline passenger flows; how to compact and limit the movement of people on public transport, etc. In the answers to these questions, the planning of collective public transport did not have shared principles and criteria, as in each country the transport policy issues were resolved in relation to local characteristics and needs. In the theoretical studies carried out there were similarities and some shared principles, such as the importance of connections between residence and work, or the rationalization of the use of transport infrastructure. However, there were quite a few differences in the approach to traffic distribution, the establishment of spatial relations, the selection of means of public collective transport, the location of land use, etc.

This chapter supports the hypothesis that the level of organization of the work of research centres and political-economic factors in each country strongly conditioned the level of development of ideas on integrated planning. It is therefore necessary to understand the contribution of research centres to the theory of integrated city and transport planning in the 1970s. It seems feasible to achieve this by analyzing the organizational character, the level of involvement and development of the subject, and the approach to strategies in the work of official study centers in the three communist countries of reference. It should be noted that there were significant differences between the USSR, the GDR and the CSR in the technical level and organizational objectives of theoretical studies, which should probably have influenced the level of the development of integrated planning. In the GDR there was a strong initiative on the part of both the state and the planners to develop theoretical work and standardise it in official documents. In the CSR there were few theoretical studies and their degree of standardisation in planning practice was weak. In the USSR, the state was barely involved in the planning and interrelation of studies, and therefore fragmentation between study centres and the prevalence of sectoral ideas remained.

3.2.1. PARADIGM SHIFT IN TRANSPORT AND URBAN TRAFFIC PLANNING

It is well known that transport and traffic planning was established in Western countries from the city paradigm for cars, at least until the sustainable mobility paradigm began to emerge (Cervero, 1997; Herce Vallejo, 2002; Hebbert, 2005; Jones, 2014). Meanwhile, studies on socialist countries are scarce. One of the first approaches to identifying planning paradigms in European communist countries has been carried out by Barbara Schmucki (2003, p. 153), who divided the period into four planning paradigms in the GDR: *traffic-friendly city* (1945-1955), *car-friendly city* (1955-1971), *city-friendly city* (1971-1980) and *human-friendly city* (from 1980 onwards). Christopher Kopper (2006) and Christoph Bernhardt (2017) have also explained the existence of the planning paradigm for cars in socialist cities. Both indicated the proximity of socialist ideas with capitalist ideas in the solution of urban traffic. However, the period of inflection on the ideas of urban transport planning in both the West and the communist countries began earlier, around the mid- and late 1960s. The criticism of the "problem" of automobiles and the indiscriminate growth of road infrastructure was found in the publications of some authors such as Buchanan, Lehrer, Hrůza, and in the discussions of international congresses.

In Western Europe in the 1960s, the problem of traffic congestion began to be tackled, even suggesting the reduction of cars by introducing some collective public transport lines (Meyer, Gómez-Ibáñez, 1981, p. 9). Even with the unavoidable support of urban public transport in large cities (the strengthening of the suburban railway exemplified in some exceptional cases such as Stockholm, Hamburg, Paris or San Francisco, as pointed out by White, 1967), there was a constant feature in the West: the generalization of the automobile mode and the construction of roads, where the role of land public transport was not defined. This was not much different in the East. The main difference from capitalist countries was the time period of financial and legislative support for public land transport; in communist countries this began in the late 1960s, while in the Western world it began in the late 1970s. The importance of collective public transport in communist countries was closely related to the need for rapid communications between areas of work and residence, in a context of great urban growth.

On the other hand, since the 1960s, as if waking up from a long sleep, debates on mobility through public transport, improving pedestrian traffic, environmental quality or heritage preservation have intensified every year.[17] It should be noted that in some countries, such as GDR, CSR, Poland or Hungary, for example, some of the environmental problems were raised. In the CSR, there was a certain concern for urban sociology, the quality of the environment and the preservation of historical sites. The state institutes carried out a series of sociological studies on cities and housing,[18] an international conference on "Environmental Problems"[19] was organised in Prague in 1971, and a department of urban ecology was established in VÚVA (1972).

Nature conservation and environmental quality were also discussed in the GDR. In 1970, the Land Culture Act [*Landesculturgesetz*][20] was passed, which emphasised the importance of environmental, nature and landscape protection. In 1969, the Faculty of Spatial and Urban Planning was established in Weimar and various studies on the concept of the socialist city were developed. These efforts were not successful from the beginning, it was a difficult process on the road to change in city

17 Among the most important events were the United Nations Conference on the Human Environment in Stockholm (1972), the European Charter for Architectural Heritage (1975), the IFHP (1977) and UITP (1977) congresses, etc.

18 See a series of publications by the CSR sociologist Jiří Musil: (1972) Goal-setting in urban planning: A case study from Czechoslovakia, *Journal of Social Policy*, 1(3), pp. 227 – 244, (1980) *Urbanization in Socialist Countries*, New York: M.E. Sharpe. Inc.

19 The conference was organised by the United Nations Economic Commission for Europe (UNECE).

20 See Volkskammer der DDR (1970) *Gesetz über die planmäßige Gestaltung der sozialistischen Landeskultur in der DDR (Landeskulturgesetz),* vom 14. Mai.

planning (Hunger, 2018; Schwarzbach, 2019). However, it cannot be denied that it contributed to theoretical and practical advances in these countries in the 1970s and 1980s.

Still, in comparison to the Western countries, in the communist countries, progress and debate were not as active, as there was no clear state interest or possibilities for the expression of opinion. In the USSR, for example, social and environmental issues were hardly discussed; there were only a few studies and issues or problems were not frequently presented at international congresses. The Czechoslovak planner Jaromír Štván underlined the problem of the environment in countries with centrally planned economies in his subchapter "Standards and Nature Protection versus Economy."[21] Štván also highlighted the issue of social problems, which were supposed to be solved by itself in a society building communism (1973, pp. 25-26). The solution to these issues needed more time, was costly in realisation and seemed rather unproductive. In the communist countries, the USSR's closed-mindedness to the new, the strong state control and the firm orientation towards the productivity of cities were decisive factors that prevented the paradigm shift in urban planning in this period.

To address the periodisation of city planning, it is shared the idea of Schmucki (2003) about the importance of the change in ideas about transport and urban traffic planning in the early 1970s. The periodization offered by David Hensher (1979) also seems to be close to what we are proposing. His periodization is quite detailed and reflects several stages of change in thinking about transport planning. Hensher proposed four stages: 1955-1964, operational development; 1964-1969, period of stability, this period overlaps the period from mid-1960 to approximately 1973, when conflicts started appearing (social, economic, metropolitan growth, etc.), and, finally, the period from the mid-1970s. In this late period some considerable and positive changes related to the improved attention to social aspects of transport planning started to appear, as well as the consideration of transport planning factors in urban planning, and the development of alternative to theoretical discussions and practical solutions. However, it is not always possible to establish a concrete time frame onthis matter. The differences were not only related to the political system, but also to each individual country.

Among other periodizations, the proposal of Hans-Dieter Künne (1996) for Stuttgart can be highlighted. He considered that the period from the end of the 1950s to the end of the 1960s was a period of reflection. The thinking on how to deal with the problem of car traffic congestion. From the late 1960s to the late 1970s was considered a period of transformation or change, and from the late 1970s to the mid-1980s was an environmental-ecological period. As can be seen, these periods share the idea that the period of involvement in thought began in the 1960s and continued with the theoretical and practical proposals in the 1970s. In this sense, a similar dynamic can be noticed in the ways of approaching the problem in the European capitalist and communist countries. The first theoretical changes in the European socialist countries began in the mid-1960s, so that the changes in the

21 In the CSR, Jaromír Štván worked on issues related to urban structure and pattern, and was also an officer of UNECE (1967-1971). About criticism of the communist regime's limited vision in urban planning, see Jaromír Štván's (1973) *Physical, socio-economic and environmental planning in countries of Eastern Europe. Their interaction at the city and city sub-area levels*, Stockholm: National Swedish Building Research.

planning of the 1970s were the result of a debate that had taken place earlier. Even so, within the communist countries, these ideas remained varied depending on different criteria and principles of planning.

Although the 1960s can be considered as the period of automobile-oriented planning paradigm, it is also the period when the problems of automobiles began to be studied and the need to strengthen collective public transport became evident. Therefore, it can be distinguished as a period of mixing of ideas regarding urban transport planning. The 1970s marked the beginning of the intentions to reach a general and agreed vision among urban and transport planners, being also a period full of contradictions and differences. In fact, the change of paradigm in the communist countries had different rhythms of development, with the maintenance of some old ideas and the advancement in some new ones. It can be said that this is not a change of paradigm, but rather a period of inflection, a transitory period of evolution of ideas, a period of dissolution of some previous ideas. On the one hand, the extreme importance of functional relations between urban areas was maintained. On the other hand, the effectiveness and efficiency of the road infrastructure in providing equal and rapid accessibility was questioned. Therefore, this period has its peculiar qualities and characteristics, one of them being the strength of the idea of the importance of collective public transport in the urban transport system and in the planning of urban structure and form.

3.2.2. THE STATE OF THEORETICAL RESEARCH AND OFFICIAL STUDY CENTRES IN THE 1960S

Since the 1960 conference on urbanism in the USSR, the scientificization of urbanism has been promoted. It was an international phenomenon that aimed at the rationality of planning methods and the consideration of the city as a system of spatial relations (Taylor, 1999, p. 99; Paden, 2003). The scientification in socialist urban planning was seen as the optimal path for economic efficiency in the distribution of resources and the productivity of cities. This great change in the idea of city planning needed theoretical studies and research centers. The study centers that were organized before the 1960s had a chaotic organization and were not related to each other. Their main objective was to establish relationships between zoning and road infrastructure classification. The transport planner was mainly concerned with road traffic calculations and infrastructure planning, while the urban planner was responsible for zoning. Most of the specialized study centers were created in the 1940s and 1950s in an attempt to make traffic and transport planning scientific within the methods of traffic engineering calculations, for example: *Kievskii Avtomobilno-dorozhnii Institut* [Kiev Institute of Automobiles and Roads] in 1944, *Hochschule für Verkehrswesen "Friedrich List" Dresden* [Higher Traffic School in Dresden] in 1952, *Vysoká škola dopravná v Žiline* [Higher Transport School in Žilina] in 1959.

"Scientification" was still a technical approach to tackling urban growth and enabling industrial development. The formula was not only to create faculties, institutes and sections, but also to standardize their scientific work and establish the relationships between them, which needed time to be implemented. The normalisation of the work of the institutes needed both a legislative basis and the individual initiatives of the technicians. At the legislative level, the meaning of cooperation be-

tween the institutes was not clear, since in most cases cooperation remained in the form of self-organisation and individual initiatives, but the issues of research and their interrelationship were not clarified, nor was the level of institutional involvement defined. Individual initiative by researchers and institutes was also scarce.

There was a continuity of mentality linked to sectoral planning. And this problem was worsened by the complexity involved in understanding the objectives and approaches to integration between urban and transport planning (new solutions and aspects of the interrelationship between transport and the city, new methods of enhancing the role of collective public transport). In this sense, the main work topics were fragmented and related to the issues that were considered urgent at that historical moment, such as traffic organization in residential units and urban centers, measurements and calculations, and traffic models. The studies lacked an overview of long-term city and urban transport planning.

Rapid changes in the urban structure, which began to be noticed from the mid-1960s, made one think about the complexity of the organization of cities and the need to consider future changes. When the great importance of rail transport in the process of urbanization of cities became evident, the shortage of institutes, departments and research centres for the planning of collective, urban, metropolitan and suburban public transport became apparent. But even more evident was the priority given, in the studies of public transport systems, to technical issues such as the production of suitable rolling stock, safety and automation of the service, improvement of the capacity and dynamic characteristics of transport. Other topics related to public transport were related to the idea of balance and compatibility of the grid configuration of motorized road and public rail transport.[22]

In fact, several institutes and departments of transport were created that tended to solve mainly the issues related to the coordination of the operation of regional and national transport systems, while the issue of urban transport was hardly left unexplored. With urban growth, especially the new peripheral areas, and in a context of limited public transport development, the problem of travel times became more acute. It was inevitable to focus attention on the issue of collective public transport. Moreover, although this was not so evident, the consideration of the needs of collective public transport systems and their interrelations with urban structure required new methods in urban planning. Coordination in the area of transport was a relatively easy matter as it was a part of traffic engineering as a discipline, so the main barrier was the interaction between two different disciplines: transport planning and urban planning.

Integration between transport and city at the planning level was a significantly more complex challenge than coordination of transport systems, as it involved a large number of departments and ministries working together. All this was to be overcome in the new theoretical studies of the 1970s which E. Hruška and J. Krásný called "a period of attempts at synthesising different functional, economic, technical,

22 See Kudryavtsev, O. K. (1963) *O Strukture Transportnykh Setei,* in Akademiia Stroitelstva i Arkhitektury SSSR (ed.), *Problemy Sovetskogo Gradostroitelstva*, Moskva: Akademiia Stroitelstva i Arkhitektury SSSR, pp. 38-59, al well as Potter, S. (1976) *Transport and New Cities, The Transport Assumptions Underlying the Design of Britain´s New Towns, 1946-1976*, The Open University, New Towns Study Unit, where were highlighted the importance of configuration of public transport network in urban planning.

social and other aspects" (1975, p. 157). This study period was neither homogeneous nor standardized. The official study centers played an important role in establishing a new theoretical basis for the extension of cities throughout the 1970s. Theoretical and sectorial solutions were worked on, with a perspective of technical-economic rationalization, but also the effort to develop integrated planning methods between urbanism and transport.

3.2.3. FRAGMENTATION IN THE ORGANISATION OF INSTITUTES AND RESEARCH CENTRES, AND THE INFLUENCE OF POLITICAL AND ECONOMIC OBJECTIVES ON THEORETICAL STUDIES IN THE USSR

Despite several attempts to create new study centres and to improve the intensity of theoretical studies, the USSR continued to have a significant problem in the organisation of work and study results. The problem lay in the high level of fragmentation of work in ministries, academic institutions and theoretical studies. This fragmentation can be observed in the ministerial organization. First, in the USSR there was no Ministry of Transport, but several ministries for various modes of transport: The Ministry of Motor Transport, the Ministry of Railways and the Ministry of Public Works linked to Transport. Second, these ministries were not responsible for urban public transport, but for roads and railways at the national and regional levels. Urban transport planning was divided between Gosstroi SSSR (State Building Committee of the USSR - hereinafter Gosstroi) and Gosplan SSSR (State Planning Committee of the Council of Ministers of the USSR - hereinafter Gosplan), but there was no centre specializing in urban transport problems.

In an attempt to improve the situation, there were several plans to organize an Urban Passenger Transport Research Institute under the umbrella of the Gosplan. The idea was announced in 1963 in a decree of the Council of Ministers of the USSR "On the improvement of urban passenger transport service", in 1967 (GARF, 1967a) and in 1979 (GAE, 1979a), but despite recognizing its necessity, the institute was not created. There were, however, a variety of research centers which studied quite a few themes but that were not interrelated and were not integrated into the urban planning process. Four of them will be examined.

(a) Tsentralnii nauchno-issledovatelskii i proektnii institut po gradostroitelstvu, TSNIIP Gradostroitelstva [Central Research and Design Institute for Urban Planning]

In the USSR, issues of urban transport development were studied in the scope of the Gosstroi. the Ministry of Civil Construction and the Gosgrazhdanstroi SSSR (State Committee on Civil Construction and Architecture of the USSR - hereinafter Gosgrazhdanstroi) functioned under the Gosstroi. Gosgrazhdanstroi was aimed at coordinating urban planning and its theoretical basis. Under the umbrella of the Gosgrazhdanstroi there were several organized institutes of urban planning in each republic of the Soviet Union, and among them the most important was the TSNIIP Gradostroitelstva. Despite the variety and agglomeration of studies, there were very few specialists who addressed the issue of integrated planning, among whom only a few can be highlighted, such as traffic engineer G. V. Bolonenkov and architects

G. Smykovskaia and O. K. Kudryavtcev. Although the idea of integrated planning spread among planners, there was a vague understanding and heterogeneous interpretation of the concept, its methods and criteria.

One can notice the concern within the TSNIIP Gradostroitelstva about the determination of geometrical characteristics of public transport networks and the determination of optimal types of urban structures. The main subjects of study of the institute were the urgent issues of the moment, such as the effect of the introduction of the railway environment in the city, methods of rationalization and planning of rapid tramway and suburban train lines, the coordinated operation of the urban transport systems, etc. Two studies of TSNIIP Gradostroitelstva can be highlighted: *Proektirovanie setei skorostnogo obshestvennogo transporta v krupnykh gorodakh* [Planning of rapid public transport networks in large cities], from 1970 and *Transport v planirovke gorodov* [Transport in city planning, 1972(a)] from 1972. However, other issues, such as passenger travel needs or structural urban effect of public transport infrastructure, were not developed.

Another problem was the overlapping of study topics by different institutions. For example, the topic of rapid public transport in large cities was also developed by the *Gosudarstvennii nauchno-issledovatelskii institut nauchnoi i tekhnicheskoi informatsii, GOSINTI* [State Research Institute of Scientific and Technical Information] organized under the State Committee on Science and Technology and the USSR Academy of Science. Among the studies carried out by GOSINTI, the following can be highlighted *Skorostnoi obshestvennii transport v planirovochnoi strukture bolshogo goroda* [Rapid public transport system in the structure of large cities], 1971, *Skorostnoi obshestvenni transport krupnogo goroda,* 1972b [Rapid public transport in large cities], 1972, or *Problemi optimizacii razvitiya sistem skorostnogo passazhirskogo transporta krupnogo goroda* [The problem of optimizing the development of rapid passenger transport systems in large cities], 1976.

A passive participation of TSNIIP Gradostroitelstva in the studies on integrated planning can be noted. There were few publications, especially in the 1970s, on the theory of city planning, and there was no tendency towards the formation of coherent principles of integrated planning. At the end of the 1970s, TSNIIP Gradostroitelstva, published several works of great interest, such as: *Metodika rekonstruktsii gorodov* [Methodology of city reconstruction], V. A. Lavrov, 1976 and *Preobrazovanie sredy gorodov i sovershenstvovanie ikh planirovochnoi struktury* [Transformation of the environment of cities and improvement of their urban structure], V. A. Lavrov, 1979. However, there was an intention to define the relationships between transport and the city; these works basically maintained the futuristic and functionalist vision of the 1960s, for example, highlighting the proposals for the vertical separation of urban transport systems, which were considered as interaction nodes between transport and city.

On the other hand, some collaborative studies were also carried out, such as *Transportnye problemy gruppovykh sistem naselennykh mest* [Transport problems in grouped settlement systems] from 1979, conducted by TSNIIP Gradostroitelstva with *Výskumný ústav urbanizmu a architektúry* [Research Institute of Urban Planning and Architecture] in Bratislava, or *Transport i gorodskaia sreda* [Transport and Urban Environment], 1978, which was developed by the TSNIIP Gradostroitelstava and the US Ministry of Residential Construction and Urban Development. In these studies,

the main idea of the transport-city interrelationship continued to reside in the interaction of rapid public transport networks and the form of urban territory, based on close zoning of functional areas.

(b) Institut kompleksnikh transportnykh problem, or IKTP [The Institute for Complex Transport Problems]

The Institute of Complex Transport Problems - hereinafter IKTP - was established in 1954 under the *Gosplan SSSR* [State Planning Committee of the USSR] Council of Ministers. The main function of the Institute was the development of studies related to the coordinated operation of transport systems. Throughout the 1950s and 1960s the theoretical studies and publications of the Institute focused on national and regional transport systems. The need for studies on the functioning of all urban transport systems was mentioned at the end of the 1960s as a topic that still needed to be developed (IKTP, 1968, p. 34-35). Finally, from the beginning of the 1970s, part of the IKTP's studies were oriented towards the topic of urban transport system, highlighting, for example, *Voprosy organizatsii raboty i razvitiia gorodskogo passazhirskogo transporta* [Issues of work organisation and the development of urban passenger transport], from 1973.

From this it can be concluded that the IKTP did not deal with the problems of integrated planning between transport engineering and urban planning, and developed only a part of that issue - the coordination of public transport system functioning. Among other research topics there was also concern for the technological development of public transport. In spite of the urgent need to solve practical problems in transport planning and management, there was analised possible application of alternative means of public transport which were difficult to carry out both technically and economically (Piryalin, 1973). Among other studies, the developed topics were: passenger flow analyses, analyses of the operation of transport systems, efficiency of rapid public transport lines and experience of public transport planning abroad.

(c) Akademia Kommunalnogo Khoziaistva K. D. Panfilova [The K. Academy of Community Economics D. Panfilov]

Some issues related to the operation of public transport in cities also came under the remit of the Ministry of Communal Economy of the Russian Soviet Federative Socialist Republic (RSFSR). Under the supervision of the Ministry there was the Academy of Communal Economy which carried out theoretical studies with the subjects devoted to the issues of rational operation of public transport system. Among the main concerns were the issues on the development of rolling stock, improvement of efficiency indicators of transport use (occupation, frequency of operation), coordination of transport systems functioning (electric ones among themselves and with bus systems) and development of technical guides for transport infrastructure planning. Since the end of 1960, this academy has developed work related to the coordination of the operation of the rapid tram system with other collective public transport systems.

However, the theoretical subjects of studies of the Academy of Community Economics coincided to a great extent with the subjects dealt with by the Institute of Complex Transport Problems on the coordinated operation of the urban

transport system. The following ones were highlighted: *Voprosy sovershenstvovaniia kompleksnoi ekspluatatsii transporta* [Questions on the improvement of complex transport operation] from 1966 and *Voprosy organizatsii raboty i razvitiia gorodskogo passazhirskogo transporta* [Questions on work organisation and development of urban passenger transport], Molodykh, from 1973. This interest in the coordination of urban transport systems can probably be explained by the importance and novelty of this topic in the Soviet context, in most of whose cities the transport system was underdeveloped. It could be interpreted that the organization of the coordinated operation of the whole urban transport system was the main problem to be solved before coming to the issue of integrated transport and city planning. On the other hand, it is worth noting the emphasis that the State placed on this first issue, probably with the aim of reaching economic and rapid solutions to the problem of urban transport, leaving the issue of integration between transport engineering and urban planning with insufficient attention.

(d) Ukrainian research and city planning institutes: KievNIIP Gradostroitelstva [Kiev Research and City Planning Institute] and *Giprograd* [the Ukrainian State Institute of City Planning]

Among the few studies devoted to integrated planning methodology, the initiatives of the KievNIIP Gradostroitelstva and Giprograd dedicated to the cities of the Ukrainian Soviet Socialist Republic could be highlighted. A number of architects worked in these institutes and were involved in studies on urban transport: A. K. Starinkevich, N. M. Khristyuk, G. A. Zablotskii and others. They published a number of studies devoted to the problem of integrated planning: *Gorodskoi transport i rasselenie* [Urban transport and settlement], 1969), *Proektirovanie setei gorodskogo transporta* [Planning of urban transport networks], 1972), *Transportnaia sistema gorodov razlichnoi velichiny* [The transport system in cities of different size], 1974 (Fig. 87).

In the early study *Transport v planirovke i zastroike gorodov* [Transport in city planning and construction], KievNIIP Gradostroitelstva, 1965, the need for integrated planning between transport and city was already mentioned. The need for the organization of joint work between different specialists related to the issues of urban structure, especially between transport specialists and urban planners, was stressed (Starinkevich, Oleinikov, 1965, p. 9). Among the planning objectives were not only the importance of optimal solutions with less investments, but also the importance of maximum convenience for people, consideration of transport needs in locational decisions, spatial and temporal interrelation of urban development issues with transport schemes, consideration of long-term city development in the overall transport plan and in a first stage of planning (Starinkevich, Oleinikov, 1965, p. 59).

As for the problems of complex transport plans, the authors stressed the absence of a relationship with existing economic possibilities, with proposals for development in stages, with consideration of prospects for passenger flow growth and with the need to increase the time frame of transport plans to 30-40 years (Starinkevich, Zablotskii, 1967, pp. 38-39). It also emphasized the importance of scientific studies to "find the optimal solutions for the development of urban transport systems related to space and time, and with the development of the whole city"

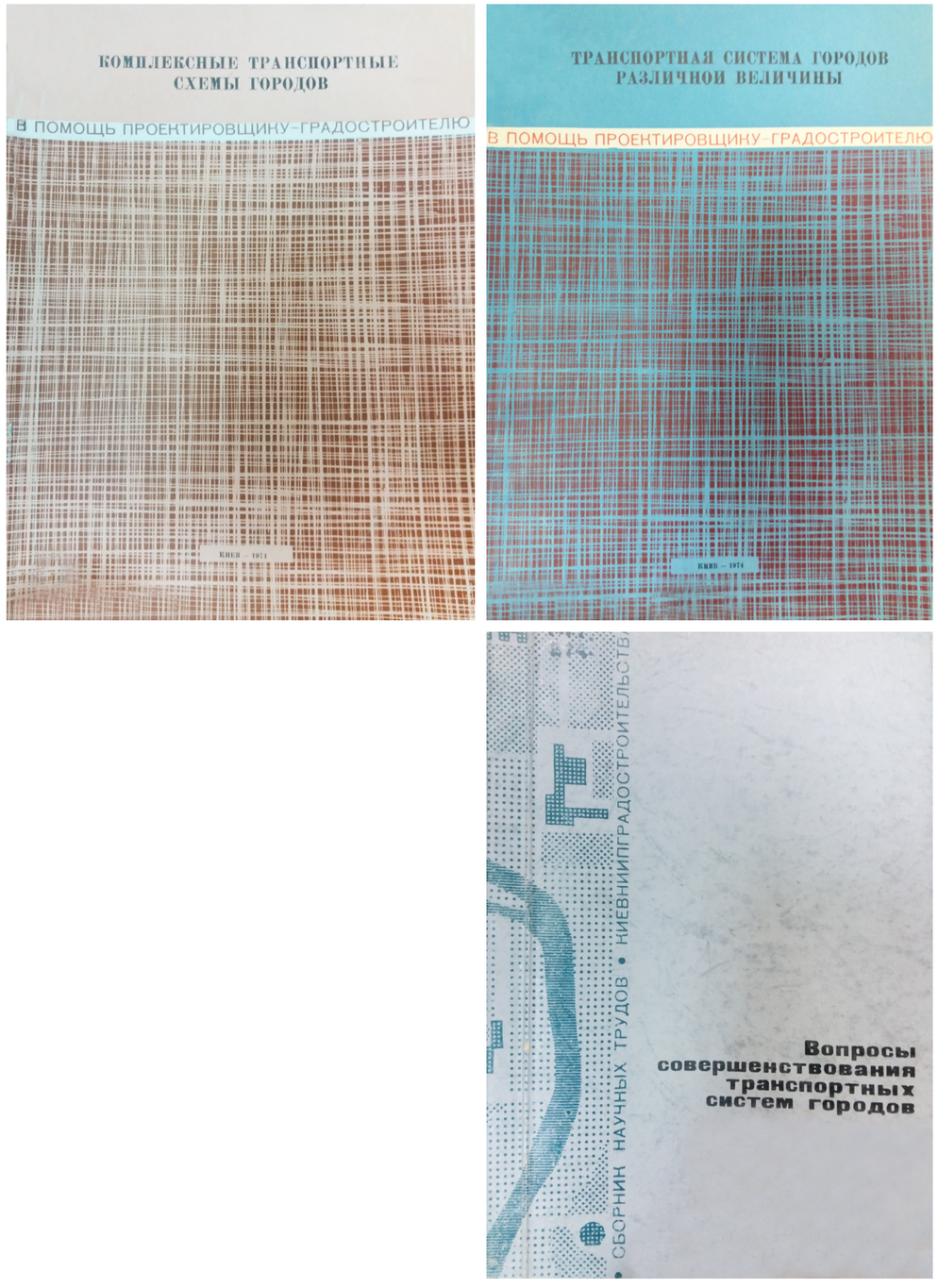


Fig. 87. The covers of a series of publications from Kiev NIIP Gradostroitelstva and Giprograd which were published in the 1970s as "assistance for planners": 1. *Kompleksnye skhemy gorodov*, [Complex city layouts] 1974a; 2. *Voprosy sovershenstvovaniia transportnykh system gorodov*, [Issues of improvement of city transport systems], 1977; 3. *Transportnaia sistema gorodov razlichnoi velichiny*, [Transport system of cities of various sizes], 1974(b).

(Starinkevich, 1974, p. 9). From this one can observe a broad understanding of the idea of integrated planning which was supported by the thorough definition of its methodological basis.

Among the most important studies KievNIIP Gradostroitelstva is the 1977 book *Voprosy Sovershenstvovaniia Transportnykh Sistem Gorodov* [Issues of improvement of transport systems in cities]. In this work several relevant principles were established, such as the need for temporal coordination of urban master plans and transport master plans, flexibility of solutions regarding future changes, as well as the strengthening of a collective public transport system (Starinkevich, Balatskii, Rigberg, Shigol, 1977, p. 11). Apart from that, emphasis was put on the active influence of transport planning on urban planning:

> *"During the planning of the road and transport network and in the selection of the means of transport it is necessary in all cases to introduce methods of generation and selection of alternatives and of optimisation, related to the consideration of the mutual influence between transport and city"*[23] *(1977, pp. 11-12).*

Finally, the need to change the reference duration for transport plans was stressed, with the determination of 10 years of detailed planning, another 10 years of project time and the last 10 years as a "perspective time" (1977, pp. 13-14). This effort of the KievNIIP Gradostoitelstva and Giprograd planners was important for the broadening of the understanding of the concept of integrated planning. But, in spite of this, theoretical discussions and studies on this issue in other study centres were limited.

In the early 1980s, KievNIIP Gradostroitelstva participated in the publication of the first handbook on planning methodology and regulations for general urban transport plans *Rekomendatsii po razrabotke kompleksnykh transportnykh skhem dlia krupnykh gorodov* [Recommendations for the development of complex transport schemes for large cities]. However, despite the title, the main concern still remained an economic rationalization (1983, p. 37): "In the development of options for the networks of collective public transport it is necessary to provide for a selection of the most economical uses of existing and new lines of passenger transport". The recommendations continued with the idea of transport zones, where the layout of transport lines was determined in relation to the distribution of passenger flows and the location of land use. However, none of the ideas of KievNIIPGradostroitelstva and Giprograd were developed and applied in the urban transport planning regulations.

In another study, *Spravochnik proektirovshika. Gradostroitelstvo* [Handbook of planners. Urbanism], Belousov, 1978, the issue of integrated planning was also not covered. The main criteria for planning public transport networks were the same as in the collective work *Principy Sovetskogo Gradostroitelstva* [Principles of Soviet

23 "При проектировании улично-дорожной и транспортной сети и выборе видов транспорта необходимо повсеместно внедрять методы многовариантного и оптимального проектирования, использующую обратную связь "транспорт-планировка."

Urbanism],[24] from the mid-1960s: minimum capital and operational investments, maintenance of travel times between residence and work, or other mass attraction areas, at 30-40 min. (TSNIIP Gradostroitelstva, 1978, p. 141).

On the other hand, the level of exchange and discussion of ideas among specialists was also low. Among the few conferences devoted to the subject of collective public transport one can be highlighted in Leningrad: *Kompleksnoe razvitie gorodskogo passazhirskogo transporta* [Complex development of passenger transport in cities], Fishelson, 1970. At this conference, some issues related to the coordinated operation of various means of collective public transport, improvement of the technical characteristics of transport, accessibility of stops and organisation of exchange points were discussed.

Fragmentation of the study topics can be seen, for example, in another conference organized in Leningrad: *Gorod i passazhir. Gradostroitelnie problemy razvitiia passazhirskogo transporta* [City and Passenger: the urban problems in the development of passenger transport], Fishelson, 1975. Despite having a suggestive title, the main topics of study remained work and cultural travel, traffic distribution in transport areas, traffic in the city centre. The following scientific conference, *Gorod i transport. Kompleksnoe razvitie transportnykh sistem krupnikh gorodov* [City and Transport. The complex development of transport systems in large cities], Soyuz Arkhitektorov SSSR) in 1979 in Leningrad was also closely related to the rational development of transport networks in the city and the rational introduction of rapid public transport, access to stops, interchange points, zones of influence, etc., leaving the issue of integrated planning unattended and undiscussed.

Evaluating that experience of theoretical studies in the USSR in the 1970s, transport specialist Shabarova, in her work *Sistema passazhirskogo transporta v gorodakh i agglomeraciiakh* [Passenger Transport System in Cities and Agglomerations], 1981, highlighted several problems in the planning of Soviet cities, such as the lack of a research plan, the lack of a functional division of competences between several institutes and study centres, and poor involvement of study centres in research activities (1981, pp. 23-24, Fig. 88). As a result, the issue of transport-city integration had a limited vision and was linked to the time of access to stops, travel and interchange time, the type and density of functional areas measured with public transport capacity and the geometric relationship of transport network configuration in relation to urban form.

In short, there was a certain lack of definition of the functions of the institutes and an uncoordinated and unhierarchical organization of research. The planning of urban transport was a subject dealt with by everyone and at the same time belonged to no one. Several study centres dealt with problems related to various subjects of the city and its transport, with ministerial control of the subjects and the results. Among the research topics of interest to the State were the coordinated operation of urban transport systems and the rationalization of the introduction of rapid public transport system in large cities, while the topic of the integration of urban planning with transport planning received scarce attention. In general, it can be concluded that weak organization of theoretical studies by the Soviet state, state control

24 Collective publication "Principy Sovetskogo Gradostroitelstva", consisted of 4 volumes, represented a fundamental research in soviet urban planning theory. It was carried out by the TSNIIP Gradostroitelstva between 1966 and 1969.

Fig. 88. Cover of the book *Sistema passazhirskogo transporta v gorodakh i agglomeraciiakh* [Passenger transport system in cities and agglomerations], Shabarova. E. V., 1981, was one of the first publications to criticize theoretical studies and the organization of institutes in the USSR.

over the issues, perspectives and research results, political interest in short- and medium-term solutions, and the maintenance of a majority sectoral view among professionals resulted in the limited development of the factors, bases, criteria and methods of integrated planning in the 1970s in the USSR.

3.2.4. STATE SUPPORT AND PROFESSIONAL EXCHANGE IN DEVELOPING THE IDEA OF INTEGRATED PLANNING IN THE GDR

The formation of theoretical studies on traffic and urban transport was carried out early in Germany. Since the 1920s, several studies on urban traffic have been developed and several institutes for urban traffic planning were opened at the universities of Cologne in 1921 and Stuttgart 1929 (Diefendof, 2014, p. 39). In addition, the Bauakademie der DDR was one of the oldest institutes in Germany where planners had worked together for a long time (Rabe, 2019). Later in the GDR, this theoretical basis was an important factor in the organization of joint work on a theoretical and practical level. At the same time, GDR state authorities supported a clear definition of the objectives in theoretical studies and the development of legal documents, manuals, guidelines for planning practice. This allowed to organise planning process in a more systematic way. Special attention was given to objectives such as maintaining the travel time of workers in new residential areas and establishing the relationship between theoretical research and practical application (VIIIth Meeting of the Communist Party in the GDR in 1971). The state also stressed the importance of long-term solutions and planning of the research process with a clear division of

functions between the various institutes. The main task in the development of scientific work was to forecast adequately and find the most efficient solutions in the location of industrial areas, the concentration of traffic flows and the development of collective public transport (Leiser, 1969).

The Ministry of Transport and the Deutsche Bauakademie were responsible for the development of theoretical studies in the 1960s. As in other communist countries, the main focus of research in the GDR was also on modern solutions in the planning and design of roads, intersections, and the use of rapid public transport (Junker, 1965, p. 69). For example, in 1961 the Deutsche Bauakademie published a paper on transport in residential areas *Wirtschaftliche Erschließung von Wohngebieten unter Berücksichtigung eines nicht trennenden Straßenverkehrs* [Economic development of residential areas taking into account a non-segregated road network] This study was an attempt to answer the urgent and sectoral issue, without having developed other issues related to the general functioning of urban traffic.

The Ministry of Transport started to publish theoretical studies mainly from the second half of the 1960s onwards, which were carried out by the urban transport research group [*Forschungsgemeinschaft Städtischer Verkehr*]. The two most important works were *Grundsätze für die Entwicklung des Verkehrs in den Stadten der DDR* [Principles for the Development of Transport in the GDR Cities], 1966 and *Basisstruktur der Verkehrsanlagen, Dresden, Leipzig, Rostock und Magdeburg* [The Basic Structure of Transport Systems, Dresden, Leipzig, Rostock, Magdeburg], 1968. These studies marked the need to reconsider general transport plans and their closer integration with long-term territorial development. While the Hochschule für Verkehrswesen in Dresden (founded in 1952), which was also under the Ministry of Transport, mainly dealt with issues related to traffic engineering, transport economics, technical issues in different modes of transport and the construction of their infrastructure. It should be noted that, despite not specializing in urban planning, urban issues, especially since the residential program in the 1970s, were considered in the theoretical studies of the school (Gross, Rehbein, 1989, p. 116).

On the other hand, at the end of the 1960s Deutsche Bauakademie published a series of studies named *Städtebau und Architektur* [Urban Planning and Architecture] dedicated to building issues [*Bauforschung*]. Among them were some dedicated to transport and urban traffic. The first study was *Stadt und Verkehr: Verkehrs- und Stadtplanung in den USA und in Westeuropa* [City and Transport: Transport and Urban Planning in the USA and Western Europe], 1968 edited by exiled Spanish architect Manuel Sánchez-Arcas (Fig. 89). The book was dedicated to the study of representative cases in technical-physical solutions such as the vertical separation of private and public traffic, the limitation of car traffic in city centres, the creation of pedestrian areas, rapid rail transport, etc. The second publication of the Baukademie was devoted to the planning of the city centre *Stadtzentren: Beiträge zur Umgestaltung und Neuplanung* [City Centre: Contributions to the Redesign and New Planning] from 1967, which was mainly related to traffic and transport issues. Apart from this, several articles were published in seminars and conferences, which, however, did not fully represent the problem of the relationship between transport and city. At the seminar *Verkehr und Städtebau* [Transport and Urban Planning], Erwin Gericke, architect of the department of spatial planning and urbanism at the University of Architecture and Construction in Weimar, noted that the main difficulty was to relate specialised areas such as transport planning and urban development. Apart

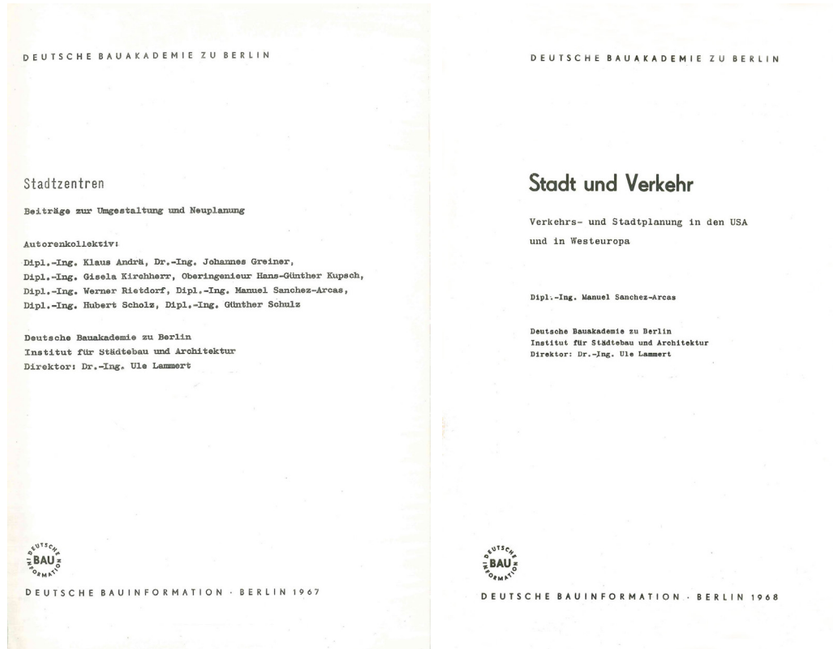


Fig. 89. Covers of two of the most important publications of the Deutsche Bauakademie edited at the end of the 1960s. *Stadtzentren: Beiträge zur Umgestaltung und Neuplanung* (1967) y *Stadt und Verkehr* (1968). They were dedicated to the study of foreign experience, without developing their own principles or yet having a global vision of the relationship between transport and the city.

Fig. 90. The building oft he Dresden Higher School of Transport "Friedrich List" Dresden, Source: Müller, H. -G. (1967) 15 Jahre Hochschule für Verkehrswesen "Friedrich List", *Wissentschaftliche Zeitschrift der Hochschule für Verkehrswesen "Friedrich List"*, 14 (3), p. 623.

from that, the importance of considering the social and cultural factors of transport was emphasized. (1968, pp. 211-212). As a result, the need to widen the knowledge of the relationships between transport and the city can be appreciated. Publications by both the Bauakademie and the Ministry of Transport were scarce and devoted to the most urgent issues, without providing the answer to a global and integrated vision of this issue.

In 1971 a relevant change was made with the establishment of the research association "Städtebau", which approved its research plan in the same year. The main objective was the efficient use of economic resources for the harmonious development of cities (Federal German Archives, 1971, p. 3). This motivated a close and continuous interrelation between different levels of authorities and various institutes. This theoretical research plan had one strong idea: the compatibility of economic and social objectives.

The inadequacy of theoretical studies on transport and city also prompted the establishment of the Central Institute for Transport Research (*Zentralen Forschungsinstitut des Verkehrswesens der DDR*, hereafter ZFIV) under the Ministry of Transport in 1971, with the subsequent formation of the Scientific Section for Passenger Transport [*Die Wissenschaftliche Sektion Personenbeförderung*], (Rabe, 2019). ZFIV was a research member institute, while the main institute was the Institute for Urban Planning and Architecture. In addition, the Dresden Superior School of Transport, which was a big institute with several departments, also cooperated as a member (Fig. 90). The Institute of Economics and the Institute for the Preservation of Historical Monuments were also collaborating partners in this process. The involvement of the study centres in the scientific activities was obligatory (Architektura ČSR, 1965, p. 483). The activities of the various institutes had to be coordinated, with the exchange of their work plans and research results, and with participation in the evaluation of the results (Federal German Archives, 1971, p. 20). These activities had their logical procedure in the publication of planning standards and recommendations which were approved by the Ministries of Construction and Transport.

The studies initiated by ZFIV in the early 1970s on the long-term development of urban transport were mainly motivated by the need to consider in the future the growth of car traffic and the planning of new residential areas in the periphery (Voigt, Schleife, Keul, 1977, p. 480). Thus, if in the 1960s in the GDR futuristic ideas were deployed in transport solutions, from the early 1970s onwards, the planning started with more organised activities and was more related to urban reality (Rabe, 2018). The topic of the research project was *Entwicklung neuer Verkehrssysteme in Städten und Ballungsgebieten* [The development of new transport systems in cities and suburban areas]. The aim of this research was the determination of relationships between the transport system and the environment through joint work between urban planning and transport specialists (Lammert, 1971, p. 647). The process of exchange of ideas was also planned, such as the relations between the study centres and the ministries, the exchange of information, the establishment of planning objectives for each study centre, the control of the research quality and realisation.

The ZFIV was the coordinating organisation for urban transport research for all research centres and local urban transport departments. In their research activity the main attention was paid to the need for the integration of transport and city approaches; to facilitate this, two agreements were signed in 1973 and 1975 on co-

operation in theoretical studies between the Ministry of Transport and the GDR Ministry of Construction (Müller, 1977, p. 15). In 1975 the *Grundsatzvereinbarung über die Zusammenarbeit auf dem Gebiete von Wissenschaft und Technik* [Main Agreement on Cooperation in Science and Technology] was signed, which was followed by the agreement *Forschung für Städtebauplanung und Stadtverkehrsplanung* [Research in Town Planning and Urban Transport Planning] of 1976 (Müller, 1977, p. 13).

To promote the exchange of ideas between urban planners, transport planners and politicians, 3 urban transport symposiums were organised in 1973, 1975 and 1977 [*Symposium Stadtverkehr*] organised by the ZFIV with the participation of the Deutsche Bauakademie (Rabe, 2018, Fig. 91 and 92). The main goal of these symposiums was to define the relationship between collective public transport and urban planning. The following topics received special attention: the connection of new residential areas with the consolidated city, the definition of a methodology for urban and transport plans, the evaluation of planning experience, the coordination of results between study centres, the discussion of difficulties and possible solutions, etc. During the symposiums several ideas were presented: reciprocal relations between transport and urban structure, priority of collective public transport and its relation with the location of land uses (Lindner, 1975, p. 247), as well as structure and form of new residential areas (ZFIV, 1975a, p. 254). In the localisation of land uses it was important to consider not only the distribution of traffic and direct relationships between areas, but also the adequacy of solutions with the possibilities of existing transport system. However, this should not limit solutions, but, on the contrary, provide the possibility of finding optimal and varied spatial relationships in terms of travel directions and types of collective public transport.

The work *Komplexe Anbindung von Wohngebieten* [Complex connection of new residential areas] was the main theme of the theoretical studies. In order to widen this topic, a study was carried out in 1974 called *Richtlinie für die verkehrliche Anbindung und Erschließung von Neubaugebieten* [Guidelines for the traffic connection and development of new development areas] which was developed as a collaborative project between the Ministry of Transport and the Ministry of Construction. In the discussions for these new studies a concern can be noted for the provision of a variety of spatial relationships in the new residential districts. The intention was to avoid the deployment of sectoral approaches to new residential areas with the aim of preventing their isolation and improving their integration with historic cities. The importance of transport connections to new residential areas was also explained by their influence on urban structure and by existing transport relationships. The isolated connection of new residential areas was seen as "an absurd idea that can lead to serious problems in the long term" (ZFIV, 1975a, p. 35). The main criterion in the planning of new residential areas was "the distribution of their traffic throughout the urban transport system" (1975, p. 36) in order to avoid the contradictions and isolation of peripheral residential areas, and to provide the conditions for varied and complex accessibility. For this purpose, the new residential areas had to be connected by a combination of different means of collective public transport such as S-bahn/bus, rapid tram/bus. This criterion was sometimes referred to as "the transitability of the new residential areas" (Jakob, 1974, p. 13) which in their layout solutions provided a variety of options for relations with the city.

These ideas were affirmed and repeated in several studies throughout the 1970s. Thus, it was stressed that "the transport connection of a new residential area would

Fig. 91. Covers of the three ZFIV symposiums in 1973, 1975 and 1977. These symposiums are an illustration of the collaboration between the ZFIV, Deutsche Bauakademie and KDT (Kammer der Technik).

Fig. 92. The urban transport symposium of 1977. In the picture traffic planner Ulrich Rabe is presenting his report. Source: Photo archive of Ulrich Rabe.

be provided only when its outgoing and incoming flows can be fully covered by the city network" (Voigt, 1976, p. 726). To this end, one of the most important approaches in the GDR was the proposal of alternative locations for residential areas, work areas and public transport networks. The concern of planners for the coherence of transport solutions can be highlighted, despite the priority of economic rationalisation.

The attention to this issue can be seen in a variety of publications developed by the Central Transport Institute: *Verkehrliche Anbindung von Wohngebieten* [Traffic Connection of Residential Areas], 1972/73; *Vorläufige Komplexrichtlinie für die Planung der Umgestaltung städtischer Gebiete* [Complex Preliminary Guide to Planning for the Transformation of Urban Areas], 1973 draft; *Komplexrichtlinie für die städtebauliche Planung und Gestaltung von Neubaüwohngebieten* [Complex Guide to Urban Planning and the Design of New Residential Areas], 1974 draft, and *Richtlinie für die verkehrliche Anbindung und Erschließung von Neubauwohngebieten* [Guide to Connecting Transport and the Development of New Residential Areas], 1974 draft.

Apart from publishing a variety of planning guidelines and recommendations, there was an intention to publish a standardised methodology for urban traffic planning. In 1981, the *Katalog der Orientierungs- und Richtwerte für die Generalverkehrsplanung der Städte* [Catalogue of indicative values and guidelines for general traffic planning in cities] was published. In this catalogue, the criteria for collective public transport were standardised with the definition of the characteristics of travel time, speed, occupancy and type of vehicles, capacity, etc. The criteria for collective public transport were also standardised with the definition of the characteristics of travel time, speed, vehicle occupation and type, capacity, etc. In addition, theoretical studies were also carried out for medium and small cities as was the case in *Methodik der Generalverkehrsplanung in Klein - und Mittelstädten* [Methodology of general transport planning of small and medium sized cities] edited in 1976 by the Ministry of Transport, 1976(a).

However, despite this great effort to form an integrated and widespread theory of transport and city planning, in the late 1970s there were still problems. There were still some shortcomings in terms of general rules for urban transport planning and in the use of general methods of urban traffic planning, fixing working stages for plans and the determination of criteria to renew existing plans (ZFIV, 1977, p. 87). Economic criteria still prevailed absolutely in the ideas of transport planning. Since the VIIIth Meeting of the GDR Communist Party in 1971, economic policy has been geared towards intensifying the use of economic resources. This policy was also important in urban transport planning in the GDR (Trembich, 1977, p. 34). The optimisation of urban structure at that time meant the minimisation of investment and maintenance costs and at the same time the maximisation of service quality (Michalk, 1972), which, because of the contradiction in objectives, was an unresolvable challenge. This maintained its relevant weight throughout the 1970s in the solutions for locating new urban areas, where the main criterion was the uniform location of land uses, uniform urban development, and uniform connection with transport lines in order to achieve the minimization of urban traffic (ZFIV, 1974, p. 4).

In spite of the strong political pressure on the results of theoretical studies that had to be adjusted to the economic objectives of the communist regime, the theory of transport and city planning in the GDR was quite developed and the research

process was quite well organized. There was consistency in the objectives of theoretical studies due to political will and administrative coordination, thanks to the exchange between transport and city study centres and to the clear definition of study topics, as well as the publication of their results and the intention to apply them in practice.

3.2.5. THEORETICAL STUDIES ON INTEGRATED PLANNING IN THE CSR

The research function in urban transport at the CSR was led by the Federal Ministry of Transport [*Federalní Ministerstvo Dopravy ČSR a SSR*] and the Ministries of Transport and Communications of each Autonomous Republic, under which were the research institutes [*Výzkumné ústavy in Brno and Žilina*] and transport schools [*Vysoké školy Brno, Žilina*] which were primarily concerned with issues of traffic engineering, transport economics and communication (Marton, 1978, p. 11). Apart from this, as in the USSR, there was also a variety of ministries involved, such as the Ministry of Science and Technology [*Vedy a Techniky ČSSR*] and the Ministry of Construction [*Ministerstvo Výstavby ČSSR*]. In connection with this, several scientific institutes were established in the 1950s to promote scientific urban and transport planning, such as the Czechoslovak Academy of Science [*Československá Akademie Věd, ČSAV*], the Transport Thematic Committee of the Scientific Council [*Oborové dopravní komise vědecké rady, MŠK*], the Transport and Communication Section [*Sekce pro Dopravu a Spoje, ČSVTS*], the Higher School of Transport [*Vysoké školy dopravní*] and the Transport Research Institute [*Výzkumný ústav dopravní*].

In order to boost transport research, the resolution of the Communist Party Central Committee of the CSR *O zvýšení úlohy vědy a techniky v rozvoji výrobních sil ČSSR* [Enhancing the role of science and technology in the development of productive forces of the CSR] was adopted in 1962. However, this variety of study centres posed the problem of dispersal of planners in different study centres, which complicated the exchange of ideas and progress in the discipline (Vandas, 1975, p. 3). It was also difficult to organize the work coordination between ministries and their study centers (Jungmann, 1963, p. 1). Transport research received a boost in 1971 when the need arose to connect transport planning objectives with state objectives on science and technology development. The topics of study were not defined among various schools and institutes (Žáčková, 2014, p. 23).

The most important study centre was the Czechoslovak Association of Scientific and Technical Societies [*Československá Vědeckotechnická Společnost - hereafter ČVTS*-], which is part of the Federal Ministry of Transport in the CSR. The ČVTS resolved various theoretical issues, such as technical development of transport, organisation of urban traffic and conceptual issues of development in collective public transport system. One of the most important publications of ČVTS was *Městská Hromadná Doprava* [Urban Public Transport] from 1975, developed by planners J. Pithardt, V. Thoř and J. Vandas (Fig. 93). The authors mentioned that this work was the first to be devoted to the issue of collective public transport planning in the CSR. It was an outstanding idea to characterize the importance of peculiarities in the urban structure of each city, which implied the differentiated location of public transport lines. Thus, the mode of collective public transport was not as important as decisions for the location of its lines, even if different spatial qualities were gen-

erated with different modes of transport (Vandas, 1971a, p. 35). From this, the importance of the continuity of the urban structure and the criterion of spatial integration of the technical transport infrastructure with the existing urban situation can be seen. It was stressed that until then little had been done in the CSR in in respect to the priority of collective public transport over private transport, which was impeded by the lack of research dedicated to new concepts of public transport.

Some new ideas were developed in this study, such as the need for adaptation of urban planning to the needs of collective public transport and the need for planning of new residential areas in relation to collective public transport systems (Vandas, 1975, p. 213). This was to be related to the improvement of long-term planning and the definition of short-term project financing (1971, p. 204). However, apart from these criteria, no detailed explanation of the integration between transport and the city was developed, but more attention was paid to the organisation of the companies' work and to passenger calculations. Collective public transport had to deal mainly with traffic between living and working areas (1975, p. 75). In general, one can note both the continuity of some technical-economic criteria and some new ideas that, unfortunately, were not very developed.

On the other hand, in 1977 Czechoslovak research and technical society (ČVTS) published a series of small publications under the title *Perspectivy Moderních Tramvají* [Perspectives of Modern Tramways], which were devoted to the study of the technical possibilities of a rapid tramway (its capacity and speed), spatial solutions in its operation as a modal split, the densification of areas around stops and the organization of rapid tramway routes. However, the main orientation of the theoretical studies was the definition of some local solutions related to the economic efficiency of the introduction of the rapid tramway system, while other conceptual and long-term issues received less or no attention.

Between 1971 and 1975 the ČVTS prepared, in a broader context, a theoretical study with the theme: *Doprava vech měst jako významný faktor procesu rozvoje osídlení* [Transport in urban regions as an important factor in the process of settlement development]. The aim of the work was the search for transport systems that could harmonise traffic growth and settlement changes (Anonymous, 1972, p. 58). The ČVTS formed another study with the title Přepravní vztahy v dopravě osob mezi i sídlišti v souvislosti se změnami sídelní struktury [Transport relations in the movement of people between districts and housing estates in relation to changes in settlement structure], which aimed to search for stable and rational transport and city relations (Anonymous, 1972, p. 59).

Apart from these studies, the topic of integrated planning on a theoretical level was hardly developed. In some publications devoted to the expansion of Prague and Bratislava, collective public transport also had a limited explanation. Both the problem of urban transport and integrated planning were related to the idea of equivalent distribution of transport activities and resources (Thoř, 1975, p. 95). A similar trend can be noticed in the journal *Architektura a Urbanizmus, Územní Plánování a Urbanismus* which was mainly devoted to the discussion of solutions developed for cities in the CSR.

Some transport specialists also developed some relevant ideas on integrated planning. In their studies, the definition of the influence of transport planning on the urban structure was tested, for example, by stressing the need for the study of

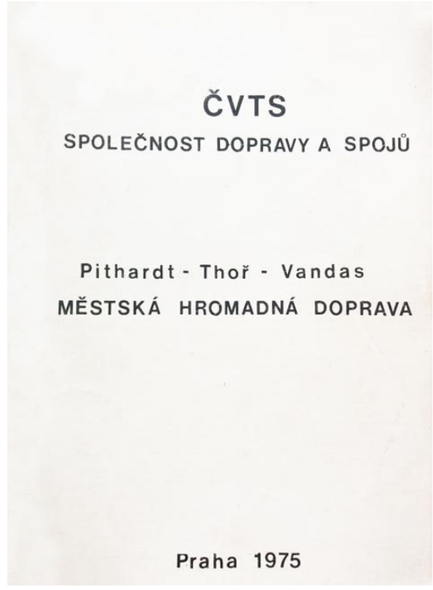


Fig. 93. Cover of *Městská Hromadná Doprava* publication [Collective urban transport], J. Pithardt, V. Thoř and J. Vandas, 1975. One of the first and most comprehensive publications on transport/city integration in the CSR.

different travel motives (Mitáš, 1976, p. 337). Emphasis was also placed on the promotion of collective public transport in the planning of new residential areas. The public transport lines, mainly the railway, were to enter in the middle, leaving the road infrastructure outside the area (Vandas, 1978, p. 39) and the connections with the city were based on a rapid tram system and secondary bus transport system (Vandas, 1978, p. 39). However, it can also be noted in the discussions that the theoretical studies themselves were of lesser importance to the planners of the CSR. Priority was given to case studies rather than theoretical principles and methods, which only served as a basis for planning (Mitáš, 1976, p. 344).

Universities were also involved in theoretical studies, e.g., the Technical University in Brno (*Vysoké Učeni Technické v Brně*). Among their studies is *Silniční a městské dopravní inženýrství* [Road and urban traffic engineering] carried out in 1972 by transport engineer F. Smýkal. In the chapter *Územní planovaní a doprava* [Territorial planning and transport] there was mention of the need to consider transport in spatial development, but the criteria for integrated planning were not developed. Instead, it highlighted direct factors and criteria such as population size, geographical features, configuration and surface area of cities, etc.

The Research Institute for Construction and Architecture at the CSR [*Výzkumný Ústav Výstavby a Architektury - hereinafter VÚVA - founded in 1952*] also participated in the publication of the theoretical studies. However, the main function of VÚVA was to carry out studies on architecture, residence, city centres and metropolitan areas for the cities of the CSR. The question of urban transport was not a priority issue for VÚVA. As it was in the GDR, in the 1960s studies were devoted to urgent issues such as traffic organisation in residential areas: Guidelines for the design of roads and traffic areas in residential areas. Public transport at that time was not the

most important tool for connecting functional areas, but a service to meet certain passenger demands. Therefore, the transport service was understood as a varied system but it had to cover the whole territory of the conurbation. As mentioned by Zdenek Nerad: "Ideally, collective public transport should allow for choice of lifestyle, place of residence, employment and recreation and the way to travel around the city"[25] (1971, p. 215). In VUVA's discussions and studies, there was an understanding of the need to look for the relationship between technical infrastructure and the environment, beyond the criteria of efficient functioning of the transport system and organized movement of people. This intention underlined the need to avoid previous solutions based only on spatial and geometrical solutions considering the movement of people as a decisive factor (Lakomý, 1970, p. 8, p. 13).

At the end of the 1970s VÚVA published a fundamental study in the planning theory of the CSR: *Zásady a pravidla územního plánování* [Principles and rules of territorial planning], 1979 (Fig. 94). It was an integrated project between several specialists that included a large chapter on transport planning. Preparation of the work began in 1976 on behalf of the Ministry of Construction and Technology at the CSR (*Ministerstvo výstavby a techniky ČSR*, 1979, p. 1). In this paper there were a number of new ideas. The influence of transport planning on the location of functional areas was highlighted (1979, p. 3). In existing proposals, it was necessary to consider long-term planning ideas, with the possibility of functional change and selection of urban forms and transport technology (1979, pp. 4-5). General transportation andurban plans were projected for 15-20 years, while there were other types of documents such as transport development studies and urban studies, which were indicative for a period of 25-30 years. In planning of collective public transport system, the most important aspect was the location of the transport lines and the characterisation of their interaction with other transport systems and functional areas, which conditioned the level of operation and the quality of public transport (1979, p. 26). Despite this change in technical perspective, the study again emphasized the paramount importance of economically prioritized connections (residence-work), since "the main political-economic task of public transport is the transport of passengers with destination to workplaces" (1979, p. 25).

However, this study was one of the few developed by VÚVA. In the 1970s the main orientation of the institute was the topic of regional development of cities, making the topic of urban transport and city integration obsolete. Despite attempts to increase and improve the criteria for evaluating the transport system, the criteria of productivity and functionality of cities (such as travel time, traffic frequency, time expenditure, functional areas, etc.) continued to have priority in the Czechoslovak theoretical framework.

In general, in the 1970s in the CSR there was a certain scarcity of theoretical publications on the subject of integrated planning, which may be related to the intention of architects to operationally solve practical issues (Architektura a Urbanizmus, 1972, p. 56). Thus, the planners of the Department of Urban Transport Engineering (*Útvar dopravního inženýrství mesta*) and the Main Department of Architecture (*Útvar hlavného architekta*) carried out, during the planning process, the corresponding theoretical studies on a particular city. Based on these studies, publications were produced on solutions and planning principles applied in each city, such as Karel Zmija's publication on Ostrava,[26] or the publications of the journal *Doprava* [Transport] devoted to urban transport solutions in the four largest cities of the CSR (Prague, Bratislava, Brno and Ostrava). These publications were the basis for further discussions, exemplifying some planning principles applied in relation to the specific characteristics of each city.

25 "Ideálem by bylo, kdyby to byla právě městská hromadná doprava, která by umožňovala volbu životního stylu, místa bydlení, zaměstnání a rekreace i volbu způsobu cestování po městě."

From the analysed publications it can be noted that the work of research centres was not coordinated and there were no collaborations in their theoretical studies. This was related to the contradictions in the organization of their functioning, division of work and cooperation between institutes, which was maintained at the end of the 1960s, being a serious problem that did not allow for an integrated vision of urban planning (Začkova, 2014, p. 42). There was no organization responsible for urban transport planning in cities, it was not fully developed by VUVA, ČVTS, or transport schools and universities. On the other hand, strong orientation of planners to the development of individual solutions explains the difficulty of synthesizing these studies to form a standardized methodology (Mitáš, 1976, p. 342). As a result, the study centres of the CSR, despite generating various materials of some theoretical depth on integrated planning during the 1970s, did not achieve unanimity either in theory or in practice.

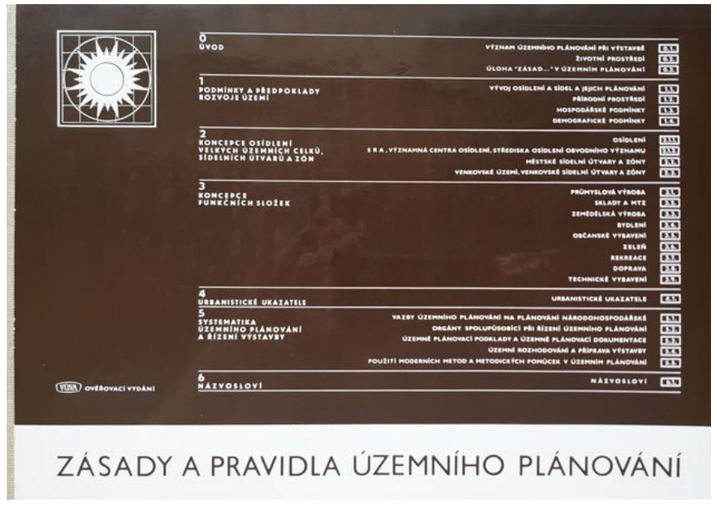


Fig. 94. Cover of *Zásady a pravidla územního plánování*, edited by VÚVA in 1979. The first fundamental study of city planning with transport planning standards in Czechoslovakia.

26 See Karel Zmija, (1967) *Resheniia gorodskogo transporta goroda Ostravi v budushchie gody,* International Conference about the development of urban and suburban transport after the 1970, Prague.

3.2.6. DISCUSSION AND CONCLUSIONS. DIFFERENCES AND SIMILARITIES IN INTEGRATED PLANNING IDEAS: THE STRENGTH OF GERMAN THEORY AND THE DIFFICULTY OF INTEGRATED PLANNING PRACTICE

In the logic of centralised planning and from ideological approaches to the superiority of socialist planning, scientific in nature and representative of the best interests of the state, integrated planning seemed to be an obvious rational requirement. However, it was a very arduous requirement. The ideas of Ladd (2001), Schmucki (2003) and Urban (2007) that a paradigm shift in city and transport planning took place in the GDR in the 1970s have been confirmed. This change is mainly explained by policies against the construction of large road infrastructures, urban renewal of city centres, the valuation of heritage and the return to some conventional methods of urban planning. This study has complemented these views with the idea that the inflection was also the result of a policy aimed at prioritising collective public transport, especially by rapid tramway. It has also been possible to show that the level of inflection in theoretical approaches in the GDR was higher than in other socialist countries. This difference can be explained by the well-organised and coordinated research process as well as a certain level of criticism of the Modern Movement's ideas.

On the other hand, the ideas of Shabarova (1981) on the problems of the realisation of general transport plans related mainly to a weak organisation of the research process have been confirmed. In this study, this problem was exemplified and the weakness of urban planning studies and their poor integration with transport studies was also examined in greater depth.

Furthermore, it has been corroborated the opinion of Žáčková (2014) on the weakness of the organisation of integrated work between institutes and study centres in the RSC. The analysis in this subchapter showed that the state was not involved in the development of research programmes, there were no coordinating authorities for this process and there was no legislative basis for organising an integrated research.

In the USSR, theoretical studies had a fragmented and incoherent character due to the lack of state organization and the departmental compartmentalization of administrative competences. There was insufficient clarity in the division of functions and in the coordinating body of the studies. Each centre carried out its studies according to the needs of the different ministries. The lack of a work plan and of concrete goals in planning theory can probably also be explained by the persistence of strong ideas to solve economically urgent issues. This resulted, on the one hand, in the overlapping of some topics of study, and, on the other hand, in the formation of gaps in theory and a certain weakness of some important topics. The theoretical studies developed were limited by sectoral visions and by the priority of technical-economic criteria. While some new ideas developed by the USSR research centres did not have sufficient continuity and coherence. Likewise, the exchange of ideas between professionals was not encouraged by the State, resulting in the continuity of barriers between the two disciplines. Urban transport remained the functional tool in the solutions of concrete problems, without having a global vision of its development and interrelation with urban planning.

In comparison with the USSR, in the GDR there was a strong formation of theoretical approaches, sufficient organization, coherence of studies, formation of planning methodology and its integration with the practice of urban planning. The state played a strong leading role in encouraging organization, collaboration, coordination, discussions and publication of results. The State's interest was directed towards the formation of optimised and long-term solutions through the application of a standardised methodology. There was clear support in the organization for the study topics and the relationships between the centers, and the professionals took advantage of this opportunity to develop their debates and their joint work. The work was coordinated by the Central Institute for Transport Research, with the contribution of other institutes in the form of collaboration and consultation on related issues. However, this did not mean that political criteria of a technical-economic nature did not play a very important role in the theoretical ideas, but that other criteria were also considered in the studies, and when there was an opportunity these criteria were combined and made compatible.

In the CSR a different approach to the process of forming an urban planning theory was chosen. The importance given to the local characteristics of each city was somewhat detrimental to general theoretical knowledge development. On the other hand, there was insufficient coordination and cooperation in the production of theoretical studies. Probably for this reason, the theoretical studies had an indicative and superficial character. The weakness in the formation of new principles and methods of integrated planning can be noted, mainly due to the lack of a clear organization and sufficient exchange between the study centers. The theoretical studies carried out developed some new ideas in the form of proposals which, however, were not formed conceptually with sufficient solidity. In general, both the publication of manuals and recommendations and the organization of interdisciplinary conferences and congresses were scarce. The weakness of theory and standard methodology meant that new ideas also suffered from deficiency in their application, resulting in varied and subjective solutions.

The division of tasks was also different, in the CSR and the GDR theoretical studies on urban transport were mainly solved by transport study centres, while in the USSR this issue was the responsibility of urban planning institutes. In the GDR there was a clearer organisation of the process and of research responsibilities, with the organisation of a new co-ordinating institute with which the Deutsche Bauakademie cooperated. While in the USSR and the CSR the division of functions between institutes was not so well defined, the urban planning, transport and science and technology institutes were responsible for urban transport studies. In both the CSR and the USSR, theoretical studies on integrated planning mostly remained in the form of mere inputs that were presented in the form of proposals, whereas in the GDR the studies were published in the form of planning guidelines and standards.

In general, it can be said that the level of development of the relationship between transport and urban planning, in the field of theory, was low both because of political-economic interest and interdisciplinary barriers. The new factors of interrelation between transport and city, the development of the variety of spatial relationships between urban areas, the consideration of the development of long-term transport systems, the consideration of existing transport relations and the search for alternative solutions implied a wide scale of intervention in urban structure. This

reconsideration of planning principles probably seemed suspicious to the communist regimes, which gave first priority to effective and cheap solutions in short and medium term.

As a partial conclusion, the inflection in the socialist urban planning paradigm in the 1970s came from new theoretical approaches to integrated planning. The analysis carried out has emphasized the existence of both barriers and new possibilities. The differential level of theoretical studies can be explained by differences in institutional pre-existences and differences in the organization of studies. The three communist countries chose different approaches. In the USSR, due to lack of organization and clear state interest, theoretical studies continued with sectorial visions and basically served to ensure the fulfillment of technical-economic criteria. In the CSR, the theoretical studies were not organized and were not considered important, resulting in weak cooperation between the study centers and ideas on integrated planning. In the GDR, the organization of a consolidated and integrated study process was seen by the state as a tool to reach optimal solutions, while professionals saw it as an opportunity to advance in the field. However, it is not easy to generalize the results of this analysis, as there were always irregularities in the opinions and ideas in each country. The evaluation criterion was the possibility of taking the ideas to a consolidated and well-thought-out concept, so that they could then be applied in practice. Without this, good ideas remained only as ideas, or were applied in an irregular and sectoral way.

This development of new ideas is not sufficiently explained by professional factors, but also by favourable conditions in the organisation of research processes. The involvement of planners in the study process is mainly explained by the setting of goals and tasks within the distributed functions, which together lead to collaboration and common results. The integration between technical infrastructure and the urban environment and the integration of urban transport planning with urban planning were challenges too difficult to understand and develop. Integrated planning was a complex phenomenon that needed consistency in order to be formed, agreed and mainstreamed among urban planners and transport planners. It was in the 1970s when for the first time the principles of sectoral planning and the simplicity of spatial solutions and relations were questioned, which were characterised by a combination of ideas. The new ideas, on the contrary, were always questioned from the existing functionalist paradigm. Overcoming this thinking was a huge task and therefore required legislative and administrative support from the state.

This period of change cannot be considered as an easy period to interpret, as it is often confusing and has contradictions. Only after developing the principles of rational planning in the 1960s, after realizing the complexity of factors involved in urban development, was it possible in the 1970s to take a further step towards the integrated planning. The theoretical studies served to define new factors of interrelation between urbanism and transport. They were also very important as they set the pace and direction for the development of integrated planning in the following years.

3.2.7. BIBLIOGRAPHICAL REFERENCES

Anonymous (1972) Z výskumných pracovísk, *Architektúra a Urbanizmus*, 2, pp. 56-59.

Belousov, V. N. (1978) *Spravochnik Proektirovshika. Gradostroitelstvo,* Moskva: Stroiizdat.

Bernhardt, C. (2017) Längst beerdigt und doch quicklebendig. Zur widersprüchlichen Geschichte der 'Autogerechten Stadt', *Zeithistorische Forschungen/Studies in Contemporary History*, 14 (3), pp. 526-540.

Cervero, R. (1997) Paradigm shift: from automobility to accessibility planning, *Urban Futures (Canberra)*, 22, pp. 9-20.

Deutsche Bauakademie (1967) *Stadtzentren: Beiträge zur Umgestaltung und Neuplanung,* Berlin: Deutsche Bauinformation.

Deutsche Bauakademie (1968) *Stadt und Verkehr: Verkehrs- und Stadtplanung in den USA und in Westeuropa*, Berlin: Deutsche Bauinformation.

Diefendorf, J. M. (2014) Urban transportation planning influences and legacies: Kurt Leibbrand, Germany's acclaimed postwar traffic planner, *The Journal of Transport History*, 35 (1), June, pp. 35-56.

Interview with Hunger Ditmar in 2018.

Interview with Schwarzbach Heinz in 2019.

Interview with Rabe Ulrich in 2019.

Federal German Archives (1971) *Forschungsvorhaben Sozialistischer Städtebau. Programm 1971 bis 1975*, Forschungsverband Städtebau, Berlin: Deutsche Bauinformation, DH/2/, 21312, 51, M304, 48.

Fishelson, M. S. (1970) *Kompleksnoe razvitie gorodskogo passazhirskogo transporta*, Materialy po kratkosrochnomu seminaru, Leningrad: Stroiizdat.

Fishelson, M. S. (1975) *Gorod i Passazhir. Gradostroitelnye problemy razvitiia passazhirskogo transporta*, III nauchnaia konferenciia v Leningrade, Leningrad: Stroiizdat.

GAE (1979) *Predlozheniia k osnovnym napravleniiam razvitiia edinoi transportnoi sistemy SSSR na 1976-1990 gody*, svodnii tom, Institut kompleksnykh transportnykh problem pri Gosplane SSSR, 403, 1, 218.

GARF (1967a) *Perepiska CK KPSS i SMRSFSR po voprosam tramvaino-trolleibusnogo khoziaistva*, vol. 3, A - 314, 3, 8589.

Giprograd (1969) *Gorodskoi Transport i Rasselenie*, Kiev: Budivelnik.

Giprograd (1972) *Proektirovanie setei gorodskogo transporta*, Kiev: Budivelnik.

Giprograd (1974) *Transportnaia sistema gorodov razlichnoi velichiny*, Kiev: Budivelnik.

Giprograd (1974) *Kompleksnye skhemy gorodov*, Kiev: Budivelnik.

Communist Party Central Committee of the CSR (1962) *O zvýšení úlohy vědy a techniky v rozvoji výrobních sil v ČSSR*, Resolution N147/1962.

GOSINTI (1971) *Sistema skorostnogo obshestvennogo transporta v planirovochnoi strukture bolshogo goroda*, Moskva: GOSINTI.

GOSINTI (1976) *Problemy optimizatsii razvitiia sistem skorostnogo passazhirskogo transporta krupnogo goroda*, Moskva: GOSINTI.

Gross, W., Rehbein, G. (1989) *Geschichte der Hochschule für Verkehrswesen "Friedrich List" Dresden*, Berlin: Transpress VEB Verlag für Verkehrswesen.

Hebbert, M. (2005) Engineering, Urbanism and the Struggle for Street Design, *Journal of Urban Design*, 10 (1), pp. 39-59, DOI: 10.1080/13574800500062361.

Hensher, D. A. (1979) Urban Transport Planning – The Changing Emphasis, *Socio-Economic Planning Sciences*, 13 (2), pp. 95-104.

Herce Vallejo, M. (2002) *La ingeniería en la evolución de la urbanística*, Barcelona: Ediciones UPC.

Hruška, E., Krásný, J. (1975) Třicet Let Urbanismu v ČSSR, Jeho Teoretický Vývoj i Praktické Realizace, *Architektura ČSR*, 4, pp. 152-164.

Hrůza, J. (1970) Teoretické aspekty dlouhodobého plánování městských regionů, *Architektúra a Urbanizmus*, IV-1, Bratislava: Vydavatelstvo Slovenskej akademie vied.

IKTP (1968) *Doklad ob osnovnykh tekhnicheskikh i ekonomicheskikh napravleniiakh dalneishego razvitiia transporta*, Moskva: IKTP.

IKTP (1973) *Voprosy organizatsii raboty i razvitiia gorodskogo passazhirskogo transporta*, Moskva: IKTP.

Jakob, G. (1974) Verkehrsprobleme in Zentralräumen der Deutschen Demokratischen Republik, *Wissenschaftliche Zeitschrift*, 21 (2), pp. 223-230.

Jones, P. (2014) The evolution of urban mobility: The interplay of academic and policy perspectives, *IATSS Research*, 38, pp. 7–13.

Jungmann, V. (1963) Za Zvýšení Úlohy Dopravní Vědy a Techniky v Rozvoji Dopravy, *Doprava*, 2, pp. 1-6.

Junker, W. (1965) Städtebau, Architektur und Perspektivplanung, *Deutsche Architektur,* 2, pp. 68-70.

KievNIIPGradostroitelstva (1977) *Voprosy sovershenstvovaniia transportnykh sistem gorodov,* Kiev: Budivelnik.

Kominarov, A. V. (1966) *Voprosy sovershenstvovaniia kompleksnoi ekspluatatsii transporta*, Moskva: Transport.

Kopper, C. (2006) Stadtverkehrs- und Fernverkehrsplanung in der Planwirtschaft der DDR, *Informationen zur modernen Stadtgeschichte*, 36 (2), pp. 60-71.

Kudryavcev, O. K. (1963) O strukture transportnykh setei, in Akademiia Stroitelstva i Arkhitektury SSSR (ed.), *Problemy sovetskogo gradostroitelstva*, Moskva: Gosudarstvennoe Izdatelstvo literatury po stroitelstvu, arkhitekture i stroitelnym materialam, pp. 38-59.

Künne, H.-D. (1996) Stuttgart – 50 Jahre Verkehrsplanung im Für und Wieder, in Archiv für die Geschichte des Strassen und Verkehrswesens (ed.), *Strassen und Verkehrsgeschichte deutscher Städte nach 1945: Stuttgart, Aachen, Bayreuth*, 10, Bonn: Kirshbaum Verlag, pp.7-49.

Lakomý, Z. (1970) Doprava a životní prostředí, *Architektúra a Urbanizmus*, IV (1), pp. 3-15.

Lammert, U. (1971) Städtebauforschung auf neuen Wegen, *Deutsche Architektur*, 11, pp. 647-652.

Lavrov, V. A. (1976) *Metodika rekonstruktsii gorodov*, Moskva: Stroiizdat.

Lavrov, V. A. (1979) *Preobrazovanie sredy krupnykh gorodov i sovershenstvovanie ikh planirovochnoi struktury*, Moskva: Stroiizdat.

Leiser, E. (1969) Gestaltung des städtischen Verkehrssystems, in *Neue Anforderungen an Städtebau und Architektur, Städtebau und Architektur bei der Gestaltung des entwickelten gesellschaftlichen Systems des Sozialismus in der DDR*, 22. Plenartagung der Deutschen Bauakademie 16. und 17. Oktober 1968, Berlin: Deutsche Bauakademie.

Lindner, W. (1975) Schlußwort zum 2. Symposium Stadtverkehr, en *Rolle und Aufgabendes Verkehrswesens in der sozialistischen Stadt*, 2 Symposium Stadtverkehr des ZFIV und der KDT, pp. 246-253.

Marton, Š. (1978) *25 rokov Vysokej Školy Dopravnej v Žiline*, Žilina: Vydatel'stvo Osveta.

Matoušek, V. (1965) Zkušenosti s Organizaci Urbanistického Výzkumu v Sousedních Socialistických Zemích a v Československu, *Architektura ČSR*, 7, pp. 482-484.

Meyer, J. R., Gómez Ibáñez, J. A., (1981) *Autos, Transit and Cities*, Cambridge: Harvard University Press.

Michalk, H. (1972), *Zur Optimierung Der Verkehrsbezögeren Stadtstruktur*, tesis doctoral. Technische Universität Dresden.

Mitáš, J. (1976) Problémy Integrace Dopravního A Územního plánovaní velkých měst, *Doprava*, 18 (4), pp. 337-346.

Molodykh, I. A. (1973) *Voprosy organizatsii raboty i razvitiia gorodskogo passazhirskogo transporta*, Moskva: IKTP.

Musil, J. (1972) Goal-setting in urban planning: A case study from Czechoslovakia, *Journal of Social Policy*, 1 (3), pp. 227 – 244.

Musil, J. (1980) *Urbanization in Socialist Countries*, New York: M.E. Sharpe. Inc.

Müller, H.-G. (1967) 15 Jahre Hochschule für Verkehrswesen "Friedrich List", *Wissentschaftliche Zeitschrift der Hochschule für Verkehrswesen "Friedrich List"*, 14 (3), pp. 623-629.

Müller, F. (1977) Die Weiterentwicklung der Generalverkehrsplanung und die Wechselbeziehungen zum sozialistischen Städtebau, en *Generalverkehrsplanung und ihre Wechselbeziehung zum sozialistischen Städtebau*, 3 Symposium Stadtverkehr des ZFIV und der KDT, 4 (11), pp. 5-13.

Nerad, Z. (1971) Městská Hromadná Doprava, *Doprava*, 3, pp. 211-217.

Photo archive of Ulrich Rabe.

Piryalin V. V. (1973) *Problemy skorostnogo transporta zarubezhom*, Moskva: IKTP.

Pithardt, J. K., Thoř, V., Vandas J. (1975) *Městská Hromadná Doprava*, Praha: Společnost Dopravy a Spojů.

Potter, S. (1976) *Transport and New Cities, The Transport Assumptions Underlying the Design of Britain's New Towns, 1946-1976*, Milton Keynes: The Open University, New Towns Study Unit.

Saitz, H. H. (2001) 50 Jahre Stadtverkehrsplanung in Erfurt, in Archiv für die Geschichte des Strassen und Verkehrswesens (ed.), *Strassen und Verkehrsgeschichte deutscher Städte nach 1945: Dresden, Leipzig, Halle, Chemnitz, Erfurt*, 16, Bonn: Kirshbaum Verlag, pp. 173-204.

SED (1971) Bericht des Zentralkomitees an den VIII Parteitag, Berlin: Dietz.

Shabarova. E. V. (1981) *Sistema passazhirskogo transporta v gorodakh i aglomeraciiakh*, Riga: Zinatne.

Shkvarikov, V. V. (1970) Problemy rasseleniia na sovremennom etape, *Arkhitektura SSSR*, 10, pp. 3-9.

Schmucki, B. (2003) Cities as Traffic Machines: Urban Transport Planning in East and West Germany, in Divall, C., Bond, W. (eds.), *Suburbanizing the Masses. Public Transport and Urban Development in Historical Perspective*, Burlington: Ashgate, pp. 149-170.

Smýkal, F. (1972) *Silniční a městské dopravní inženýrství*, Praha: Nakladatelství technické literatury.

Soyuz Arkhitektorov SSSR (1979) *Gorod i Transport. Kompleksnoe razvitie transportnykh sistem krupnykh gorodov*, IV Leningradskaya nauchno – tekhnicheskaia konferentsiia, Tezisy dokladov, Leningrad.

Starinkevich, A. K., Oleinikov, E. S. (1965) *Transport v planirovke i zastroike gorodov*, Kiev: Budivelnik.

Starinkevich, A. K., Zablotskii, G. A. (1967) Zadachi razrabotki i obosnovanie sostava materialov kompleksnykh skhem transporta krupnykh gorodov, in Kiev-NIIPGradostroitelstva (ed.), *Transport i planirovka gorodov, materialy nauchnoi tekhnicheskoi konferentsii*, Kiev.

Štván, J. (1973) *Physical, socio-economic and environmental planning in countries of Eastern Europe. Their interaction at the city and city sub-area levels,* Stockholm: National Swedish Building Research.

Taylor, N. (1999) Anglo-American Town Planning Theory since 1945: Three Significant Developments but not Paradigm Shifts, *Planning Perspectives*, 14 (4), pp. 327-345.

Thoř, V. (1975) Ovlivňování Četnosti Cest Obyvatelstva, *Architektura ČSR*, 2, pp. 95-96.

Trembich, K. (1977) Generalverkehrsplanung und sozialistische Intensivierung, en *Generalverkehrsplanung und ihre Wechselbeziehung zum sozialistischen Städtebau*, 3 Symposium Stadtverkehr des ZFIV und der KDT, 4 (11), pp. 31-35.

TSNIIP Gradostroitelstva (1970) *Proektirovanie setei skorostnogo obshestvennogo transporta v krupnykh gorodakh*, Moskva: Rotaprint.

TSNIIP Gradostroitelstva (1972a) *Transport v planirovke gorodov*, Moskva: Rotaprint.

TSNIIP Gradostroitelstva (1972b) *Skorostnoi obshestvenni transport krupnogo goroda,* Moskva: Rotaprint.

TSNIIP Gradostoitelstva and Ministry of Housing Construction and Urban Development USA (1978) *Transport i gorodskaia sreda, sovmestnyi sovetsko-amerikanski doklad*, Moskva: Stroiizdat.

TSNIIP Gradostroitelstva (1979) *Transportnye problemy gruppovikh sistem rasseleniia*, Moskva: Stroiizdat.

TSNIIP, KievNIIP, BelNIIP Gradostroitelstva (1983) *Rekomendatsii po razrabotke kompleksnykh transportnykh skhem dlia krupnikh gorodov*, Moskva: Stroiizdat.

Vandas, J. (1971a) Systémy Městské Hromadné Dopravy, in Vandas, J., Matoušek, J., Novák, K., Plicka, I., *Městská doprava*, Praha: Státní pedagogické nakladatelství, pp. 33-39.

Urban, F. (2007) Designing the past in East Berlin beforeand after the German reunification, *Progress in Planning*, 68, pp. 1-55.

Vandas, J. (1978) Význam mestski hromadní dopravy pro rozvoj míst, *Doprava*, 20 (1), pp. 30-40.

Voigt, W. (1976) Wohnungsbauprogramm und Stadtverkehr, *Wissenschaftliche Zeitschrift*, 23 (3), pp. 725-735.

Voigt, W., Schleife, W., Keul, D.-J. (1977) Stand und Entwicklung der Stadtverkehrsforschung in der DDR, *Die Strasse*, 17 (2), pp. 480-485.

Volkskammer der DDR (1970) *Gesetz über die planmäßige Gestaltung der sozialistischen Landeskultur in der DDR (Landeskulturgesetz),* vom 14. Mai.

VÚVA (1979) *Zásady a pravidla územního plánováni*, Brno: VÚVA.

White, H. P. (1967) The Rapid Transit Revival-A Comparative Review of Overseas Practice, *Urban Studies*, 4, (2), pp. 137-148.

Žáčková, M. (2014) *Historie a Činnost Urbanistického Pracoviště Výzkumného Ústavu Výstavby a Architektury v Brně*, tesis doctoral, Brno University of Technology, Brno.

ZFIV (1974) *Richtlinie für die verkehrliche Anbindung und Erschließung von Neubaugebieten*, Berlin: ZFIV.

ZFIV (1975a) *Rolle und Aufgabendes Verkehrswesens in der sozialistischen Stadt*, 2 Symposium Stadtverkehr des ZFIV und der KDT, Berlin: ZFIV.

ZFIV (1976a) *Methodik der Generalverkehrsplanung in Klein- und Mittelstädten,* Berlin: ZFIV.

ZFIV (1977) *Generalverkehrsplanung und ihre Wechselbeziehung zum sozialistischen Städtebau*, 3 Symposium Stadtverkehr des ZFIV und der KDT, Berlin: ZFIV.

ZFIV (1981) *Katalog der Orientierungs- und Richtwerte für die Generalverkehrsplanung der Städte,* Berlin: ZFIV.

Zmija, K. (1967) *Reshenie Problemy Gorodskogo Transporta v Ostrave v Budushchie Gody*, International Conference about the Development of Urban and Suburban Transport in the period after the 1970, Praha: ČKD Praha.

3.3. INTERNATIONAL CONGRESSES ON URBAN PLANNING AND TRANSPORT IN THE 1960S AND 1970S: ADVANCE AND EXCHANGE OF TECHNICAL KNOWLEDGE BETWEEN CAPITALIST AND COMMUNIST COUNTRIES

"Development of big cities in capitalist countries shows a complete impotence in the management of processes such as the unlimited growth of cities and the spontaneous growth of automobile traffic; there public interests are subordinated to the elements of private enterprise and to automobile dictation (...) In the conditions of the planned socialist economy, there are ample opportunities to regulate both the city growth and the automobile fleet development."[27]

(Polyakov, A. A., 1967).

Since Khrushchev's arrival in the mid-1950s and his policy of liberation from Stalinist practices, this initiated an intensive period of learning from the Western experience in planning socialist cities. Khrushchev's aim was to improve the socio-economic situation in the USSR through the study of Western progress in urban planning (Ward, 2012, p. 510). After the IIGM the rationalization of city planning, rapid urbanization and transformation of urban structures, technical solutions in housing, traffic and urban transport were the new, common problems for Western and communist countries. The congresses were an important means of exchanging ideas as planners were able to have direct contact with better interpretation of problems and experiences. As was stressed at one the IFHP congresses (*International Federation for Housing and Planning)*:

> *"The finest thing about such a congress is always the personal contact and human relations, which are established or renewed here, and the direct exchange of ideas within a small group" (IFHP, 1966, p. 9).*

This exchange was particularly intense in the late 1950s and early 1960s (Ward, 2012; Yakushenko, 2016). However, if learning about urban planning (zoning, housing, new cities and urban reconstruction) started to become less frequent from the mid-1960s, exchanges related to urban traffic and transport remained very strong and intensified in the 1960s and 1970s.

The interest of the communist countries in the subject of transport at international congresses is explained by anticipated growth in car traffic in the future. On the other hand, the common objective for all countries in that period in the search of integration solutions between transport and city can be highlighted. In spite of sharing the ideas, the interpretation was always differential in each country. The plurality of Universal Modern Movement was also present in communist countries and based on selective learning and local interpretations (Wakeman, 2014). The criteria for selection of learning practices were generalized application and consolidated ideas in Western planning (Khrupin, 2016, p. 61). This was one of the reasons for the

27 "В развитии больших городов капиталистических стран проявляется полное бессилие в управлении этими процессами (неограниченный рост города и стихийный рост движения легковых автомобилей) (...) В условиях социалистического планового хозяйства имеются широкие возможности регулировать рост городов, так и развитие парка легковых автомобилей."

failure of some ideas as they were oriented towards short-term solutions and were wrong. The acceptance of these ideas without criticism led to similar results. The solutions were seen as a technique that can be copied and applied quickly, with few particular objectives and criteria in city planning.

In terms of the exchange of ideas, the issue of residential housing and road infrastructure planning is more closely studied (Ward, 2012, 2016; Beyer, 2011; Bocharnikova, 2014; Bernhardt, 2017). While there is little attention to the exchange of ideas on collective public transport planning and urban structure at international congresses. Since the early 1960's together with the movement of ideas in the West considering the presence of the car in the city as a complex social problem, accessibility as an adjustable urban feature and planning as a tool for the control of car traffic, emanating from the works of Colin Buchanan (Traffic in Towns, 1963), in the communist European countries started discussions on the enhancement of collective public transport and the need for integrated planning. The aim of these congresses was not to copy existing solutions and continue with the same ideas, but to advance in the field of interrelationship between transport and city. Western countries, compared to communist countries, had more incentive to solve this problem by having them present in their cities, which made them more advanced. The hypothesis of this chapter is based on the fact that transport and urban planning were considered as technical matters, therefore, they did not enter into the ideological scope which facilitated the learning of the western ideas. While the European communist countries developed official triumphalist and falsifying discourse in these congresses.

Considering this complex context, the tasks of this chapter are firstly, are to understand the discourse of Western ideas, secondly, to analyze the reports of the communist countries and thirdly, to evaluate the level of importance of Western ideas in the theory and practice of socialist urban planning. This will be approached through the analysis of some papers presented at the international congresses on urban planning and transport, as well as through the analysis of the internal publications of the socialist countries. The international congresses were chosen in relation to their importance and influence on both urban planning and urban transport: International Union of Architects (IUA), International Federation for Housing and Planning (IFHP), the International Scientific Consultancy for Transport and Urban Traffic Planning in Budapest [Budapester Internationale Wissenschaftliche Beratung für Stadtverkehrsplanung und Verkehrstechnik] and the International Union of Public Transport (UITP).

3.3.1. CONGRESS OF THE INTERNATIONAL UNION OF ARCHITECTURE (IUA)

The IUA Congress was established after the IIGM with the aim of distancing itself from political debates, yet it never ceased to be a political event (Zubovich, 2016, p. 119). Probably, because urbanism and architecture are the means to represent the quality of life and economy of the participating countries. Relations between Western and Communist planners intensified in the late 1950s. After a change of direction in Soviet city planning since the mid-1950s, uncertainties arose about new planning principles and the intention to eradicate traditional methods. One of the important events marking this concern was the plenary session of the Union of

Architects of the USSR in 1957 (Kosenkova, 2011, p. 6). The resolution of this plenary session was the recognition of low levels of development of urban planning theory and methods of forecasting future development of cities that led to several errors and unreasonable planning (Soiuz Arkhitektorov SSSR, 1957, p. 4). The Congress in Moscow in 1958 was devoted to the theme "Construction and Reconstruction of Towns 1945-1957". It was the first international congress held in the USSR, which was intended to demonstrate the abandonment of Stalinism and openness to world society (Glendinning, 2009, p. 200). The congress was attended by 1,500 people from 51 countries (Yakushenko, 2016, p. 93). In the preface to the publication of the Congress, the importance of knowledge sharing was stressed:

> *"The architects who participate in the congress would like to compare their ideas with what had already been implemented in reality, to compare their experience with the experience of others, their opinions with the opinions of their colleagues (...) This work aims at that kind of comparison" (IUA, 1958, p. 2).*

Apart from this, a special interest in the solution of traffic and urban transport in existing cities was underlined as old solutions did not respond to the new urban reality (IUA, 1958, p. 2). As noted in the evaluation of the congress in the journal Arkhitektura SSSR in 1958, one of the objectives of the congress was to demonstrate to Soviet planners the great possibilities of new techniques in contemporary urban planning (Anonymous, 1958, p. 1, Fig. 95).

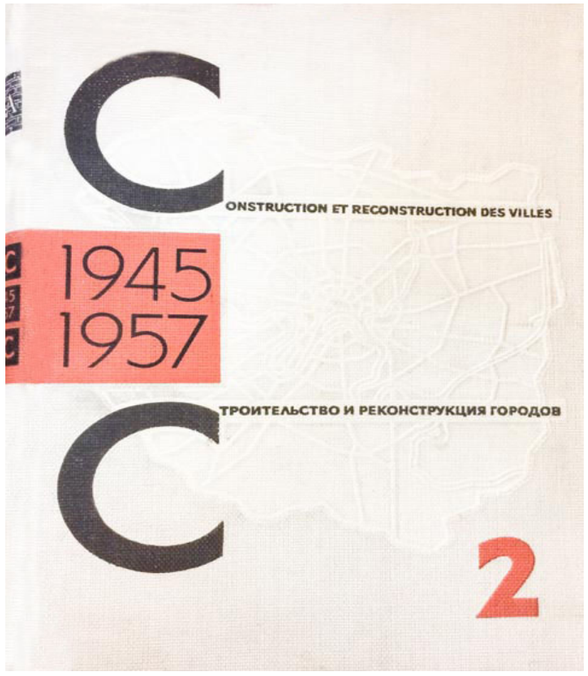


Fig. 95. Cover of the additional volume developed during the IUA Congress in Moscow in 1958.

The peculiarity of this congress was the organization of reports through a questionnaire that was probably designed by the Soviet Union. The questionnaire was an efficient way to collect the answers of each country in relation to the most important questions. Among these questions the interest in rational solutions in urban

structure based on zoning principals, and on functional application and coordination of collective public transport can be highlighted. From this, one can appreciate the special interest of Soviet planners in the experience of coordination of transport and urban traffic operation.

It is important to emphasize that apart from this objective of learning from the experience of other countries, there was an intention to demonstrate the strength and potential of the USSR. This was achieved through the publication of an additional volume to the main volume of the Congress. This publication presented the successful experience of reconstruction of 15 Soviet cities. Detailed explanation was given to issues such as zoning, rationalization of urban traffic, development of residential units and satellite cities, separation of industrial areas, and creation of new recreational areas.

It is interesting that the subsequent IUA congresses were barely dedicated to the topics of urbanism, transport planning and urban traffic. The congresses in London (1961), Cuba (1963), Madrid (1975) and others were mainly devoted to particular issues related to architecture, housing and building technology.

Later, the IUA congress in Warsaw 1981 "Architecture, Man, Environment", despite having a suggestive title, hardly commented on the subject of private traffic and its negative effect on the environment. As for the organization of the contributions, each country presented different themes in its reports, which gave a fragmented character to the topics it dealt with. Analyzing the texts, it is obvious that the main interests of this congress were the issues related to urban rehabilitation and reconstruction, ecological issues, the process of housing construction or the minimization of the influence of industrialization on the environment. Among them, a report from Hungary can be highlighted, "Architecture - the Workplaces and their Environment" where the problem of zoning was presented, which conditioned long distances between work and residential areas, as well as the negative effect of cars on the urban environment (pollution, increased use of urban surface, energy use, etc.), (Arnóth, 1981, p. 92-93). Apart from this report, the GDR report dealt with the issue of urban traffic in new residential areas. Some of the approaches to the problem of the environment were solved through interrelation and long-term urban traffic and structure planning. Among the main achievements was the solution for residential space, which was planned with an idea of direct relationships between pedestrian areas and collective public transport stops (Stingl, 1981, p. 39). There was also some criticism of this experience, about the low level of recognition of the complexity of the environment, which had to be dealt with through better cooperation between planners and better coordination of planning process of the GDR cities.

3.3.2. CONGRESSES OF THE INTERNATIONAL FEDERATION FOR HOUSING AND PLANNING (IFHP)

The IFHP congresses had a wide range of discussions compared to the IUA. The congress topics were divided into two sections: housing and urban planning. The problems of transport and urban traffic were discussed in the latter section. Among the first congresses to have this theme was the congress in the Hague in 1958 with

the theme "Urban Renewal" which had a section called "Land Use and Circulation in Relation to areas for Renewal Action" which was presented by the UK transport engineer Mr. John L. Beckett. The proposals in this section were directly related to the ideas of Modern Movement. It emphasized the importance of the separation of major traffic from urban planning, as well as traffic from each other through a separation of levels. Some proposals also related to collective public transport: "Public transport services can normally be limited to arterial roads, only touching the planning units and having their 'stops' near the points of contact" (Stosberg, 1958, p. 37). The solution was then in isolation and complete limitation of residential areas from any type of traffic. As for the combination of rail and road transport, the only solution seemed to be the empowerment of buses, avoiding the operation of railways that were considered uneconomic and uncomfortable (Becklett, 1958, p. 31).

The problem of traffic and its negative effect on urban growth was recognized (Becklett, 1958, p. 32), but there were no proposals on how to deal with this problem. The methods continued to be based on the provision of road traffic space and the limitation of city size. The human-scale solution was limited to the creation of residential areas, while outside residential areas a car remained the priority. These solutions were also being developed in communist countries, as the main methods of solving the future growth of private traffic.

The first change occurred at the IFHP congress in Tokio in 1966 which devoted a section to urban traffic issues "Urban Transportation and Urban Pattern". The main topics of discussion were: integrated planning, balance between private and public transport and suburban and regional transport planning in cities. It was strongly recognized that the automobile was an economic, social and environmental problem (1966, p. 35). However, the main idea remained the segregation of cars from pedestrian traffic. It was still difficult to change the thinking of planners that planning for road infrastructure expansion is not the only solution for urban traffic improvement. At the same time, discussions on the importance of collective public transport overlapped with this idea. It should be noted that the low level of service of collective public transport was a common problem for both capitalist and communist countries. In relation to this problem, the aim of the congress was to seek solutions for rapid transit, especially on railways and underground. The main solution was related to the development of railway lines and their relationship with urban structure. Similar issues had also appeared in communist countries since the mid-1960s, with the main topic being the enhancement of collective public transport, especially suburban railways, and the need for coordination between all the transport systems in their cities.

The need for interrelationships between transport and urban growth was accepted, and with this, the need for interrelationships between transport planners and architects for efficient operation of urban transport system (IFHP, 1966, p. 38). Apart from this, one of the main issues was the balance between public and private transport, which was based on the need to implement a comprehensive transport plan. These initial ideas needed to be developed into planning practice, in order to make further progress in enhancing the role of collective public transport and pedestrians. It should be noted that communist countries did not report (except for Poland's continuous interventions), nor were they well developed in the literature of that period, which suggests that these ideas were mainly developed in Western countries.

The ideas evolved in the 1970s in western countries with the aggravation of energy problems and traffic congestion, which gave the scientific and technical community a new impetus to find solutions. In European socialist countries, the creation of the institutes and their prospective studies was one of the manifestations of change. The IFHP congress in Amsterdam in 1975 was devoted to a lasting issue: integrated planning. This time, the inadequacy of physical integration in the urban plan was recognized (IFHP, 1975, p. 574), giving priority to integrated decisions among various state agencies (Blair, 1975, pp. 31-32). This problem was common to the countries of Western and Eastern Europe. However, there were some differences between them. The advantages of the capitalist countries in this matter were a certain flexibility in decision-making and a greater possibility for the creation of new agencies and corporations supported by a strong reflection on the difficulties. In contrast, in the communist regimes, in spite of having possibilities of centralized coordination of planning, there were difficulties in decisions, which, in most cases, were imposed because of political objectives unrelated to the planning technique.

The other IFHP congress in 1977 was a continuation of previous discussions with the theme "Towards a more Humane Urban Technology", part of which was devoted to the issues of transport and the urban environment. The main peculiarity was the concern for environmental issues. The strategy was based on the use of existing resources without requiring major changes and interventions (Martin, Bayliss, 1977, p. 153). This gave rise to the second wave of intensifying the establishment of ideas for the enhancement of collective public transport. Traffic and urban transport issues should preferably be dealt with on the basis of existing public transport systems and infrastructure, with the appropriation of technology and means of transport. In this context, tramway system was recognized as one of the most rational and economically accessible solutions. In this congress, the European socialist countries participated as listeners, without presenting their reports.

3.3.3. INTERNATIONAL SCIENTIFIC CONSULTANCY FOR TRANSPORT AND URBAN TRAFFIC PLANNING IN BUDAPEST

Among the important events that took place in the communist countries, the meetings of the scientific consultancy in Budapest (Budapester internationale wissenschaftliche Beratung für Stadtverkehrsplanung und Verkehrstechnik) that took place since the early 1970s stands out. The idea for the organisation of meetings between traffic specialists came from Prof. Dr.-Ing. Hans-Georg Retzko of the Darmstadt University of Technology and was agreed with by the Budapest Transport Science Association Mr. Keller at the beginning of 1970 (Rabe, 2020). The participants of this consultancy were different European countries: Sweden, FRG, Austria, Yugoslavia, Poland, GDR, USSR, CSR and Hungary. This congress was one of the few opportunities for meetings, shared discussion and establishing common conclusions among planners from very different European countries. The first two meetings were still dominated by the concern for urgent issues such as traffic organisation at intersections, traffic regulation, signalling and safety, presenting solutions for the provision of conditions for the circulation of traffic. While new ideas such as long-term transport planning (I), spatial solutions for urban traffic management (II) and quality of transport service and urban life (III) started to be developed later.

One such topic, for example, can be found in Professor Retzko's report with the theme *Verkehrsplanerische Grundsätze zur Langfristigen Verbesserung des Stadtverkehrs* [Traffic Planning Principles for the Long-Term Improvement of Urban Traffic] presented in 1973. The long-term principles were based on a collaborative operation of urban transport to be an integrated part of urban, metropolitan and regional planning. These themes were shared by Western and communist planners. On the communist side the reports were presented by GDR, Hungary and CSR, explaining both good practices and difficulties in implementation. At the same time, however, there was alsoan intention to demonstrate the superiority of the communist regime through a positive evaluation of its experience. For example, the report by Jahn, S. and Saitz, H. H. in 1974, with the theme *Die sozialistische Verkehrspolitik unter Beachtung der ständig steigenden Motorisierung* [Socialist transport policy in relation to increasing motorisation], had as its main objective the highlighting of the achievements in the organisation of collective public transport systems and its control over privatetraffic.

Another important meeting was in 1976 which was dedicated to the search for a relationship between transport planning, lifestyle and quality of life [*Verkehrsplanung und Lebensweise, Lebensqualität*]. The main solution to improve urban life was the provision of an adequate collective public transport service together with the extension of transport planning criteria, especially sociocultural ones which were not considered before. The importance of people's decisions about mobility was recognized, while zoning decisions were not overlyhighlighted. Coordination between land use planning and transport was considered one of the main solutions for improving the environmental quality and attractiveness of collective public transport (1976, p. 12). The technical characteristics (frequency of operation, network density, travel comfort, regularity of operation, travel time and accessibility of stops) of public transport had to respond to people's social needs. However, this recognition did not imply that these ideas would be quickly implemented in practice. The time was still needed to develop the theoretical basis for this and to establish it in the thinking of planners and politicians.

The meeting that took place in 1977 was devoted to *Entwicklung der Methodik der Generalverkehrsplanung* [Development of the Methodology of General Transport Planning]. It highlights another advancement in planners´ thinking which included definition of methods of road traffic management through "*modal split*", consideration of travel decisions of people, adaptation of private traffic to urban life and giving priority tocollective public transport. The experiences of joint work and evaluation of general transport plans were presented. Also, the extension of planning objectives and criteria. For example, in the case of the GDR, the criteria of transport planning were not limited only to technical-economic issues, but also to social and ecological criteria (accessibility of city centre and residential areas).

The 1978 meeting was a continuation of the development of earlier issues with the theme *Menschengerechte Stadtverkehrsentwicklung* [Human-oriented urban transport development]. Priority was given to the organisation of urban space for comfortable pedestrian traffic. One of the significant reports was from the GDR. The outstanding idea of this report was the reconsideration of pedestrian traffic planning, mainly related to the improvement of the attractiveness of collective public transport through the provision of pedestrian accessibility to its stops in city centres and residential areas (1978, p. 6). Transport had to be adapted to the needs of pedestrians in order to establish a safe and pleasant relationship. The objective was to increase the role of pedestrian traffic with a shorter distance to public transport stops of 300-400 m., instead of 800 m which was previously a generally accepted norm (1978, p. 15). Solutions also included the provision of multiple connections of new residential areas, the development of car traffic outside residential areas and the internal development of public transport networks (Gerd, 1975, p. 19). From this it can be seen that at the end of the 1970s the GDR had several new approaches to urban traffic management that were shared at these meetings and at international congresses.

In general, meetings of planners in Budapest were instrumental in exchanging their views, raising problems, recognizing the need for change which helped to advance the issue of integration of traffic and transport planning with urban planning. However, this was still mainly in the form of discussions that onlystarted to be implemented in planning practice during the 1980s.

3.3.4. CONGRESSES OF THE INTERNATIONAL UNION OF PUBLIC TRANSPORT (UITP)

The other important platform for the exchange of ideas on the development of public transport was a series of congresses of the International Union of Public Transport, UITP [*Union Internationale des Transports Publics*], (UITP web page). These congresses originated in 1885 in Brussels under the name *Union Internationale de Tramways/Internationaler Permanenter Strassenbahn-Verein* [*International Union of Tramways International Permanent Tramway Association*]. Until WWII, UITP's membership was only from European countries, later it started to have members from all over the world (Robbins, 1985). It became an important event for the exchange of experiences, situations, research results, policies and technical development of public collective transport. The aim of these congresses was not so much to copy solutions and continue with the existing ideas, but to advance in the subject of transport and city interrelation, and to alleviate traffic congestion. The interest of the communist countries in the subject of transport at the international UITP congresses is closely related to the anticipation of the expected growth in automobile traffic. The universality of the Modern Movement was also extended to the communist countries, through selective learning and local interpretations (Wakeman, 2014). The criteria for its implementation were the generalised application and consolidated formation of Western planning ideas (Khrupin, 2016). At the same time, the European communist countries also presented their reports by creating a false narrative, hiding the difficulties and presenting mostly positive achievements to the Western public. Often, however, the socialist experience was never analysed, possibly because it was not considered remarkable for Western countries (Cook, Ward, Ward, 2014, p. 25).

a) Common technical issues: public transport priority and balance with private transport

The UITP congresses aimed at exchanging information and forming technical conclusions on public transport planning (Fig. 96). Compared to the communist countries, the problem of traffic congestion was more serious in Western countries,

with its negative social, economic and environmental consequences (Moraglio, 2015). In 1956, the Commission on Transport and Urban Planning was established within UITP, which was the main committee for the solution of traffic and urban transport planning problems. Apart from this planning committee, there was also a committee on traffic congestion. It was not until 1975 that another important committee was created: The International Commission on Prospective Study of Public Transport.

The first UITP congress that gave public transport a high priority was held in Paris in 1959 and the topic was "Conditions for the successful competition of public transport against private transport" (UITP, 1959). In 1961, for the first time at the congress, transport expert F. Lehrer from the Federal Republic of Germany addressed the need for coordination and integration of urban public transport planning with city planning (Lehrer, 1961). This idea held by Lehrer, although not original, was very relevant and robust, at a time when this was overlooked by the deployment of the paradigm of city planning for automobile traffic. Therefore, at the time, it seemed a novel idea.

At the 1963 congress, this theme continued with discussions on co-ordination and co-operation between different public transport systems with the aim of enhancing the role of collective public transport. The next congress, the one in Tel-Aviv in 1965, was devoted to the results of the fight against automobile traffic congestion in the period between 1955 and 1965. Among the main conclusions was that there was a weak development of public transport, mainly related to urban traffic management methods that did not have any success in this period (Nielsen, 1965, p. 32), (Fig. 97). The culmination of the congress discussions occurred at the London congress in 1969, when Lehrer presented a comprehensive report in which he underlined the decisive importance of the interaction of collective public transport with urban and suburban spatial planning in the context of automobile traffic congestion.

In the 1960s, the idea of balance between public and private transport started to become the key issue at UITP congresses. A balance for Western countries meant increasing the role of public transport over private transport in order to alleviate road traffic congestion. The main objective was to provide efficiency in road use and improve urban space quality. The type of public transport did not seem to be important, the substitution of one means of public transport for another was seen as a waste of time and finances (Bockemühl, Bandi, 1963, p. 48). The ratio between collective public transport modes was also unimportant. What was relevant was the rational sharing of tasks between public and private transport, in their balance, so that "The question, therefore, cannot be resolved from the point of view of 'either/or', but only from that of 'fifty/fifty'" (Lehrer, 1961, p. 36).

Public transport service should mainly cover central and suburban areas. In other urban areas with less intensive private transport traffic, the provision of public transport was not as critical. The justification of Western planners was based on the idea that public transport could not satisfy all the needs of the population (Lehrer, 1969, p. 49). This division of tasks between public and private transport was considered as a form of social justice (Lehrer, 1969, p. 137). In the 1970s, these ideas began to be considered in relation to urban planning issues. Attention was given to issues related to integrated planning between public transport and urbanism, as well as

between urban and suburban transport in a long-term perspective. UITP congresses, mainly from the mid-1970s onwards (UITP, 1975, 1977 and 1979)[28] were devoted to these issues (Fig. 98). This was the period when Western and Eastern debates began to converge and when planners from the communist countries started to share their experiences.

In general, although some priority was given to public transport in Western countries, the role of private transport remained very important. In the European communist countries, however, they did not think that automobile could compete with public transport: automobile could exist in the city, as long as its quantity was limited. In the internal publications of the communist countries, the lack of balance between public and private transport in capitalist cities was emphasised propagandistically, contrasting with the development of public transport in socialist cities.[29]

b) The triumphalist and falsifying narrative of the Soviet Union and Czechoslovak reports at UITP congresses

With the opening of UITP to the states of real socialism after World War II, its permanent assistance was limited to the Soviet Union and Czechoslovakia from about 1967 onwards. The reports from both communist countries were similar in their content and mode of presentation. They took a descriptive form with a review of the existing situation and technical developments in public transport. This was strange, as the Soviet Union established only general guidelines for urban transport policy, although it did impose its principles of urban planning, which could be observed after the 1960 Congress of Urban Planning in Moscow (*Vsesoiuznoe Soveshanie po Gradostroitelstvu*), where rather abstract transport planning guidelines were announced. They were related to the principles of the Modern Movement, but at the same time to the need for the development of collective public transport. They represented generic principles of urban transport planning, which had to be rational, economical and focused on solutions for mass passenger movement and fast connections to work areas.

The European countries of real socialism each formed their own interpretations on the issue of urban transport planning. Differences include the choice of public transport modes, transport solutions in the city centre, relationship between urban and transport planning, decisions on urban growth and the development of transport networks, traffic organisation in new residential areas, etc. On the other hand, at these conferences, the USSR and Czechoslovakia highlighted a purely technical and transport management orientation. The representatives were traffic engineers or members of urban service ministries, who were not competent to discuss such a complex issue as transport and city planning.

The first report was realised in 1963 in the section on "Horizontal and vertical separation between public and private transport to improve traffic flow." K. K. Klopotov, a representative of the Soviet Union and a member of the Ministry of Commu-

28 See Paschetto, A. (1975) *Gegenseitige Beeinflussung zwischen öffentlichem Verkehr und der Entwicklung von Stadt und Region*, Brüssel, UITP; Bennet R., Elmberg C. (1977) Priority for Surface Public Transport, Montreal, UITP; Meyer H. H. (1979) *Die langfristige Rolle des öffentlichen Verkehrs*, Helsinki, UITP.

29 See TSNIIP Gradostroitelstva SSSR (1966) *Principz Sovetskogo Gradostroitelstva*, vol. 1., Moskva: Stroiizdat., Polyakov A. A., (1967) *Transport Krupnogo Goroda*, Moskva, Znanie.

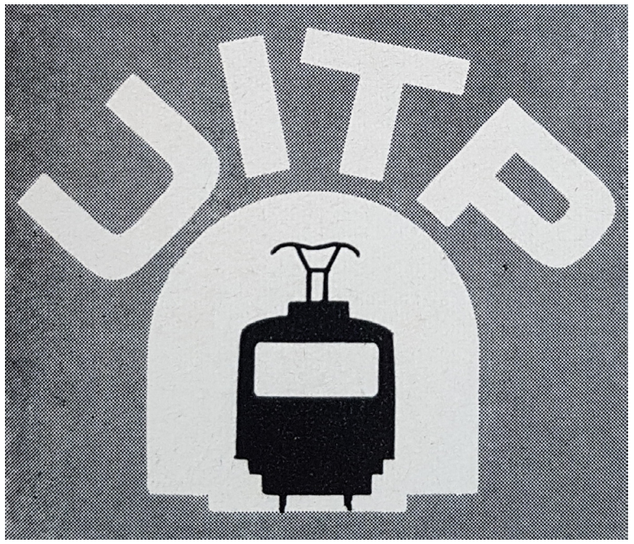
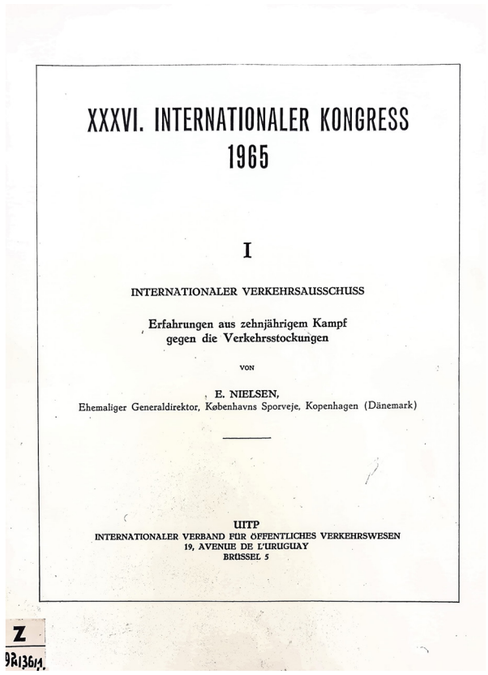
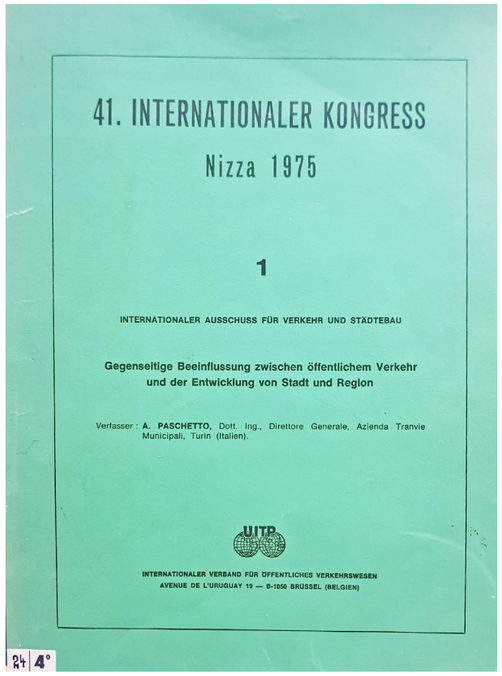


Fig. 96. The logotype of the UITP. Source: Belin, R. (1975) 41st Congress, *Railway Gazette International*, 131(5), p. 173.





Left, Fig. 97. Cover of the 1965 Congress *Erfahrungen aus zehnjährigem Kampf gegen die Verkehrsstockungen* [The experience of ten years of fighting traffic congestion], Tel-Aviv, UITP. The summary of an ongoing struggle with automobile traffic, the willingness of professionals to share knowledge and move forward.

Right, Fig. 98. The other cover of the Congress after 10 years of meetings, in 1975. UITP, *Gegenseitige Beeinflussung zwischen öffentlichem Verkehr und der Entwicklung von Stadt und Region* [Mutual influence between public transport and the development of the city and metropolitan area], Nice, UITP. Recognition of the role of public transport in urban and metropolitan planning.

nal Economy of the Republic of the Russian Federation, presented the report about public transport planning in the Soviet Union. Klopotov's report was mainly devoted to the development of rolling stock and improvement of tramway infrastructure construction, automation of control of its service, improvement of capacity and speed, as well as improvement of operation of repair shops. Some information on the development of four-axle tramway rolling stock (RVZ-6) was presented as a cutting-edge technology that was widespread in Soviet cities, while this tramway model operated only on an experimental basis and only in large and some industrial cities. He explained the solutions for horizontal and vertical separation of public and private traffic in a short paragraph, highlighting some measures such as the need for construction of the metro system, separation of public and private transport lines, and rationalisation of private traffic. The other Klopotov report presented in 1973 was also devoted to the technical development of collective public transport, highlighting the progress in capacity and speed of the metro system in Soviet cities. It was a propagandistic technical approach, showing only the progress and never the problems.

The report of E. V. Tchebotarev, the representative of the Soviet Union at the 1969 congress, presented the "Study of new public transport systems: air-cushion vehicles, conveyor belts, monorails, cable cars, etc." (Tchebotarev, 1969). The topic about alternative means of public transport, very popular at that time, presented the opportunity to demonstrate the progress of communist regimes. This futuristic vision often replaced the discussion of real and urgent problems, such as the organisation of public land transport operation or the coordination between public and private transport systems.

The representative of Czechoslovakia at the 1969 congress, J. K. Pithardt, gave a short presentation in the section on report discussions. Pithardt, who was a member of the Czechoslovak Scientific and Technical Society, devoted his report to issues such as the development of underground public transport in Prague or projects of vertical separation of public and private transport in central areas of Czechoslovak cities.

At the 1971 congress, the report of the Czechoslovak transport planner D. Habarda continued the discourse of the Russian Klopotov. Habarda devoted the whole report to the description of achievements in tramway production and its technical characteristics in 4-axle trams (T2) and articulated trams (K2). Compared to Habarda's report, most of the congress participants devoted their reports to the main topic of the congress: increasing the attractiveness of public transport with contributions to the solutions of improving the operation and planning of collective public transport.

Thus, it can be noted that the main objective of the reports at the UITP congresses was to demonstrate the technical progress of the Real Socialism countries, trying to generate an image on the basis of statistical information on the amount of new built infrastructure, technical progress in rolling stock or number of transported passengers. Certainly, there were advances and good experiences, but there were few, while there were great difficulties which, of course, were not to be reflected in their reports. On the other hand, there was little contribution to the congress debates, especially to the conceptual questions on methods and solutions for public transport planning.

The internal narrative about the UITP congresses in Czechoslovakia and the Soviet Union

The results of the UITP congresses were interpreted differently within the states of real socialism. In the internal debates in Czechoslovakia, it was not denied that the Western solutions presented at these congresses were interesting and important. Although there were no publications devoted to the UITP congresses, the proceedings of the congresses were frequently indicated as relevant references in their studies. The problems raised at the UITP congresses did not appear to be alien to the Czechoslovak situation; on the contrary, they were carefully and attentively studied. For example, the UITP proceedings were used as a conceptual basis in *Koncepce rozvoje městské hromadné dopravy do roku 1980* [Development of urban public transport until 1980] published by the Czechoslovak Ministry of Transport (Ministerstvo Dopravy ČSSR) in 1967, as well as in the important publication *Městská doprava* [Urban Transport], published in 1971 (b) by the traffic engineer Jaroslav Vandas, and in *Městská Doprava: Základy Teorie a Praxe* [Urban Transport: Fundamentals of Theory and Practice], Lacek, 1983). It is worth noting that the latter work was one of the first publications which thoroughly developed the transport planning theory of Czechoslovakian cities.

The ideas of the UITP congresses were also studied in the USSR. Compared to Czechoslovakia, in the Soviet Union was created a false internal narrative, trying to diminish the importance of the progress and highlighting the limitations and difficulties of Western countries in dealing with the problem of urban traffic congestion. Despite this attitude, special publications were issued to share the knowledge and experience gained at UITP congresses. Particularly notable are two technical reports from the Soviet Union delegation. Thus, Klopotov, after the 1969 UITP congress in London, published a book dedicated to the congress: *Usovershenstvovanie Ekspluatatsii gorodskogo transporta zarubezhom* [Improving the operation of public transport abroad]. In the foreword, the author insisted on the characteristic triumphalist discourse, contrasting the problems of the West with the favourable conditions and achievements of the Soviet Union in the planning or organisation of collective public transport. However, it underlined, that despite all the problems and issues specific to capitalist economies, the interest of some technical solutions, which, "critically evaluated", could be applied to public transport in the Soviet Union (Klopotov, 1969, p. 7):

> *"Despite this, some particular technical and operational solutions, which are realised in public transport abroad, evaluated from a critical position, can be applied in the organisation of public transport work in the USSR. In particular, we are interested in questions of limiting the influence of private transport in passenger movement and in efficiency of public transport work."*[30]

Klopotov also explained this interest by the future emergence of traffic congestion problems, which could be prevented under the favourable conditions in the Soviet Union. It is curious that the main issues of the UITP congresses were

30 "Тем не менее отдельные технические и эксплуатационные решения, осуществляемые на зрубежном городском транспорте, оцененные с критических позиций, могут быть применены при организации работы общественного транспорта в городах СССР. В частности, полезно ознакомиться с осуществляемыми за рубежом мерами по ограничению воздействия индивидуального автотранспорта как на условия передвижения населения вообще, так и на эффективность работы общественного транспорта, в частности."

not discussed in this work. Instead, secondary issues, related to technical matters such as public transport operation or development of control systems, payment and automation, were mentioned. This was probably because the Soviet authorities were still focused on learning technical solutions to solve the most urgent issues. Precisely the foreword to this publication propagandistically included the falsifying narrative (Klopotov, 1969, pp. 6-7):

> *"The contrast to this systematic and intensive development of urban transport in the Soviet Union is the urban transport service of most capitalist countries, where the movement of people has become a major social problem (...) Under the pressure of public opinion and the growing demands of the workers, attempts are being made to revitalise the role of public transport (...) Many of these attempts bring only some punctual results, and in some cases do not go beyond plans and wishes."*[31]

The other technical report of the Soviet Union delegation was dedicated to the congress in Montreal in 1977 (Fig. 99). This time, the report had an extensive explanation of the ideas on transport and city planning. And it was devoted to the main issues: the priority of public land transport, the role of rail transport in urban transport system and the integration between urban and suburban transport.

In this report it can be noted the discovery of a great variety of factors in the integration of urban and suburban transport, which provoked a certain interest of the USSR to learn from the previous UITP congresses (Ministry of Urban Services of the RSFSR, 1977, p. 40):

> *"(...) it is necessary to study the information on foreign experience, at UITP congresses, number 42, and at several previous congresses, to consider the positive experience in the coordination and integration of urban and suburban public transport, which will be appropriate to apply in Soviet conditions" (RSFSR Ministry of Urban Services, 1977, p. 40).*[32]

It can be concluded, from these two Soviet reports that the learning from the UITP congresses was relatively superficial. Perhaps the triumphalist and falsifying official discourse began to become an insurmountable reality for the professionals and politicians who were creating it, which prevented a better analysis of Western ideas in the USSR.

31 "Контрастом такого планомерного и интенсивного транспорта в Советском Союзе является транспортное обслуживание многих капиталистических стран, где перемещение население превратилось в сложную проблему большого социального значения (...) Под давлением общественного мнения и все возрастающих требований трудящихся предпринимаются попытки, направленные на возрождение роли общественного транспорта (...) Многие из этих попыток приносят частичные результаты, а в ряде случаев не выходят за пределы пожеланий."

32 "Следует изучить информацию о зарубежном опыте, содержащуюся в гендокладах на 42-ом и ряде предыдущих конгресов МСОТ с тем, чтобы учесть положительный опыт координации и интеграции городского и пригородного общественного транспорта, который будет целесообразно использовать в советских условиях."

3.3.5. DISCUSSION AND CONCLUSIONS

It has been confirmed the opinions of Wakeman (2014), Yakushenko (2016), Khrupin (2016) and Ward (2016) on the special interest in learning about rational city planning ideas since the late 1950s. This learning was carried out in a straightforward, urgent and uncritical way, with the aim of progressing quickly. It was realised mainly through international congresses. In this sub-chapter it has been possible to demonstrate a low level of professional development and a lack of negative practical experience with the Modern Movement ideas, which also contributed to this kind of learning.

Apart from that, it has been confirmed the ideas of Schmucki (2003), Kopper (2006), Beyer (2011) and Bernhardt (2017) about the importance of the city for automobiles concept in the countries of communist regimes, which was explained by the aspiration to develop a fast urban traffic circulation in order to create a modern "socialist city." In this subchapter it has been possible to complete with several others, such as: the new methods of traffic engineering considered as tools for achieving the order and economic functioning of cities, as well as the ideological and economic importance of the anticipation of the automobile traffic congestion problem. It has also been completed with the study of the subsequent period from the mid-1960s and into the 1970s related to the less studied topic, the learning of Western ideas about collective public transport planning, which subsequently served as a basis for the development of rapid tramway and its integration into the city.

The international congresses were of great importance for the advancement in dealing with the problem of automobile traffic congestion, as well as the interrelationship between transport and city. On the other hand, ideas of the urban planning and transport congresses were developed in parallel. The town planning congresses did not always include the issues of transport and urban traffic. Especially in the 1950s and early 1960s, the issues of an urgent nature were related to the questions of building and housing construction, construction technique, etc., leaving aside the questions of town planning and transport. Change was gradually taking place, starting in the early 1960s. Throughout the decade there were ideas and proposalsaimed at reconsidering some planning principles, but they were not extensively shared. While in the 1970s it was possible to achieve some unanimity in the views of practitioners in the discussions. Especially at the end of the decade, the automobile finally became an issue that had to be managed through spatial methods and control of its operation. Pedestrian traffic and collective public transport were given priority, which needed to be supported by "soft" interventions for the environment and efficient ones for urban economy.

The participation of the communist countries in the international congresses had a dual purpose: to learn about Western ideas and developments, and to propagandise about a supposedly socialist city, demonstrating the power of the communist countries. The ideas shared at the congresses were often important references for solving certain traffic and urban transport problems. Some of the developments in the communist countries followed the congresses, trying to learn some technical solutions to solve particular public transport and urban traffic problems. Despite this, there were significant differences in the understanding of these concepts. Automobile transport and its infrastructure was a symbol of modernity also in the societies of real socialism, but public transport had an economic and ideological

Fig. 99. The cover page of the Soviet Union's technical report about the UITP congress in 1977. Ministerstvo Zhilishchno-Kommunalnogo Khozyiaistva RSFSR (Ministry of Urban Economy of the Russian Soviet Federative Socialist Republic) (1977) *Tendentsii razvitiia zarubezhnogo gorodskogo obshestvennogo transporta* [Trends of Development of Collective Public Transport Abroad], Moskva. This publication may demonstrate recognition of the need to learn more from Western experience in urban transport.

priority. This duality was a blatant contradiction, which impeded the formation of narratives and made it difficult to critique Western approaches, which sometimes also conditioned their direct learning and application.

The European communist countries participated mainly as listeners. The reports presented generally had little contribution to the congress themes, and were in the form of a few summaries on the current state of urban transport. The emphasis was also placed on technical developments in rolling stock, the improvement of public transport services, and co-ordinated work between transport companies. But there were also cases where countries such as the GDR, Poland, the CSR and Hungary also made relevant contributions. This mainly occurred in the 1970s with the development of the theoretical basis of research institutes and the paradigm shift in urban planning.

On the other hand, in the internal discussions about the international congresses, it continued with the triumphalist discourse. In the case of the UITP congress, for example, if among the Czechoslovak technicians the results of the UITP congresses were not denied, among the technicians of the Soviet Union the triumphalist discourse was always maintained. The ideas of the congresses were published in

Soviet literature, but the methods developed by Western countries were presented as inefficient and even useless in the context of the irreversible process of traffic growth in capitalist cities. In contrast, in the conditions of Soviet urban planning, these same ideas could have a positive effect because public transport and its infrastructure were developed at the right time.

Thus, it can be said that the West was gradually setting the direction of urban transport planning by overcoming difficulties, even if the need for adequate solutions was urgent. In the Europe of real socialism, however, the omnipresence of the triumphal and deceitful narrative prevented an open discussion of urban transport problems, which ultimately contributed to negative consequences for transport planning in their cities.

3.3.6. BIBLIOGRAPHICAL REFERENCES

Anonymous (1958) Piatii Kongress Mezhdunarodnogo Soiuza Arkhitektorov, III Plenum Pravleniia Soiuza Arkhitektorov SSSR, *Arkhitektura SSSR*, 7, pp. 1-2.

Arnóth, L. (1981) *Architecture – the Workplaces and their Environment*, in XIV World Congress of the International Union of Architects, Reports and Contributions, Warszawa, 15-21 June, pp. 92-95.

Becklett, L. (1958) *Land Use and Circulation in Relation to Areas for Renewal Action*, in Report of International Seminar on Urban Renewal, IFHP, The Hague.

Belin, R. (1975) 41st Congress, *Railway Gazette International,* 131(5), pp. 173-174.

Bennet, R., Elmberg C. (1977) *Priority for Surface Public Transport*, 42nd UITP International Congress, Montreal.

Bernhardt, C. (2017) Längst beerdigt und doch quicklebendig. Zur widersprüchlichen Geschichte der 'Autogerechten Stadt', *Zeithistorische Forschungen/Studies in Contemporary History*, 14 (3), pp. 526-540.

Beyer, E. (2011) Planning for Mobility Designing City Centers and New Towns in the USSR and the GDR in the 1960s, in Siegelbaum, L. H. (ed.), *The Socialist Car Automobility in the Eastern Bloc*, Ithaca: Cornell University Press, pp. 71-91.

Blair, L. H. (1975) *Session Chairman s Report, in Papers and Proceedings International Congress*, IFHP, Integrated Planning and Plan Implementation in Urban Areas, vol. 2, Amsterdam, 24-30 August.

Bocharnikova, D. (2014), *Inventing Socialist Modern A History of the Architectural Profession in the USSR, 1932–1971*, PhD thesis, Florence, European University Institute.

Bockemühl, R., Bandi F. (1963) *Discussion on the Report of Traffic Committee: Horizontal and vertical separation of public and private transport to improve the fluidity of urban traffic*, 35th UITP International Congress, Vienna.

Budapester internationale wissenschaftliche Beratung für Stadtverkehrsplanung und Verkehrstechnik (1976) *über Verkehrsplanung und Lebensweise, Lebensqualität*, 21-23 April, Budapest: Verkehrswissenschaftliche Verein.

Budapester internationale wissenschaftliche Beratung für Stadtverkehrsplanung und Verkehrstechnik (1977) *über Entwicklung der Methodik der Generalverkehrsplanung*, 13-15 April, Budapest: Verkehrswissenschaftliche Verein.

Budapester internationale wissenschaftliche Beratung für Stadtverkehrsplanung und Verkehrstechnik (1978) *über Menschengerechte Stadtverkehrsentwicklung*, 12-14 April, Budapest: Verkehrswissenschaftliche Verein.

Cook, I. R., Ward, S. V., Ward, K. (2014) A springtime journey to the Soviet Union: Postwar planning and policy mobilities through the Iron Curtain, *International Journal of Urban and Regional Research,* 38 (3), pp. 805-822.

Glendinning, M. (2009) Cold-War conciliation: international architectural congresses in the late 1950s and early 1960s, *The Journal of Architecture*, 14 (2), pp. 197-217.

Habarda, D. (1971) *Discussion on the reports*, 39th UITP International Congress, Rome, pp. 49-51.

IFHP (1958) *International Seminar on Urban Renewal,* The Hague, 22-29 August.

IFHP (1966) *Proceedings of the XXVIIIth World Congress of the International Federation for Housing and Planning*, Tokio.

IFHP (1975) *Integrated planning and plan implementation in urban areas*, Amsterdam, 24-30 August.

IFHP (1977) *Towards a more humane urban technology*, Geneva, Switzerland, 5-10 September.

International Union of Architects (IUA) (1958) *Construction and Reconstruction of Towns*, 1945-1957, Moscow: State Building and Architecture Publishing House.

Interview with Ulrich Rabe in 2020.

Jahn, S., Saitz, H. H. (1974) *Die sozialistische Verkehrspolitik unter Beachtung der ständig steigenden Motorisierung*, en Budapester internationale wissenschaftliche Beratung für Stadtverkehrsplanung und Verkehrstechnik über Qualität des Stadtverkehrs, 17-19 April, Budapest, Hungary, pp. 5-18.

Khrupin, K. G. (2016) Nauchnie mezhdunarodnye sviazi akademicheskoi arkhitekturno-stroitelnoi nauki v seredine XX veka, *Architecture and Modern Information Technologies*, 4, (37), pp. 60-66.

Klopotov, K. K. (1963) *Discussion of the report of the Traffic Committee: Horizontal and vertical separation of public and pribate transport to improve the fluidity of traffic*, 35th UITP International Congress, Vienna, pp. 42-44.

Klopotov, K. K. (1969) *Usovershenstvovanie ekspluatatsii gorodskogo transporta zarubezhom*, Moskva: Izdatelstvo literatury po stroiltelstvu.

Klopotov, K. K. (1973) *Erhöhung der Leistungsfähigkeit von U-Bahnen*, 40th UITP International Congress, The Hague.

Kosenkova, Y. L. (2011) Dolgii put k gorodu. K postanovke prolemy uzucheniia sovetskogo gradostroitelstva 1950 – kh – nachala 1980-kh godov, *Internet-vestnik VolgGASU*, 3 (17), pp. 1-15.

Lacek, M. (1983) *Městská doprava: základy teorie a praxe*, Praha: Nakladatelství dopravy a spojů.

Lehrer, F. (1961) *Public Transport within the Framework of Urban General Traffic Plans*, 34th UITP International Congress, Copenhagen.

Lehrer, F. (1969) *Regional Organization of Transport and Urban Development*, en 38th UITP International Congress, London.

Martin, B. V., Bayliss, D. (1977) *Transportation. New Technology for old cities*, en IFHP International Congress, Towards a more Humane Urban Technology, vol. 1, Geneva, Switzerland, 5-10 September.

Meyer, H. H. (1979) *Die langfristige Rolle des öffentlichen Verkehrs*, 43th UITP International Congress Helsinki.

Ministry of Urban Services of the RSFSR, Ministerstvo Zhilishchno-Kommunalnogo Khoziaistva RSFSR (1977) *Tendentsii razvitiia zarubezhnogo gorodskogo obshestvennogo transporta*, Moskva.

Ministry of Transport of the CSR (1967) *Koncepce rozvoje městské hromadné dopravy do roku 1980*, Archivo Federal de República Checa.

Moraglio, M. (2015) Shifting Transport Regimes. The strange case of Light Rail Revival, in Kopper, C., Moraglio, M. (eds.), *The Organization of Transport. The History of Users, Industry and Public Policy*, New York and London: Routledge, pp. 155-172.

Nielsen E. (1965) *Erfahrungen aus zehnjährigem Kampf gegen die Verkehrsstockungen*, 36th internationaler Kongress, Brüssel.

Paschetto, A. (1975) *Gegenseitige Beeinflussung zwischen öffentlichem Verkehr und der Entwicklung von Stadt und Region*, 41th UITP International Congress, Brüssel.

Pithardt, J. K. (1969) *Discussion of the report*, 38th UITP International Congress, London, p. 48.

Polyakov, A. A. (1967) *Transport Krupnogo Goroda*, Moskva: Znanie.

Retzko, H.-G. (1973) *Verkehrsplanerische Grundsätze zur Langfristigen Verbesserung des Stadtverkehrs*, Budapester internationale wisseneohaftliche Beratung für Stadtverkehrsplanung und Verkehr, über Beeinflussung des Verkehrstechnik, 11-13. April, Budapest, Hungary, pp. 23-28.

Robbins, R. M. (1985) *Ein Jahrhundert des öffentlichen Verkehrs: UITP, 1885-1985*, Brüssel: Internationaler Verband für öffentliches Verkehrswesen.

Soiuz Arkhitektorov SSSR (1957) Pervoocherednie zadachi arkhitektorov, III Plenum Pravleniia Soiuza Arkhitektorov SSSR, *Arkhitektura SSSR,* 3, p. 4.

Stingl, H. (1981) *Housing Development in GDR – Achievements and Future Tasks*, in XIV World Congress of the International Union of Architects, Reports and Contributions, Warszawa, 15-21 June.

Stosberg, H. (1958) *Planning Principles for Residential Improvement*, in Report of International Seminar on Urban Renewal, IFHP, The Hague.

Tchebotarev, E. V. (1969) Study of new systems of public transport: air-cushion vehicles, conveyor-belts, monorails, ropeways, etc., 38th UITP International Congress, London.

TSNIIP Gradostroitelstva (1966) *Principy sovetskogo gradostroitelstva*, vol. 1, Moskva: Stroiizdat.

UITP (1959) *Conditions of the Successful Competition of Public Transport with Individual Transport*, 33rd UITP International Congress, Paris.

UITP (1965) *Erfahrungen aus zehnjährigem Kampf gegen die Verkehrsstockungen*, 36th UITP Internatoional Congress, Tel-Aviv.

UITP (1975) *Gegenseitige Beeinflussung zwischen öffentlichem Verkehr und der Entwicklung von Stadt und Region*, 41th UITP International Congress, Nizza.

Vandas, J. (1971b) *Městská doprava*, Praha: Státní pedagogické nakladatelství.

Wakeman, R. (2014) Rethinking postwar planning history, *Planning Perspectives*, 29 (2), pp. 153-163.

Ward, V. S. (2012) Soviet Communism and the British Planning Movement: Rational Learning or Utopian Imagining? *Planning Perspectives*, 27 (4), pp. 499-524.

Ward, S. V. (2016) Urban planning visits and Anglo-Soviet communication in the 1930s and 1950s, *Russian Journal of Communication*, 8 (3), pp. 288-301.

Yakushenko, O. (2016) Soviet Architecture and the West: The Discovery and Assimilation of Western Narratives and Practices in Soviet Architecture in the late 1950s–1960s, *Laboratorium*, 8(2), pp. 76–102.

Zubovich, K. (2016) Democracy: The International Union of Architects and the Cold War Politics of Expertise, *Room One Thousand*, 4 (4), pp. 104-116.

Internet sources:

https://www.uitp.org/

3.4. THE PRACTICE OF INTEGRATED PLANNING IN THE 1960S AND 1970S: THE CASES OF DRESDEN, BRATISLAVA AND YAROSLAVL

The practice of integrated planning began rapidly from its announcement in the mid-1960s. Urban growth and accessibility problems required accelerated urban transport solutions. Integrated planning was also seen as relevant to the communist regime and therefore easy to implement. The implementation of plans by state planning institutes, common objectives, public land - all these seemed to be the pre-determined elements of integrated planning. However, in practice there were difficulties in defining the order and process of implementation of urban and transport plans, in organizing joint work between planners. Politicians, transport engineers and architects had to start a new way of working. Integrated planning lacked both theoretical studies and the legislative basis for interaction between departments. The existing experience when transport schemes were carried out within urban plans already meant the development of an integrated vision among specialists. However, there was still a lack of detailed transport planning solutions, for the state this did not imply rational and economic solutions, while for traffic engineers it did not imply a better consideration of transport characteristics in urban planning.

The first general transport plans were basically considered as a tool for short-term city transportation benefits. Transport departments were created in each city as the body that had a similar role to the town planning department. In spite of this, transport continued to adapt to urban planning solutions. The main issue for all communist countries was the development of a technical basis of transport and coordination of its operation. The solutions were dominated by urgent issues such as road infrastructure development, improvement of interrelationships between collective public transport means, creation of parking lots, transport in city centres, etc. After the change of the decades, the socio-economic context was changed and progress was achieved in professional matters. The new realities of growth in the importance of metropolitan areas, the housing deficit and the planning of new residential development required new approaches to integrated planning. Furthermore, professional progress and theoretical and practicaladvancements in understanding factorscontributed to the understanding of the complexity of transport-city interrelation, and requiered the reconsideration oflong-term urban and transport plans.

In this process, each socialist country had its own logic of organization of integrated planning. This depended on the level of maturity in the organization of the planning process, the objectives and legal norms established by the state, the disposition of planners for integration and cooperation, etc. This planning practice is not well studied. Changes in general transport plans are omitted with emphasis on the development of urban plans. The difference between the two planning periods is not defined, considering the 1960s and 1970s as a homogeneous period. However, every change in socialist urban planning was due to particular objectives with well-defined results.

Therefore, this chapter has the task of answering the following questions: How did the idea of integrated planning evolve in the 1960s and 1970s? What factors acted as facilitators and limiters to the development of integrated planning? What

similarities and differences did the USSR, the GDR, the CSR and the three selected case studies have? The hypothesis that the communist countries had different dynamics in the development of integrated planning was developed. If the first experience in the 1960s was similar in all three countries, variations appeared in the 1970s due to variations in organization and professional approaches. In order to better understand this planning practice, the process of urban and transport planning at a national level is analysed. Also, the general transport plans in three cities, Dresden, Bratislava and Yaroslavl, are analysed in relation to urban plans and with a comparative perspective. The three case studies represent a similar urban size, as well as a similar level of industrial and residential development. While the interest of the comparison is explained by several approaches in the integration of urban and transport plans.

3.4.1. THE PROGRESS OF INTEGRATED PLANNING IDEAS IN GDR, THE DRESDEN GENERAL TRANSPORT PLANS

The implementation of the general transport plans in the GDR was initiated by the GDR State Planning Commission [*Staatliche Plankommission*] and the GDR Ministry of Transport. From 1967 onwards, with the resolution of the 7th Communist Party Meeting, it was decided that urban planning would be carried out by the local planning committees (Henn, 1969, p. 47). General transport plans were implemented by the transport departments in each city which started to operate in the mid-1960s. Since the foundation of the Central Transport Institute [*Zentrale Forschunginstitut für Verkehrswesen, ZFIV*] in 1971, state policy on the reconsideration of general transport plans began to include ideas on long-term planning (Paetzold, 1973, p. 357). The general transport plans were evaluated and approved by the Central Transport Institute according to the theoretical methods and principles of planning that were established by the same institute. After the process of evaluating the plans, representatives of the institute visited the cities to encourage discussions with both transport planners and city councils (Rabe, 2018). However, this type of ZFIV participation was limited to medium and large cities with more than 200,000 inhabitants, while the plans of medium and small cities were completed at a regional level (Rabe, 2018).

The planning process of collective public transport at local level was enhanced by the creation in 1973 of the coordination councils for collective public transport (Koordinierungsrates Offentlicher Personennahverkehr) in cities such as Berlin, Dresden, Magdeburg, Halle, Leipzig, Rostock and Karl-Marx-Stadt. One of the problems in the GDR, as in the USSR and the CSR, was the weakness of local decision-making bodies and project financing. Also, the importance of industrial companies in financing and city planning decisions (Häußermann, 1996, p. 221). Despite this, in comparison to the USSR and the CSR the level of involvement of local planners in the realisation of the overall transport plans in the GDR was higher.

The organisation of the integrated planning process was one of the important concerns of the communist state of the GDR. In 1967 the Deutsche Bauakademie adopted a resolution on the need to develop general urban and city transport plans. In this resolution the objectives for integrated planning were underlined:

- Increasing the responsibility of local bodies in order to create avertical system of relations between all participants in the urban planning process.

- Improvement of integrated work, division of functions and clarification of relations between different territorial and urban departments.

- Identification of new planning principles by determining functional, technical, artistic and economic aspects.

- "Establishing closer links between general transport plans and general urban plans of the cities and urban centres (until now, general transport plans have focused on the main regional transport networks, but the most important investment needs arise within the cities and urban centres to ensure the efficiency of the main routes)"[33] (Deutsche Bauakademie, 1969, p. 48).

Since the early 1970s, a major change in general transport plans began in connection with the criticism of the planning of cities for automobiles. The planning of collective public transport had to receive attention as the only solution with positive long-term effects. Long-term planning also stimulated discussions about the integration of urban planning with collective public transport planning that should lead to structural changes in cities[34] (Böhme, 1971, p. 444). There was a strong idea about the need for urban structure development (Stadtstrukturmodelle) with the integration of land use and transport decisions that served as a tool for discussions between architects and traffic engineers.[35] This was solved through solution alternatives studies, where the possibility of locating functional areas and the existing transport structure were compared to reach a better state of accessibility (Keul, 1977, p. 487). At that time, not only was the importance of locating functional areas considered, but also the possibilities of the existing transport system (with its attributes such as accessibility, connectivity, varied spatial relations, etc.).

On the other hand, the state supported the idea of synchronized planning in time, and simultaneous realization of urban and transport plans and projects (ZFIV, 1975a, p. 262). The proposal was to carry out general urban and transport plans for three periods of five-years which were evaluated and complemented simultaneously (ZFIV, 1977, p. 83). The general transport plans in the GDR were planned for a period of 10-15 years. The main reason for keeping the duration of the general transport plans at 15 years was the possibility of rapid ageing of the plans lasting 30-40 years (Glissmeyer, 1969). Ultimately, this type of planning was not considered to be the long-termsolution, but rather a medium-term period. It was probably an idea oriented to define and provide achievable interventions. This period coincided with the duration of general urban planning.

33 "Herstellung einer engeren Verbindung zwischen General verkehrsplan und Generalbebauungsplan in den Städten und Siedlungsschwerpunkten (bisher wurden in der General Verkehrsplanung der Bezirke schwerpunktmäßig nur die gebietlichen Hauptverkehrsnetze berücksichtigt, die umfangreichsten Investitionsanforderungen entstehen aber innerhalb der Städte und Siedlungs Schwerpunkte zur Sicherung der Leistungsfähigkeit der Haupttrassen."

34 The integration between transport and city in GDR city planning was referred to in some texts as "Verkehrsstädtebau", see, Böhme, 1971, p. 444.

35 See Siegel, H. (1969) Strukturmodellen als Kernstück der Einheit von Generalbebauungsplan, Generalverkehrsplan und Plan zur Entwicklung des Bauwesens am Beispiel der Stadt Leipzig, in Deutsche Bauakademie (ed.), *Generalbebauungsplanung der Städte der DDR*, Berlin: Deutsche Bauinformation, pp. 54-57.

The other notable idea was the process of evaluating the experience of integrated planning of urban and transport master plans. The evaluation of the first general plans was carried out in 1976 (b) by the Central Transport Institute and published in the work *Begutachtung der Generalverkehrspläne (GVP) für Städte der DDR* [Evaluation of urban transport general plans in the cities of the GDR]. The evaluation of urban and general transport plans was organised between the Deutsche Bauakademie and the ZFIV. The simultaneous planning of both plans was possible in some cities such as Dresden, Magdeburg and Cottbus, (Bolchynek, Leyer, Krause, 1977, p. 4). On the other hand, during the process of localisation of urban areas, urban master plans still needed to better consider the ideas of general transport plans such as the overall network structure, accessibility and proximity of collective public transport system. Apart from that, there was a lack of simultaneous development in transport and urban plans, a lack of continuous coordination of the planning process by the state (Bolchynek, Leyer, Krause, 1977, p. 36), as well asalow level of generalization of traffic planning methods among planners (ZFIV, 1977, p. 87).

The 1970s was a contradictory period as it was an intense period of theoretical research, organization of urban transport bodies, introduction of new theoretical methods and principles into the practice of general transport plans, and realization of general plans in cities. The standardization of the transport planning process began only at the end of 1970 as a result of the establishment of relationships between planning bodies, discussions of new ideas and evaluation of general transport plans. This planning experience in the GDR is valuable because of its approach to improving the relationship between urbanism and transport both in theory and practice of city planning.

Parallel planning: the experience of the 1967 and 1975 General Transport Plans in Dresden

The city of Dresden was a medium-sized city with 500,158 inhabitants in 1967 (Statistisches Amt der Stadt Dresden, 1968, p. 113) which remained stable without growth in the 1960s. Dresden was an industrial centre for metal processing, light industry and food. It also had a developed conurbation area. The city was heavily bombed during the IGM. The first years after the war were mainly devoted to reconstruction. In the city there were transport plans developed within the urban plan in 1950 and 1952. The interest in urban transport was strengthened from the end of the 1950s and the beginning of the 1960s with the decision to create an urban transport planning group under the economic commission of the city, organizing its work according to the planning principles developed by the GDR Ministry of Transport (Federal German Archives, 1961b, p. 4). The new study on urban transport in Dresden was developed in 1961 with the theme "Integrated transport planning" by the integrated transport planning brigade and discussed within the Socialist Central Working Group.

The main focus of this study was the analysis of the distribution of passenger flows within urban transport networks (Dresden Municipal Archive, 1961a, p. 2). On the other hand, it was noted that, the overall transport plan could not be based only on general concepts and centralised decisions, emphasising the need to define guidelines and planning principles (Dresden Municipal Archive, 1961b, p. 3). One of the objectives set for the development of public transport systems was to increase

their efficiency and attractiveness compared to private transport (Dresden Municipal Archive, 1961b, p. 3). This was proposed to be achieved through organizational methods related to the coordination of operation of public transport systems (coordination of routes, fares, integration between companies, etc.). However, these ideas were not achieved due to the absence of a legislative basis for cooperation between different planning departments.

A new general transport plan [*Generalverkehrsplan*] was published in 1967 by the transport department. The plan proposed the development of urban transport in three stages: until 1970, between 1971-1975 and between 1976-1980. The main peculiarity was the simultaneous drafting of the general urban plan (*Generalbebauungsplan*) with an attempt to integrate the objectives of city and transport planning. The general transport plan was the result of cooperation between different organs such as the city's transport department [*Büros für Stadtverkehr des Rates der Stadt Dresden*], Dresden University of Technology, University of Transport, Design Office for Urban Planning of the City Council of Dresden, the GDR Association of Architects, etc. However, transport still remained dependent on the ideas of a general urban plan, the transport proposals were mainly related to the planning of transport lines and routes in relation to existing land uses. This can be explained by the fact that a general urban plan did not envisage any urban development. Therefore, the objective of both the urban plan and the transport plan was to organize existing urban territory. The urban transport proposals were to improve urban traffic circulation, through the classification or planning of road infrastructure, the organisation of traffic in the city centre, the creation of car parkings and uniform distribution of traffic on the city's transport infrastructure and the pedestrianisation of the city centre.

The report on both plans consisted of two separate sections: the general urban plan and the general transport plan. The urban plan did not comment on transport solutions, concentrating on the issues of zoning and the composition of urban areas. The urban master plan was the distribution of industrial areas to define the economic basis of the city's development (Lecht, 1968, p. 196). The urban structure had to be ordered with a clear division of residential and industrial areas. There were few new urban developments. The proposals in the general transport plan were related to a suburban train network, especially the location of new stops. The small cities in the Dresden metropolitan area were connected by suburban trains in order to provide the connection to the industrial areas within the city. While the general transport plan included a zoning plan and a transport adaptations plan. This can be seen in the explanatory notes of the plans:

> *"The general traffic plan covers all types of traffic and includes statistical, technical and operational issues. Its aim is to achieve optimal transport performance and to examine urban transport in a complex that includes the commercial and organizational aspect of transport, as well as transport routes and facilities and means of transport within the city, nearby cities and rural communities"*[36] *(Dresden City Council, 1967, p. 50).*

36 "Der Generalverkehrsplan geht auf alle Verkehrsarten ein und umfaßt statistische, verkehrstechnische und betriebliche Fragen. Er strebt nach einem Optimum a Verkehrsleistung und untersucht den städtischen Verkehr in einem Komplex, der sowohl die kommerzielle und organisatorische Seite des Verkehrs als auch die Verkehrswege und die Verkehrsanlagen sowie die Verkehrsmittel innerhalb der Stadt und der angrenzenden Städte und Landgemeinden beinhaltet."

Therefore, the proposal of the 1967 general transport plan was to coordinate the functioning of suburban trains, trams, trolleybuses and buses as a "unified system of collective public transport service" (Niewand, 1969, p. 70). Although this coordination did not involve the development of a public transport system, it was basically the arrangement of existing lines with a few extensions without new line directions.

Another objective of the 1967 general transport plan was the development of unified tariff setting and coordinated task division between public transport modes (Dresden Municipal Archive, 1967), (Fig. 100). One of the proposals was the organization of joint work between three urban and suburban public transport companies in the creation of common fares and routes. This was supported by the decision of the Ministry of Transport and The Central Department for Research and Development [*Zentrale Abteilung Forschung und Entwicklung*] in 1964, where the idea of the priority of collective public transport was understood and explained with the improvement of the technical state of means of transport and the improvement of passenger comfort (Fedearl Archive of Germany, 1964, p. 11). The plan was oriented to the organization of traffic and road infrastructure: the construction of roads, parking lots, segregation of pedestrian traffic. The suburban train, following the modern western experience, was considered to be the main means of urban transport.

The general transport plans were developed in the form of diagrams where the suburban train lines were related to the tram lines, as well as the suburban train to the bus lines (Fig. 101). The system planning of roads and intersections, alongwith the close location of functional areas was considered the main solution to the problem of improving urban traffic intensity and circulation (Deutsche Bauakademie, 1965, p. 7). Ideas about long-term development were almost absent from the general transport plans of 1967 (Richter, 1973, p. 339), development consisted of the prolongation of some lines where spatial-structural changes were not foreseen.

In general, the urban master plan and the 1967 transport master plan were mainly devoted to the development of existing urban areas and the transport system. There were no new urban developments as there were no new proposals in the organization and modernization of urban transport. This seemed understandable within the political-economic context of that period. However, at the end of the 1960s this context changed rapidly, with the need for long-term industrial and residential development.

The following year, 1968, the City of Dresden received a letter from the Ministry of Transport on the need to reconsider the ideas for the new general transport plan for the period 1971-1975. This was explained by the need to include the results of the new study carried out by the Central Research and Technical Group [*Zentrale Arbeitskreis für Forschung und Technik*] on the subject of *Basisstruktur der Verkehrsanlagen Dresden, Leipzig, Rostock and Magdeburg* [The Basic Structure of Transport Systems] in examples from Dresden, Leipzig, Rostock and Magdeburg] (Dresden Municipal Archive, 1968).

With this, the city council in 1970 carried out a new study entitled *ie Hauptprobleme des Generalverkehrsplanes der Stadt Dresden* [The Main Problem of the General Transport Plan of Dresden]. In this study, among the needs for reconsideration of the 1967 General Transport Plan, the need for clarification of the general concept of city development and urban transport, the enhancement of the role of collective public transport, phased planning, road and private transport infrastructure de-

velopment were highlighted (Dresden Municipal Archive, 1970). Subsequently, two important documents were published which served as the basis for the start of planning new general transport plans:

The resolution of the GDR Council of Ministers entitled 'On the development of long-term planning', 03.05.1972, [Beschluss des Ministerrates der DDR zur Entwicklung langristigen Planung].

Report on the development of transport policy in the GDR up to 1990, published by the GDR Ministry of Transport, 5 January 1973, [Konzeption der verkehrspolitischen Entwicklung der DDR im zeitraum bis 1990 des Ministerium für Verkehrswesen].

In connection with this new political-economic context, the city council and the transport department developed in 1973 the document *Konzeption zur weiteren Arbeit am GVP der Stadt Dresden im Rahmen der langfristigen Planung* [The concept for the continuation of the work on the GVP of the City of Dresden in the framework of long-term urban planning]. As was previously the case, the urban and transport master plan was implemented in parallel. The concept of the urban master plan was also developed in 1973 (Fig. 102). In 1974 in October together with the urban master plan (Fig. 103) the first transport master plan concept was developed with the deadline of 1990. The final variant of the general transport plan was developed in 1975 (Fig. 104 and 105). The urban master plan of 1974 contained a zoning plan, a plan of location of new residential areas, of composition of the city, and city center concept. The integration with the urban transport solutions was presented only in the form of a comprehensive plan of urban transport networks which was included in a general urban plan. This plan was the result of cooperative work between transport specialists and architects.

The main change was the recognition of the tram as the main means of public transport. Mainly because of the development of two new residential areas Prohlis and Gorbitz which were located outside the access of the S-bahn lines. The development of these two residential areas created the need to reconsider any general transport plan of 1967 (Dresden City Council, 1977, p. 17). The solution was based on the provision of combined use of suburban train, bus and tram with the establishment of a connection to the working space, the city centre and recreation areas (Dresden Municipal Archive, 1974). In general, collective public transport received more attention in this general transport plan with the definition of its area of coverage.

The long-term transport planning policy of this plan was aimed at improving public land transport and creating rapid tram networks (Dresden Municipal Archive, 1975a). Despite the recognition of tramway (Dresden Municipal Archive, 1977a), its role was still weak, undefined and unstable. This was also stressed in the evaluation of the overall transport plan by the GDR Ministry of Transport in 1976. In this document the absence of concepts for further development of the tramway system into a rapid transit system was stressed. The interventions and proposals for the modernisation of the tramway system were limited only to solutions of separate platform use with some extensions, especially in connection with the new residential areas Prohlis and Gorbitz. The proposals were based on the rationalisation and concentration of passenger traffic with effective use of the existing capacities of

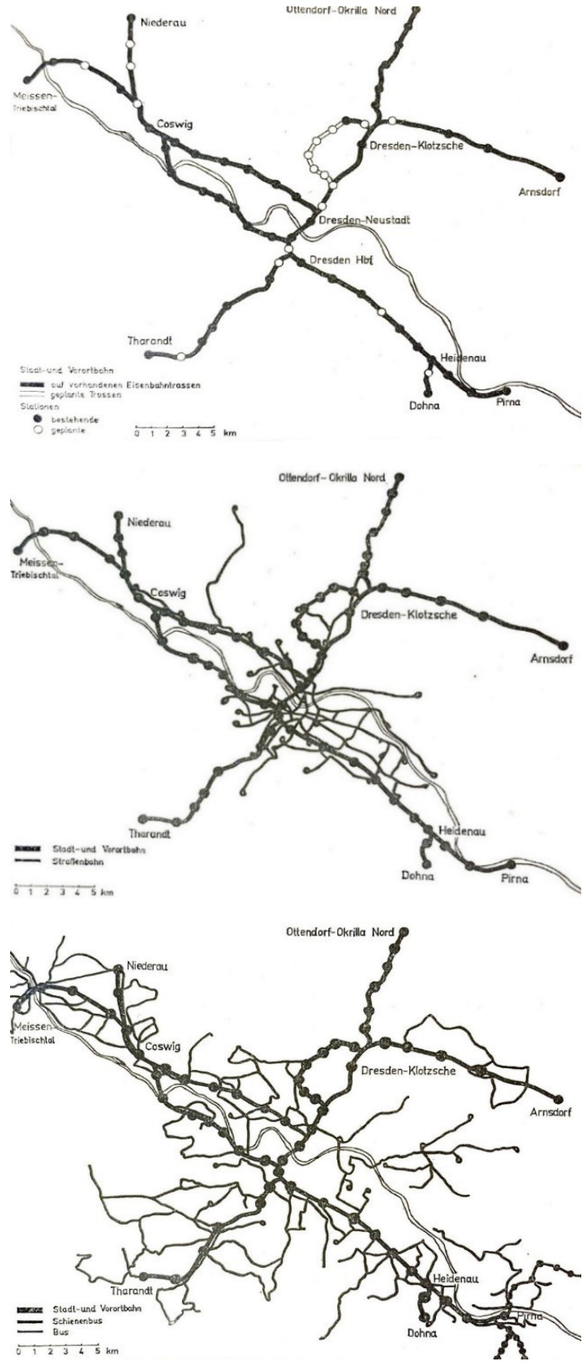


Fig. 100. Dresden general transport plan 1967. Future suburban railway system; future suburban railway and tram route system; future suburban railway system and bus network Source: Dresden City Council (1967) *Generalbebauungsplan und Generalverkehrsplan der Stadt Dresden*, p. 55, p. 56, p. 57. Each transport system had its area of application: suburban train for the metropolitan area, trams for the centre and consolidated city, while buses operated in the low-density periphery.

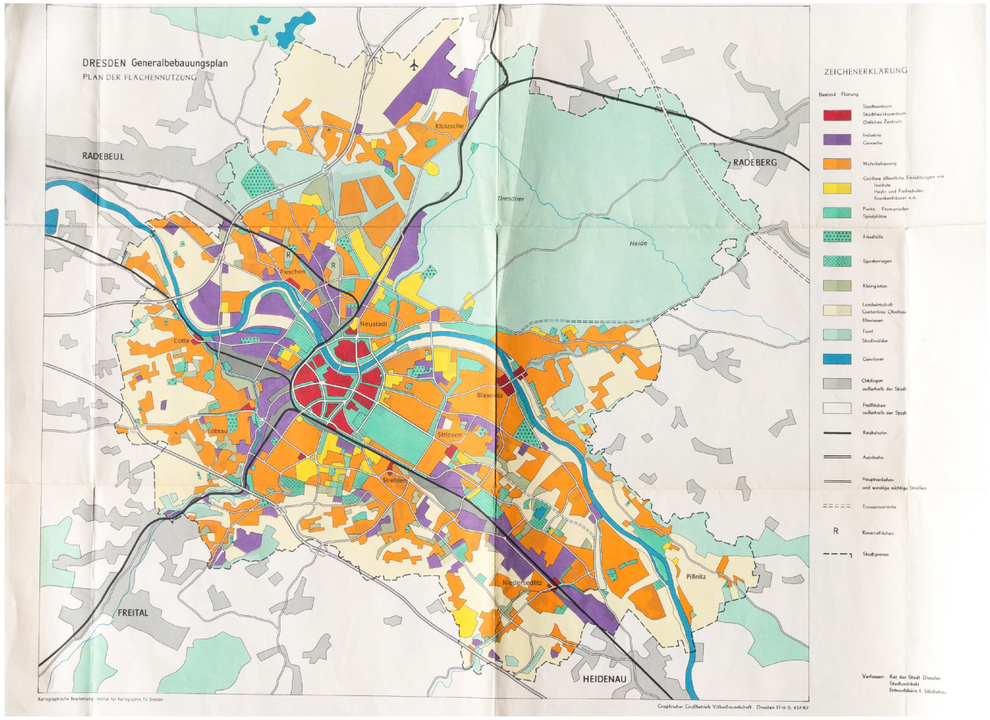


Fig. 101. Dresden zoning plan, 1967, drawn up by the city planning office [*Entwurfsburo für Städtebau*]. Source: Dresden City Council (1967) *Generalbebauungsplan und Generalverkehrsplan der Stadt Dresden*. The absence of urban development and the containment of existing urban areas can be noted. Between transport networks only the road and rail infrastructure were marked.

collective public transport infrastructure. The actions were related to some short extensions of the busiest lines, as well as to the needs of central area and new residential areas.

Among the objectives of the general transport plan, it is possible to highlight the development of technical transport infrastructure in relation to the development of urban territory, as well as the strengthening of the role of the collective public transport system as opposed to private transport (Dresden Municipal Archive, 1974). The transport plan consisted of the urban development plan, studies on the distribution of traffic between public and private transport, alternatives for the selection of collective public transport means, solutions in freight traffic, pedestrian traffic (within the central area plan), car traffic and the forecast of its development andcollective public transport traffic with its coverage areas.

Finally, the general transport plan, 1975, had several novelties and advancements compared to the 1967 plan. The first breakthrough was the establishment of transport planning objectives before the analysis and proposals of transport alternatives were undertaken. This was important during the evaluation of the results and the maintenance of collective public transport priorities, and the accessibility of urban areas, the connectivity between different means of collective public transport with the service coverage of the whole urban and suburban territory. The other peculiarities were the consideration of urban development in transport solutions

and the consideration of transport characteristics in the location decisions of new residential areas. Likewise, while the 1967 general transport plan was based on the assignment of trips and the priority of the relationship between work and residence, in the 1975 plan this idea was improved by the consideration of other travel objectives such as shopping, culture, studies, etc. In connection with this, collective public transport system itineraries were organized. Comparing the two plans and their relationship with urban plans, an evolution of the ideas of integrated planning can be noticed, both in the spatial interrelationship between transport and city, and in the organization of joint work between planners and authorities.

3.4.2. DIFFICULTIES IN ORGANISING INTEGRATED PLANNING IN THE CSR: BRATISLAVA GENERAL TRANSPORT PLANS

In the CSR the decision on the need for the implementation of the general transport plans was also initiated in the mid-1960s. The organisation of planning processes was more chaotic than in the GDR. This was probably because the state was not actively involved in this process. The functions between the ministries and planning institutes were not well defined, which impeded joint working process. The Ministry of Transport began its involvement in urban transport issues in 1960. One of the functions of the Ministry was the definition of general concepts of transport planning and definition of technical-economic issues of the means of transport. For this purpose, several studies were carried out by the Ministry of Transport and Telecommunication of the CSR in 1962 *Koncepcia a rozvoj mestskej hromadne dopravy v ČSSR v období rokov 1964-1970* [The plan of conceptual development of urban public transport for the years 1964-1970] and in 1966 *Koncepcia rozvoje mestkej hromadne dopravy* [The concept of development of collective public transport until the years 1980]. Among the main concerns of these studies is the planning of rapid public transport system in the cities of the CSR. The proposals of these studies were mainly related to the improvement of the material base of collective public transport.

The general transport plan [*Generální dopravní plán*] was ordered by state bodies such as the Ministry of the Interior [*Ministerstvo Vnútra*] or National Committees [*Národni Výbor*], these bodies were also responsible for the approval and evaluation of the plans (VÚVA, 1979, p. 6). The plan was developed for a period of 15-20 years which coincided with the duration of the urban plan [*Územní Plán*]. The urban plan was carried out by local planning bodies such as the main departments of architecture, [*Útvar hlavního architekta*] of each city. Before the general transport plan the concept of further development of collective public transport [*Návrh Ďalšieho Rozvoja Mestskej Hromadnej Dopravy*] was worked on for a period of 30 years. This study was carried out before the General Transport Plan by the Transport Institute Dopravoprojekt Bratislava. The aim of the study was to provide the analysis and evaluation of transport development alternatives. They were properly developed with the involvement of different transport institutes and departments. The discussions aimed at long-term planning intensified the importance of the interrelationship between collective public transport and the territorial development of cities. The result of the studies was an individual analysis of each city.

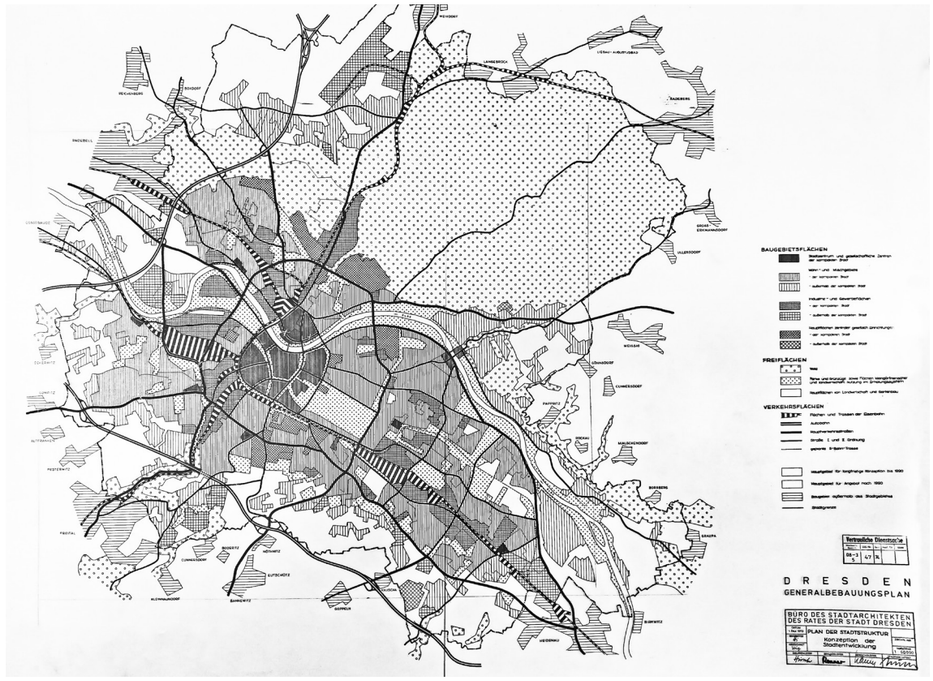


Fig. 102. Dresden's concept of urban development, 1973. *Haupgebiet für langfristige Konzeption bis 1990,* The urban structure plan with the overlapping layer of new long-term developments up to the year 1990. Source: Federal German Archives, DH/2/Plan, 2804. It can be seen the idea of compact location of new urban areas.

Fig. 103. Urban structure plan with the superposition of the new urban areas in 1974. Source: Federal German Archives (1974) DH/2/Plan, 2804, 51, Haus 901/EG, 9. It can be seen the intention of the use of the existing empty areas to maintain the compactness of urban model.

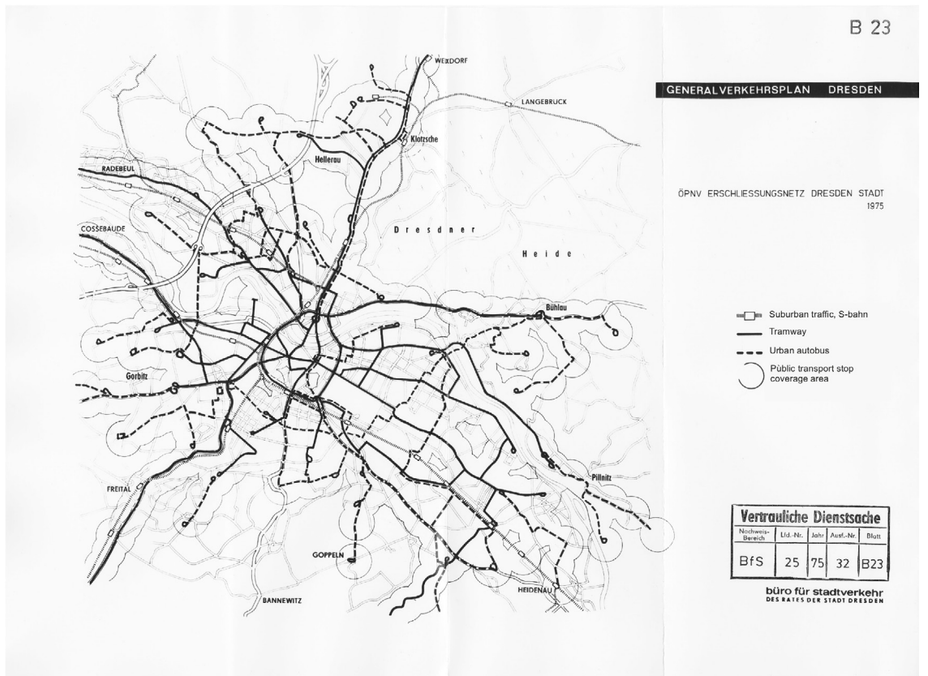


Fig. 104. General transport plan of Dresden for 1975. Source: Dresden Municipal Archive, (1975b).

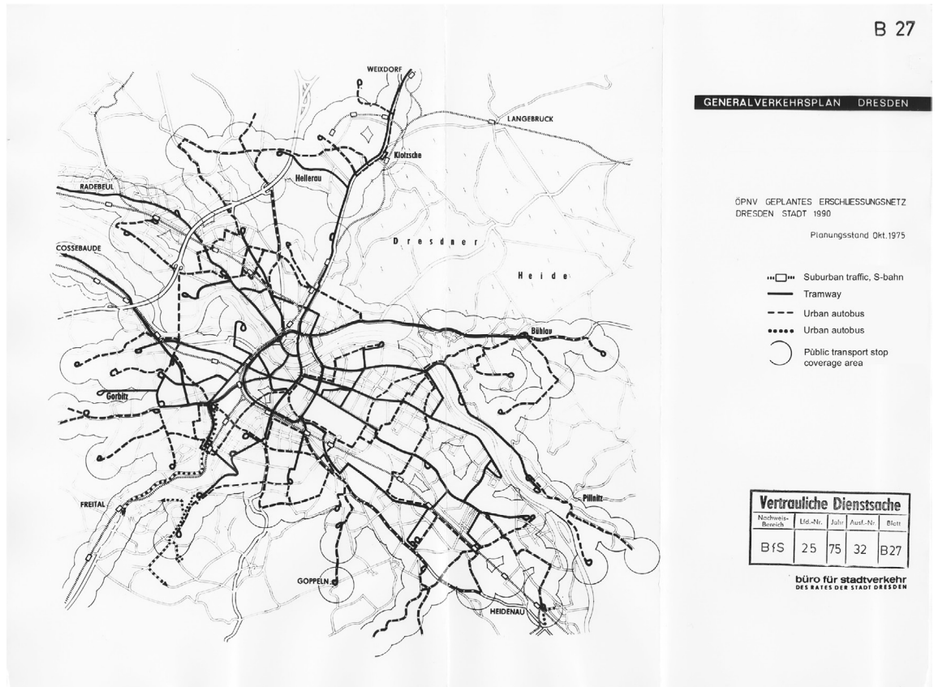


Fig. 105. General transport plan of Dresden for 1990. Source: Dresden Municipal Archive, (1975c).

The evaluation of general transport plans was also carried out by the Ministry of Transport of the CSR (after 1968 by the ministries of transport CSR and SSR), by the department of city architecture, by collective public transport companies. Local transport departments carried out general transport plans, while preliminary transport studies were realized by state institutes which had more resources for that.

In the discussions conducted through the journal *Doprava* [Transport] from the early to mid-1970s the main problem was the organisation of a coordinated operation of urban transport systems to provide "an order in urban transport for safe, continuous and economical functioning" (Smýkal, 1968, p. 202). Therefore, measures in transport planning were also related to the hierarchization of motorized transport system, location of parking places, collective public transport lines and stops, stations, etc. All of this was evaluated with criteria of safety, performance, economy, level of capital investments (Smýkal, 1968, p. 205) having the rationalistic strategy as the main direction in future transport development (Komárek, 1968, p. 7). In connection with these established ideas or objectives, from the beginning of the 1970s the period of integrated and unified development of urban transport system began, in terms of integration of companies, travel tariffs, integration of routes and means of transport, rational division of traffic between means of transport.[37] At the end of the 1960s the main concern remained the improvement of technical characteristics of transport, improvement of transport routes, automation, improvement of fluidity and speed of urban transport, efficiency in urban traffic organization. Conceptual issues, integrated and alternative solutions were hardly raised.

The importance of the idea of integrated planning between transport and the city intensified from the mid-1970s. It was called the "multidisciplinary and integrated approach to transport and spatial planning"[38] (Mitáš, 1976, p. 345) and was basically initiated in theory. In his discussion transport planner Jaroslav Mitáš who introduced the sociological method of defining urban traffic, also questioned zoning as the method that increased the distance between urban areas, as well as its schematism with respect to citizens' travel motives. Despite this, the method of a designated distribution of passenger traffic and travel objectives continued to prevail in the practice of general transport plans in the 1970s.

The simultaneous and coordinated implementation of general urban and transport plans was not carried out in the 1960s and 1970s. This was the exception rather than the norm, which is why the 1979 publication *Zásady a pravidla územního plánováni* [Principles and norms of urban planning] mentioned the objective of parallel implementation of general urban and transport plans (p. 5). Meanwhile, sometimes the transport plan influenced changes in the urban plan, sometimes the opposite, zoning influenced transport decisions. The time gap between the two plans remained long, complicating the integration process.

37 See articles of Hons, J. (1973) Jednota Dopravní Soustavy v Plánovitém Řizení Rozvoje Socialistické Dopravy, *Doprava,* 4, pp. 296-300; Kražek, J. (1974) Vybrané Problémy Rozvoja Jednotnej Dopravnej Sústavy na Slovensku, *Doprava,* 2, pp. 6-11.

38 Jaroslav Mitáš also highlighted that (1976, p. 343): "The constant change in the social and physical context of cities is of great importance in the sense that a land-use plan cannot focus solely on a specific and final objective (vision), i.e., the shape of the city, supported by a precise calculation of what it is today. For example, in the field of transport networks, it is important to determine the extent to which they are flexible in addressing current problems, as well as the possibility of addressing future extreme changes in urban organism".

Hierarchical planning: doubts about the means of rapid public transport in general transport plans in Bratislava

Bratislava was one of the main cities of the CSR and the capital of the Slovak Socialist Republic since 1969. Some industrial areas of the city were bombed during WW2. In the post-war period, the reconstruction of the city was accompanied by the extension of its territory (from 68 km2 to 187 km2) through the inclusion of nearby settlements (Horák, 2014, p. 64). At the end of 1950, Bratislava did not have any plans for the future growth of the city, apart from some low-density extensions; therefore, the existing transport system had to be developed without large investment demands (DPMB, 1959, p. 12).

In 1956 the urban plan was drafted, which considered the city as a closed and complete entity (Fig. 106). The new general urban plan of 1963 (Fig. 107) and several studies on the development of the urban public transport system conducted in 1962 and 1963 by the Department of the Chief Architect of Bratislava maintained this idea. The study on the development of collective public transport in Bratislava [*Štúdie Rozvoja MHD v Bratislave*] was initiated in 1962 which was developed within the general urban plan [*Územní Plán*] and carried out by the main department of architecture of the city (Fig. 108). The need for these studies was related to the anticipation of population and industrial growth in the 1970s and 1980s. The number of workers was expected to double from 135.000 in 1963 to 270.000 in 1980 with the development of mechanical engineering, mining and glass industry sectors (Braun, 1963, p. 3). The urban plan of 1963 was developed for a short to medium-term period, until 1970, each stage was developed for 2-3 years. The proposals for urban transport were presented with transport schemes inside the urban plan.

The disintegrated work in that direction between the main architect's department and the transport engineering department resulted in the development of several proposals that did not meet transport needs. Apart from the problems with connecting new urban areas with rapid public transport, there was also the problem of isolating suburban areas with inadequate travel time. Highlighting this problem, traffic planner Surový commented in 1963 on the economic difficulties that did not allow this problem to be solved in an efficient and long-term manner:

> *"Our opinions are often limited, unable to be generous, and motivated by financial difficulties. We almost always subordinate the perspective to the financial difficulties and take on the development, which is the cheapest and according to the possibilities of the present moment. This approach often punishes us and becomes a serious obstacle to development"*[39] *(Surový, 1963, p. 371).*

It should be noted that Bratislava had an underdeveloped tram infrastructure, therefore, both the development of tram and suburban train systems needed capital investments. This was one of the reasons for discussions and several drafts of transport plans or urban plans.

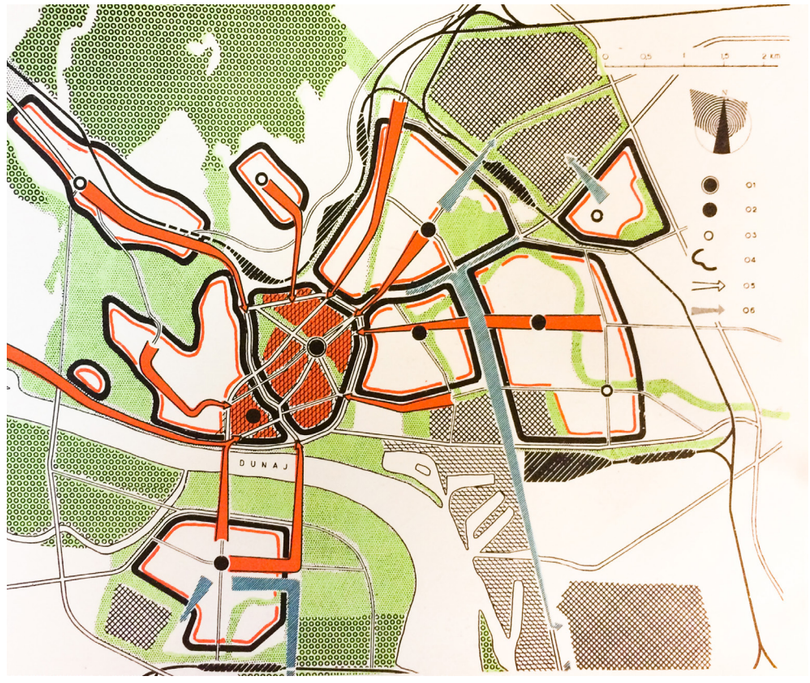
39 "Náš náhľad je často úzkoprsý, neschopný veľkorysosti, motivovaný finančnými ťažkosťami. Perspektívu podriaďujeme skoro vždy finančným ťažkostiam a predpokladáme taký rozvoj, ktorý je najlacnejší (podľa súčasnosti). Takýto prístup nás už neraz potrestal a stal sa vo svojich dôsledkoch vážnou brzdou vývoja."

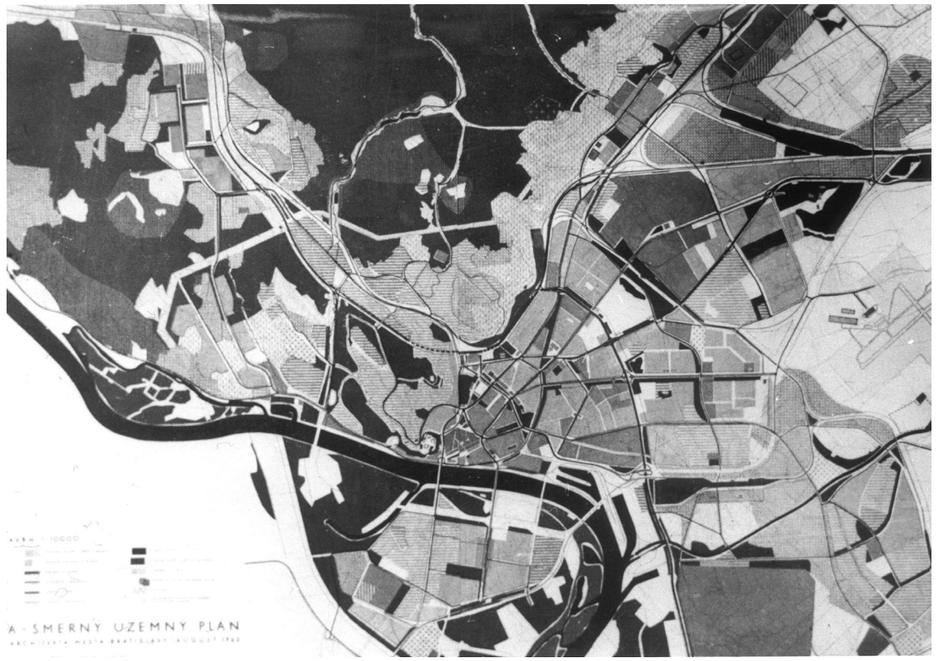
The first extensive study of urban transport was carried out in 1967 with the aim of defining the state and problems of urban transport that had to serve for the preparation of the general transport plan of the city. This study was based on the urban plan of 1966. The main problem was the growth of the city population without improving the technological state of urban transport, especially in rail transport (Slovak National Archive, 1969, Fig. 109). In this study, urgent problems such as accessibility of the urban centre and peripheral areas were emphasized. The growth of mobility of people, where the amount of population planned by the general urban plan for the year 1970 (about 317.000 people) was achieved in 1966 (Bratislava Municipal Archive, 1969, p. 183) and had the tendency for growth. Apart from that, the growth of the working population in 1966 reached 176.844, while the general urban plan foresaw a number of 162.150 for the year 1970 (Bratislava Municipal Archive, 1969, p. 185). All this conditioned the need to reconsider both the general urban plan and the urban transport solutions, and especially collective public transport.

The general urban transport plan was drawn up by the city transport engineering department [*Útvar Dopravního Inžinirstva Mesta Bratislavy, - hereinafter UDIMB*] with the cooperation of the Dopravoprojekt Bratislava Institute. The planning of the general urban transport plan started in 1966 and ended in 1969. During the development of the general transport plan in 1968, the department of the chief architect and Dopravoprojekt Bratislava also collaborated and set up a working group (Surový, 1968, p. 134). Prior to the general transport plan, several studies were carried out, e.g., *Generálne Riešenie Mestskej Hromadnej Dopravy v Bratislave* [General solutions for urban public transport in Bratislava] in April 1969 () developed by the Bratislava transport engineering department, under the direction of transport planners Rudolf Surový and Tomáš Hollarek. As Bratislava is the capital of the country, the Ministry of Transport, Posts and Telecommunications of SSR [*Ministerstvo Dopravy, Pôšt a Telekomunikácií SSR*] also participated in setting the planning objectives and studying the concept of urban transport in the city. The final version of this general transport plan was prepared in 1970 with a deadline of 2000, dividing the development of collective public transport system into 4 stages (until 1972, 1972-1976, 1976-1982, and 1983-2000).

Bratislava had two major and urgent problems to solve in the new general transport plan. First was the growth of travel time, due to the fragmentation of the urban structure, and second was the concentration of passenger flows in the centre. The first problem was expected to be resolved by the introduction of rapid means of public transport on a separate platform in order to develop high speeds in unstructured areas (Surový, 1968, p. 134). The second problem was to be solved by the redistribution of passenger flows within the city centre. The urban centre was a very important node, the socio-cultural facilities (main and daily use) and the largest working areas were located mainly in the city centre. This led to large flows of passengers (Surový, Hollarek, 1962, p. 348). On the other hand, the center also had a significant amount of through traffic between residential and work areas. As in other city cases of that period, the solution was provided by the development of an underground tramway. Despite not being able to fulfil this objective for a long time, the tram lines were not eliminated. The solution was to maintain them and change the route to a less busy direction.

The final version of the general urban transport plan [*Súborný Generel Dopráv*)] was drawn up in 1970, which implied the need to reconsider the urban plan (Brati-





On the top, Fig. 106. The proposal for the division of the city in 1956 Source: Hrůza, J. (1958) *Gradostroitelstvo v Chekhoslovakii*, Prague: Soyuz arkhitektorov Chekhoslovactkoi Respubliki, p. 95. A strong orientation towards zoning and a consideration of the city as a "finished organism" can be observed.

Below, Fig. 107. Urban plan [*Uzemní Plán*] developed in 1963 and approved in 1966, Source: Archive of the Slovak Academy of Science (1963) *Smerný Uzemní Plán Bratislavy*. The 1958 plan had continuity in the general urban plan in 1963.

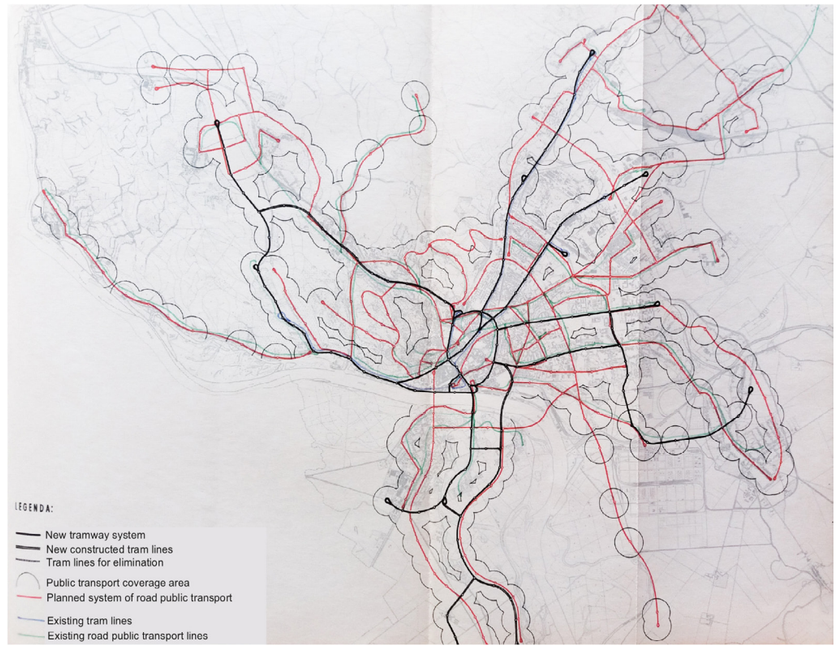
slava Municipal Archive, 1969, p. 3). The urban transport decisions developed within the general urban plan of 1966 did not consider various transport issues such as differentiation of transport types by functions, definition of line construction stages, technical parameters, etc. The general transport plan still needed the collaboration of other ministries, departments and universities in order to reach integrated solutions (Bratislava Municipal Archive, 1969, p. 26). Emphasis was placed on the problem of planning and evaluation separately from the private transport system, urban planning and collective public transport, which led to fragmented solutions (Hruška, 1968, p. 55). The plans for each mode of transport were developed by different transport institutions and departments.

On the other hand, the city's main architecture department participated in the evaluation of general transport planning. In conclusions the general transport plan recommended reconsidering the urban plan to improve the concentrated location of urban areas. As it can be noted the plan had several difficulties in the organization of joint work and it was mainly the adaptation to the decisions of the urban plan of 1966. In the late 1960s the change in the status of the city and its expected economic development led to the need to reconsider the amount of population in the city and its agglomeration (Vorel, 1974, p. 5). The territorial extension of the city, the need for consideration of suburban public transport and a better transport solution in the centre questioned the validity of the general transport plan (1970).

The new general urban plan was developed in the years 1973-1975 and was approved by the Ministry of Construction and Technology of the Slovak Socialist Republic [*Ministerstvo výstavby a techniky SSR*] in 1975 and by the Slovak Government in 1976 (Bratislava Municipal Archive, 1980, p. 117, Fig. 110). The objective of this urban plan was to propose urban development. Integration between traffic specialists and urban planners was partial. On the one hand, there were representatives of the Ministry of the Interior (Ministerstvo vnútra) who were responsible for the development of urban transport and supported the idea of light rail in Bratislava (Bratislava Municipal Archive, 1975, p. 230). Also, a representative of the Dopravoprojekt Bratislava participated in the evaluation of the plan. While the planners of the municipal transport department were not involved in these discussions.

After the urban plan in December 1974 the "Proposal for the further development of collective public transport in the capital of the Slovak Socialist Republic, Bratislava, until the year 2000" [*Návrh Ďalšieho Rozvoja Mestskej Hromadnej Dopravy v Hlavnom meste SSR Bratislave*] was approved by the city's transport engineering department [*Útvar Dopravného Inžinierstva Mesta Bratislavy, UDIMB*], (Fig. 111). This proposal was launched by the City Council in 1971 and the SSR Government Presidency which ordered the presentation of the solutions for collective public transport for the year 1974 (Bratislava Municipal Archive, 1974, p. 3). The main objective of this study was to determine the means of rapid urban transport. The study did not serve as an official document for the development of collective public transport, but only for discussions and suggestions. Nevertheless, it remained important, for developing the alternatives and influencing the decisions of the general transport plan of 1980.

The transport proposals were based on the territorial development envisaged by the 1974 urban plan (Bratislava Municipal Archive, 1974, p. 102). After the evaluation of both rapid public transport systems, it was recommended that suburban



Top, Fig. 108. Public transport development study carried out in 1963 by traffic engineer T. Braun and the main architecture department of the city. Source: Bratislava Municipal Archive (1963) *Štúdia rozvoja mestkej hromadnej dopravy: Prognóza a návrh 1 etapy*, Útvar hlavného architekta mesta Bratislavy. In red line tram, in green line bus, in blue trolleybus.

Bottom, Fig. 109. The proposal of the fourth stage of development of collective public transport system (until 2000) realized in 1969 by the Traffic Engineering Department in Bratislava. Source: Slovak National Archive (1969b) *Správa o súbornom riešenie dopravy v Bratislave*, KM 13.1 – 10.3., Materialy MDPaT SSR. In the plan's legend, rail network was mentioned as the main means of collective public transport, but the density of the network implied that it was developed for tram transport.

trains be built, mainly because of a better connection to peripheral areas (Fig. 112). The main explanation was the long distances and speeds of suburban trains (Bratislava Municipal Archive, 1974, p. 89). The special attention of rapid public transport development was given to the urban area in the west and northwest because of its distant location and fragmented character. Also, because of large passenger flows, the residential area in the south of *Petržalka* had to be served by suburban trains. The suburban train system was complemented by a system of buses and trolleybuses. As a result, one of the proposals with the development of light rail until 2000 was chosen in the general urban plan and was applied for in the location of territorial development of the city.

In 1980 the new Bratislava General Transport Plan was published. This General Transport Plan was developed on the basis of the General Urban Plan (Bratislava Municipal Archive, 1980, I, p. 127) and the proposals of the 1974 Transport Study. The main objective of this plan was "the creation of an integrated transport network coordinated with the urban body" (Bratislava Municipal Archive, 1980, VII, p. 4). Among the planning principles were priority of collective public transport, electric transport, segregation of means of transport, the interrelationship between urban and suburban transport (Bratislava Municipal Archive, 1980, VII, p. 4). The suburban train system was chosen as the main means of public transport. With the delay of its choice, the main problem of the general transport plan was the coordinated operation of collective public transport systems, especially the division of passenger traffic among them. The main strategy was the gradual replacement of the tram system with suburban train lines, which was to be carried out until the year 2000.

As can be seen, both general transport plans of Bratislava were adapted to the solutions of urban plans. There was insufficient cooperation and exchange between administrations and between planners. The Ministry of Construction and Technology did not cooperate with the Ministry of Transport. Decisions on territorial development and zoning were taken by the Ministry of Construction and Technology. Comparing the two general transport plans, it can be seen that the hierarchy of the planning process was maintained when transport decisions followed urban plan decisions. This rigid hierarchy of relations led to the delay in the implementation of the general transport plans. This was probably related to the geographical peculiarities of the city when there was a lack of options to select the direction of urban development. However, apart from that reason, the priority was on the idea of urban composition and the maintenance of the urban model, and not so much on the organization of integrated planning.

3.4.3. GENERAL SCHEME OF PASSENGER TRANSPORT IN THE USSR, ITS IDEAS AND DIFFICULTIES: THE CASE OF YAROSLAVL

The situation in the USSR was somewhat similar to the planning practice of the CSR. Until the mid-1960s, transport schemes or organizational schemes of urban transport functioning were planned, which were based on the decisions of the general urban plan (Skorobogatov, Sleptzov, Shtundel, 1974, p. 28). It was a rapid form of urban traffic organisation for a period of 5-8 years without the need for large investments. However, this changed with the rapid urban growth of the early 1960s.

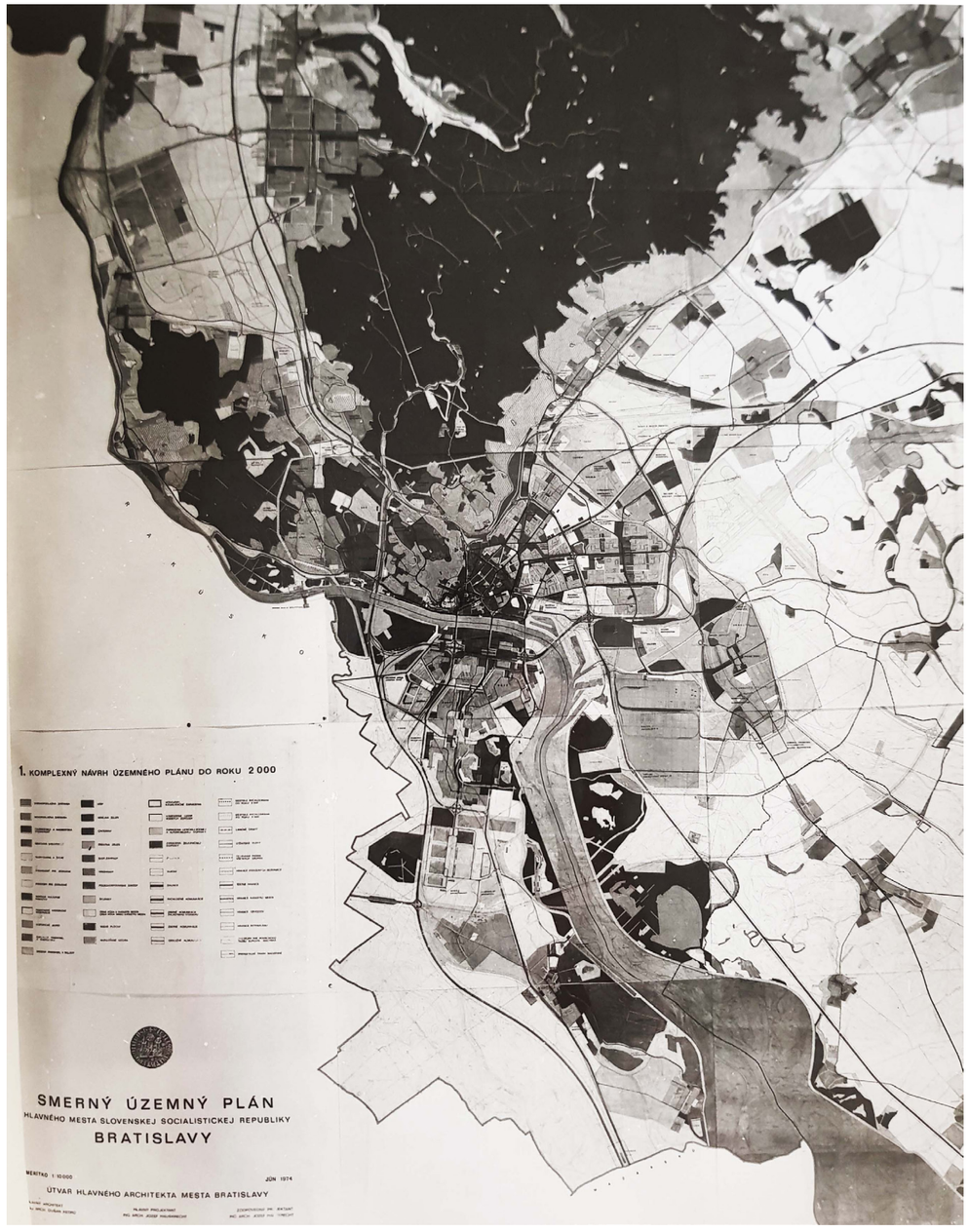


Fig. 110. The new urban development envisaged by the general urban plan, June 1974. The extension of the city was in the south and west directions, the location of new residential areas in the distance of 15-20 km. Source: Bratislava Municipal Archive (1975) *Správa o celkovom postupe spracovania, prérokôvania a schvaľovania návrhu ŠUP hlavného mesta SSR Bratislavy*, Útvar hlavného architekta mesta Bratislavy, NVB, 1975, IX/2, p. 166.

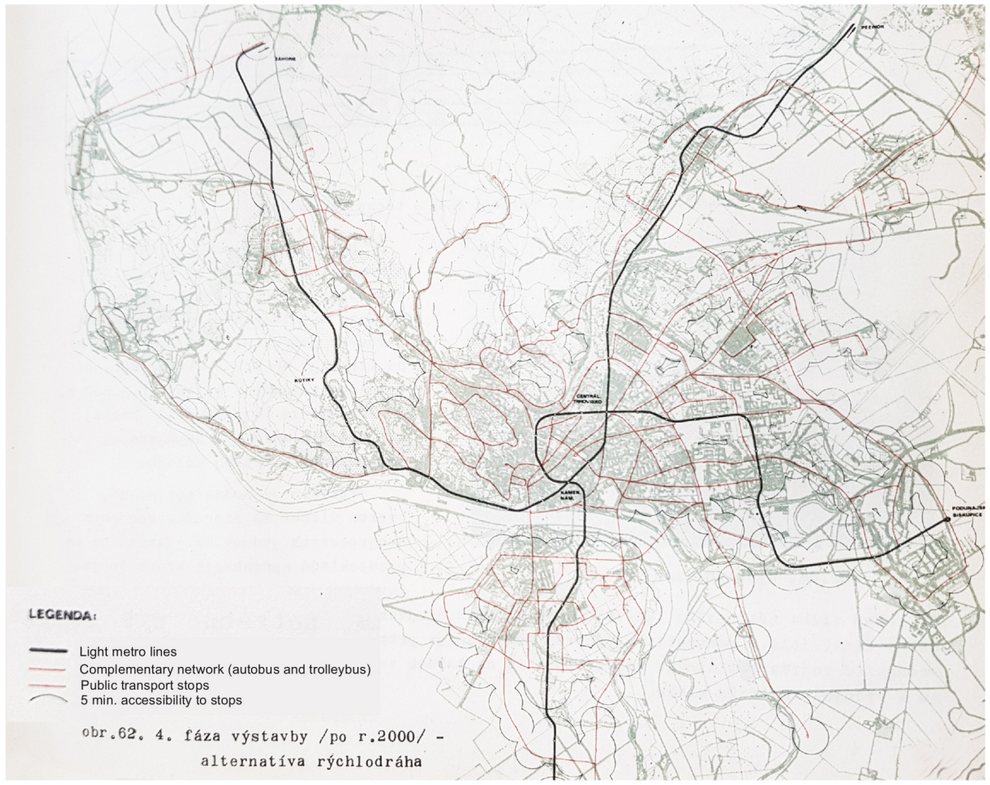


Fig. 111. The alternative of collective public transport development based on the choice of light rail until the year 2000 1974. Source: Bratislava Municipal Archive (1974) *Návrh ďalšieho rozvoja mestskej hromadnej dopravy v hlavnom meste SSR Bratislave*, UDIMB, 1975, I, p. 294.

Fig. 112 Left: The proposed suburban train system (until the year 2000) of the general transport plan of 1980. Right: The proposal of implementation of first suburban train lines to connect new residential area with the city. Source: Bratislava Municipal Archive (1980) *Generel Dopravy hlavného mesta SSR Bratislavy,* Útvar Dopravného Inzinierstva Mesta Bratislavy, Zápisanice rady NVB, I, p. 132, p. 136.

From the late 1950s, both industrial cities and cities with administrative functions in the late 1960s doubled or tripled their population (Harris, 1971, p. 120; Bocharov, Kudryavtsev, 1972, p. 26). The rapid "ageing" of urban plans can be explained in part by the reluctance of the State and the State Planning Committee of the USSR (*Gosplan SSSR*) to increase the territory of cities as this implied new investment for the development of transport infrastructure.[40]

From the mid-1960s the practice of planning integrated transport schemes [*Kompleksnaia transportnaia skhema*] began, which were based on the *Ukazaniia po razrabotke kompleksnikh skhem transporta dlia gorodov s naseleniem 250.000 i bolee* [Guide on planning schemes of development of all means of urban passenger transport with 250.000 and more inhabitants] approved by Gosplan SSSR in 1969. According to this document, general transport plans were to be carried out for a period of 10-15 years (Skorobogatov, Sleptcov, Shtundel, 1974, p. 28).

The general transport plans were first prepared for large cities with a population of more than 800.000, such as Rostov-on-Don (750.000 in 1966), Volgograd (742.000 in 1967), Chelyabinsk (850.000 in 1969), etc. For medium-sized cities, such as Sivtivkar (200.000), Sterlitamak (200.000), or Pskov (200.000), comprehensive transport schemes have been in place since the mid-1980s. At the beginning of that decade, as a result of the experience of integrated planning, only 17 cities had approved passenger transport schemes, and transport departments worked in 38 cities of the Russian Republic - RSFSR (GARF, 1981).

As for planning of transport schemes, there were no departments of urban transport planning and public passenger transport in the cities of the USSR. The need for creation of local transport departments was announced several times in 1964 (GARF, 1967a), and also in 1979 (GAE, 1979b), however, it was not completed.

The complex transport schemes were carried out by the various departments: by the urban planning institutes under the control of the Gosstroi RSFSR, by the Transport Institute *Giprokommundortrans* under the supervision of the Ministry of Urban Services of RSFSR [*Ministerstvo Zhilishchno-Kommunalnogo Khoziaistva RSFSR*], and by Giproavtotrans under the supervision of the Ministry of Motor Transport and Roads of RSFSR [*Ministerstvo avtomobilnogo transporta i shosseinykh dorog RSFSR*]. The implementation of the integrated transport schemes by the same institute was an exception, as in most cases they were implemented by *Giprokommundortrans*, while the urban plans were implemented by the state institutes of urban planning. This usually increased the difficulties in coordinating transport schemes and urban plans, since the transport schemes did not coincide with the provisional transport plans developed within the urban plans. In addition, being state institutes, planners could not frequently visit the cities and carry out the drafting of transport schemes, which had a negative influence on their quality. Interaction between state and local planners was limited.

40 Bocharov, Y., Kudryavtsev, O. K. (1972, p. 24): "For the cities of RSFSR (900 cities) 720 urban plans were realized, within which 370 plans were fundamentally replanned or reworked in connection with the rapid functional and territorial development of these territories", (Tolko dlya RSFSR, v kotorii vkhodyat bolee 900 gorodov, za poslednie godi razrabotani plani dlya 720 gorodov. Odnako, dlya bolshei chasti gorodov (370) generalnie plani bili korennim obrazom peredelani ili vnov razrabotani v svyazi s bistrim funkcionalnim i territorialnim rostom etikh naselennikh mest).

The complexity of integration between urban and transport plans was also enhanced by the difference in planning time. The urban plan was planned for a period of 25-30 years, and the transport scheme was carried out for a period of 10-15 years. This conditioned the development of different objectives and solutions which contributed to erroneous planning for collective public transport systems (Bordukov, 1974, p. 3). The problem was especially in the selection and development of rapid public transport (Skorobogatov, Sleptcov, Shtundel, 1974, p. 28) which did not respond to long-term urban development.

The difference was also in the coordination of the funding period, which resulted in time difference in the realisation of both plans. The urban plan was requested and financed by Gosstroi SSSR, while the general transport scheme was financed by Gosplan SSSR. The period of financing was not agreed between the two bodies, so first the general urban plan was made, and after 5-7 years the general transport scheme was completed. Apart from that, the integrated transport scheme had a long period of approval (about 5-6 years) by the state and local bodies. This was a serious problem as it caused delays in completion of better urban public transport[41] (Starinkevich, Balatzki, Rigberg, Shigol, 1974, p. 6). As a result of the absence of the approved scheme, temporary solutions of urban transport were carried out by local authorities. These solutions were not compatible with long-term urban and transport development leaving the new residential areas without adequate collective public transport services (GAE, 1981, p. 120).

As for the first experience with integrated transport schemes, traffic planner Polyakov noted that the general scheme of the city Gorkii worked on in 1966 for a period of 5 years was mainly oriented on reduction of backwardness in development of transport material bases accumulated in previous years (GARF, 1966a). The main objective of the general transport scheme in the 1970s remained the coordination of public and private transport operation, as well as urban and suburban transport (GARF, 1978, p. 34). The solutions were based on "the elimination of narrower points, the increase of network density, transport capacity, public transport speeds, the replacement of car stock, the reduction of engine intervals, the creation of depots, the repair base, and so on. (GARF, 1966a). The evaluation of comprehensive transport schemes was first carried out by the Council of Technical and Economic Experts Gosplan RSFSR. Later, from the end of 1970, this function was transferred to the Institute of Integral Transport Problems Gosplan SSSR.

One of the most important criteria was the compatibility of transport schemes with urban plans. For example, in the evaluations of comprehensive transport schemes in Gorkii there was a chapter devoted to checking the consistency of transport solutions with urban plans, where these solutions should not contradict the fundamental ideas of the overall urban plan (Nersesyantz, 1976, p. 111). While the experience of cooperative evaluation and discussion of integrated transport schemes and urban master plans was still scarce. Preliminary transport schemes

41 This explanation of the problem of development of urban plans and of urban transport was given in the article "*Problemy proektirovaniia i realizatsii transportnykh sistem gorodov*" (Starinkevich, Balatzkii, Rigberg, Shigol, 1974, p. 6). Examples were the time gap in Lviv between the 1967 general urban plan and the 1972 complex transport plan; Dnepropetrovsk, 1965 and 1976; Odessa 1966 and 1971, Kiev 1967 and 1972. The contact between two organizations was difficult to establish, each solved its functional issues without integration of decisions, there was no coordinating body between them.

carried out within urban plans did not consider the opinion of traffic specialists and were not discussed during the planning process, as well as this they were carried out by different planning institutes, coordination between which was not established.

Related to this was the internal criticism of that experience. In the report prepared by Gosgrazhdanstroi SSSR in 1981 *Razvitie Gradostroitelstva SSSR 1976-1980* [Development of Urbanism in the USSR between 1976 and 1980], (GAE, 1981), several problems in urban transport were highlighted such as delay in development of rapid public transport systems, lack of adequate public transport service in new residential areas, lack of relationships between general transport plans and the material base of cities, as well as the sectoriality of organizations and departments of planning, construction and operation of urban transport. In the performance evaluation of the 1970s, Gosgrazhdanstroi of the USSR mentioned that there was a serious problem in the organization of joint work between different bodies:

> *"The serious brake on the proportional and complex development of city transport systems is the separation of the organizations of planning, construction and operation of urban transport systems as a single complex. On the other hand, the absence of state and local bodies for coordination and development of parts and elements of urban transport systems, which are subordinated by different ministries and departments"*[42] *(GAE, 1981, p. 137).*

In order to address these problems *Gosgrazhdanstroi* of the USSR proposed the creation of a coordinating body throughout the Soviet Union for the development and financing of integrated transport schemes in 1981, as well as for the establishment of standardized criteria and principles of planning. This should have helped in the evaluation and control of implementation in urban and transport plans (GAE, 1981, pp. 138-140).

Also, in 1980 the Council of Ministers of the USSR adopted Resolution N1138 *O merakh po dalneishemu razvitiiu gorodskogo passazhirskogo transporta* [About measures of further development of urban passenger transport], which was one of the first official documents emphasising the need for priority provision for urban passenger transport operation. Among the measures it can be outlined the state financing of tramway projects serving distant industrial areas, as well as of repair of tramway rolling stock. The necessity of reparation was emphasised as one of the urgent and important measures. The other new measure was the consideration of indicators on the functioning of urban passenger transport in the state plans and annual plans of the federal republics. Finally, it can be highlighted the measure on the requirement of the combination of several collective public transport companies to provide complex operation. Despite these measures and efforts, the importance of tramway as the main means of land transport was not specified, and

42 "Серьезным тормозом пропорционального и комплексного развития дорожно-транспортных систем городов является ведомственная разобщенность организаций, осуществляющие проектирование, строительство и эксплуатацию городских дорожно-транспортных систем как единого комплекса, с другой отсутствие государственных и местных органов координирующие работу и развитие частей и элементов городских дорожно-транспортных систем, подчиненных разным министрествам и ведомствам."

special measures for its modernisation were not developed. Thus, in the 1980s the tramway in the USSR remained a means of transport with the equal significance as trolleybus and bus.

(Un) integrated planning*: the preliminary plan and the general transport plan of Yaroslavl (1973)*

Yaroslavl is a medium sized city located 270 km north of Moscow. The city was not bombed during the WW2 which facilitated proposals for urban extension and reconstruction based on the *mikroraion* concept of the 1950s. Extension was planned in the south and south-west direction (Saprykina, 2006, p. 290), while reconstruction was based on the enlargement of blocks and the improvement of streets. In order to rationalize its urban structure, the city had several urban plans in 1955, 1960 and 1963, carried out by the state institute *Lengiprogor*. The difference between these plans was in the increase of the city's territory.

The 1960 urban plan was planned for 550.000 inhabitants. However, in 1961 *Gosstroi RSFSR* made a proposal for the drafting of the new urban plan because of the need to increase the population to 650,000 inhabitants, which was planned in 1963 (Regional Archive of Yaroslavl, 1963-1988, p. 24). The approval of a general urban plan by all the ministries and departments was completed only in 1968 (Regional Archive of Yaroslavl, 1963-1988, p. 102). In the meantime, all these urban plans lacked urban transport plans and studies (Regional Archive of Yaroslavl, 1979, p. 51).

From the mid-1960s urban growth reached a high level with the planning and construction of new residential areas: Bragino (140.000 people), Zavolzhskii (170.000 people), rebuilt Privolzhskii area (70.000 people).

To this end, in 1970 the *Lengiprogor* Institute carried out the new urban plan which was approved by the RSFSR Council of Ministers in 1971. Strangely, the chief architect did not participate in the process of urban planning of the city (Regional Archive of Yaroslavl, 1979). The decisions of the 1970 urban plan were based on the close location of functional areas (Lengiprogor, 1970, p. 13), the location of new residential areas was determined in relation to the location of work areas (Lengiprogor, 1970, p. 14). The city model was transformed from a compact form to a linear configuration. Along with this, the urban plan changed the road and tram infrastructure network (Fig. 113 and 114).

Within the documentation of the urban plan, the study entitled "Urban transport" and the scheme of urban-regional transport system (Fig. 115). The urban transport study consisted of a brief description of the current state of the collective public transport means and infrastructure. The study was based on the idea of dividing passenger flows between urban areas by separating them into areas of attraction (work) and areas of settlement (residence), (Fig. 116). This short and superficial study served for the planning decisions of collective public transport infrastructure. Subsequently, this scheme served for the development of the Comprehensive Transport Scheme [*Kompleksnaia Transportnaia Skhema*].

The integrated transport scheme was completed in 1973 at the request of Yaroslavl City Council by the same Lengiprogor Institute. The scheme was planned for a period of 10 years (1970-1980). The transport and traffic solutions in the scheme

had to be adapted to the urban planning decisions and the preliminary transport scheme. In the evaluation of the general transport scheme, it was mentioned that: "The general transport scheme was prepared in accordance with the general urban plan and did not contradict its decisions"[43] (Ilinskii, 1972, p. 63). Therefore, in this scheme no new proposals for urban transport were developed, but the aim was to adapt to the previous solutions. On the other hand, there was a long period of approval of the integrated transport scheme. Thus, in 1976 the scheme had not yet been approved (Regional Archive of Yaroslavl, 1976, p. 204) which led to several difficulties:

> *"The department does not have a duly approved plan for the development of urban electric transport for the current five-year plan of 1976-1980, which is based on real economic and technical opportunities (...) On the other hand, the change and reconstruction of individual sections has been carried out in recent years on the basis of one-off solutions without adequate coordination with the scheme, justification and preparation. The implementation of decisions is being carried out in a hurry. This has led to economic losses and technical difficulties"[44] (Regional Archive of Yaroslavl, 1976, p. 204).*

This rapid and brief completion of the urban transport studies led to a low assessment by traffic experts. The evaluation of the Yaroslavl integrated transport scheme by the *Gosplan RSFSR* Technical and Economic Council noted the scarcity of rapid communication with some residential areas such as Krasnoperekopskii (south-west) and Zavolzhskii (east). This was related to the underestimation of the number of passengers especially in the large residential areas, which finally did not have rapid communication with the city (Ovechnikov, 1972, p. 17). This problem was justified in the application of empirical data (Bolonenkov, 1972a, p. 40). These decisions led to a rapid tramway network limited only to the directions of the new Bragino residential area and the industrial areas in the south of the city. The preliminary urban transport scheme did not function as a tool of integration between urban plans and integrated transport schemes. Possibly, in this case because it was carried out by the same planning institute, the preliminary scheme was not questioned. Anyway, it is worth noting the rigidity and complexity of the change of the preliminary transport scheme in the stage of development of integrated transport schemes.

The other problem was the integration of the urban passenger transport system with the suburban transport system. The general transport scheme did not include its development, mainly due to the lack of the general regional development plan that was not approved until the end of the 1970s (Regional Archive of Yaroslavl, 1979, p. 238). As a result of the commission's evaluation, considering the comments and re-editing the transportation scheme was proposed. This was the result of an

43 "Комплексная транспортная схема в целом разработана в соответствии с генеральным планом и не противоречит решениям заложенными в ней."

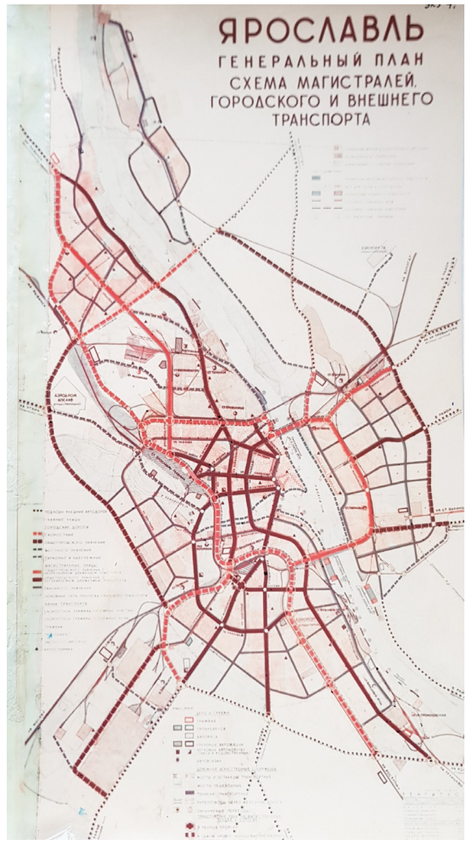
44 "В управлении нет утвержденного надлежащим образом плана развития городского электротранспорта на текущую пятилетку 1976-1980, которая базируется на реальных технических и экономических возможностях. Более того, изменения схем движения и реконструкция отдельных участков проводятся в последние годы на основе разовых решений, без должной увязки с упомянутой схемой, обоснования и подготовки. Реализация осуществляется поспешно. Это привело к экономическим потерям и техническим затруднениям."

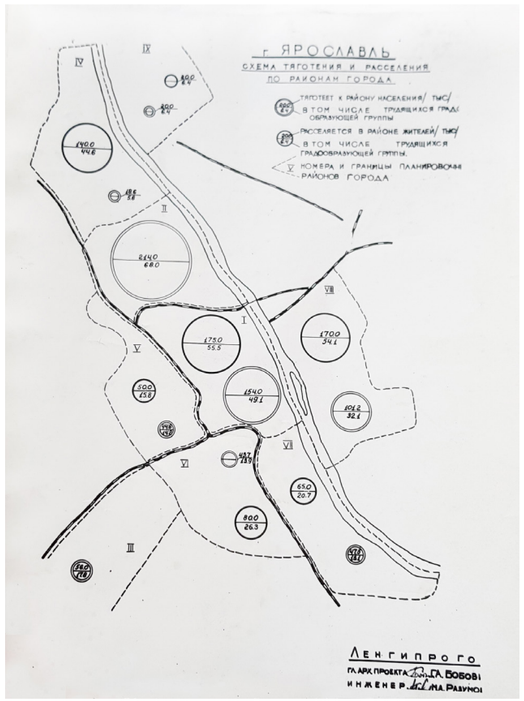
Left, Fig. 113. The situation of the city in 1967. Source: Lengiprogor (1971) *Generalnii Plan goroda Yaroslavl 1971*, Archive of the Department of Architecture and Land Relations of Yaroslavl city.

Right, Fig. 114. Urban plan edited in 1970. Source: Lengiprogor (1971) *Generalnii Plan goroda Yaroslavl 1971*, Archive of the Department of Architecture and Land Relations of Yaroslavl city. It can be noted the scale of urban growth of the city.

inadequate relationship between urban structure and collective public transport solutions. But first of all, it was the result of the lack of cooperation and coordination of decisions during the planning process.

In order to improve this situation, coordinated work was organized for the planning and construction of the city based on the *Gradostroitelnii dogovor Yaroslavlya* [Yaroslavl City Planning Agreement], 1976). The aim of this agreement was to improve the interaction between different organizations. Among the outstanding attempts is the creation of an "integrated team of authors" between the USSR Central Urban Institute and the *Yaroslavgrazhdanproekt* city planning department in the planning of new residential districts (Sdobnov, 1980, p. 36). Apart from this, there was an attempt to create a unified collective in the planning of microdistrict Nº 11, between planners and local and regional authorities, in order to improve the exchange of ideas and the quality of decisions. However, these attempts were of a minor nature (such as the construction of buildings and microdistricts). Urban plans





Left, Fig. 115. Preliminary sketch of roads, urban and regional transport in Yaroslavl realized within the 1970 urban plan, Lengiprogor Institute. Lengiprogor (1971) *Generalnii Plan goroda Yaroslavl 1971*, Archive of the Department of Architecture and Land Relations of Yaroslavl city.

Right, Fig. 116. The scheme of passenger traffic distribution between residential and work areas, 1967. Source: Lengiprogor (1971) *Generalnii Plan goroda Yaroslavl 1971*, Archive of the Department of Architecture and Land Relations of Yaroslavl city.

and transport schemes continued without adequate integration. The evaluation comments of the Gosplan involved both changes in the transport scheme and in the urban plan which were never carried out.

3.4.4. DISCUSSION AND CONCLUSIONS. VARIED INTEGRATION: CONSTRAINTS AND FACILITATORS OF THE INTEGRATED PLANNING

Through these analyses it is confirmed the ideas of Crouch (1979) and White (1979) about the problems of the implementation of integrated planning in the USSR, mainly explained by the vertical organisation of the urban planning process and the low level of interaction between the different ministries. In this subchapter, with the case analysis of Yaroslavl, these problems have been exemplified. However, it has also been shown that although there was no legislative basis for integrated work, there were local initiatives that tried to establish relations between different

city planning and construction departments. Thus, it could be seen that this problem was also related to the low level of involvement and interest of local planners and politicians.

On the other hand, it has also been possible to confirm the ideas of the German researchers Schleife (2001) and Saitz (2001) that, despite state control and economic constraints, municipal transport departments in the GDR played a significant role in the advancement of urban transport planning. This subchapter has shown that transport professionals had an interest in developing their discipline. Transport planners often tried to combine the economic efficiency of their solutions with the needs of the population. In this search for optimal solutions, they were able to meet the economic conditions of the state, but also to respond to social criteria.

Following the analysis of integrated planning practice in the GDR, the CSR and the USSR, the variety of approaches according to the level of the organisation cooperation and coordination between politicians and planners can be highlighted. Despite the fact that, in the mid-1960s, all three countries started with similar ideas aimed at the coordination of urban transport operations and the need for joint work between planners. In the late 1970s, following different efforts and policies, the three countries had different levels of development of integrated planning. In the case of the GDR there was a common understanding or objective on the need for integrated planning for economic and social issues. The organization of the process by the state made it possible to organize an integrated approach with a clear division in the coordination, cooperation and evaluation of results of both plans. While in the case of the CSR the organization by the state was weak and the interrelations between the planners were not defined. On the other hand, in the USSR, it also had a fragmented organisation with a vague division of functions between different state bodies that contributed negatively to integrated planning (Fig. 117).

As for the three case studies here one can see the different approaches and changes in urban and transport plans. In the case of Dresden, it can be seen that the process of planning general transport plans and urban plans was well organised in terms of coordination, monitoring and evaluation of results. This was accompanied by the development of theoretical ideas and standardised methods whose application was also controlled by the state. The parallel implementation of urban and transport plans was also a major achievement of city planners. This made it possible to discuss opinions over a period, agree on common decisions and implement the plans simultaneously, without the need for subsequent changes. Dresden demonstrates the experience of the evolution of integrated planning ideas throughout the 1960s and 1970s. If the first general transport plan of 1967 had as its goal the organisation of a coordinated system of collective public transport, in the second plan a great effort was dedicated to the integration between urban and collective public transport development. Both city planners and transport planners had a voice in the city planning process and decisions.

Bratislava was the case when the general urban plan was adapted to the decisions of the urban plan. The studies of transport proposals were documents that studied the transport possibilities within the decisions taken in the urban plan and then guided general transport plan. While the transport plans were evaluated by the urban planning departments, the city plans were not evaluated by the transport departments. Sometimes decisions were taken through discussions and meetings

between transport planners and city planners. However, this process was random in nature. As can be noted from the case of Bratislava, the presence of such hierarchy in the process of city planning conditioned the delay in the development of general transport plans, leaving the city with communication problems.

Yaroslavl was the case when it came to integration through the provisional transport plans made within the city plans. It was a good idea for integration between urban and transport decisions. However, this idea failed because it still considered transport planning as an easy question and had a superficial attitude to its long-term development. As a result, preliminary plans could not serve as the basis for general transport plans, and thus integrated planning was not “sufficiently or fully comprehensively developed”. There were no “transport-city” mutual interaction as urban plans continued to be strongly based on zoning ideas. Thus, the main problem of the general transport plans was the poor coordination between urban public transport systems, urban and suburban transport and between collective public transport and automobile traffic.

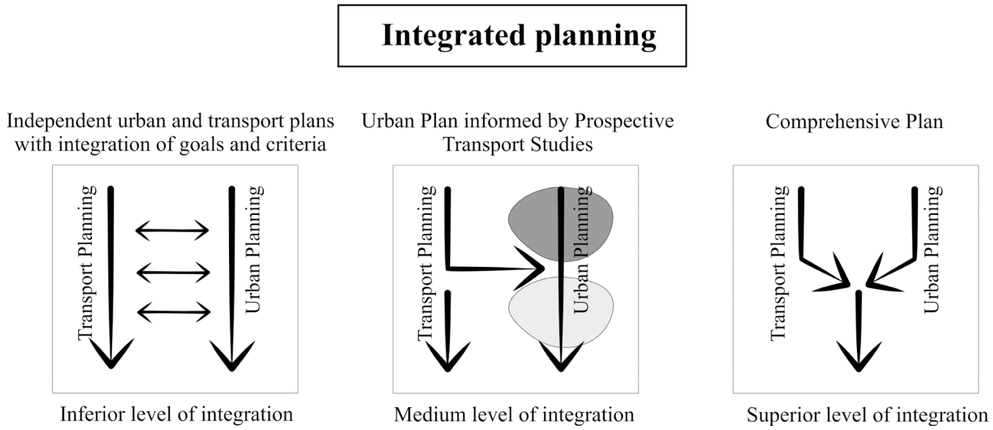


Fig. 117. Levels of integrated planning developed in the GDR, the CSR and the USSR. Source: Author’s elaboration.

This chapter demonstrates the change in the concept of integrated planning that can be explained both by the socio-economic context of cities and by professional development. It should be stressed that socio-economic development needs were the accelerator of the changes, but not the determining factor. Under similar conditions different cities demonstrated different objectives and approaches in integrated planning practice. Among the most important factors that contributed to the process of change of plans are the level of organization of integration process by the state, involvement of planners in joint work, consideration of transport in urban decisions, increasing the significance of transport (in terms of social aspects and for long-term territorial development). In addition, the integration was limited by technical-economic factors, state control, rigidity in communication between urban planners and traffic engineers.

In more general terms, this chapter allows us to understand the first period of the practice of integrated planning. It highlights the lack of experience and maturity in integrated work, the difficulties in organising debates between planners, in

organising the sequence between planning processes, in evaluating results and making the necessary changes, as well as the fragmentation of urban planning and transport bodies which contributed to inconsistent and incoherent results. Despite these difficulties, it is a very valuable theoretical and practical experience, since the evaluation of the problems of this period allowed progress to be attained later in the 1980s.

3.4.5. BIBLIOGRAPHICAL REFERENCES

Archive of the Slovak Academy of Science (1963) *Smerný Uzemní Plán Bratislavy.*

Bocharov, Y., Kudryavcev, O. (1972) *Planirovochnaia struktura sovremennogo goroda*, Moskva: Izdatelstvo literatury po stroitelstvu.

Bolchynek, F., Leyer, L., Krause, L. (1977) *Erkenntnisse und Erfahrungen aus der Begutachtung von Generalbebauungsplänen ausgewählter Städte*, Berlin: Verlagsort.

Bolonenkov, G. V. (1972a) *Skorostnoi obshestvenni transport krupnogo goroda*, Moskva: GOSINTI.

Bordukov, I. V. (1974) O razrabotke kompleksnykh skhem razvitiia gorodskogo passazhirskogo transporta, in Giprigrad (ed.), *Kompleksnye transportnye skhemy-gorodov*, Kiev: Budevelnik, pp. 3-6.

Böhme, U. (1971) Personenverkehr in Städten — ein Umweltproblem, *Deutsche Architektur*, 7, pp. 440-445.

Bratislava Municipal Archive (1963) *Štúdia rozvoja mestkej hromadnej dopravy: Prognóza a návrh 1 etapy,* Útvar hlavného architekta mesta Bratislavy.

Bratislava Municipal Archive (1969) Generálne Riešenie Mestskej Hromadnej Dopravy v Bratislavy, Útvar hlavného architekta mesta Bratislavy.

Bratislava Municipal Archive (1975) *Návrh Dalsieho Rozvoja Mestskej Hromadnej Dopravy v Hlavnom Meste SSR Bratislave*, Útvar Dopravného Inzínierstva Mesta Bratislavy, Zápisanice rady NVB, I.

Bratislava Municipal Archive (1980) *Generel Dopravy hlavného mesta SSR Bratislavy*, Útvar Dopravného Inzínierstva Mesta Bratislavy, Zápisanice rady NVB, I.

Braun, T. (1963) *Stúdia Rozvoja Mestkej Hromadnej Dopravy*, Archivo Municipal de Bratislava, Útvar hlavného architekta mesta Bratislavy.

Crouch, M. (1979) Problems of Soviet Urban Transport, *Soviet Studies*, 31 (2), pp. 231-256.

Deutsche Bauacademie (1965) Grundsätze der Planung und Gestaltung der Städte der DDR in der Periode des umfassenden Aufbaus des Sozialismus, *Deutsche Architektur*, 1, Berlin, pp. 4-8.

Deutsche Bauakademie (1969) *Generalbebauungsplanung der Städte der DDR*, Berlin: Deutsche Bauinformation.

Dresden City Council (1967) *Generalbebauungsplan und Generalverkehrsplan der Stadt Dresden*, Dresden: EMZ-Druck.

Dresden City Council (1977) *Generalverkehrsplan der Stadt Dresden*, Dresden: Polydruck.

Dresden Municipal Archive (1961a) *Protokoll über die 3. Tagung der Zentralen Sozialistischen Arbeitsgemeinschaft "Komplexe Verkehrsplanung",* am 2.2.1961.

Dresden Municipal Archive (1961b) *Anordnung der komplexen Verkehrsplannng für die Stadt Dresden*, Rat der Stadt Dresden, Stadtarchitekt, Brigada Komplexe Verkehrsplanung.

Dresden Municipal Archive (1967) *Generalverkehrsplan der Stadt Dresden*, Bericht uber den Stand und noch offener Probleme des Generalverkehrsplanes der Stadt Dresden, 9.1.2 – 041.

Dresden Municipal Archive (1968) *Basisstruktur der Verkehrsanlagen*, Bericht Zentrale Arbeitskreis für Forschung und Technik, 1.3. – 043.

Dresden Municipal Archive (1970) *Die Hauptprobleme der GVP der Stadt Dresden*, Rat der Stadt Dresden, Vorlage für die Beratung des Arbeitskreises Geselschaftsprognose der Bezirkleitung Dresden der SED am 30. 06. 1970, 9.1.2 - 046.

Dresden Municipal Archive (1973) *Konzeption zur weiteren Arbeit am GVP der Stadt Dresden im Rahmen der Langfristigen Planung*, Rat der Stadt Dresden, Abteilung Verkehrs und Strassenwesen, 002537 - A.

Dresden Municipal Archive (1974) *Generalbebauungsplan, Entwurf unter besondere Berücksichtigung der Landfristigen Planung der Komplexen Wohnungsbaus*, Büro für Stadtarchitekten des Rates der Stadt Dresden 28.06.1974, 001859 - 4.

Dresden Municipal Archive (1975a) *Verkehrspolitische Grundsätse für die GVP und die strategische Ausbaukonzeption bis 1980 und danach*, Rat der Stadt Dresden, Stadtrat für Verkehrs und Nachrichtenwesen, 9. 4.

Dresden Municipal Archive (1975b) *Generalverkehrsplan Dresden*, *Erschliessungsnetz Dresden Stadt,* 1.5.3.1. - 982-2-16 - B 23.

Dresden Municipal Archive (1975c) *Generalverkehrsplan Dresden, Geplantes Erschliessungsnetz Dresden Stadt 1990*, 2.5.3.1. - 982-2-16 - B 27.

Dresden Municipal Archive (1977) *Konzeption zur vorberatung Stadtverordnetenversammlung*, 4.2.1 - 212.

Federal German Archives (1961) *Städtebauliche Planung Dresden*, Diskussionsgrundlage für die Sitzung der Kommission Städtebau und Architektur, DH/2, 21414, 51, M304, 48.

Federal German Archives (1964) *Der wichtigsten Entwicklungstendenzen der Wissenschaftlich-Technischen Grundrichtung für die Entwicklung des Verkehrswesens*, Ministerium für Verkehrswesen, Zentrale Abteilung Forschung und Entwicklung, DM/1/, 8346, 51, 39.

Federal German Archives (1973) DH/2/Plan, 2804, 51, Haus 901/EG, 9.

Federal German Archives (1974) DH/2/Plan, 2804, 51, Haus 901/EG, 9.

GAE (1981) *Razvitie Gradostroitelstva SSSR 1976-1980*, Gosstroi SSSR, 5, 1, 1665.

GARF (1967a) *Perepiska CK KPSS i SMRSFSR po voprosam tramvaino-trolleibusnogo khoziaistva*, vol. 3, A - 314, 3, 8589.

GARF (1966a) *Dokumenty po rassmotreniiu kompleksnoi skhemy razvitiia vsekh vidov gorodskogo passazhirskogo transporta v Gorkom na 1966-1970gody,* (obosnovaniia, raschety, zaklyucheniia ekspertov), Gosplan RSFSR, A-262, 8, 6024.

GARF (1978) *O soglosovanii KTS vsekh vidov gorodskogo passazhirskogo transporta Gorkogo*, Sovet Ministrov RSFSR, Gosplan RSFSR, A-259, 46, 8905.

GAE (1979b) *Razvitie gradostroitelstva v SSSR 1971-1977 gody*, TSNIIP Gradostroitelstva, 5, 1, 1215.

GARF (1981) *O merakh po dalneishemu razvitiiu gorodskogo passazhirskogo transporta v RSFSR*, vol. 1, Gosplan RSFS, A-259, 48, 3181.

Glissmeyer, H. (1970) *Prognostische Verkehrsprobleme im Städtebau der DDR*, Fachtagung der Zentralen Fachgruppe "Gebiets-, Stadt- und Dorfplanung" des BDA 20. und 21. Februar 1969 in Magdeburg, Generalbebauungsplanung der Städte der Deutschen Demokratischen Republik, Berlin: Deutsche Bauinformation.

Goldzamt, E. (1980) *El Urbanismo en la Europa Socialista*, trad. Madrigal, P., Barcelona: Gustavo Gili.

Gosplan SSSR (1969) *Ukazaniia po razrabotke kompleksnykh skhem razvitiia gorodskogo passazhirskogo transporta dlia gorodov s naseleniem 250.000 i bolee*.

Harris, C. D. (1971) Urbanization and Population Growth in the Soviet Union, 1959-1970, *Geographical Review*, 61 (1), pp. 102-124.

Häußermann, H. (1996) *Stadtentwicklung in Ostdeutschland: soziale und räumliche Tendenzen*, Opladen: Westdt. Verlag.

Hons, J. (1973) Jednota Dopravní Soustavy v Plánovitém Řízení Rozvoje Socialistické Dopravy, *Doprava*, 4, pp. 296-300.

Horák, P. (2017) *Urbanizmus 20. storočia na Slovensku Prípadová štúdia Bratislava*, doctoral thesis, Slovenská Technická Univerzita v Bratislave, Fakulta Architektúry.

Hruška, E. (1968) Rozhovor o Bratislavskej Doprave, *Project*, 3, pp. 51-57.

Hrůza, J. (1958) *Gradostroitelstvo v Chekhoslovakii*, Prague: Soiuz arkhitektorov Chekhoslovackoi Respubliki.

Ilinskii, G. (1972) *Zakliuchenie v chasti uviazki skhemi s generalnym planom goroda*, en Materialy po rassmotreniiu kompleksnoi skhemy razvitiia vsekh vidov gorodskogo passazhirskogo transporta Yaroslavlia, Gosplan RSFSR, GARF, A-262, 16, 1431.

Interview with Rabe Ulrich in 2018.

Keul, D.-J. (1977) *Generalverkehrsplanung und sozialistische Intensivierung, in Generalverkersplanung und ihre Wechselbeziehung zum sozialiistischen Städtebau*, Berlin: Verlagsort.

Komárek, V. (1968) K Výsledkům Dosavadních Prací na Dlouhodobém Výhledu Ekonomiky ČSSR, *Doprava*, 10, pp. 1-7.

Kražek, J. (1974) Vybrané Problémy Rozvoja Jednotnej Dopravnej Sústavy na Slovensku, *Doprava*, 2, pp. 6-11.

Lecht, K. W. (1968) Der Generalbebauungsplan — Prognose für die sozialistische Stadt, *Deutsche Architektur,* 4, pp. 196-203.

Lengiprogor (1971) *Generalnii Plan goroda Yaroslavl 1971*, Archive of the Department of Architecture and Land Relations of Yaroslavl city.

Mitáš, M. (1976) Problémy integrace dopravního a územního plánovaní velkých měst, *Doprava*,18 (4), pp. 337-346.

Ministry of Transport of the CSR (1967) *Koncepce rozvoje mestkej hromadne dopravy do r. 1980,* Federal Archive of the Czech Republic, MDIII, 17, 10239.

Nersesyantz, N. (1976) *Materialy po rassmotreniiu kompleksnykh skhem razvitiia vsekh vidov gorodskogo passazhirskogo transporta goroda Gorkogo*, GAE, A 262, 16, 4440.

Niewand, G. (1969) Der öffentliche Personennahverkehr im Generalverkehrsplan Dresden, *DDR-Verkehr*, 2, pp. 70-74.

Ovechnikov, E. V. (1972) *Materialy po rassmotreniiu kompleksnoi skhemy razvitiia vsekh vidov gorodskogo passazhirskogo transporta Yaroslavlia*, Gosplan RSFSR, GARF, A-262, 16, 1431.

Paetzold, W. (1973) Die Entwicklung des Verkehrs in den Städten der DDR - Aufgaben für Forschung und Generalverkehrsplanung, *DDR-Verkehr*, 9, pp. 357-360.

Regional Archive of Yaroslavl (1963-1988) *Materialy, otchety, zaklyucheniia, spravki po obsledovaniiu planirovki i zastroiki goroda Yaroslavlia*, 5, 5, 254.

Regional Archive of Yaroslavl (1976) *Perepiska s ministerstvom zhilishchno-kommunalnogo khoziaistva RSFSR, i oblastnym upravleniem kommunalnogo khoziaistva za 1976 god*, 1358, 3, 265.

Regional Archive of Yaroslavl (1979) *Spravka o sostoianii zastroiki goroda Yaroslavlia za 1979 god*, P – 872, 5, 35.

Richter, G. (1973) Langfristige Planung des Verkehrs im Rahmen der volkswirtschaftlichen Reproduktion, *DDR-Verkehr,* 8, pp. 339-346.

Saprykina, N. S. (2006) *Sovetskaia Arkhitektura Yaroslavlya: Realnost i Virtualnost*, Yaroslal: YGTU.

Sdobnov, Y. A. (1980) *Yaroslavskii gradostroitelnii dogovor*, Moskva: Znanie.

Siegel, H. (1969) Strukturmodellen als Kernstück der Einheit von Generalbebauungsplan, Generalverkehrsplan und Plan zur Entwicklung des Bauwesens am Beispiel der Stadt Leipzig, in Deutsche Bauakademie (ed.) *Generalbebauungsplanung der Städte der DDR*, Berlin: Deutsche Bauinformation, pp. 54-57.

Skorobogatov, B. V., Sleptzov, B. V., Shtundel, E. V. (1974) *Opyt proektirovaniia kompleksnykh transportnykh skhem, in Giprograd (ed.), Kompleksnye transportnye skhemy gorodov*, Kiev: Budivelnik.

Slovak National Archive (1969a) *Informatívna Správa. O navrhu na riešenie o dopravnej koncepcie v Bratislave*, MDRT SSR, Ministerstvo Dopravy Pošt a Telekomunikácií SSR, KM 13.1 – 10.1.

Slovak National Archive (1969b) *Správa o súbornom riešenie dopravy v Bratislave*, MDRT SSR (Ministerstvo Dopravy Pošt a Telekomunikácií, KM 13.1 – 10.3.

Smýkal, F. (1968) Koordinace Řízení Dopravy ve Městě, *Doprava*, 10, pp. 202-205.

Soveta Ministrov SSSR (1980), *O merakh po dalneishemu razvitiiu gorodskogo passazhirskogo transporta*, N1138.

Starinkevich, A. K., Balatzkii, S. N., Rigberg, G. B., Shigol, M. M. (1977) Problemy proektirovaniia i realizatsii transportnykh sistem gorodov, in KievNIIPGradostroitelstva (ed.), *Voprosy sovershenstvovaniia transportnykh sistem gorodov*, Kiev: KievNIIPGradostroitelstva, pp. 3-14.

Statistisches Amt der Stadt Dresden (1968) *Dresden in Zahlen: Statistisches Jahrbuch der Stadt Dresden,* Dresden.

Surový, R., Hollarek, T. (1962) Problemy dopravy v Bratislave, *Doprava*, 10, pp. 348-354.

Surový, R. (1963) K Problémam Predmestskej Dopravy, *Doprava*, 5, pp. 367-371.

Surový, R. (1968) *O generálneho riešenia MHD v Bratislave predkladaný na základe uznesenia Rady,* NV3 č- 278/68 zo dňa 17.12.1968, Bratislava Municipal Archive, Národný výbor mesta Bratislavy.

Vorel, V. (1974) *Návrh, správy do Vlády SSR o ďalšcm rozvoji mestkej hromadnej dopravy*, Archivo Municipal de Bratislava, NVB.

VÚVA (1963) *Směrnice pro navrhování komunikací a dopravních ploch v sídlištích,* Brno: VÚVA.

VÚVA (1979) *Zásady a pravidla územního plánováni*, Brno: VÚVA.

ZFIV (1975a) *Rolle und Aufgabendes Verkehrswesens in der sozialistischen Stadt*, 2 Symposium Stadtverkehr des ZFIV und der KDT, Berlin: ZFIV.

ZFIV (1976b) *Begutachtung der Generalverkehrspläne (GVP) für Städte der DDR*, Berlin: ZFIV.

ZFIV (1977) *Generalverkehrsplanung und ihre Wechselbeziehung zum sozialistischen Städtebau*, 3 Symposium Stadtverkehr des ZFIV und der KDT, Berlin: ZFIV.

White, M. P. (1979) Planning of urban transport systems in the Soviet Union: A policy analysis, *Transportation Research Part A: General*, 13 (4), pp. 231-240.

View of the Gorbitz residential area in Dresden in the late 1980s.
Source: Dresden Municipal Archive, 6.4.40.2-IX311_00033886.

IV. THE DEVELOPMENT OF RAPID TRAMS AND THEIR RELATIONSHIP WITH URBAN STRUCTURE AND FORM

"The transport system also has great tasks ahead of it, because its efficiency influences the effectiveness of our national economy in many respects (...)
We are particularly interested in improvements in transporting the workforce."[1]

(E. Honecker at the Eighth Congress of the East German Communist Party, quoted in Erfurt Municipal Archives, 1975, p. 14).

The words of the Chairman of the State Council of the GDR quoted above reflect once again the weight given to public transport, and especially to rapid transit, in Communist countries in the 1970s. This is a topic that hitherto has not been well defined and has tended to be over-generalized, but nevertheless is of great interest. The previous chapter, given over to matters of the integration of town planning and transport engineering during the period 1964 to 1982, made it possible to go deeper into the context, and to investigate the development of rapid tram lines and the factors affecting urban structure and form they entailed, a detailed discussion of which will be the main theme of this chapter. The aim is to explain the inclusion of high-speed tramways in Socialist town planning during the 1970s.

This period was characterized by new State policies aimed at stabilization and normalization of Communist dictatorships after the Prague Spring of 1968 (Mannová, 2000, pp. 291-293). Policy responses to increased criticism in society had to be developed (Pollack, 1999, p. 36) in a context of a lack of coherence in the dictatorships in the Soviet Union's orbit (Kott, 2004, p. 238; Rubin, 2008). Among these responses was the social policy of providing housing, facilities, transport services, and the like, seen as a form of consumerism (McDermott, 2015), which was the main method of demonstrating State care and winning the loyalty of the population (Jarausch, 1999; Meuschel, 2000; Grieder, 2012). Thus, programmes for the construction of new housing were a powerful tool for preventing worker dissatisfaction and mitigating social problems (Ladd, 2001, p. 585).

Programmes for residential growth programmes on the peripheries of Socialist cities from the early 1970s onwards relied on rapid tramways to improve the speed and capacity of passenger transport. As in the case of Western countries, tram modernization was a contradictory and unevenly practised approach, because of conflicts with motor traffic. However, with the intensification of political, economic, social and environmental problems, the idea of rapid tramways and light rail began to appear an efficient solution. Consequently, starting in early 1970s, plans for general transport and urban development began to incorporate rapid tramway systems.

1 "Große Aufgaben stehen auch vor dem Verkehrswesen, weil dessen Leistungsfähigkeit in vieler Hinsicht die Effektivität unserer Volkswirtschaft beeinflußt (...) Besonders am Herzen liegt uns die Verbesserung des Berufsverkehrs."

However, it was one thing to keep tramway systems in place and adapt them to the requirements of road traffic, and another to convert them into the main urban transport system, since this implied reconsidering the entire organization of transport and the re-assignment of land use. Tramway networks required modernization of their rolling stock and infrastructure, while the integration of high-speed trams required new regulations, planning principles and design criteria. This gave rise to national and international discussions and suggestions. These changes involved a new generation of planners who had been trained in the 1960s and by the 1970s were trying to reconsider the concepts of, and approaches to, urbanization. The experience of a number of Western European countries, such as the FRG, Switzerland, Austria, Belgium and the Netherlands, was studied. In order to ensure the efficient application of higher-speed trams, emphasis was placed on the investigation of issues such as the interrelationships between rapid tramways and zoning, and urban structure and form.

A range of questions are analysed in this chapter. How were decisions on the planning of rapid transit taken? What were the objectives, constraints and limitations that were emphasized? What factors were involved in the decisions adopted? What changes did rapid transit bring to town planning? How were new residential areas planned? Finally, how were these matters compared with experience in Western European countries?

The chapter starts with a sub-chapter 4.1 dedicated to the emergence of fresh views of trams after numerous studies and debates, relating to economics, transport, technical matters and town planning. It also examines the problems of the technological development of rolling stock. The introduction of higher-speed tramway systems was closely related not only to increases in distances and passenger numbers, but also to changes in urban structures, examples being Ostrava, Yaroslavl and Erfurt. The next subchapter, 4.2, is devoted to the study of these new residential areas and their spatial relationship to consolidated city, urban centre and working areas. Moreover, the organization of their internal structure is also considered, focusing on solutions to spatial conflicts between trams and road infrastructures, as well as the part played by pedestrian traffic. Case studies are offered of the new residential areas of Líšeň and Bohunice in Brno, Nový Barrandov in Prague, Sykhiv in Lviv and Gorbitz in Dresden.

Summary of Chapter IV:

IV. The Development of Rapid Trams and Their Relationship with Urban Structure and Form

4.1. The Technological Development of Rapid Trams and their Increasing Role in Town Planning

4.2. Rapid Tramways for New Residential Areas: The Combination or Separation of Road and Tramway Infrastructure. Case studies of Brno, Dresden and Lviv

4.1. THE TECHNOLOGICAL DEVELOPMENT OF RAPID TRAMS AND THEIR INCREASING ROLE IN TOWN PLANNING

From the early 1970s, there was a growing role for modes of transport running on rails, as they could offer greater capacity and higher speeds at an affordable price. The commonest solutions in large conurbations all over Europe were metro and suburban rail systems, which did not disturb motor vehicle traffic, because they ran underground or on dedicated tracks. However, it was less clear how to deal with trams running at surface level, especially in medium-sized cities. The 1970s can therefore be appreciated as a transitional period in which there was a lack of standardized principles for public transport technology. On the one hand, the ideas of Modernism, which involved a maximum use of surface areas for motor transport and envisaged running public transport underground, continued in force. On the other hand, attempts were made to find solutions for public transport that employed existing rail technologies, adapting them to economic, environmental and social conditions.

One technology that had the potential for modernization and adaptation to different urban and suburban conditions was the tramway. However, the ideas of combining tram lines with road traffic, and of giving priority to trams over cars were still difficult to embrace.[2] The technological development of tramway material was gradual and often tentative, implemented with different local and national goals and visions (Petkov, 2020, p. 18). Thus, it was only from the 1970s onwards that a slow period of tramway renascence began in European Communist and Western countries.[3]

In order to achieve the hoped-for efficiency of operation of new modernized tramway systems, it was necessary to improve rolling stock and infrastructure, especially tracks, and to integrate them into town planning. Modernization of the rolling stock was a technical issue that proved hard to resolve, especially in Western European countries. Studies were carried out and attempts were made to improve the speed and capacity of tramcars, but no significant developments were achieved during the 1970s. Likewise, the inclusion of rapid tramways in Socialist town planning also met with a range of difficulties. At times, they were seen only in the form of separate lines to connect new residential areas, although on occasion they were incorporated into a coherent tramway system. On a case-by-case basis, the degree integration into land uses and urban models of rapid tram lines could differ.

The aim of this sub-chapter is to explain the period of tramway renascence in Communist Europe during the 1970s, with its contradictions, problems and differences. In particular, it seeks to elucidate the concept and technological devel-

2 The preference for the underground tramway solution, however, continued also in the 1980s and 1990s, while decisions on reserved platform tramway have only recently been taken, and based on economic efficiency studies (Petkov, 2020, p. 144).

3 In contemporary studies the revival of the tramway is rather studied as a post-socialist phenomenon (Brzezinski, Suchorzewski, 2004; Zelezny, 2013, 2014; Pucher, 1999). However, this idea, although it did not have such a great technological development, already started since the beginning of the 1970s.

opment of rapid tramways, and the theoretical approaches in transport and town planning adopted to accommodate them. Additionally, three case studies show the differences in implementation that were to be found, covering three cities: Ostrava in Czechoslovakia, Yaroslavl in Russia and Erfurt in Germany.

The conclusion reached is that in European Communist countries there was considerable diversity in both urban public transport policy and solutions involving integrated planning for transport and cities. The approaches and solutions to tramway planning and modernization were quite different, this being related to variations in terms of State policies for collective public transport, to the extent of involvement of local authorities, to the actual implementations of urban and transport studies and plans, and to the quality of planning criteria for rapid tramways.

4.1.1. THE RENAISSANCE OF TRAMWAYS AND ITS TECHNICAL ASPECTS

As mentioned above, the concepts of light rail and high-speed tramways emerged as a response to a range of social, economic, political and technical problems. On the one hand, such tram lines were an attempt to answer traffic congestion and social criticism of the quality of the urban environment, on the other hand, the oil crisis revealed the inadvisability of relying solely on motor transport[4] (Moraglio, 2015, p. 161; Petkov, 2020, p. 3). In addition, the drive to industrialize, together with strong urban growth from middle of the 1960s onwards, increased the demand for rapid public transport. The problems were worse in medium-sized cities, which could neither manage with existing bus services nor build a system as expensive as a metro. An efficient solution was sought to meet the needs of such middling cities, faced with intermediate flows of between 2.000 and 20.000 passengers per hour. In parallel, technological innovations were expected to resolve the spatial conflicts between private and public transport.[5] There was much uncertainty about which mode of rapid public transport should be chosen, with continuing theoretical debate and studies on planning experiences and on the technical characteristics of light rail and rapid tramways. This subchapter analyses these debates in some Western European countries, and in the three Communist countries, the USSR, the GDR and the CSR.

a. Debates about Rapid Transit and Light Rail in Europe

In Western countries discussions focused principally on light rail. The oil crisis was the last straw that put an end to the never-ending growth in motor traffic that had given no thought to urban models, and it accelerated studies on the possibility of implementing light rail (Taylor, 1980, p. 69). The urgency of finding an efficient solution turned the 1970s into a period of intense exchange of knowledge, experiences and public transport technologies.[6] There was a search for a hybrid, versatile solution that could combine several features, operating both underground and on surface or even elevated lines. Comparisons between tram services and those offered by commuter trains and metros favoured tramways, as an outcome of their higher service frequencies and shorter distances between stops (Dewees, 1979, p. 302). Studies on the experiences of the 1960s in modernizing tramway systems, especially in countries such as the FRG, Belgium, the Netherlands and Sweden became prominent. These were the countries that had tried to respond efficiently to the problem of public mobility in medium cities with a population of between 100.000 and 1.000.000 inhabitants by developing a combined means of transport running both on the surface and underground where appropriate. Thus, throughout the 1960s and 1970s, large West German cities such as Hanover, Bremen, Cologne, Karlsruhe, and others gradually modernized their tram networks. The most innovative interventions involved segregating tramway lines from road traffic and the possible construction of tram tunnels. However, these approaches were not yet widespread and the development of the existing system was the preferred solution in larger cities. In contrast, small and middling cities mostly abandoned their tramways. Between 1945 and 1981 in West Germany approximately sixty tramway undertakings were closed down, this being accompanied by an atmosphere of constant opposition to keeping such services in operation that lasted until the early 1980s (Schmucki, 2010, p. 13, p. 15). In the Netherlands, too, trams were retained in only three cities, Amsterdam, Rotterdam and The Hague, while they were abandoned in other smaller cities in favour of bus services.

4 See Smith, W. S. (1977) The Energy Crisis Today: A Perspective, *Traffic Quarterly*, 31, pp. 5-19.

5 Young, A. P., Maltby, D., Constantine, T. (1969) Urban Transit Systems: Choice for Investment, *Official Architecture and Planning*, 32 (12), pp. 1454-1460; Schmucki, B. (1997) Individualisierte kollektive Verkehrssysteme und kollektivierte individuelle Verkehrssysteme. Die Vision von Neuen Technologien zur Lösung der Verkehrsnot der Städte in den 1970er Jahren, in Dienel, H.-L. and Trischler, H. (eds.), *Geschichte der Zukunft des Verkehrs. Verkehrskonzepte von der Frühen Neuzeit bis zum 21. Jahrhundert*, Frankfurt/New York: Campus Verlag, pp. 147-169.

In some Western countries, the technical problems of ensuring tramways were separate from roads continued for a long time, this constituting one of the factors that most strongly limited the development of tram networks (Petkov, 2020, p. 258). However, with the crisis of the 1970s, the countries that had decommissioned their tramway systems to the greatest extent, such as the UK, France and the USA, started to study experiences based on the modernization of such networks. A number of planners in these countries stressed the need to deploy tramway systems: "We have proven technology that can be used now; leave novelties to a new generation." (Joyce, Prigmore, 1979, p. 211).

In the United States, the importance of high-speed public transport had been discussed since the early 1960s. In large cities such as Boston, Philadelphia, Chicago or San Francisco, "rapid transit" projects were developed. This experience was motivated by the demonstration of their advantages in carrying capacity (Anonymous, 1963). The solutions were based in the first instance on development and modernization of suburban trains and "subways" (underground railways),[7] as neither politicians nor planners were yet ready to accept trams or light rail tracks on the streets of their cities. Therefore, rapid or express bus services often seemed to be an efficient and easy-to-implement solution (Maynard, 1969, p. 353).

One of the most prominent studies on the applicability of the European experience of light rail in US cities was carried out by transport engineer Vukan Vucnic

6 One of the important means of knowledge exchange were the journals Modern Tramway and Light Rail Review and Railway Gazette International.

7 White, H. P. (1967) The Rapid Transit Revival—A Comparative Review of Overseas Practice, *Urban Studies*, 4 (2), pp. 137-148.

in 1972.[8] He emphasized the advantages of light rail and rapid tramways, including the possibility of gradual construction depending on the funding to hand, and the possibility of conversion to underground or commuter rail at a later date (Vucnic, 1972, p. v). He also underlined the possibility of diversification and complementarity of public transport.[9] Despite this, there remained some confusion about the meaning of light rail, and its resemblance to old conventional tramway systems prevented its rapid acceptance and implementation (Stewart, 1980, p. 67):

> *"Light rail transit is hard to define. The difficulty stems from a number of causes. It is not the product of a single invention such as Frank Sprague's trolley. It did not materialize at one moment as did Andrew Hallidie's cable car. Finally, its current physical characteristics are so varied that a convenient definition is practically overwhelmed by exceptions (…) When America's transportation specialists attempt to describe LRT, the perception is often a confusing kaleidoscope of form and function with a strong coloring of the old-fashioned streetcar."*

From the middle of the 1970s onwards, investigations were carried out in France into the possibility of implementing light rail in middling cities (Boquet, 2017, p. 7). Technical characteristics were studied, and the flexibility and efficiency of the solutions were stressed.[10] However, resistance to tramway-like developments remained strong, especially because of the psychological barrier of returning to trams, which had been abandoned only a short time ago (Moraglio, 2015, p. 164). Therefore, the earliest light rail projects dated mostly from the mid-1980s onwards, for example those in Nantes and Grenoble.

A balance had to be found between modernity and efficiency. Light rail was an acceptable idea for politicians and planners, as long as conversion into a metro remained feasible for the future, this facilitating decision-making on the modernization of existing tramway systems and the planning of new lines.

On the other hand, it should not be forgotten that there was also a development in the profession, as social and environmental motives came to be promoted. Passenger access to tram and metro stops was compared, highlighting the difficulty of access to metro stations.[11] This gradual change in thinking in the 1970s was crucial in altering planning paradigms already in the 1980s. Hans-Georg Retzko, working

8 During the 1970s in the United States, there were several studies dedicated to light rail. See Vucnic, V. (1972) Light Rail Transit Systems: A Definition and Evaluation, United States Department of Transportation Urban Mass Transportation Administration. Also, the publications of Transportation Research Board dedicated to Light Rail Transit, United States Department of Transportation (1977) *Light Rail Transit, Technology Sharing, State-of-the-Art Overview*, May.

9 See also Patricelli, R. (1976) LRT can offer an attractive level of service at significantly lower capital cost, *Railway Gazette International*, 132 (7), p. 251, where he underlined the initial period in the development of light rail system: "We realise that as s result of 30 years neglect our knowledge of LRT in the United States – its cost, performance and service potential – is inadequate. We hope that the conference on LRT which UMTA (Urban Mass Transportation Administration) sponsored in June 1975 marked the beginning of a concerted effort to correct this situation."

10 Rapport de la trente-huitième table ronde d'économie des transports tenue à Paris (1977) *Possibilités offertes par certaines techniques traditionnelles pour les transports urbains. Trams et trolleybus*, Conférence Européenne des Ministres des Transports.

11 Dewees, D. N. (1979) A Comparison of Streetcar and Subway Service Quality, *Journal of Transport Economics and Policy*, 13 (3), pp. 295-303.

as transport planner in the FRG, stressed in a 1978 article that the pursuit of futuristic solutions in urban transport should come to an end, with emphasis laid on conventional solutions and more realistic approaches (1978, p. 590).

Finally, at the Conference of the International Association of Public Transport (UITP) held in 1979, there was discussion of the vital role that might be played by light rail as an efficient solution to the problem of traffic congestion and urban mobility. It was already being seen as a modern solution (Groche, 1979, p. 4): "A new form of railway that is neither a metro nor a creaking, rattling tram from great-grandmama's days."[12]

Meanwhile, debates on the future of rapid public transport in European Communist countries began with the difficulty of choosing between rapid trams and light rail. In these Socialist countries, the elimination of tram infrastructure was much debated and partly carried out during the post-war period, but starting in the late 1960s such an approach began to be questioned (Honzík, 1967; Jansa, 1967; Sheinyuk, 1971; Bolonenkov, 1972a). In several publications from the late 1960s, a change of opinion about tramway systems can be noted, with the consideration of the possibility of future modernization. Several factors played a role in this shift in approach. On the one hand, there was a concern, shared with the West, about the deterioration of accessibility arising from urban sprawl, as well as, to a lesser extent, worries about environmental degradation. On the other hand, rather than as a complex social issue, the problem of urban traffic was understood as a weakness of the economic system. For this reason, fast-extending urban sprawl and the consequent increase in travel times was a challenge to overall economic efficiency, providing support for the idea that mass rapid transit had to become more prominent in urban areas.

There is no denying the influence of the debates at Western international congresses seeking a solution to car traffic congestion. The UITP congress in Barcelona in 1967, although mainly devoted to the development of suburban trains, metros, monorails and new models of buses, was also impactful in considering the issue of rapid tramways[13] (Fig. 118). Such a solution seemed optimal to the Communist countries, concerned about the growth of passenger traffic and the future emergence of congestion problems in their cities. In the early 1970s in the USSR, it was claimed that this successful Western experience could be applied in the future (Kominarov, 1970b, p. 35): "Foreign experiences in operating rapid tramways have confirmed their reliability and regularity, and revealed the possibility of using trams in a new way."[14] In particular, comparisons with metros led their more economical cost and speed of construction to be highly appreciated (Zakharov, 1970, pp. 102-103).

Consequently, comparative studies of buses, trolleybuses, trams and rapid trams were undertaken. High-speed tramways were considered as a definite pos-

12 "Ein neues Schienenbahn-System, das keine U-Bahn ist, aber auch keine quietschende und ratternde Strassenbahn aus Urgrossmutters Zeiten."

13 These discussions highlighted the successful experience of some Western European countries (West Germany, Italy, Austria, etc.) that modernised their trams and increased rolling stock capacity.

14 "Зарубежный опыт эксплуатации скоростного трамвая подтвердил надежность, закономерность и возможность использования трамвая в новом качестве."

sibility for the future, as they demonstrated efficiency in service, in terms of their carrying capacity, operating costs, passenger comfort, winter operability, and other features. In these studies, Czechoslovak planners were among the first to recognize the crucial need for separate tracks and the modernization of rolling stock.[15]

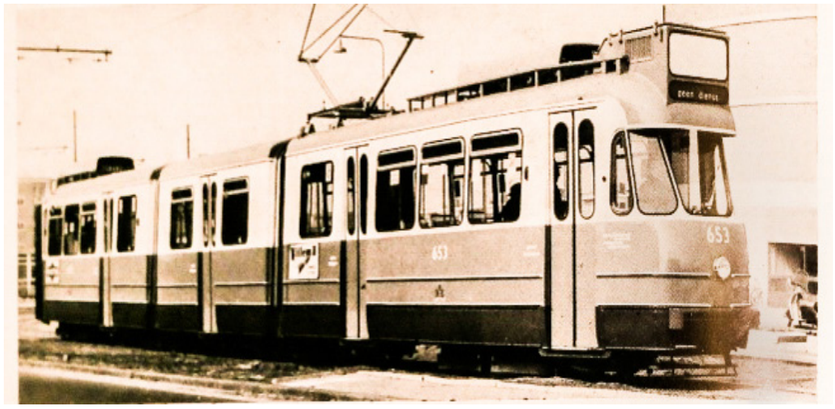


Fig. 118. One of the modern tramway models presented at the UITP congress in Barcelona, 1967. Source: UITP (1967) *Theorie und Praxis der Stadtverkehrswirtschaft*, XXXVII internationaler Kongress, Barcelona.

Although rapid tramways were supposed to be an ideal answer as they fitted in well with the policy of rationalization and financially optimal solutions, this did not take immediate shape in reality. At the beginning, they were limited to experimental projects and there were no definite decisions on high-speed tram networks and their future. This can be explained by the influence of Modernist ideas, which were still predominant, and so there was a search for innovations in the form of alternative means of rapid public transport.

It took some years before rapid tramway projects began to be implemented. The final decision on the development of such systems was the result of a combination of several factors. First came the urgency of providing accessibility to new residential areas (Rabe, 2020), but there were also the attraction of low construction and operating costs, good carrying capacity and speed efficiency, not to mention the success of light rail projects in Western countries. In the GDR, the CSR and the USSR there was a similar dynamic in terms of rapid tramway development, which started in the early 1970s. However, there were differences in the degree to which projects were brought to fruition, in the pre-existent tramway infrastructures, in the development of rolling stock and in the opinions of planners.

In the case of the USSR, the decision to implement high-speed tramways was more hesitant than in the GDR and the CSR. Opposition to the modernization of tram networks was especially persistent in the USSR, where there was less of a culture of trams in transport planning, and the extent and density of tramways were lower.[16] This was probably the outcome of several different factors. Firstly, trams

15 See Zouhar, W. (1968) *Městská hromadná doprava*, Praha: ČKD., Honzík, A. (1967) *Mezinárodní Konference o vývoji městské a příměstské kolejové dopravy po roce* 1970, Praha: ČKD., Jansa, F. (1967) *Městské Dráhy Elektrické*, Bratislava: Slovensko vydavateľstvo technickej literatúry. N. P.

16 Stramentov, A. E., Fishelson, M. S. (1963) *Gorodskoe dvizhenie*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu, arkhitekture i stroitelnym materialam, pp. 34-35.

were not considered a means of transport compatible with motor traffic. The State Committee on Civil Engineering [*Gosgrazhdanstroi*], in its 1968 plan for the development of public transport in the period 1971 to 1975 announced it would be promoting trolleybuses and buses, because they offered greater flexibility than did trams (GAE, 1968). Secondly, by the time the need for tram modernization was accepted, most of the tramway lines had already been eliminated from city centres or moved to secondary streets with a lesser concentration of urban flows and activities. An intention to reduce the number of tramway lines in Soviet cities was justified by transport specialists. Molodykh emphasized, for example, a reduction in the density of tram networks as a result of the expansion of cities, an increase in the availability of infrastructure for other types of urban transport, delays in the construction of lines in new residential areas, the low speed of trams in comparison with other means of public passenger transport and the elimination of tramways from major urban roads (Molodykh, 1973, pp. 12-13). Similarly, Bolonenkov pointed out several problems, such as the poor development of tram system, with a low level of connectivity, which was a result of the removal of tram lines from central parts of cities, and routing decisions for tramways influenced by a linkage with motor transport networks, all of which increased travel time and made lines less direct (Bolonenkov, 1971, p. 25).

Moreover, there were other problems. The new, more rapid, tram lines were poorly integrated with the existing tram network and other transport systems, and old rolling stock was being used to connect the new peripheral areas. Finally, there was a problem of lack of definition of criteria and optimization factors in the selection of means of collective public transport (Skorobogatov, Sleptzov, Shtundel, 1974, p. 29), which often ended in controversial decisions.

The efficient service provided by modernized tramways in Western European countries was also an important criterion in Socialist urban planning. Several studies were carried out on the Western experience and the possibilities of applying this mode. However, in the USSR there were few studies on rapid tramways as such, but rather on high-speed public transport in general, electric passenger transport, or rapid transit. Among the few studies on rapid tramways, the most influential was Sheinyuk's publication from 1971, which studied the experiences of the FRG, the USA, Sweden, Belgium and Austria. The transport planners Vladimir Khitzenko and Vladimir Veklich also studied the practices of Western European countries in detail. On the basis of these investigations, publications were produced and several high-speed tramway projects were put into effect in Soviet cities.[17]

The planning of experimental rapid tram lines started from the end of the 1960s in large cities such as Kiev (1967), Novopolotsk (1967), Saratov (1968), and Volgograd (1969). The worsening of transport problems in these cities encouraged the introduction of high-speed tramways, but the level of implementation was low, the

17 Vladimir Veklich participated in the UITP congress in Barcelona in 1967 where he was interested in the idea of rapid tramway developed in some Western European countries. Subsequently, he applied this idea to the planning of the rapid tram line in Kiev (the line connected the residential area with the city centre, length 9.5 km). Khitzenko did several trips, studying the examples of rapid tramway in West Germany, Belgium and Italy. See Khitzenko, V. V. (1975) Rol premetropolitenov i skorostnogo tramvaia v reshenii transportnoi problemi krupnykh gorodov, in Fishelson, M. S. (ed.), *Gorod i passazhir. Gradostroitelnye problemy razvitiia passazhirskogo transporta*, III Scientific Conference in Leningrad, pp. 154-160.

projects affecting only a few specific lines and not constituting coherent tram systems. Widespread implementation of rapid tramway projects, like those in a number of Western countries, started only in the early 1980s (Lviv, Krivoi Rog, Kharkov, Volgograd, Stary Oskol and Izhevsk).

In comparison with the USSR, the GDR eliminated its trams much less extensively in the 1960s. Tram lines were mostly still in place and could form the basis for a rapid transit system. However, a definitive decision for rapid trams was not reached until the mid-1970s here, either. The main means of rapid public transport in medium cities was the suburban commuter train, as in Rostock, Magdeburg, or Dresden.[18] Several studies pointed out the efficiency of tram modernization in urban plans for the future.[19] The need for modernization of the tramway system was justified by increasing car traffic and a consequent reduction in urban transport speeds (Keul, 1969, p. 266). Tramway modernization was considered a possible solution that would address the problem of low average speeds, and provide efficiency and effectiveness in transporting middling flows of passengers (Rüger, 1968, p. 173). Although this idea was more or less established, the modernization of the tramway system did not start quickly: detailed studies and a political decision were needed, and these did not take place until the early 1970s.

In Dresden, for example, from the late 1960s onwards there were discussions about the choice of public rapid transit. One of the difficulties was the lack of any technical development of high-speed tramway rolling stock (Dresden Municipal Archive, 1968), so that commuter trains were seen as the principal means of urban public transport. There were many doubts about the future of the tramway system and there was a need for joint studies between urban planners and transport specialists to justify its replacement by suburban trains, buses, monorail or rapid trams.[20]

Experimental high-speed tramway projects were implemented in Schwerin (1969) and Erfurt (1971).[21] The first such line in Schwerin (1969) connected a new residential area with the city centre and the industrial zone. This example served as a guideline for other cities in the GDR (Waschulewski, Hasse, 1975, p. 456). With

18 This can be appreciated in the journal *Deutsche Architektur* 1970, which was entirely devoted to the topic of urban traffic. The articles were mainly about the new means of rapid public transport such as monorail and there was no mention about rapid tramway. As the conclusion of these discussions the urban and suburban train was to receive the main role in the future development, with the limitation of the tram network and its use as a complementary means of public transport.

19 There were several studies in the late 1960s that underlined the importance of rapid tram system modernisation, the organisation of separate platforms, the development of rolling stock capacity, and tunnel lines. See, Dietzschold, G. (1967) Grundsätze für die Entwicklung des Verkehrs in den Städten der DDR, *Die Strasse*, 7 (6), pp. 243-247.

20 See Glissmeyer, H. (1970) Versuchs - und Entwicklungsstelle des Straßenwesens. Prognostische Verkehrsprobleme im Städtebau der DDR, in Deutsche Bauakademie (eds.), *Generalbebauungsplanung der Städte der Deutschen Demokratischen Republik*, Berlin: Bauinformation, pp. 63-67.

21 In these early projects, when modernist ideas were still strong, within new residential areas, attempts were made to provide for the separation of pedestrians from tram traffic with the organisation of pedestrian overpasses and tunnels. Also, in the case of Schwerin it is interesting to note that a study was carried out in 1965 by Liebmann, H., *Straßenbahn oder Omnibus im Stadtverkehr* (Tram or Autobus in Urban Transport) for the selection of means of public transport, where it was concluded that the best solution would be to remove trams, or to organise only bus service. This was explained by slow speed of trams during combined operation with road transport. The organization of separate tram platforms was not considered as a possible solution.

the availability of detailed studies on this and on foreign experiences, from the mid-1970s onwards the planning of rapid trams was undertaken in further cities, such as Berlin, Leipzig, Cottbus, Magdeburg, Karl-Marx Stadt, Rostock and Gera. From this time onwards, for GDR planners it was no longer a question of whether or not to implement rapid tramways, but rather of how to improve the level of integration of such services with the urban transport system and town planning.

In the CSR, there were a couple of rapid tramway projects in the 1960s (Košice and Most-Litvínov), but the possibility of the widespread introduction of rapid trams in middling cities was generally not considered. Rather, emphasis was laid on the development of higher-capacity buses or suburban commuter rail. However, there were several studies that paved the way for the possibility of the application of the rapid tramway in Czechoslovak cities.[22] Nevertheless, it was not until the middle of the 1970s that there was a political decision by the State to plan for fast tramways. In 1976, pilot projects for rapid trams were announced in Ostrava (with about 300,000 inhabitants) and Brno (with some 350.000). Doubts remained about the implementation of rapid tramway systems in smaller cities, like Pilsen, Košice, Liberec or Olomouc, or larger cities like Prague and Bratislava.

This can be exemplified by the case of Bratislava, where the choice of the main means of rapid public transport had been debated for a long time. In the discussions around the general transport plan in 1969, stress was laid on continuing the development of existing urban public transport systems. A gradual modernization of the tram system in the direction of rapid tramways was desirable in terms of the city's operational needs (Surový, 1969, p. 190). The transport engineer Surový pointed out that the problem of collective public transport was not related to any lack of suggestions for novel transport systems, but to the impossibility of improving the existing system because of a shortage of funds and the poor organization of the town planning process (Surový, 1969, p. 192). Despite these sensible comments, in the 1970s the main proposal for Bratislava was the replacement of the tramway system by light metro (*rýchlodraha*), which was both a suburban and an urban mode of transport.[23] However, it was better at connecting the peripheral areas with the centre, and not so much for meeting the traffic needs in the core of the city.

There were doubts about the modernity of rapid tramways, since trams were at times seen as an elderly, obsolete means of transport, this being an outcome both of technical difficulties and of deeply rooted opinions among planners. The matter was especially difficult in city centres, where the application of rapid tramways seemed impossible, because of the cost of construction of tunnels and the limited surface areas available for segregated tracks.

All of this contributed to the slow development of rapid tramways in the Communist countries. Starting in the middle of the 1960s, various studies and comparisons of public transport modes were undertaken (Fig. 119). Thereafter, the early 1970s saw several pilot rapid tramway projects and detailed urban transport stud-

22 See Habarda, D. (1966) *Mestská a Cestná Doprava I. Tramvaje*., Bratislava: Vysoká Škola Dopravná v Žiline v Slovenskom Vydavatel'stve Technickej Literatúry, N. P.

23 In the 1970s one of the main topics of study and a concern of Czechoslovak planners was the connection of suburban areas with cities. The main solution for this was the planning of suburban rail with direct access to the city centre. Meanwhile, the possibility of using a rapid tramway yet was hardly considered.

Fig. 119. Book covers of the most important publications about rapid tramways in the CSR, the GDR and the USSR, published since the mid-1970s. On the left, the cover of the paper by R. Bankovič, *Der Platz der Strassenbahn im System des öffentlichen Personenstadtverkehr* (The place of the tramway in the urban public transport system) for the international conference held in Prague in 1977, *Perspektivy modernich tramvají*, edited by Československá Vědeckotechnická Společnost. This conference on the prospects of modern trams can be considered as one of the first major events at which the importance of the fast tramway was recognised in Eastern and Western European countries. The main focus of the presentations was on the application possibilities of the rapid tramway and the enhancement of its role in public transport system. In the centre, *Richtlinie für die Planung und Gestaltung der vebesserten Strassenbahn - Schnellstrassenbahn* (Guidelines for the Planning and Design of the Improved Tramway - Rapid Transit), published by the Zentrale Forschuninstitut für Verkehrswesen der DDR, Berlin, 1976. On the right, the book published in Leningrad in 1976 by V. V. Khitzenko, *Skorostnoi Tramvai* (Rapid Tramway).

ies. From the middle of that decade onwards, on the basis of interchanges of studies and the evaluation of experiences, international discussions on the need for the modernization of tramway systems were deepened and extended.

The novelty of the light rail concept in European Communist countries can be seen from the international congress on Prospects for Modern Trams [*Perspektivy modernich tramvají*] that was held in Prague in 1977. This congress can be assessed as the starting point for the recognition of tramway modernization as a common theme in the West and East. The article "A Second Century for the Tram?" [*Vtoroe stoletie tramvaia?*] by Shapilov (1980) published in the USSR also indicates the weight laid on this issue. The aim was to ensure recognition that rapid tramways were crucial for generalized planning in Soviet cities. After three decades of abandonment and a narrowly selective development policy for trams, in the early 1980s their importance in terms of transport capacity, speed and economy of construction compared to buses, trolleybuses and metros was finally recognized. The main difficulty was how to modernize the ageing infrastructures and vehicles of the existing tramway system (rolling stock, tracks, platforms, and the like).

As an explanation of which trends were shared, and which not, Europe-wide, it can be argued that there was a disparity in urban tramway policies during the 1960s and 1970s. Moreover, it cannot be categorically stated that tramways were an attribute of the "Socialist city" or that they were not well developed in Western countries. The variety of opinions and solutions in plans for trams was not always a response to the political regime, but rather to the town-planning, social, cultural and technological conditions in each country. Nevertheless, the key difference between Western and Communist countries was the relative degree of retention of trams in middling cities, which is explicable in terms of the efficiency and capacity of tramways (Hass Klau, Crampton, Benjari, 2004, pp. 70-71), as may be appreciated from Fig. 120.

b. Light Rail and Rapid Tramway Concepts in Europe

Although there were several attempts to make a distinction between the concepts of light rail and of rapid tramways, this was never easy to achieve. The concept of light rail involved various technological combinations that made it difficult to differentiate clearly and to apply a precise terminology (Vucnic, 1972; Topp, 1999; Norley, 2010, Petkov, 2020). Nevertheless, urban transport planners of that period agreed that light rail should have a greater degree of separation from the road infrastructure and be designed according to metro rail standards with regard to track gauge, curve radii, platform heights, additional safety standards and so forth. This was precisely because they anticipated that in the future it would be converted into a metro or a suburban commuter rail system. Light rail reached a similar maximum speed to rapid trams, in excess of 60 kph, but its commercial running speed was higher, at between 30 and 40 kph, thanks its better performance and dynamic characteristics. There was also a difference in terms of its higher passenger capacity and adaptive modifications to the rolling stock (Pithardt, 1975).

However, transport characteristics could differ, depending on the level of development of the system, varying between rapid tram and metro features (Groche, 1979, p. 6). Hence, the difference between high-speed tramways and light rail, and indeed the sense of other expressions used at that time, like pre-metro, demi-met-

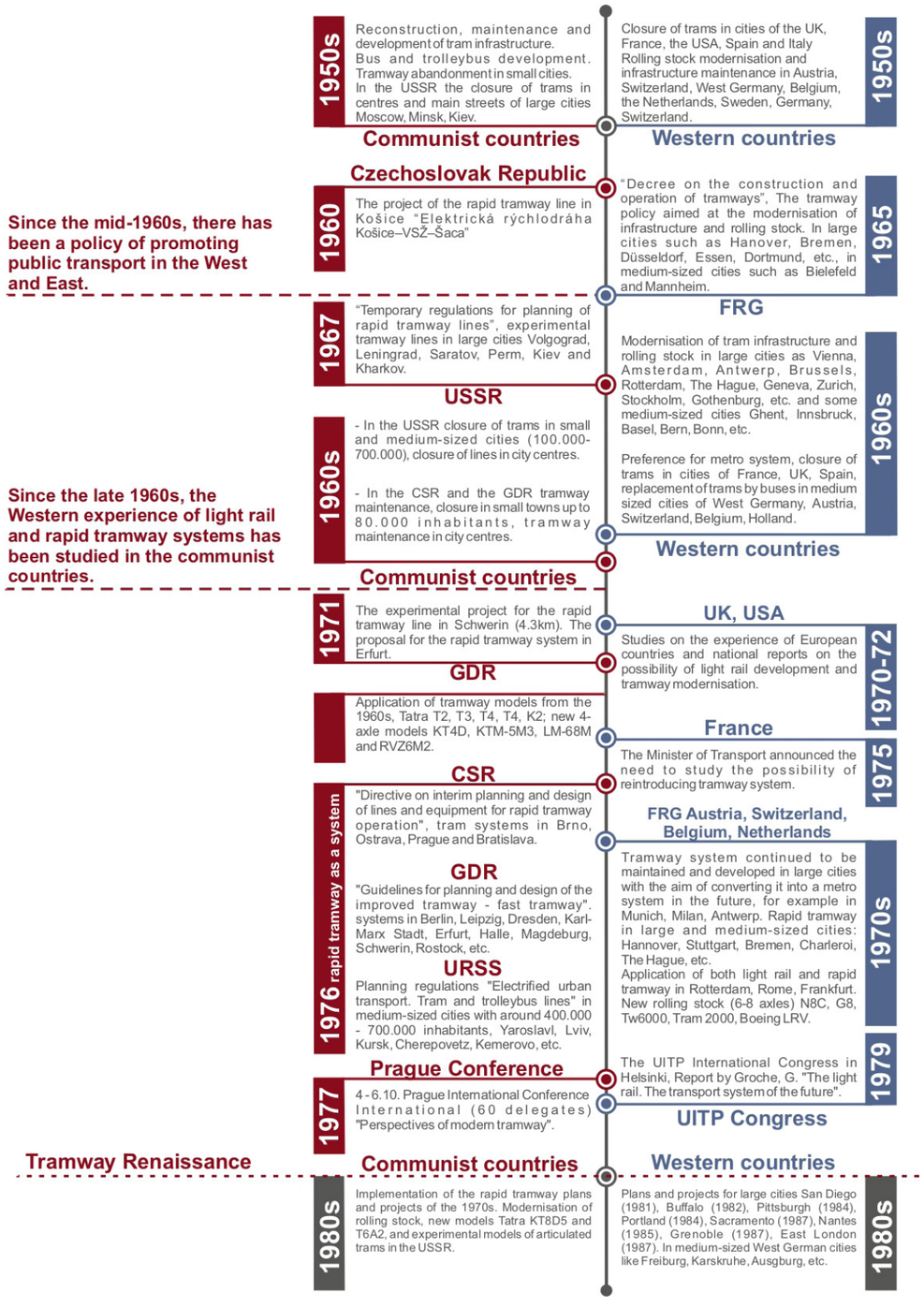


Fig. 120. Timeline 1: Comparison of tramway policies in European capitalist and communist countries. Source: Author's elaboration.

ro, or semi-metro, remained vague and the terminology in the sources themselves could and can be misleading. In some Western European countries, such as the FRG, Switzerland, Sweden, Austria, Belgium or the Netherlands, in the 1950s and 1960s there was an early modernization of rolling stock and tram infrastructures. In these countries, the aim was to create a tramway system transitional to a metro, with each country using its own name, such as *Stadtbahn*, *métro léger*, *tunnelbana*, and others. There were, and still are, alternative designations in some countries, often an attempt to modernize the name by avoiding the use of the terms "tram" or "tramway" and their equivalents. This confusion can also be noted in Khitzenko's work: in the rapid tramway projects described, subsurface sections were called either underground tramway, demi-metro or semi-metro, whilst pre-metro or light metro were terms corresponding to underground sections of tram lines built to metro standards (Khitzenko, 1976, p. 7).

The use of the term light rail can in fact be explained by an intention to imply metros rather than tramways, although the systems concerned had few underground sections and there were only future plans for their conversion into a metro system. Apart from technical questions concerning tram versus rail standards, it was difficult at the time, and still is today, to establish a clear difference between rapid tramways and light rail with regard to their urban meaning, especially because of their versatile practical functionality. What is certain is that both solutions were based on the modernization and extension of existing tramway systems.

In the European Communist countries, rapid trams had their own terminology: *Skorostnoi tramvai* in the USSR, *Schnellstrassenbahn* in the GDR and *Rychlá tramvaj* in the CSR, all meaning "fast tram". In contrast, light rail was called Metrotram [metro-tram] in the USSR, *Stadtbahn* [city rail] in the GDR and *Rýchlodráha* [literally, "fast track"] in the CSR. Rapid trams were intended to run on lines separated from other modes of transport, with rolling stock of higher capacity and better dynamic characteristics than the conventional tramway, with longer distances between stops, and with some underground sections at major intersections, although not more than 10% to 15% of total track length (Khitzenko, 1976, 6; Zakopal, 1977, p. 8; Erfurt Municipal Archives, 1975, p. 4), as may be seen from Fig. 121.

The key difference was that rapid tramways did not assume the functional standards of metros.[24] Rapid trams were neither metro rakes nor suburban trains, although they could share some of their characteristics in underground sections and could operate in suburban areas. In addition, rapid trams had several unique features when compared to conventional tram vehicles, which characterized them very specifically. Firstly, they were improved rolling stock, with an average running speed in service of 18 to 20 kph in the core of a city and 30 to 35 kph on the outskirts, this being achieved through a separation from motor traffic by means of segregated tracks. Secondly, they offered notable improvements in acceleration and braking characteristics, greater carrying capacity through the development of articulated trainsets, a height adjusted to platforms at stops and quieter operation.

24 Khitzenko (1970, p. 76) established three groups of modern tramways: 1.- with the possibility of later modernisation into a metro, 2.- without the possibility of modernisation into a metro, but with some underground sections and intersections at different levels, and 3.- lines with reserved platforms, but without level differentiation.

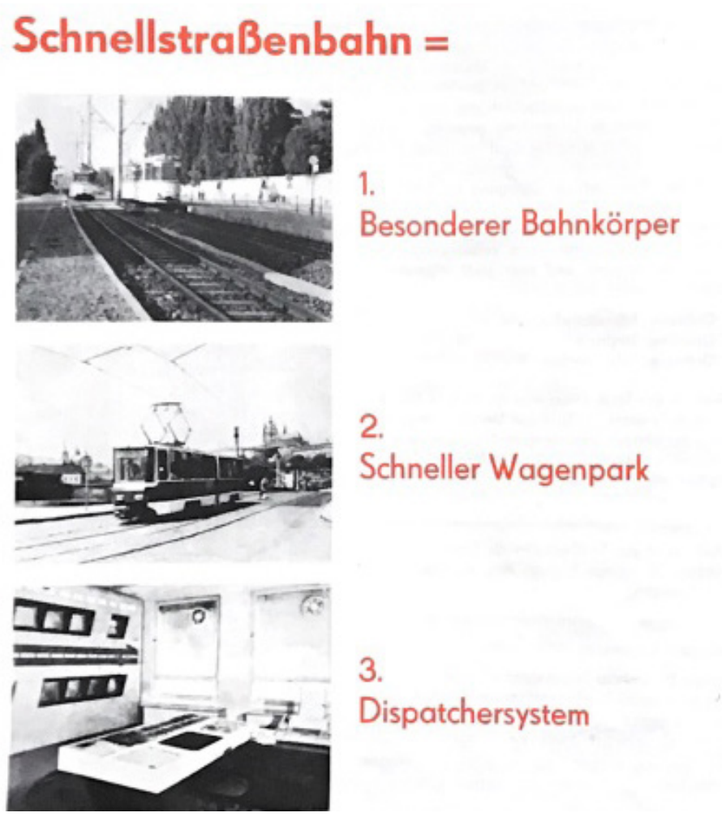


Fig. 121. Main characteristics of rapid tramway, 1. Reserved platform, 2. More rapid rolling stock, 3. Transport control and management system. Source: Erfurt Municipal Archive (1975) *Generalverkehrsplan Erfurt 1975*, 7/161-10 Bl. 40, p. 44. It can be appreciated the simplicity of rapid tramway concept which did not need the separation of levels or passenger facilities (low floor level, doors in both directions).

To implement the rapid tram concept, there was a need firstly to enhance general tramway infrastructures, and secondly to improve the technological standards of rolling stock, such as higher transport capacity through the development of articulated models and greater average running speeds, as well as better acceleration, deceleration and traction. However, during the 1970s European Communist countries had technological difficulties and could not solve most of these needs. In comparison, in Western European countries, technical progress in tramway rolling stock continued, with improvements to capacity, dynamic characteristics, design and comfort. The technical difficulties faced by European Communist countries are likely to have been conditioning factors that generated doubts and delays in the modernization of tramway systems, and in seeing them as a generally accepted solution for medium cities.

c. Technical Development of Rolling Stock

In order to achieve any noticeable differences between rapid and conventional tramways, the capacity and speed of tramcars had to be improved. Speed depended on the technical characteristics of the vehicles, while capacity depended on the

possibility of increasing the presence of articulation. During the 1970s Western European countries continued to make progress on these characteristics. One of the most advanced manufacturers in Western Europe was *Düsseldorfer Waggonfabrik* or DÜWAG, which produced different types of vehicles with specific variants for a range of cities. There were also other manufacturers, such as *Linke Hofmann Busch* in West Germany, *Schindler Waggon AG* in Switzerland, *La Brugeoise et Nivelles* in Belgium, *Boeing-Vertol* in the United States.

Most of these manufacturers produced six- or eight-axle trams (Fig. 122 and Fig. 123), significantly increasing carrying capacity to between 300 and 500 passengers, permitting flows of up to 25.000 passengers per hour in one direction. In the 1970s, a great effort was put into standardization, but also the differentiation of rapid tramway and light rail models. The main differences lay in the possibility of operating vehicles at low platforms, high platforms, or a high and low platform combination, as a transition between differing transport systems.[25]

In these models, times for acceleration, at 1.1 to 1.3 metres per second (mps), and braking, at 1.2 to 1.5 mps, were reduced, which significantly improved operation over short distances between stops in built-up areas. Capabilities for flexible operation in various urban situations were also improved. Vehicles or trainsets could be double-ended, to avoid any need to construct terminal loops, whether on the periphery or more especially within the city. In addition, tramcars could have doors on both sides, which increased their adaptability to different infrastructure conditions. Attempts were also made to increase the flexibility of tramway networks by combining them with rail systems in a number of experimental projects in West Germany.[26] Such solutions, however, implied additional costs for vehicle construction and operation (Taplin, 1984, p. 22).

Although low-floor trams were not yet in existence in the 1970s[27], the need to improve passenger access to cars was already being considered. The usual height of tram floors was around 880 mm, which required the use of three steps to enter (Hondius, 1993, p. 79). To achieve a lower floor, it was necessary to modify the construction of the bogies, which was technologically very difficult and costly (Hondius, 1993, p. 78; Petkov, 2020, p. 63). One of the solutions adopted was the installation of raised platforms at stops, accessed by ramps or stairs (Fig. 124). However, the construction of most models of tram adopted alternatives using fixed or moveable steps on the cars themselves (Fig. 125). The Federal Republic of Germany was one

25 The differentiation between rapid tramway and light rail was also proposed in relation to the number of axles and the length of the carriages: 6 axles for tramway and 8 axles for light rail. See Anonymous (1977) Time to standardise LRT car designs, *Railway Gazette International*, 133 (5), pp. 180-185.

26 The unification of the rolling stock characteristics between metro, suburban train and tram was a technical difficulty, mainly due to the variation of the height of the platforms at the stops. The change of tram rolling stock and the use of high platforms only, especially within the city, was inconvenient as it extended the length of stay. While the lowering of metro carriage heights resulted in a loss of speed.

27 The vehicle floor height must have been around 345 mm, and the low-floor tramway was first applied in Geneva and Grenoble in the late 1980s (Topp, 1999, p. 137).

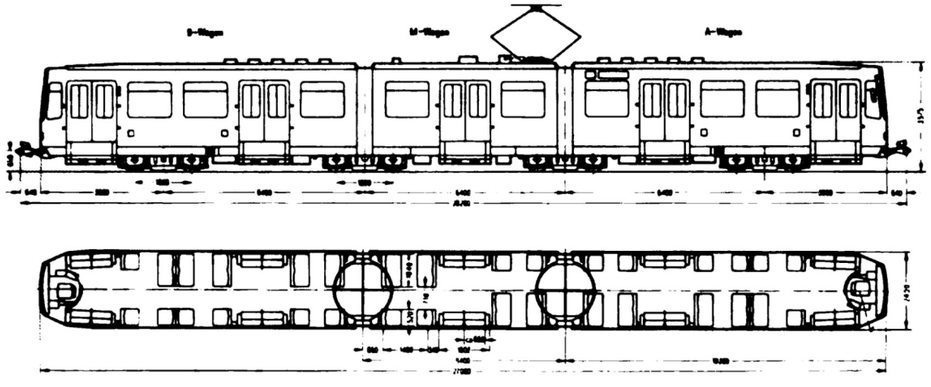


Fig. 122. One of the new tram models of Duewag in Hanover. Source: Scheelhaase, K. (1982) Experience with German Light Rail Systems, *Traffic Quarterly*, 36, p. 55.

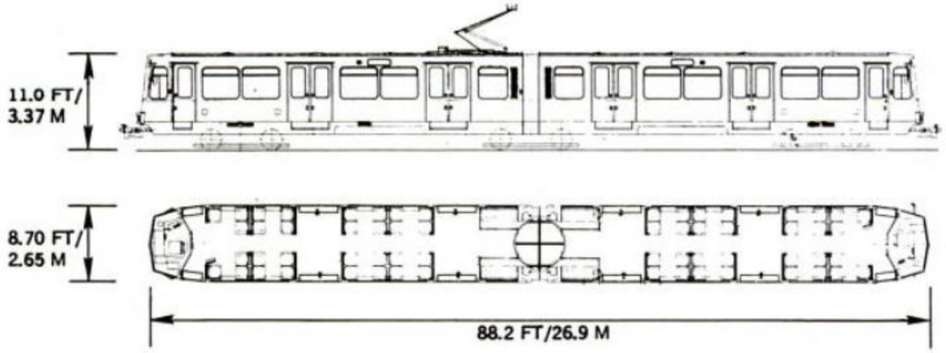


Fig. 123. Tram model B8 Duewag. Source: Diamant, E. S. (1976) *Light Rail Transit: A State-of-the-Art Review*, Executive Summary, Washington: U.S. Department of Transportation, p. 38.

of the first countries to try to unify tramway and rail system vehicles and tracks in the late 1960s by producing cars and carriages with transformable access arrangements.[28]

In Western countries the 1970s saw a major breakthrough in tram rolling stock, although in many cities the need to replace old tramcars still remained. Among the advances were improvements in capacity, performance and vehicle design. This kind of technological development encouraged views in favour of modernization of the tramway system and in discussions there was a gradual change to a similar positive opinion among planners and politicians (Fig. 126). However, this technological development was also an impetus for international debates and a change in planning ideas in the European Communist countries.

As was noted in Chapter III, *ČKD* was the largest tramcar manufacturer in COMECON, supplying Czechoslovakia, the USSR (where T3SU trams were in service in more than thirty Soviet cities), the GDR with T3D and T4D models, Romania and Yu-

28 See Anonymous (1969) Rapid Transit in Ruhr-2: Stadtbahn, *Railway Gazette International*, 125 (18), pp. 708-710.

Fig. 124. Elevated platform in Bremen for tram access similar to metro. Source: Diamant, E. S. (1976), p. 27.

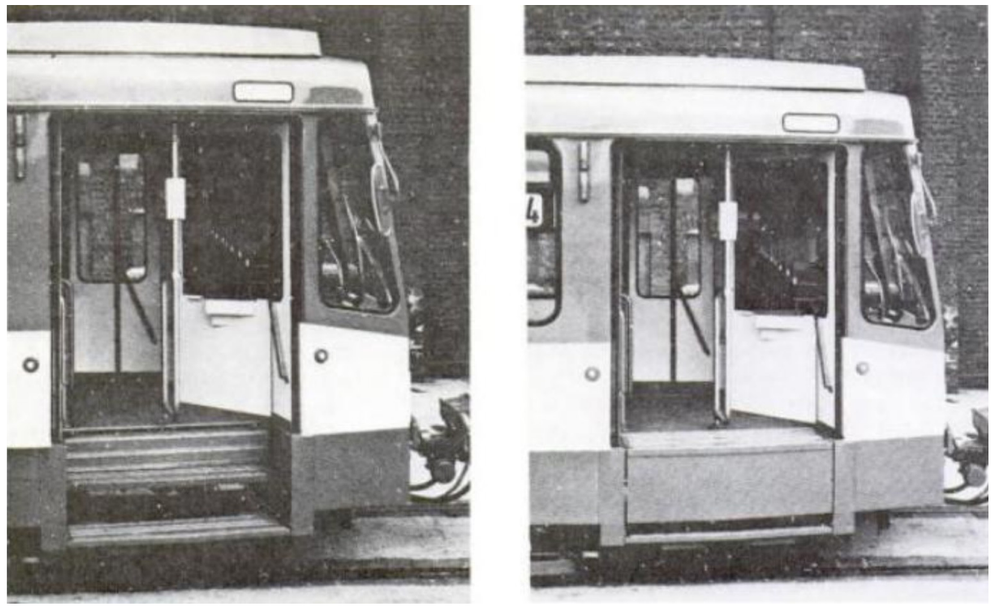


Fig. 125. Transformability of steps to an elevated platform. Source: Diamant, E. S. (1976) p. 28.

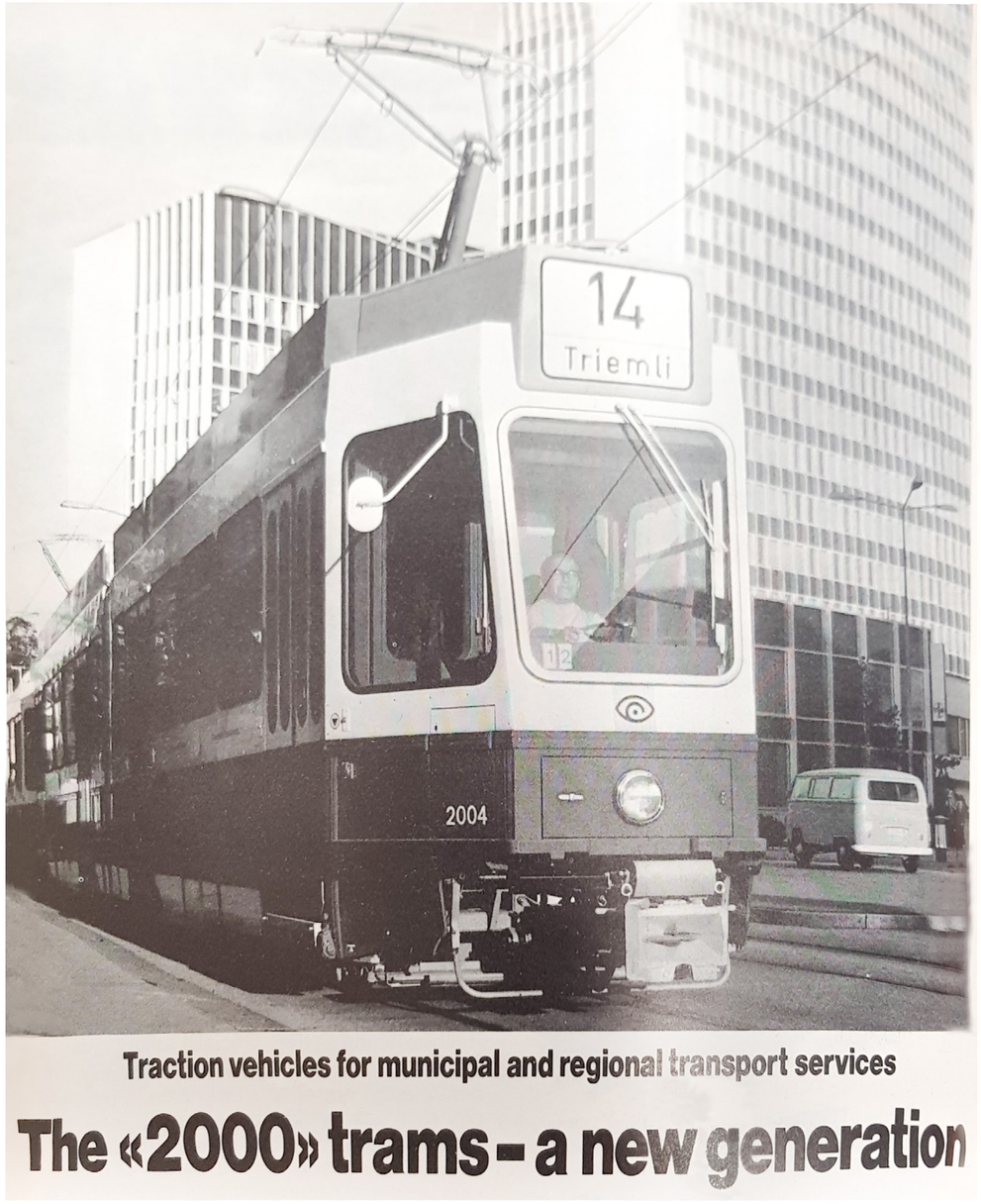


Fig. 126. The new "Tram 2000" rapid tramway model in the early 1980s. Source: Anonymous (1981) *Railway Gazette International*, 137 (5), p. 362. It was a flagship model marking the possibility of future development for the modernisation of tramway system.

goslavia with T1, T2, T3 and T4 trams. These vehicles had a relatively high maximum speed of 65 kph, which was suitable for the transport needs of cities' industrial peripheries, and a capacity of between 95 and 110 passengers in the T2 and T3, and 117 in the T4 model.

In the 1970s there were difficulties in the supply of rolling stock suitable for rapid tramways. The Czechoslovak manufacturer *ČKD* continued the production of its models from the 1960s. Three tram types were produced in the 1970s for the development of rapid tramway projects: T2, T3 and K2. The T2 model could be coupled in two-car sets carrying a total of some 150 passengers, while the T3 could be similarly run-in trains of up to three cars, giving a capacity of about 350 travellers (Fig. 127). The K2 articulated tram with six axles (Fig. 128) was produced from 1966 onwards, and used only in medium-sized cities such as Bratislava, Brno and Ostrava, having space for up to 108 passengers. The most suitable model for high-speed tram systems was undoubtedly the T3.

In the GDR of the 1970s, T3D and T4D models continued to be used in tandem with B3D and B4D trailers, which generated various combinations of cars, usually two motor cars and a trailer (Fig. 129 and Fig. 130). The T4D model was vital in the GDR because it was built narrower than the T3 in order to allow operation in the narrower old streets of the heart of cities. Moreover, this model had better traction and could function well in topographically difficult areas (Berhge, Heiner, 1978, p. 79).[29]

A new model from *ČKD* produced for the GDR was the four-axle KT4 (Fig. 131). Design studies for this type started in the middle of the 1960s, experimental production of cars began in the early 1970s and mass production from 1976. To ensure it matched the needs of GDR cities, co-ordinated work was organized involving *ČKD*, the GDR Ministry of Transport and the transport undertakings of each city. These KT4D types were seen as ushering in a new era for trams, since in comparison with the T3 model they had better acceleration, at 1.4 mps versus 1.3 mps, and braking at 1.6 mps compared to 1.0 mps (Bauer, 1995, p. 371).

An article in the *Berliner Zeitschrift* newspaper emphasized the quiet ride, thanks to modern wheel suspension and damping, with fast initial acceleration, comparable with the "Wartburg"[30] motorcar, and a short braking distance (Straßburg, 1976). The guideline for the project was the idea of producing an articulated tram, with car-section lengths of around sixteen or seventeen metres, which would allow for a small curve radius of as little as fifteen or sixteen metres (Federal German Archives, 1969). Such characteristics would facilitate the operation of trams in narrow streets. Although the maximum end-to-end measurement for a single tram was limited to forty-five metres, with an eye to the safety of road traffic, three-car coupled sets were used in several cities, with an overall length of up to fifty-seven metres (Fig.

29 The traction of T4D was 2%, which permitted the possibility of not losing speed (ZFIV, 1976c, p. 9).

30 The car brand produced in the GDR.

Fig. 127. Model T3 in a two-carriage train in Ostrava in 1992. Source: Bauer, G., Linert, S., Losos, L., Mahel, I. (1995) *Straßenbahnen in der Tschechischen und Slowakischen Republik.Von der Pferdebahn zum Tatrawagen*, Praha: NADATUR, p. 275.

Fig. 128. K2 tram model in Brno in 1970. Source: Bauer, G., Linert, S., Losos, L., Mahel, I. (1995*) Straßenbahnen in der Tschechischen und Slowakischen Republik.Von der Pferdebahn zum Tatrawagen*, Praha: NADATUR, p. 269.

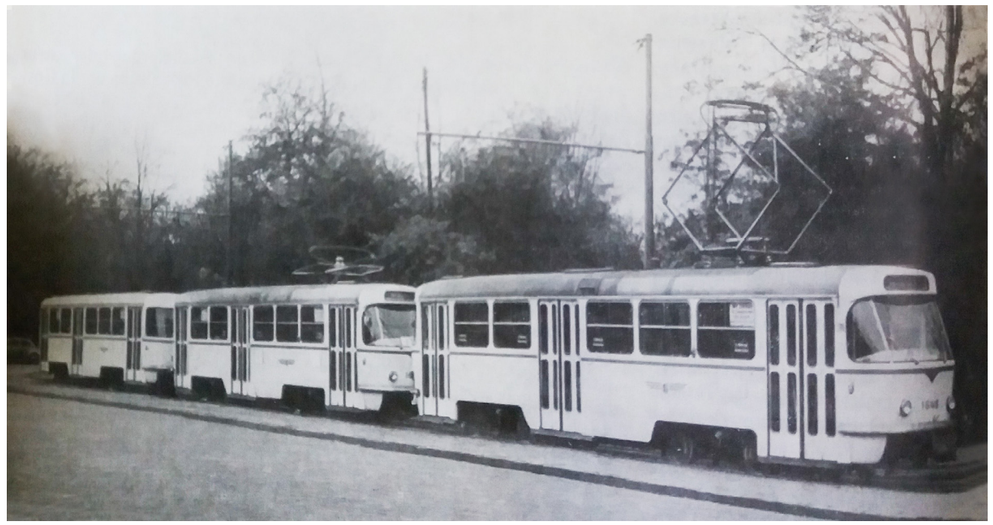


Fig. 129. Combination from T4D+T4D+B4D in Leipzig. Source: Berhge, M., Heiner, M. (1978) *Die Straßenbahnen in der DDR. Geschichte Technik Betrieb*, Berlin: Motorbuch Verlag, p. 68., original source Verkehrsbetriebe Leipzig

Fig. 130. T3 model in Dresden: two traction cars and a B3D trailer forming a Großzug, one of the typical solutions for increasing passenger capacity. Source: Kreschnak, W. (1981) *Geschichte der Dresdner Straßenbahn*, Berlin: Verlag Tribüne, p. 211.

132).[31] From this it can be seen that, although faced with technological restrictions, GDR planners tried to overcome these problems (Fig. 133) and believed in the possibility of future improvements in rolling stock.[32]

In the USSR in the 1970s, several models of tramcar were used in implementing rapid tramway projects, among them the Czech T2, T3, and T4, while others were produced by Soviet manufacturers. Trams built by the Czech company *ČKD* were used mainly in multi-unit running (Ivanov, Ponomarev, Ieropolskii, 1977, p. 11). In 1972 the USSR carried out several successful experiments involving the coupling of three T3 trams into a train (Ponomarev, 1973, p. 28). Unlike the GDR, the USSR did not produce trailer cars.

The production of K2SU and KT4SU articulated trams was limited. The K2SU model was built from 1966 to 1969 and used only in major cities such as Moscow, Kharkov, Sverdlovsk, or Kuybyshev. Cancellation of the K2SU order was justified by problems with the tram's central bogie (Ponomarev, Ieropolskii, 1981, p. 11). Additionally, there were servicing complexities with articulated trams, and difficulties in the supply of spare parts from the CSR. Production of the KT4SU model was also limited, amounting to 435 cars for eight cities. Building of experimental prototypes started in 1976, but mass production only from the early 1980s. The limited adoption of this model is explained by its specificity (small turning radius), so it was put into operation only in a few cities with narrow streets and uneven topography, such as Lviv, Vinnitsa, Liepāja, or Zhitomir.

On the other hand, in order to improve the transport capacity of tramways, new models of tramcar were developed during the 1970s in the USSR. These vehicles were required to operate in multiple units, which had not previously been the case. Among these types were the four-axle KTM-5M3 model, produced starting in 1973 by the Soviet company Ust-Katav Kirov Wagon-Works UKVZ [*Ust-Katavskii vagonostroitelnii zavod imeni S. M. Kirova*,], often called Ust-Katav from the city where it was located, the four-axle RVZ-6M2 model, produced from 1975 onwards by RVZ, the Riga Wagon-Building Factory [*Rizhskii vagonostroitelnii zavod*], and the LM-68M model produced from 1973 on by VARZ, the Leningrad Wagon Repair Works [*Leningradskii vagonoremontnii zavod*]. These trams were designed for two cars to be run as a married pair or twin-set, increasing capacity to some 200 or 220 passengers, with flows of 12,000 to 15,000 travellers per hour in one direction feasible (Bondarevskii, Chertok, Ponomarev, 1975, p. 3). Pneumatic braking was installed on these models, which improved their characteristics with rates of 1.3 or 1.4 mps[33] and rubberized wheels significantly minimized noise (Bondarevskii, Chertok, Ponomarev, 1975, pp. 3-4).

31 In the German plans, it was considered the future development of the 6-axle KT6 Tatra tramway model.

32 In the Rapid Transit Planning Regulation, 1976, it was also defined the speed criteria for rapid transit rolling stock. One of them was the provision of a high acceleration (1 m/s2) with a speed of 40 km/h and high specific traction power on the loaded vehicle (*Hohe spezifische Antriebsleistung*, p = 8kW/t.), (ZFIV, 1976c, p. 9).

33 Braking improvement was one of the important achievements, as in the previous models KTP/KTM-2, LM-57, RVZ braking time was around 1.2 m/s2.

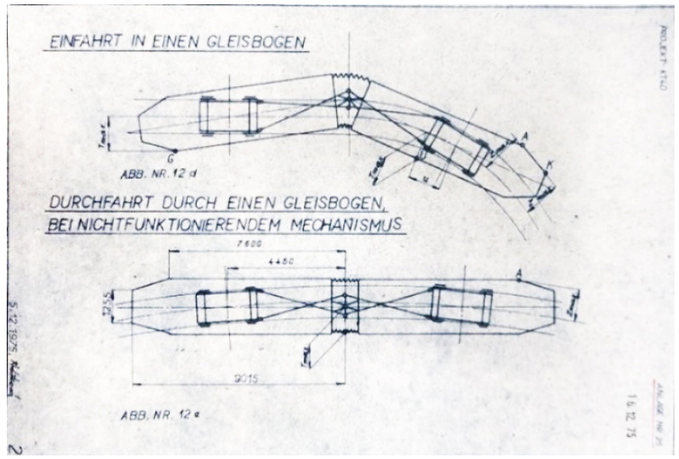


Fig. 131. KT4D project realised by ČKD Tatra in 1975. Source: Federal German Archives (1970) *Projekt. Der Erprobung (Null-ten) - Serie des vierachsigen Strassenbahn - Kurzgelenktriebwagens mit geteilten Wagenkasten - Typen Nummer 200*, DM1, 8703, 51, M306. The aim was to adapt the turning radius to the narrow streets of the inherited city.

Fig. 132. The KT4D tramway in three tractions, with a length of 57 m and a capacity of 450 persons. Source: Saitz, H. (1988) Erfurt city and traffic: An example of traffic policy and planning in the German Democratic Republic, *Transport Reviews*, 8 (1), p. 8. This was one of the successful attempts of implementing the rapid tramway idea.

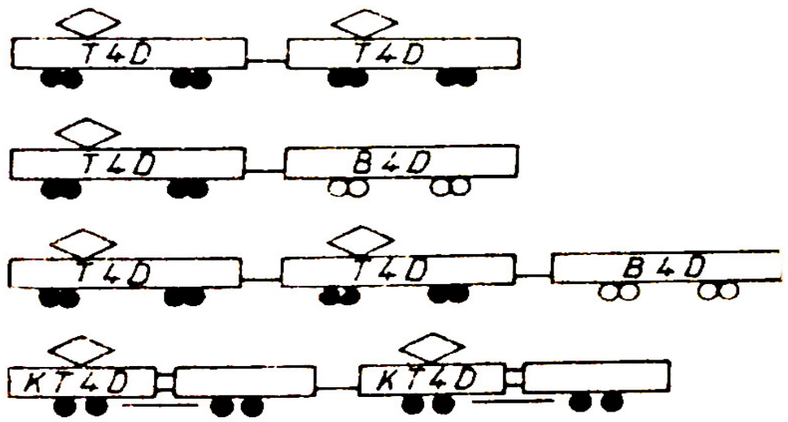


Fig. 133. Proposed formation of tramway compositions to realise the fast tramway concept. Source: ZFIV (1976c) *Richtlinie für die Planung und Gestaltung der verbesserten Strassenbahn - Schnellstrassenbahn*, Berlin: ZFIV, p. 9. It can be noted the aspiration to create a variety of combinations to increase passenger carrying capacity.

Moreover, it should be noted that there were several experimental projects for articulated tramcars in the USSR during the 1960s and 1970s (Fig. 134 and Fig. 135).[34] Among these models were the LVS-66, LVS-86 and LVS-89 types from VARZ, the RT-47 from RVZ in Riga, and the KTM-5S from Ust-Katav. Another project was the six-axle 71-607 model produced by UKVZ in 1979, one of the features of which was a low floor at entrance, although inside the car there were steps (Shpakov, Zyuzin, 2016, p. 64). The main objective was to minimize passenger entry times and thereby increase the average running speeds (Butina, 1978). Owing to technical difficulties, production of some of these models did start until 1980s. Russian researcher Iliya Shpakov, for example, mentions some of the difficulties in the LVS-66 model (2013, p. 213):

> *"(...) these models showed serious design flaws that prevented them from being recommended for mass production. The couplings did not allow cars to negotiate small-radius curves, there were problems with the new finite-element indirect field-oriented control system for the traction motor, and weaknesses in the base support for the body."*[35]

In the early 1970s it was expected that the development of the new four-axle RVZ-7M model would improve the shortage of rolling stock for fast tramways. However, construction problems prevented mass production. In 1971 the technical specifications for designing six- and eight-axle trams was published (Rzhavinskii, 1973, p. 72). It was hoped that production of these new multi-axle vehicles would to

34 The first articulated tramway project was started in 1962 at the Ust-Katav factory (Shpakov, 2013, p. 212). In 1965 K. D. Panfilov's Academy of Urban Service published "Specification of planning of fast tramway rolling stock" (*Tekhnicheskoe zadanie na proektirovanie podvizhnogo sostava skorostnogo tramvaia*), Moscow. This document developed the standards for the construction of 6 and 8 axle wagons with a capacity of up to 350 persons.

35 "(...) показавших серьезные конструкторские просчеты, из-за которых вагон не был рекомендован к серийному производству: узел сочленения не позволял проходить вагонам кривые малого радиуса, проблемы в новой косвенной системе управления ТЭД (тяговый электродвигатель), слабое основание рамы кузова."

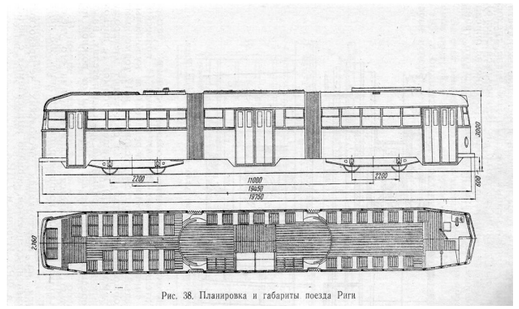
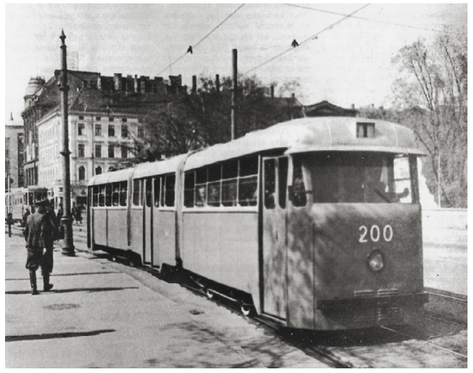


Рис. 38. Планировка и габариты поезда Рига



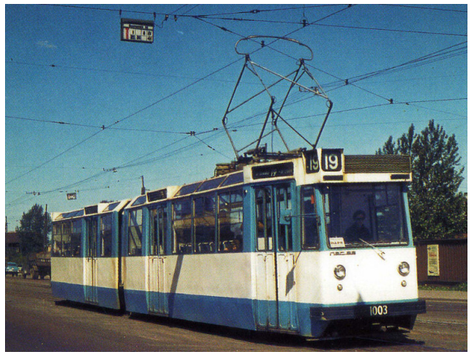


Fig. 134. Experimental models of soviet articulated trams. On the left the vehicle and plan of RT-47 model, on the right LS-86 and LVS-66 models. Source: Stanislav Vazhenin, www.transphoto.org., and Murashov Sergei, www. transphoto.org.

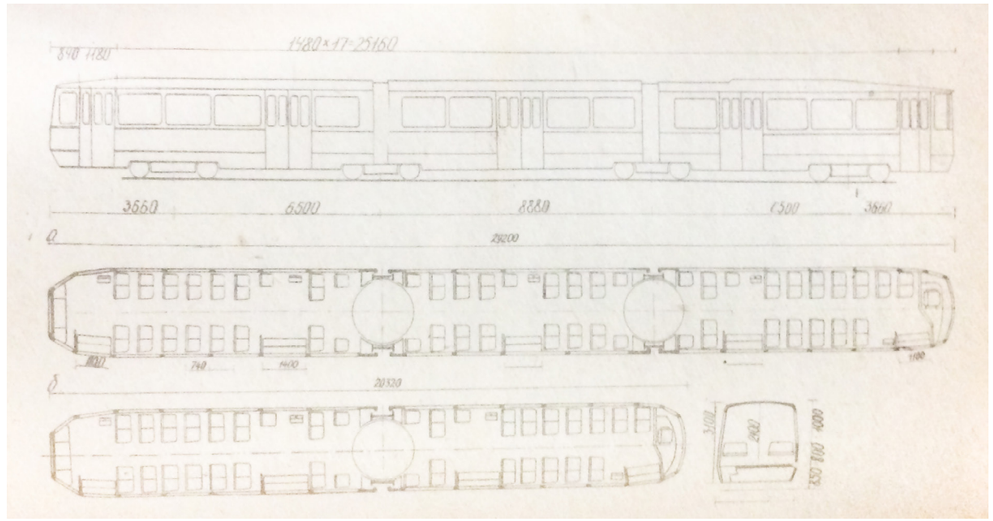


Fig. 135. Soviet project of new 6- and 8-axle tramway models realised by Vsesoiuznii nauchno-issledovatelskii institut vagonostroeniia (All-Union Scientific Research Institute of Wagon Construction). Source: Rzhavinskii, B. A. (1973) Novyi podvizhnyi sostav dlia gorodskogo relsovogo passazhirskogo transporta, in Sheinin, A. N. (ed.), *Uluchshenie raboty gorodskogo passazhirskogo transporta*, Moskva: MDNTP, p. 74.

be organized between 1976 and 1980 (Rzhavinskii, 1973, p. 72). However, in reality in the 1970s there was practically no mass production of articulated models either by *ČKD* or by Soviet tram builders.[36] This was likely to have been one of the factors that slowed plans for rapid tramways in the USSR.

In most Soviet cities, two- and four-axle tramcars from the 1950s and 1960s, which could not operate as multiple units, continued to be widely used. The KTM-2 and KTP-2 were produced between 1961 and 1969, the RVZ-6 from 1960 to 1966, and the LM-57 between 1957 and 1969. These models had poor performance, with acceleration at 1.0 mps to 1.1 mps and braking at 1.3 mps, and their carrying capacity was limited to between 110 and 150 passengers. Newer models from the late 1960s, such as the RVZ-6M, built from 1966 to 1974, and LM-68, produced between 1968 and 1975, improved somewhat in speed characteristics, with acceleration in the range 1.2 mps to 1.4 mps, and braking between 1.3 and 1.4 mps, and also in capacity, with room for around 150 to 170 travellers. However, these models ran into technical operating problems, so that their mass production had to be cancelled in the middle of the 1970s.[37]

In general, it can be said that in the 1970s the technical development of rolling stock in European Communist countries remained at a low level. Despite the efforts made and some improvements achieved, the two crucial characteristics for rapid tramways, capacity and speed, remained underdeveloped. Articulated models encountered technical difficulties that limited their mass production and application. Service speeds and technical characteristics were still far from ideal, which also limited the high-speed tramway concept. Various noteworthy improvements were achieved by the 1980s, when it proved possible to build the KT8D5 eight-axle and the KT6 six-axle models, which better met the technical characteristics proposed for rapid tramways. Even so, the specifications of rolling stock were more appropriate to peripheral areas where high speeds could be developed than to city centres, since acceleration and braking did not meet the operational standards for a rapid tramway. Likewise, the large wheels on the bogies were suited to attaining higher speeds on the outskirts and in suburban areas, but in central zones this solution was not very convenient, because of the requirement for raised platforms at stops. Thus, it can be said that in the 1970s specialization of rolling stock technology in order to improve the flexibility of operations under different urban conditions remained an unsolved problem. This can be explained by the fact that this was both technologically difficult and at the same time costly to implement.

The two tables below (Table 1 and Table 2) indicate the tramcar models used in Europe. The profiles of models operated in the USSR, the GDR and the CSR in the 1970s may be seen in Fig. 136 to 148.

36 It should be noted that Soviet comparisons emphasised the technological progress in the development of tramcars, e.g., in the study by Khitzenko, V. V., *Skorostnoi tramvai*, 1976, p. 82. However, comparisons were usually realized between the models generally used in Western European countries and experimental soviet models produced in small quantities.

37 These include, for example, the LM-68's problems with external shell integrity, cracking, horizontal and vertical deviation from straightness (Reznik, Kulakov, 1977, p. 5).

Table 1. Comparison of the technological characteristics of tramcars produced by the European communist countries

Vehicle type	*T1*	*T2*	*T4*	*K2*	*KT4D*	*RVZ-6M2*	*KTM5M3*	*LM-68M*
Year of production	1962	1963	1967 (RSC) 1968 (RDA) 1972 (URSS)	1965	1974	1975	1973	1973
Axle quantity	4	4	4	6	4	4	4	4
Length, mm.	14000	14000	14000	20400	18110	14080	15104	15000
Width, mm.	2500	2500	2200	2500	2200	2600	2600	2550
Seating capacity	25	24	35	49	38	38	46	35
Maximum capacity	75	115	92	108	105	112	140	115
Maximum speed, km/h	65	65	55	60	65	65	65	70
Comercial speed, km/h		inside the city 20,8 km/h.			in periphery 29,3 km/h.			
Service speed, km/h		inside the city 15,1 km/h.			in periphery 25,8 km/h.			
Acceleration, m/s²		1,3	1,3	1,4	1,4	1,2	1,4	1,3
Breaking, m/s²		1,0	1,5	1,0	1,6	1,3	1,4	1,3
Possibility to create multiple units	T + T	T + T + T	T + T T + B T + T+B	T + T	KT KT + KT KT + KT+ KT	T + T	T + T	T + T

Source: Information based on Khitzenko, V. V. (1976) *Skorostnoi Tramvai*, Leningrad: Stroiizdat, pp. 84-95; Efremov, I. S., Gushe-Malkov (1970) *Teoriia i raschet mekhanicheskogo oborudovaniia*, Moskva: Izdatelstvo literatury po stroitelstvu, p. 12; Bondarevskii, D. I., Chertok, M. S., Ponomarev, A. A. (1975) *Tramvainye vagony RVZ-6M2 i KTM-5M3*, Moskva: Transport, pp. 4-7; Lacek, M. (1982) *Městská Doprava. základy teorie a praxe*, Praha: Nadas, pp. 50-51.

Table 2. Comparison of the technological characteristics of tramcars produced by the Western European countries

Type of vehicle	*N8C (Duewag)*	*G6 (Duewag)*	*G8 (Duewag)*	*TW6000 (Duewag y LHB)*	*Boeing LRV*	*GTL8-1 La Brugeoise et Nivelles*	*Tipo B8 (Duewag)*	*Be 4/6 Tram 2000 Schindler Waggon AG*
Year of production	1975	1963	1971-1972	1974-1993	1976-1979	1981	1973	1976
Axle quantity	8	6	8	8	6	8	6	6
Length, mm.	26648	19100	27960	27000	21641	28600	28000	21400
Width, mm.	2330	2350	2350	2400	2642	2350	2650	2200
Seating capacity	54	40	64	46	52	71	72	50
Maximum capacity	226	180	250	150	210	189	183	157
Maximum speed, km/h	70	70	70	80	80	70	80	65
Comercial speed, km/h	aprox. 17-20							
Service speed, km/h	aprox. 16-21 km/h in central part of the city	24-32 km/h in middle part of the city	hasta 40 km/h in periphery					
Acceleration, m/s²	1,2	1,1	1,0	1,1	1,3	1,3	1,15	1,1
Breaking, m/s²	1,2	1,2	1,2	1,2	1,6	1,5	1,2	1,2

Source: Information based on Vucnic, V. (1972) *Light Rail Transit Systems: A Definition and Evaluation, United States Department of Transportation Urban Mass Transportation Administration*, p. 28; https://www.wikiwand.com/de/Boeing_LRV; Diamant, E. S. (1976) *Light Rail Transit: A State-of-the-Art Review*, Executive Summary, Washington: U.S. Department of Transportation, p. 33.

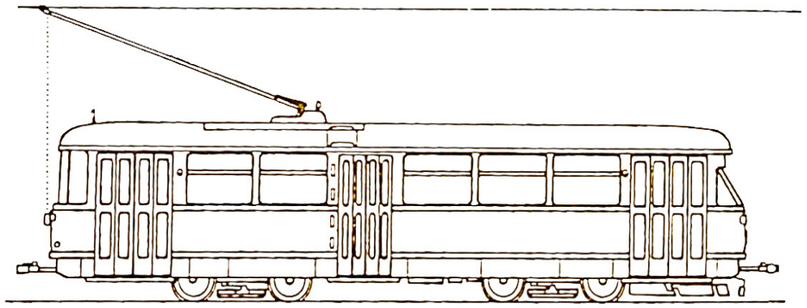


Fig. 136. Tatra T1 for the CSR and the USSR. Source: Bauer, G. (1995) *Straßenbahnen in der Tschechischen und Slowakischen Republik von der Pferdebahn zum Tatrawagen*, Praha: NADATUR, 12.

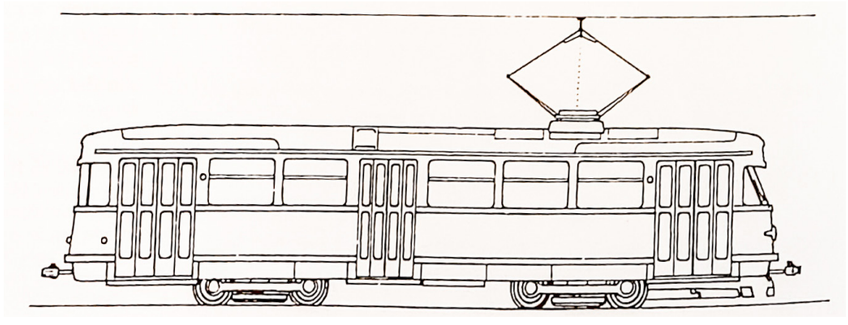


Fig. 137. Tatra T2 for the CSR and the USSR. Source: Bauer, G. (1995) *Straßenbahnen in der Tschechischen und Slowakischen Republik von der Pferdebahn zum Tatrawagen*, Praha: NADATUR, 12.

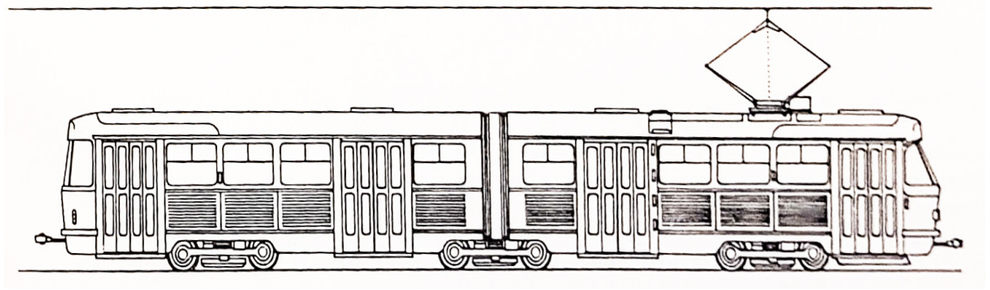


Fig. 138. Tatra K2 for the CSR. Source: Bauer, G. (1995) *Straßenbahnen in der Tschechischen und Slowakischen Republik von der Pferdebahn zum Tatrawagen*, Praha: NADATUR, 12.

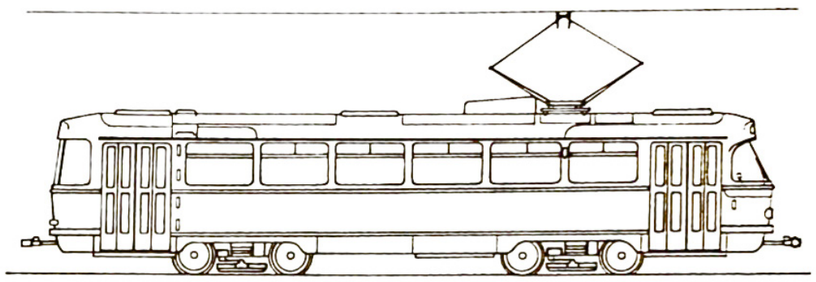


Fig. 139. Tatra T3SU for the USSR. Source: Bauer, G. (1995) *Straßenbahnen in der Tschechischen und Slowakischen Republik von der Pferdebahn zum Tatrawagen,* Praha: NADATUR, 12.

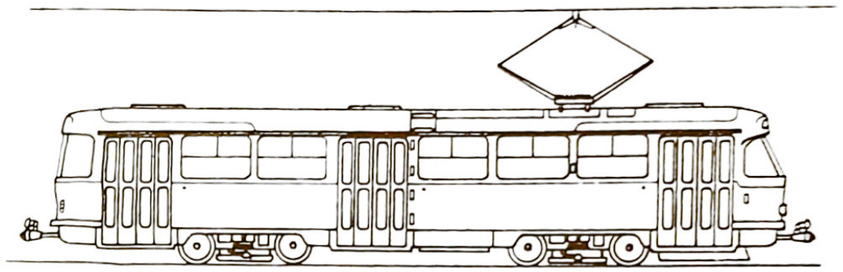


Fig. 140. Tatra T3D for the GDR. Source: Bauer, G. (1995) *Straßenbahnen in der Tschechischen und Slowakischen Republik von der Pferdebahn zum Tatrawagen*, Praha: NADATUR, 12.

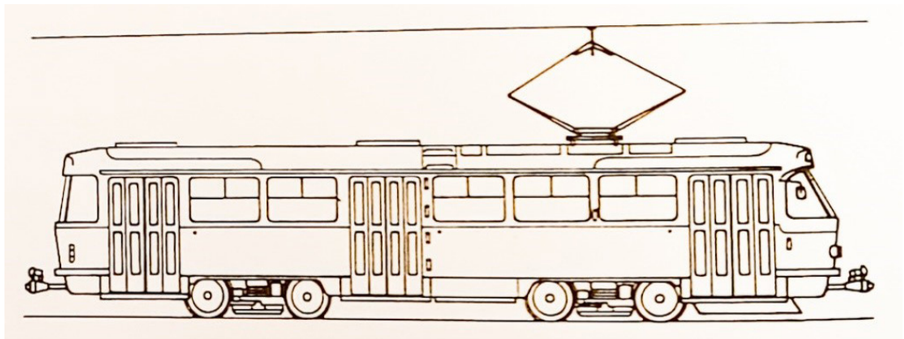


Fig. 141. Tatra T4D for the GDR. Source: Bauer, G. (1995) *Straßenbahnen in der Tschechischen und Slowakischen Republik von der Pferdebahn zum Tatrawagen*, Praha: NADATUR, 12.

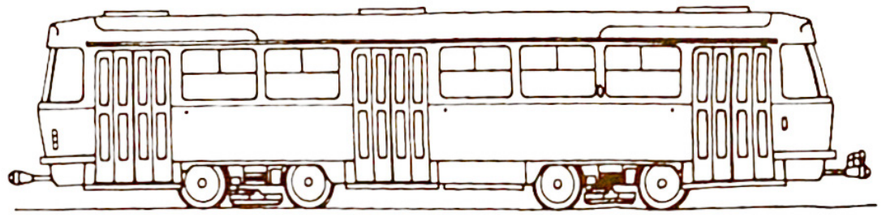


Fig. 142. Models for the B3D and B4D trailers applied to the German tram models T3D and T4D. Source: Bauer, G. (1995) *Straßenbahnen in der Tschechischen und Slowakischen Republik von der Pferdebahn zum Tatrawagen*, Praha: NADATUR, 12.

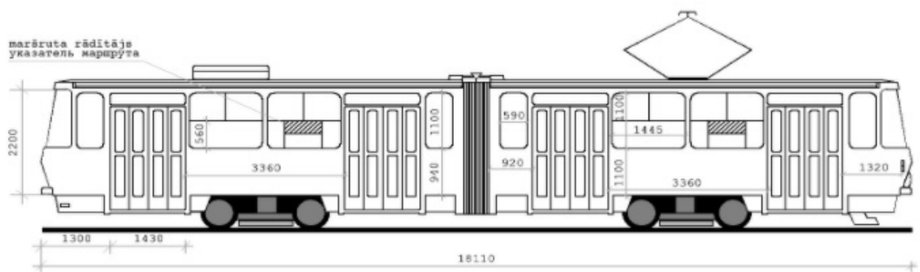


Fig. 143. KT4SU model for the USSR. Source: http://www.liepajastramvajs.lv/ru/vagoni.

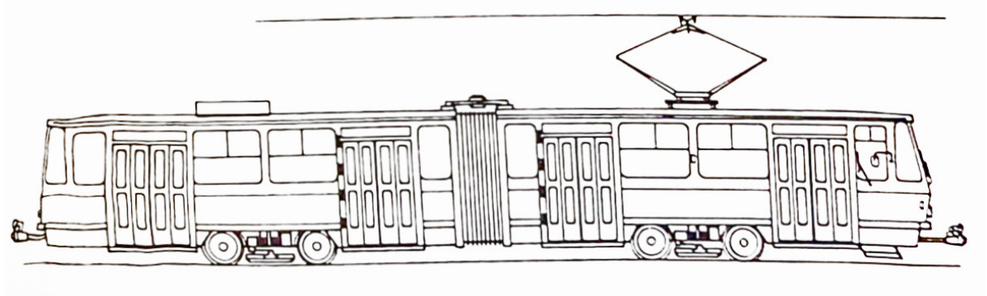


Fig. 144. KT4D model for the GDR. Source: Bauer, G. (1995) *Straßenbahnen in der Tschechischen und Slowakischen Republik von der Pferdebahn zum Tatrawagen,* Praha: NADATUR, 12.

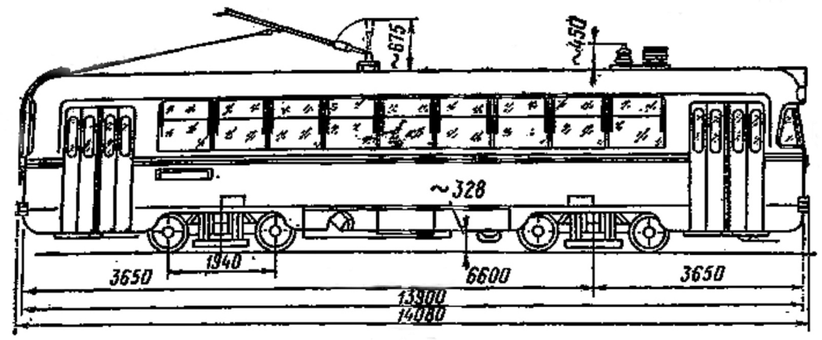


Fig. 145. RVZ-6M model produced by the manufacturer Rizhskii Vagonostroitelnii Zavod, in Riga, the USSR, 1974. Source: Ponomarev, A. A. (1975) *Tramvainye vagony RVZ-6M2 i KTM-5M3*, Moskva: Transport, 4.

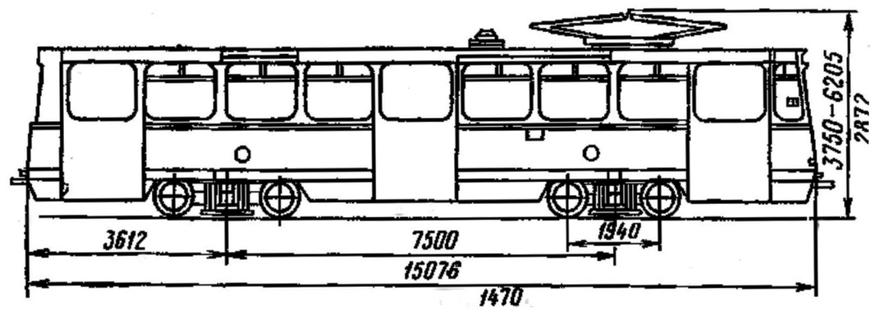


Fig. 146. KTM-5M3 model produced by the manufacturer Ust-Katavskii, in Ust-Katav, the USSR, 1973. Source: Ponomarev, A. A. (1975) *Tramvainye vagony RVZ-6M2 i KTM-5M3*, Moskva: Transport, 5.

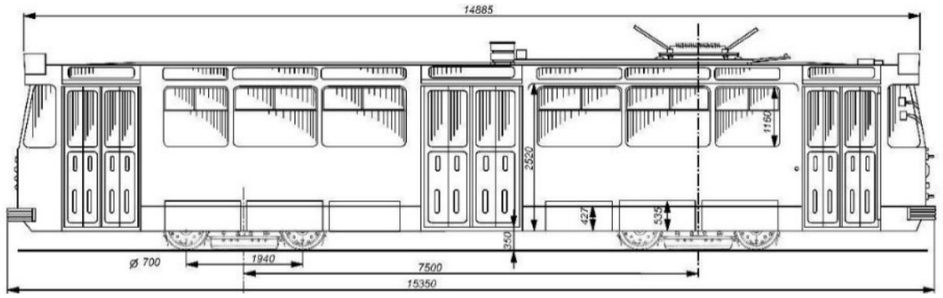


Fig. 147. LM-68 model produced by the manufacturer from Leningrad, the USSR, 1973. Source: Vlad Kupcov, https://techlibrary.ucoz.ru/_ld/0/1_lm68.jpg.

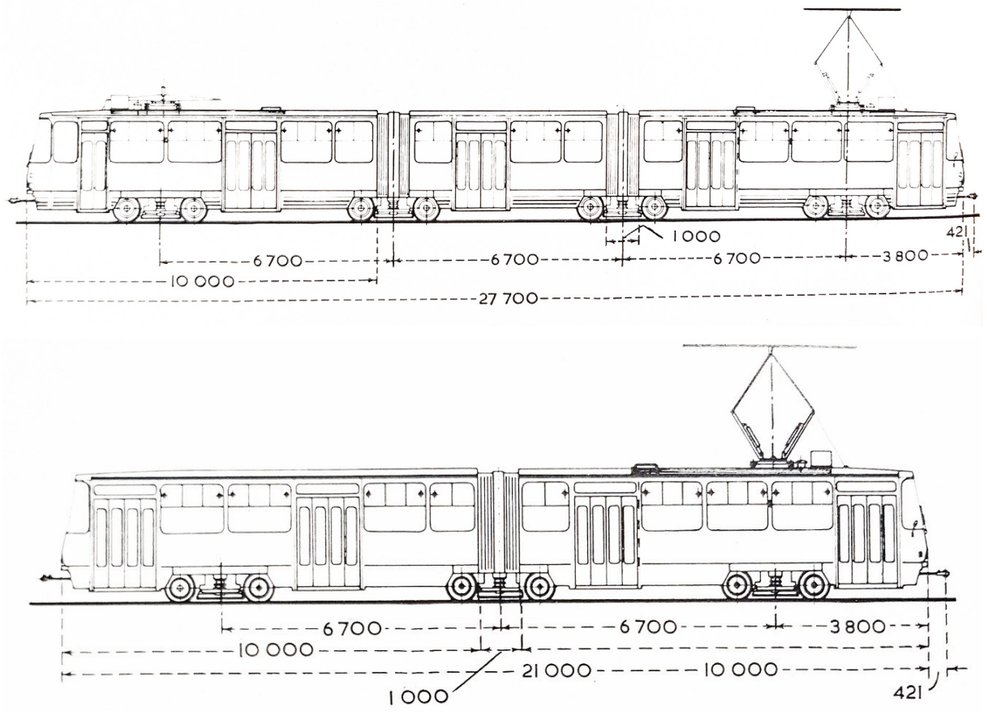


Fig. 148. New experimental tramway models K6 and K8 produced by Tatra in the 1970s. Source: Taplin, M. (1976) Eastern Europe leads in tramcar standardisation, *Railway Gazette International*, 132 (7), p. 256. This was one of the attempts to standardise rolling stock in order to improve its mass production.

4.1.2. RAPID TRAMWAYS IN TOWN PLANNING IN THE GDR, THE CSR AND THE USSR

In order to achieve the ideal of rapid tramways, not only rolling stock needed to be improved, but also the state of infrastructures and the incorporation of lines into town plans. Whilst the improvement of tram infrastructures was a clear technical issue, there were doubts and debates about interrelationships with urban planning. On the one hand, transport specialists stressed it was crucial to adapt urban structure and design to the needs of the rapid tramway (Vandas, 1977, p. 7). On the other, town planners did not always take this view into consideration, and continued using previous techniques. The problem was made worse by a lack of detailed regulations, insufficient co-operation between town planners and transport specialists, and the limited extent of State involvement in organizing integrated planning processes. However, it cannot be said that all planners failed to understand the importance of integrating rapid tramways into urban plans. Several studies were carried out that highlighted the major role of rapid public transport in town planning, with the understanding that fast trams were a powerful tool influencing various aspects of urban plans:

a. Capacity and Connectivity of Rapid Tramways: A Powerful Force for the Redistribution of Functional Areas

To turn the hoped-for efficiency of rapid trams into reality, there had to be urban density along their lines and around their stops. Urban territory could no longer be as homogeneous as before, and required reconsideration of the location and spatial relations of the principal areas. Consequently, most urban and transport plans also needed to be reconsidered. The main public transport system proposed, the rapid tramway, with its concentrated corridors, had to be differentiated from the complementary public transport system using trolleybuses and buses, intended to cover less densely populated areas. On a rapid tramway axis, sequences of functional zones, industrial, residential and tertiary, needed to be created so as to provide direct access between them and to concentrate passenger flows (Fig. 149).

The location of urban zones would also be determined by high-speed tramways. It was accepted as normal for a city to have a single urban centre with connections to the periphery, with residential areas located either in the centre or outside it, but industrial areas always set on the outskirts. However, logically, connections between them were not unidirectional, as the location of the functional zones also influenced decisions on the routing of fast tram lines. In the interrelationship between zoning and rapid tramways, the arrangement of travel choices such as to provide a homogeneous distribution of passenger flows was a prominent and widely applied technique.

b. The Configuration of Rapid Tramway Networks: An Influential Factor in Urban Models

There were a number of theoretical studies on ideal Socialist city models which basically aimed at shaping cities through control of the geometry of urban plans. This was essentially an outcome of arguments of economy of space, infrastructure construction costs and compactness in access to public transport stops. Rapid tram lines were crucial in defining the directions in which cities would grow and

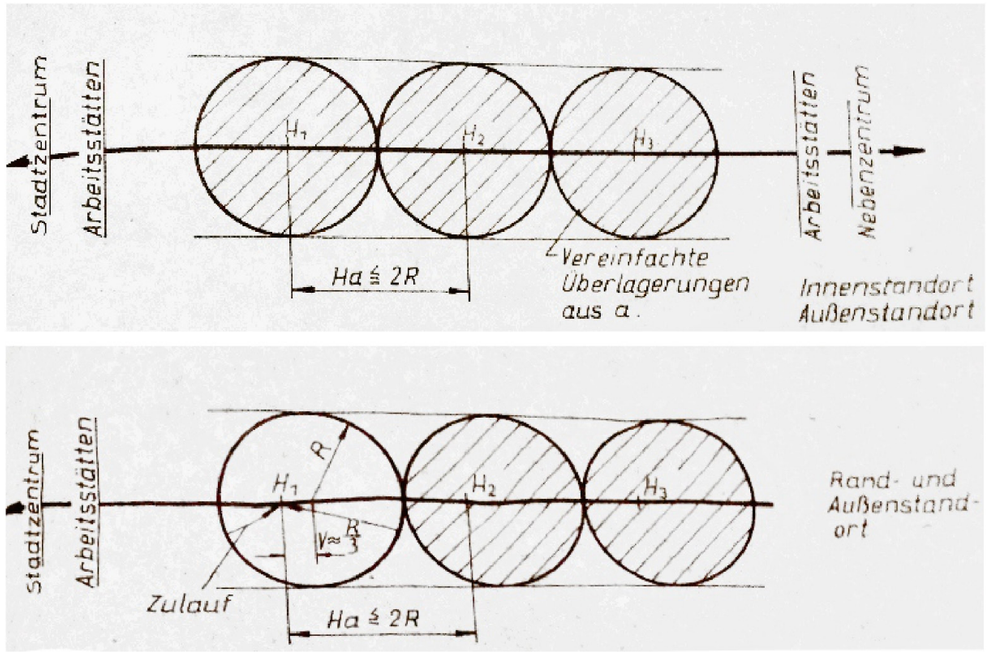


Fig. 149. Scheme of the concentration and sequence of the main urban areas, residential, urban centre and working areas. Source: ZFIV (1974) *Richtlinie für die Verkehrliche Anbindung und Erschliessung von Neubauwohngebieten*, Berlin: ZFIV, p. 161.

were therefore considered a powerful tool for controlling urban models. Various examples can be found in cities such as Yaroslavl or Tula (USSR), Erfurt, Cottbus or Magdeburg (GDR) and Brno, Bratislava or Košice (CSR), where the installation of new rapid tram lines was undertaken in relation to a desired urban model.

Various studies had been performed in the USSR which resulted in the establishment of a typology of urban models: 1. Fragmented urban structures with scattered or transverse location of nodes of attraction in relation to transport lines; 2. Linear urban structures with longitudinal location of nodes of attraction; 3. Centralized urban structures with a dispersed location of nodes of attraction; and 4. Configuration of high-speed tram networks, urban form being determined by planning and zoning so as to help control the distribution of passenger flows (Fig. 150).

c. The Speed of Rapid Tramways: A Tool Ensuring Coherence and Integrity in Urban Structures

With the expansion of built-up areas, it became more difficult to provide urban compactness and rapid access between the different parts of cities. There was also a new and urgent necessity to consider the relationships between cities and their metropolitan areas in urban plans (especially because of the flows of workers from the suburbs). On the other hand, accessibility deteriorated when strict functional separation was maintained. Increased travel times were felt to be a negative factor for the orderly and expeditious functioning of cities. Rapid tramways, with their higher speeds, almost double those of conventional trams, were supposed to help overcome spatial fragmentation and improve the coherence of urban structures.

They were thus an optimum solution for some industrial cities with fragmented structures, like Ostrava or Karaganda. High-speed trams also served to improve communications in large urban areas by connecting them with new peripheral zones (Fig. 151).

Apart from these shared ideas about the relationship between high-speed trams and town planning, there was also room for specific solutions in urban transport policy. The European Communist countries did not follow common principles and methods in urban transport planning. Their main criterion was the economy and efficiency of solutions. This was stressed, for example, in a COMECON publication in 1974, where the Construction Commission explained that the improvement of urban transport should be carried out in relation to the possibilities of each country (COMECON Standing Commission for Construction, 1974, p. 4):

> *"Measures for improving and developing transit systems and for solving transport problems should differ in accordance with the social, economic and other conditions in each COMECON Member State."*[38]

This report also explained the importance of modernizing the existing tramway system into rapid tram lines (COMECON Standing Commission for Construction, 1974, p. 10):

> *"In several COMECON individual Member States trams constitute the principal means of public transport, even in city centres, under conditions of limited road traffic, and they retain the lead in this field. It is recognized that there is a need to modernize existing networks so as to create high-capacity lines, replacing obsolete rolling stock and combining tramcars into trains, so that tramways can be viewed as the first step towards electric urban railways."*[39]

With this statement, the major place rapid tramways would occupy in future urban solutions in Communist countries was highlighted. From the mid-1970s, new regulations for planning high-speed tramway systems were issued,[40] which aimed to provide guidelines for improving the efficiency of rapid tram operations and integration of networks with urban planning.

In the CSR a publication from 1971, *Pravidla technického provozu městských drah* [Rules for the Technical Operation of Urban Railways], explained the technical and construction criteria for rapid tramways. Subsequently, in 1976, the Federal Ministry of Transport of the Czechoslovak Socialist Republic issued a document entitled

38 "Die Maßnahmen zur Vervollkommnung und Entwicklung der Verkehrssysteme und Methoden zur Lösung der Beförderungsprobleme müssen entsprechend den gesellschaftlichen, ökonomischen und anderen Bedingungen jedes Mitgliedslandes des RGW differenziert werden."

39 "In einer Reihe von Mitgliedsländern des RGW, in einzelnen Ländern selbst in den zentralen Stadtzonen, stellt unter den Bedingungen eines eingeschränkten Kraftverkehrs die Straßenbahn das wichtigste öffentliche Nahverkehrsmittel dar und wird in dieser führenden Position belassen. Dabei wird anerkannt, daß es erforderlich ist, die bestehenden Netze so zu modernisieren, daß Strecken mit hoher Durchlaßfähigkeit geschaffen werden, den veralteten Wagenpark zu ersetzen und einzelne Wagen zu Zügen zusammenzufassen, so daß die Straßenbahn als erste Stufe einer elektrischen Stadtbahn verstanden werden kann."

40 Normally, rapid tramway projects were realised by state institutes such as in the CSR *Rudný Brno or SÚDOP Praha* (the state institute for transport design) working in cooperation with municipal transport departments, in the USSR state institutes such as *Kharkovmetroproekt, Giprokommundortrans, Kievproekt, Metrogiprotrans*. The exception was the GDR where rapid tramway projects were realised by the transport departments of the individual cities.

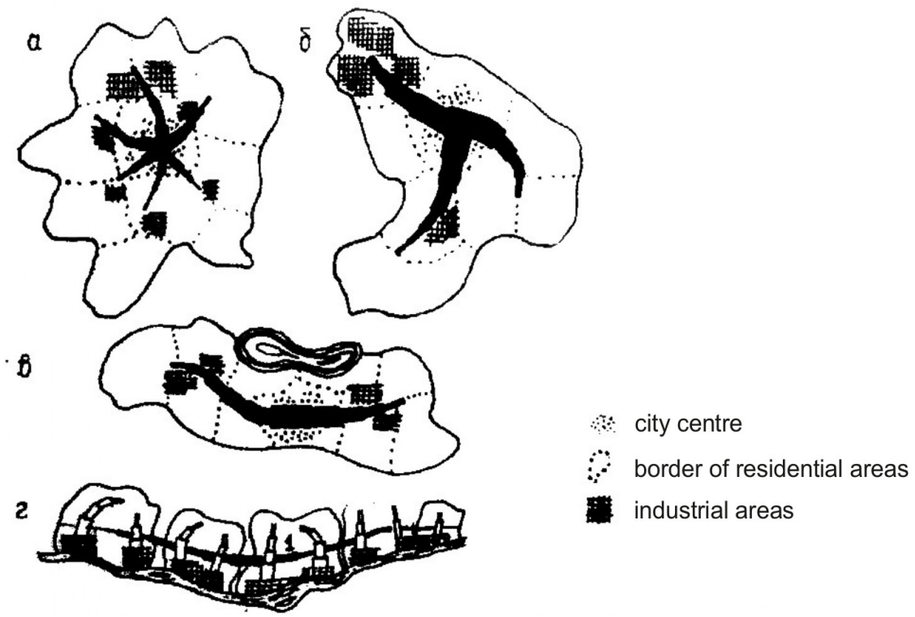


Fig. 150. Different urban models with the introduction of rapid transit. Source: Bolonenkov, G. V. (1972a) *Skorostnoi obshestvennyi transport krupnogo goroda*, Moskva: Gosgrazhdanstroi SSSR, p. 38. It can be noted the maintenance of urban centre and its direct connection with the industrial and residential areas.

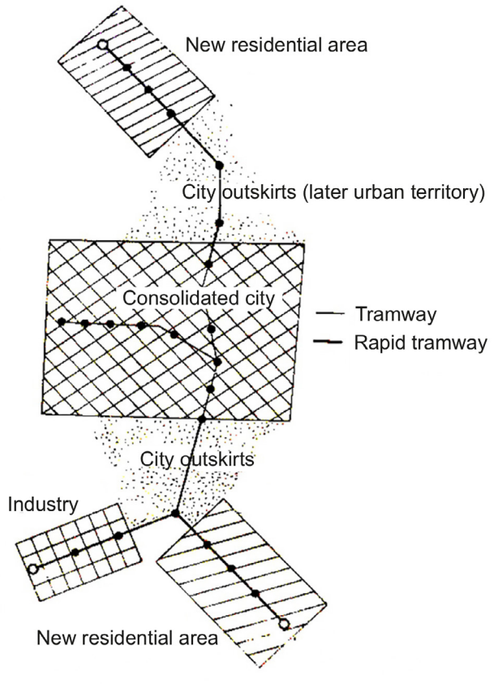


Fig. 151. The idea of integration of new rapid tram lines with existing tram network, providing connections to the city centre. Source: ZFIV (1976c) *Richtlinie für die Planung und Gestaltung der verbesserten Strassenbahn - Schnellstrassenbahn*, Berlin: ZFIV, p. 6.

Prozatimní směrnici pro plánováni a projektováni tratí staveb a zařízení pro provoz rychlé tramvaje [Interim Directive for the Planning, Design and Construction of Lines and Equipment for Operating Rapid Tramways][41]. These guidelines enhanced the role of rapid tramway systems in urban and transport planning solutions, although the 1976 Territorial Planning and Building Act [with the full title *Zákon* číslo *50 ze dne 27 dubna 1976 o územním plánování a stavebním řádu*] covered only town and country planning issues. Among the main ideas were the following: separation of tram lines from urban traffic, improvements in the condition of the track to increase speed, installation of some sections in tunnels or on elevated tracks, and advances in rolling stock (Ostrava Municipal Archive, 1978a, p. 3). At the same time, however, the expectation was that in the future there might be an innovative development of rapid public transport. This view, arising because of various experiments, such as the Transit Expressway Revenue Line ("Skybus"), Bertin's Aérotrain, SAFEGE monorails, and the like, was not neglected (*Výzkumný Ústav Výstavby a Architektury* [Research Institute for Construction and Architecture], VÚVA, 1979, p. 4 and pp. 42-43).

In the USSR there were a number of planning guidelines for the implementation of early rapid tramway projects. One publication, from 1967, was *Vremennie tekhnicheskie usloviia proektirovaniia eksperimentalnykh linii skorostnogo tramvaiia* [Interim Technical Design Specifications for Experimental High-Speed Tramway Lines]. Another, from 1971, was *Tekhnicheskie ukazaniia po proektirovaniiu i sooruzheniiu puti skotrostnoi linii tramvaiia* [Technical Guidelines for the Design and Construction of a High-Speed Tram Line], which was published by the Ministry of Urban Services of the RSFSR. This latter document was supplemented from operating experiences with the Leningrad rapid tramway line. The final document on the planning of rapid tramways was published in 1976 by the State Committee for Construction of the USSR ("Gosstroi"), being entitled *Elektrifitsirovannyi gorodskoi transport. Tramvainye i trolleibusnye linii* [Electrified Urban Transport. Tram and Trolleybus Lines]. Only transport institutes were involved in drafting this, so the guidelines were principally to do with transport and not so much with town planning, explaining the mostly technical solutions for rapid tramways, such as the dimensions and curve radii of lines, types of construction materials, and methods of electrification.

The same idea was developed in the town and country planning regulations of 1975, entitled *Planirovka i zastroika gorodov, poselkov i selskikh naselennykh punktov* [Planning and Construction of Cities, Towns and Rural Settlements], coded SNIP II-60-75. Only certain specific transport issues, such as size of passenger flows, speeds, distances between stops, and the dimensions of cities, were mentioned, but the document lacked principles and criteria for integrating tramways into urban planning.

Modernization of tram infrastructures was also considered in the GDR in the regulations on tramway construction and operation from 1959 and 1969, the *Bau- und Betriebsordnung für Straßenbahnen* [Building and Operating Regulations for Trams], abbreviated to *BoStrab*. According to these two successive documents, new tram lines were to be planned outside city centres, while lines under reconstruction within built-up areas were to have segregated tracking (*Gesetzblatt der*

41 About the technical solutions of construction of fast tramway tracks was published in ČSN 73 6405 "Projektování tramvajových tratí" in 1975 and in "Podmínky pro projektování tratí, staveb a zařízení tramvajové rychlodráhy" in 1980.

DDR, 1959, § 10; 1969, § 10). Special regulations entitled *Richtlinie für die Planung und Gestaltung der verbesserten Strassenbahn - Schnellstrassenbahn* [Guidelines for the Planning and Design of Improved and High-Speed Trams] were issued in 1976 by the Central Institute for Transport Research of the GDR, with the participation of representatives of the GDR Academy of Construction. This document was quite different from what was in place in of the USSR and the CSR, since it not merely addressed technical transport issues, but also gave space to questions of integrating trams into urban space. This included pedestrian accessibility, the functional organization of areas around stops, new residential zones, the routing of tram lines, the design of tram stops, and meeting-points with road transport.

This was a work in which urban transport specialists co-operated with town planners from the Institute for Town Planning and Architecture of the GDR Building Academy [*Institut für Städtebau und Architektur, Bauakademie der DDR*]. However, there were also specific regulations such as the *Komplexrichtlinie für die städtebauliche Planung und Gestaltung von Neubauwohngebieten* [Detailed Guidelines for Town Planning and the Design of New Residential Areas] of 1976, in whose development representatives of the Institute for Transport Research were not involved. This document did not go at any depth into urban transport solutions. General principles and standards were stated, such as the radius of coverage of stops, recommendations on zoning, distances between stops, and similar. These regulations were more oriented towards questions of zoning, residential housing and facilities.

All in all, it can be said that there was a divergence between transport and city planning regulations. With the introduction of rapid tramway systems into the CSR and the USSR, attention was paid to the technical issues of line construction, while spatial issues of town planning were hardly addressed. The criteria for including rapid tramways in urban plans were poorly defined, which led to subjective and inefficient local solutions. In the case of the GDR, although it was not always possible to intermesh regulations, there was joint study of the incorporation of rapid transit when planning cities. The Institute of Transport Planning was responsible for ensuring efficiency in rapid transit planning and starting in the middle 1970s issued several sets of regulations in co-operation with the *Deutsche Bauakademie*, from 1973 renamed *Bauakademie der DDR* [GDR Building Academy] and the architecture departments of various cities.

It is illuminating to compare the technical criteria for rapid tramway planning in the three Communist countries, since there were both similarities and differences. For example, there was a shared understanding that rapid tramways were improved lines, with tracks on reserved or segregated space, operating with an average speed in excess of 25 kph (*Zentrale Forschungsinstitut des Verkehrswesens* [Central Transport Research Institute] or ZFIV, 1976c, p. 2; Gosstroi, 1977, p. 3; VÚVA, 1979, p. 27). Its passenger flows should be of the order of 12,000 to 15,000 an hour in each direction (ZFIV, 1976c, p. 2; VÚVA, 1979, p. 27; Gosstroi, 1977, p. 3).[42] The end-to-end length of such a line in urban areas should be some fifteen to eighteen kilometres (Gosstroi, 1977, p. 3; VÚVA, 1979, p. 27).

42 Although earlier this idea was not so clear, for example, in some publications before this regulation it was mentioned that rapid tramway should be applied in large cities with passenger flow up to 25.000 in one direction in one hour (Kominarov, 1970b, p. 34).

The main differences were related to distances between stops and the optimal size of cities for implementing such a system. The distance allowed between stops in the GDR and the CSR was smaller than in the USSR, at about 500 to 700 metres in city cores and 700 to 1,200 metres in outer areas (ZFIV, 1976c, p. 8; Lacek, 1982, p. 48). In the USSR, in contrast, the distance recommended between stops was 800 to 1200 metres in built-up areas, and more than 1,500 metres in less urbanized areas (Gosstroi, 1977, p. 9).

The differences in terms of city size, however, were remarkable. In the USSR rapid tramways were envisaged for cities of between 500.000 and 1.000.000 inhabitants (Bolonenkov, 1971, p. 15; Molodykh, 1973, p. 26), with the range sometimes being stated as between 800.000 and 1.200.000 population (Bolonenkov, 1972a, p. 30; GAE, 1968). In contrast, in the GDR and the CSR rapid trams were visualized in cities exceeding 100,000 inhabitants (Bolchynek, Leyer, Krause, 1977, p. 117; Lammert, 1979, p. 108; Lacek, 1982, p. 73).

This latter difference is to be explained by the fact that in the USSR there were far more cities that needed to organize rapid public transport. Hence, it is likely that in order to limit the number of cities requiring such tramways, the size threshold above which a tram system of this sort could be included in plans was increased. The differences in the distances between stops can be explained by the less compact structure of Soviet cities, combined with an aspiration to increase the indicated average speeds of rapid tramways.

In other words, the transport criteria for fast tramways, such as speeds and passenger numbers, were similar in the three countries studied. However, the criteria related to town planning, like distances between stops and the size of city envisaged, were different.

In general, it can be said that the theoretical concepts included shared ideas related to transport and urban economics. There were differing views in respect of integration into urban planning solutions and technical criteria for rapid tramways. To gain a better understanding of the application of these ideas in practice and other relevant aspects, three cities are analysed in the following section.

4.1.3. THREE CASE STUDIES: OSTRAVA (CSR), YAROSLAVL (USSR) AND ERFURT (GDR)

The Czech city of Ostrava, the Russian city of Yaroslavl and the GDR city of Erfurt presented very different dynamics in their development of rapid tramways during the 1970s. These cities have been chosen precisely because they represent different scenarios in historical terms, and because they show urban and transport decisions that can be analysed in a comparative way.

Ostrava is a case where trams was recognized quite early on as the most suitable means of transport to provide accessibility to industrial areas for their workers and to overcome the relative isolation of some urban areas. This meant that the tramway system was maintained and improved as early as the 1950s. In the 1970s, with suburban development, it was enhanced through modernization into a rapid tramway.

Yaroslavl represents a completely different situation. Although it was a city with significant urban and demographic development, trams lost their former role from the late 1950s onwards, being largely replaced by trolleybuses and buses in the 1960s. However, in the 1970s rapid tramways were back on the agenda, even if only for the most urgent connections.

Although Erfurt was a smaller city than the previous two, with around 200.000 inhabitants, it opted for rapid tramways at an early stage. As the urban area expanded, the aim was to keep average travel times down to below thirty minutes. Hence, the role of high-speed trams was to provide urban coherence and compactness.

The selection of these three cases, among those studied, is explained because they demonstrate different trends that emerged in European Communist countries. On the one hand, policies for selecting the means of public transport, in terms of city size and urban space, were quite diverse. On the other hand, there were differences in approaches to urban and transport planning, especially in the way these processes were organized by institutes and planners, as well as in the methodology for, and quality of implementation of, public transport policy.

a. Ostrava: Rapid Trams as a Key Element in Suburban Traffic and Metropolitan Development

This city represents an instance of the generalized use of trams. It retained a tramway network in the heart of the urban area, and modernized and extended it to accommodate peripheral growth. A proposal for a rapid tramway was formally expressed in a general plan, the *Uzemní Plan Města* [Land Plan for the City] of 1965. This indicated that the extension of the tram system should be undertaken in accordance with the technical parameters for a high-speed tramway, such as segregated tracking, greater distances between stops, and platforms adjusted to the floor height of vehicles (Ostrava Municipal Archive, 1965). Thus, in the 1950s the tram network had been maintained and improved, a feature distinguishing Ostrava from other cities in Central and Eastern Europe), but in the 1960s its lines were not only to be extended but also modernized with a foreseen future conversion into a rapid tramway system.

Ostrava was a medium to medium-large city, but a decision to bring suburban areas inside expanded boundaries meant that the population changed from about 300.000 inhabitants to some 700.000, and the urban district came to comprise an area of 25.000 hectares (Ostrava Municipal Archives, 1977), the result being a conurbation with industrial agglomeration (Barton, 1975). This type of boundary change was a widespread phenomenon affecting many large European cities from the middle of the 1960s onwards. Ostrava in the 1970s saw continuing industrial development and the zoning of its urban areas, as well as greatly increased traffic within the conurbation.

The General Transport Plan of 1973 progressed the tramway network and pointed to a foreseeable need for studies, and indeed the introduction of rapid tramways. However, it did not consider the future of public transport on the scale of metropolitan area. In 1977, the new *Směrný územní plan* [Indicative Zoning Plan, or *SÚP* (Fig. 152), envisaged continued expansion of a residential area called *Jižní město* [South City] in the southerly part of the conurbation, and of industrial areas.

Neither of these plans proposed any particularly significant extension of tramway lines, whose length was slated to grow from 48.6 kilometres in 1977 to 57.7 km in the 2000s, but there was qualitative development, aimed at modernizing the rolling stock and segregation tracks.

However, during the 1970s, several decisions initiated the development of high-speed trams and brought a need to reconsider the recently approved General Transport Plan of 1973 (Fig. 153). First, there was the Prognostic Study for Facilities in the Ostrava-Karviná Conurbation [*Prognostická studie vybavení ostravsko-karvinské aglomerace*] conducted by VÚVA, *Výzkumný Ústav Výstavby a Architektury* [The Research Institute for Construction and Architecture] in Brno in 1972, which gave an impetus for an announcement at the Fifteenth Congress of the Communist Party of Czechoslovakia in 1976 (*XV sjezdu Komunistické Strany Československa*, 1977) on the need for the improvements in, modernization of, and priority for, rapid public transport in large cities and conurbations (Ostrava Municipal Archive, 1978c). Second, there was the document *Dlouhodobý Výhled Rozvoje Dopravy v ČSR Do Roku 1990* [Long-Term Outlook for the Development of Transport in the CSR up to the Year 1990], published in 1974 by the Ministry of the Interior of the CSR [*Ministerstvo Vnútra ČSR*]. In both texts, rail-based transport was given pride of place, especially the development of rapid tramways.

In the face of these new realities, the General Transport Plan of 1973 had lost its relevance and the scope of transport planning had to be extended. This was resolved by the document *Studie Přehodnocení Koncepce MHD v Ostravě* [Study Re-Evaluating the Concept of Public Transport in Ostrava], which was commissioned by *Útvar dopravního inženýrství města Ostravy* [The Ostrava City Department of Transport Engineering, abbreviated as *UDIMO*] and undertaken in 1974 by *Inženýrské Služby Český Svaz Stavebních Inženýrů v Brně* [Engineering Services of the Czech Association of Civil Engineers in Brno]. In this study, an underground tramway was proposed for the city centre, with peripheral residential areas retaining conventional tram lines, similar to the proposals in the 1964 Transport Plan. This revision was based on the Definition of the Conurbation [*Vymezení Aglomeraci*] for Ostrava drawn up in 1976 by the Municipal Department of Transport.

The CSR Government approved the principle of the modernization of the collective public transport system in 1975, which was subsequently reflected in the City Plan (Ostrava Municipal Archive, 1978c, p. 5). This incorporated the rapid tramway project of 1977 (Ostrava Municipal Archive, 1978b, p. 6), reasoning strongly for its primary role in rational development of the urban agglomeration (Ostrava Municipal Archive, 1976, p. 15).

The Traffic Engineering Department of the City of Ostrava, *UDIMO,* held several technical seminars in 1978. One was entitled *Rozšírení systému rychlé tramvaje do příměstských oblastí Mesta Ostravy* [Extending a Rapid Tramway System to the Suburban Areas of the City of Ostrava]. Another had as its topic *Komplexní řešení dopravy v ostravské aglomeraci* [Integrated Transport Solutions for the Ostrava Conurbation]. Two long-term problems in public transport were highlighted in these meetings, indicating that it was necessary to introduce rapid tramways in Ostrava. First, there were growing travel times as the urban territory expanded by as much as fourteen to seventeen kilometres out into suburban areas, such as Hlučín, Bohumín, Havířov and Frýdek-Místek, where connections by high-speed trams had to

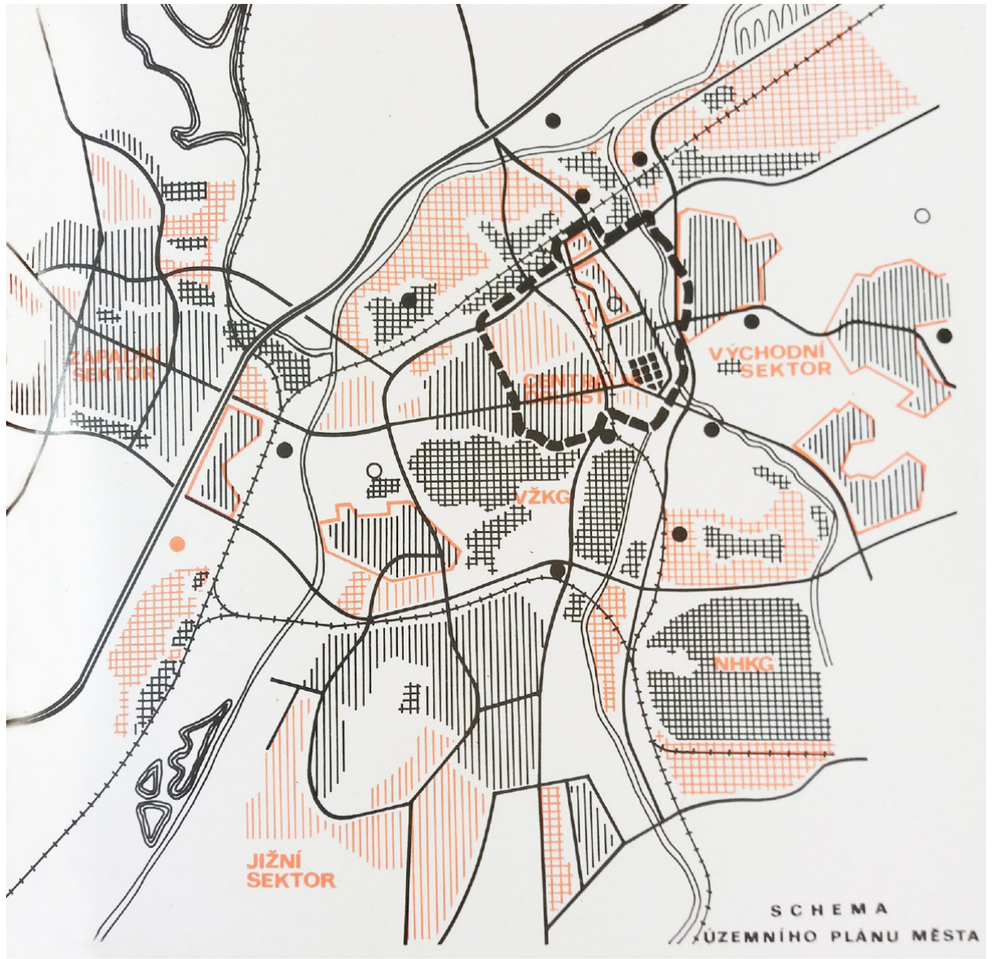


Fig. 152. Scheme of the Urban Plan of Ostrava, 1977. Source: Ostrava Municipal Archive (1979) *Schema Územního Plánu Města*, Útvar Hlavního Architekta Města. It can be observed limited residential development on the south of the city and considerable industrial expansion.

Fig. 153. General transport plan of Ostrava, edited in 1973 by the City Transport Department. Source: Ostrava Municipal Archives (1973) *Generel Dopravy Ostrava*, UDIMO, 1424. The dotted black lines correspond to the tramway, the red lines to main roads, the blue lines to urban roads and the green lines to special connecting roads.

be considered, since existing railway lines had been installed without considering the communication needs of suburban areas. Secondly, there were delays to public transport caused by having to share lanes with other road traffic, with the consequence of low service speeds of fifteen to twenty kph. In the light of this, there was an intention was to increase the average running speed of public transport to thirty-five kph (Ostrava Municipal Archive, 1978d, pp. 6-7).

Another crucial document worth mentioning is the *Důvodová zpráva o zajištění přípravy a realizaci systému rychlé tramvaje v městech Brně a Ostravě* [Explanatory Memorandum on Ensuring the Preparation and Implementation of High-Speed Tram Systems in the Cities of Brno and Ostrava] published by the Czechoslovak Government in 1978. In it, the proposals for Ostrava were to set up three rapid tramway lines in urban areas: 1) Jižní město via Vítkovice to the city centre; 2) Jižní

město via the northern industrial zone to the city centre; 3) Poruba via the city centre to the Klement Gottwald smelter at Nová hut' (Ostrava Municipal Archive, 1978a, p. 14), (Fig. 154 and 155). These extensions would be facilitated by the pre-existing tramway infrastructure. However, although accessibility of suburban areas was the main cause for the introduction of a high-speed tram system, in the early stages of these improvements planners were more concerned with modernizing the existing tramway system in the city centre, the only exception being new developments in the residential area of Havířov.

The rapid tramway was defined as the main means of urban public transport, with buses and trolleybuses acting as complementary feeders, which meant re-organization of the entire collective transport system of the conurbation. The bus network was to be cut back, but the use of electric vehicles was to be augmented (Novák, 1982, p. 12). In the meantime, it was soon realized that it was not possible to achieve any radical amelioration of the situation merely by introducing a few rapid tram lines; rather, the entire public transport system had to be improved (Ostrava Municipal Archive, 1978c, p. 3), (Fig. 156).

A comparison of suburban commuter trains and high-speed trams led to the conclusion that the latter were the appropriate solution for the city (Ostrava Municipal Archive, 1974a, p. A-26). In 1977 the Ostrava City Council approved the conversion of the existing system into a rapid tramway on the basis of a *Studie rozvoje systému rychlé tramvaje* [Study of the Development of a Fast Tram System] that was made available in June of 1977 (Ostrava City Archives, 1977, p. 5). The main objective was to create an integrated public transport system in the Ostrava conurbation over the long term (Ostrava Municipal Archive, 1976, p. 3).

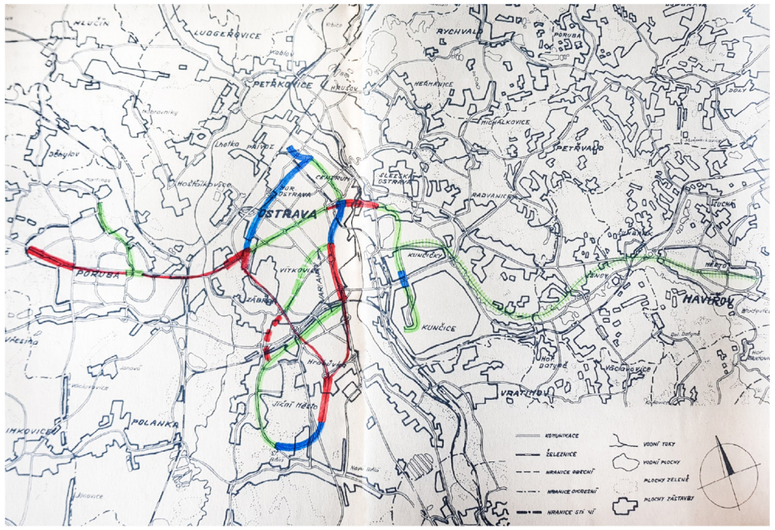


Fig. 154. Construction phases of the rapid tramway in Ostrava between 1978 and 2000. The scheme of the gradual implementation of the rapid tramway system with the first connection to the Havířov suburban area. Source: Ostrava Municipal Archive (1978c).

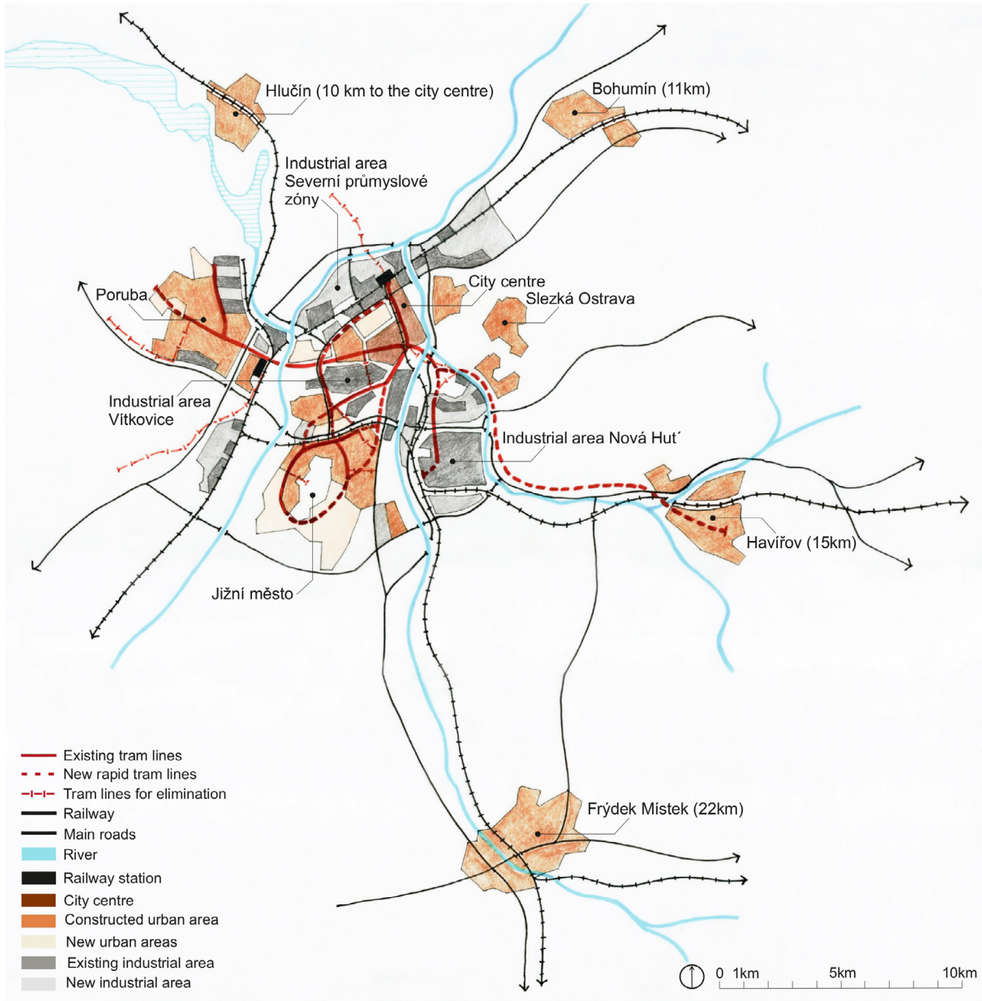


Fig. 155. Scheme of the Ostrava metropolitan area and the development of rapid tramway system in the late 1970s. Source: Author's elaboration based on the General Urban Plan of 1977, plan of the rapid tramway system of 1978, the plan of the existing tramway network of 1976 and the plan of the urban agglomeration of 1976. It can be seen the modernisation of the existing system and its adaptation to the rapid tramway system, especially its first connection to the Havířov suburban area.

The high-speed tramway tracks were to be set on a reserved surface space for 80% of the route length, with some underground sections in the form of underpasses, amounting to 20%, at intersections with roads. The total extent of the lines would increase to forty-eight kilometres. The carrying capacity of the rapid tramway was planned to grow to between 12.000 and 18.000 passengers an hour in each direction. Rapid lines would constitute about 75% of the total tram system (Zakopal, 1977, p. 8) would ensure that maximum access times anywhere in the conurbation would not exceed forty-five minutes (Ostrava Municipal Archive, *UDIMO*, 1976, p. 13). In order to attain that goal, it was planned to replace T-3 trams with the T-5 model

within fifteen years (Ostrava Municipal Archive, 1974a, p. 17). In addition, there were proposals to adjust motor services in the direction of a modal split with a higher share for electric public transport (Ostrava Municipal Archive, 1974b, p. 10).

It is also worth noting how the evaluation criteria for the rapid tramway began to spread into considerations of environmental and social factors (Ostrava Municipal Archive, 1974b, p. A-2). For example, its contribution to improving social life through an extension of the network to cover the entire conurbation was spotlighted, as well as its input in improving traffic flows in the more densely used urban areas (Ostrava Municipal Archive, 1978a, p. 4), as may be seen from Fig. 157. Enhancement of the comfort of public transport and links between urban areas were studied (Ostrava Municipal Archive, 1974b, p. A-11), this being accompanied by thought for environmental factors, such as air quality and noise abatement, that followed the line of debates by CSR planners since the late 1960s. On the other hand, the physical separation of trams from other modes of transport, one of the ways to achieve higher speeds, was a response to an expected growth in motor traffic. At the time, this was taken to be a social and environmental improvement. However, the pace of tramway development was slower than expected. It required the incorporation of new planning methods into urban plans, this occurring only from the 1980s onwards (Ostrava Municipal Archive, 1974b, p. 5).

In conclusion, the Ostrava rapid tramway was a solution that relied on existing technical and financial possibilities, based on the idea of segregated tracking, upgrading the technical characteristics of the rolling stock, and improving the organization and management of journeys, all without an immediate requirement for major interventions, such as the building of underground sections to ensure level separation at intersections. Moreover, attention was paid to the issue of joint planning of urban growth and mobility. A succession of transport studies offering alternatives and co-ordinated interaction between the State and local bodies contributed to a well-developed solution for the entire public transport system in the city and its metropolitan area.

4.1.3.2. The Rapid Tramway in Yaroslavl as an Unavoidable, Limited Solution for Urban Growth

In the early post-war period, in the absence of alternative means of transport the tramway network was retained. However, priority was given to the extension of bus lines and the introduction of trolleybus services. One of the problems hindering the desired developments for trolleybuses and buses in the 1950s was the lack of an adequate road infrastructure. Nevertheless, starting in the late 1950s and running into the 1960s there was a decommissioning of much of the city's tram infrastructure, supported by road building and a gradual extension of bus and trolleybus operation.

As was mentioned in Chapter 3, new residential areas, such as Bragino with 140.000 inhabitants, Zavolzhskiy with 170.000 and the renovated Privolzhsky area with a population of 70.000, were planned from the middle of the 1960s onwards. The policy of population containment was abandoned root and branch, and a new town plan began to be drafted that would provide for a significant extension of the peripheral areas. This led to the first proposal for the introduction of a rapid tramway.

Fig. 156. Images of the rapid tramway in Ostrava in the late 1970s. Left: one of the few underground tramway solutions implemented in Ostrava, in the Třída Dr. Martínka Ostrava-Hrabůvka area in the late 1970s. This type of solution was mainly a solution in intersections with regional roads. Right: reconstruction in 1978 of the Dolní stop in the consolidated city (Plzénská Street). The implementation of pedestrian tunnels to cross tramline in roads with heavy traffic. Segregated tram platforms located in central part of roads was the most widely applied solution in Czechoslovakia during the 1960s and 1970s. Sources: Utvař dopravního inženýrství města Ostravy (1982) *Doprava a Životní Prostředí v Ostravé*, Ostrava: UDIMO, 10; www.transphoto.com

Fig. 157. Implementation of rapid tramway in the residential areas Hrabůvka and Bělský Les. View of Horní Street in the late 1970s. Source: www.transphoto.com.

Delays in developing an Urban Transport Plan gave the local authorities an opportunity to intervene, adopting solutions based on the elimination, replacement or re-siting of tramway lines. In the early 1960s, discussions began on the topic of taking trams out of the city centre and the result was that between 1964 and 1969 the City Council proceeded to remove them from the main streets (Fig. 158). This type of solution was common in medium-sized cities in the USSR, but there were also examples of partial removal of tram lines in Eastern Europe, especially in the bombed cities of the GDR, such as Dresden or Leipzig. Thus, the projects to extend the tramway network were abandoned (Kovalev, 2005, p. 221) and system length was reduced from 18.3 km in 1967 to 13.3 km in 1969 (Yaroslavl Regional Archive, 1972). Even though there was a definite need to connect the residential areas in the north of the city with the industrial zones, the tramway project was not put into practice, even though the transport capacity of buses and trolleybuses was insufficient (Kovalev, 2005, pp. 223-224).

Paradoxically, in a context of intensive industrial development and the consequent need for public transport, trams were replaced by trolleybuses and buses on the more heavily travelled sections of the urban periphery. As a result of these interventions, from the mid-1960s Yaroslavl had a well-developed trolleybus system operating in the centre, along main streets and to all industrial areas. For their part, tramways connected a few residential areas to the edges of the city centre and to industrial areas. Subsequent projects for tram lines to improve connections between urban areas, although envisaged in the schemes drafted by the city's public transport undertaking, did not become reality in the 1960s.

Resistance to admitting the functionality of trams continued into the 1970s. The 1971 General Urban Plan from the *Leningradskii Gosudarstvennii Institut Proektirovaniia Gorodov Gosstroia RSFSR* [The Leningrad State Institute for the Design of Cities of the State Committee for Construction of the Russian Soviet Federative Socialist Republic], *Lengiprogor* for short, envisaged several rapid tramway lines (Fig. 159, 160 and 161). This was justified by the expansion of the urban zone to a length of some thirty kilometres north-to-south, and a growth in area from 83.000 to 132.000 hectares (Yaroslavl Regional Archive, 1969, p. 3). The length of tram lines was to be extended substantially, to fifty-four kilometres, of which forty-two were to be for fast trams (about 78%). The average length of a journey by tram at the time was about 5.8 km, but this was expected to increase significantly (Lengiprogor, 1971, p. 204). Despite the emphasis on trams in the plan, it was envisaged that buses should take 38% of all journeys (142 million passengers per year) compared to 30% for trams (113 million). Service speeds would have to average 30 kph in order to achieve a maximum travel time of forty-five minutes (Lengiprogor, 1971, p. 211). Despite the description of these concepts in the Urban Plan, the necessary *Kompleksnaia Transportnaia Skhema*, or Integrated Transport Scheme, was not approved until 1977. This time lag again meant that decisions about trams between 1971 and 1977 were taken only at the local level.

The projects for new residential areas considered the appropriateness of installing tramways in accordance with the guidelines defined in the General Urban Plan. During construction of the lines in the Bragino residential area in the north of the city, initially a central space in the main street was reserved for the high-speed tram line. However, in order to maintain the iconic nature of the existing avenue, it

Fig. 158. Sovetskaia Street in the city centre in 1966: removal of tramway line. Source: YarGET Museum.

was decided to move the tramway onto secondary streets (Kovalev, 2005, p. 236), as shown in Fig. 162. The consequence was that the rapid tram line was forcibly squeezed into built-up streets that were not originally designed for it (Fig. 163).

Local decisions prevailed over the urban and transport plans controlled by higher authorities, which was due to a lack of State inspection. In 1963 the Council of Ministers of the USSR highlighted the fact that there was a problem with local decisions, with municipal councils removing tram lines without any explanation or prior traffic study (GAE, 1963):

> *"There are instances in which the executive committees of local councils of workers' deputies remove or relocate tram lines in a totally unreasonable way, replacing them with other means of transport that have a smaller carrying capacity."*[43]

Apparently, this attitude continued into the 1970s as well, with the excuse of the lack of State funding to permit municipalities to develop tram lines. In short, there remained an attitude against the tramway, which was considered to be an obsolete or expensive means of transport.

43 "Наблюдаются случаи, когда исполкомы местных советов депутатов трудящихся совершенно, необоснованно снимают и переносят трамвайные линии, заменяя их другими видами транспорта меньшей провозной способ."

Fig. 159 and 160. General Urban Plan and Preliminary Transport Plan of Yaroslavl, 1971. Left: General Urban Plan of Yaroslavl 1971 elaborated by the Lengiprogor Institute. Right: Preliminary Transport Plan (developed within the General Urban Plan), also edited in 1971 by the Lengiprogor Institute. In solid green, the existing tramway lines; in dashed green, the tramway lines to be eliminated; in blue, the new tramway lines proposed by the plan; in dashed yellow, the underground tramway sections. It can be seen a sparse network of the existing tramway in relation to the significant development of new tram lines in the peripheral areas. Source: Lengiprogor (1971) *Generalnyi Plan goroda Yaroslavl 1971*, Archive of Yaroslavl City Department of Architecture and Land Relations.

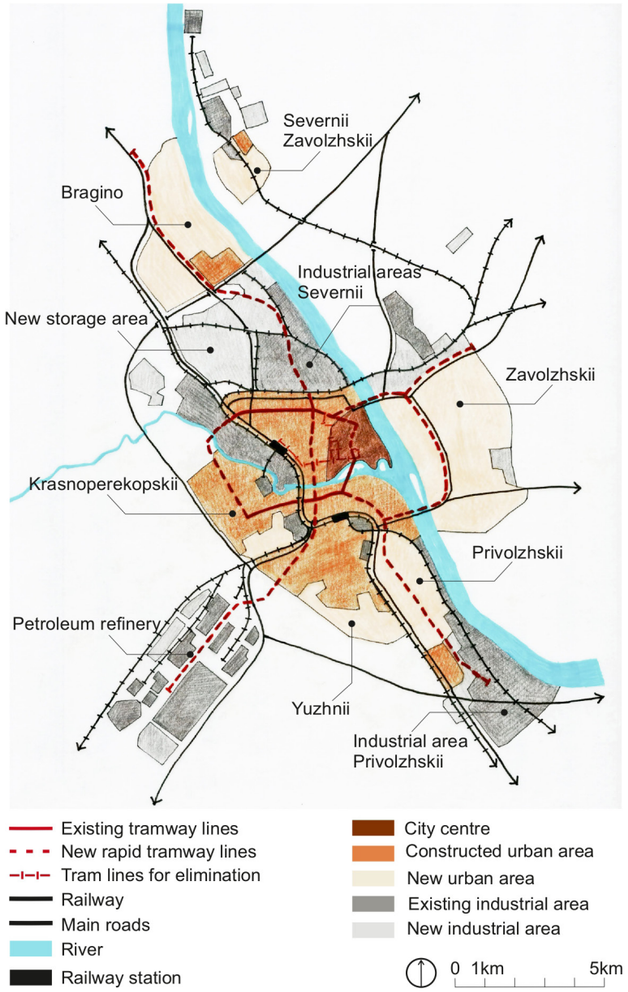


Fig. 161. Scheme of Yaroslavl's urban growth and the proposed rapid tramway. It was planned a large extension of tramway lines; however, the density of the network was low and some important areas were not connected. Source: Author's elaboration based on the existing city plan of 1970, the General Urban Plan and its Transport Scheme of 1971.

A complementary explanation for the elimination of trams may have been the 1966 decision of the Ministry of Urban Economy of the RSFSR entitled *Perspektivnoe razvitie gorodskogo obshestvennogo transporta 1966-1975* [Prospective Development of Urban Public Transport 1966-1975] which planned only restricted increases in trams alongside an extremely intensive development of trolleybuses. The plan envisaged that in cities with 100.000 to 250.000 inhabitants, 60% of passenger traffic was to be carried by buses and 37% by electric transport. In urban areas with 250.000 to 1 million inhabitants, 50% of journeys would be by bus and 43% by electric transport. It was only in cities with more than a million inhabitants that electric transport was given priority, being assigned 60% of passenger movements

Fig. 162. Leningradskii Avenue in the late 1970s with trolleybuses and autobuses. Source: www.yargid.ru, photo by Zinaida Shemetova.

Fig. 163. Rapid tramway on the secondary Street Trufanova in the Bragino residential area. Source: Tumanov, A. (2014) *Dzerzhinskii raion. Sobitiia i liudi*, Yaroslavl: Yarnovosti, p. 240.

versus 30% for buses. These forecasts undoubtedly influenced the final percentages across the country, expected to be 55% bus and 35% electric transport (GARF, 1966b).

This ministerial resolution also made it clear that only in large cities were electric vehicles (trams and trolleybuses) to be the main means of transport, whilst elsewhere buses were to be the principal mode transit. Nevertheless, it should be noted that the concept of electric transport favoured trolleybuses, because of their advantages of lower track construction costs, quieter operation and better manoeuvrability. Thus, it was decided to increase trolleybus passenger traffic to 22% and reduce tramway traffic to 18% by 1975 (GARF, 1967a). Tramway infrastructures were accordingly cut back in the 1960s. The share of passengers carried by trams decreased from 57.6% in 1960 to 41.5% in 1965, 34% in 1967 and 26.5% in 1969. In contrast, trolleybuses carried 36.9% and buses 36.6% in 1969 (GARF, 1972b, p. 17).

In the late 1960s and early 1970s, with a growth in the size of urban zones and a deterioration in accessibility of their outskirts, the need for a high-speed tramway began to be considered at State level. The main concern was to connect residential and industrial areas, while the possibility of relieving car traffic congestion in city centres by using trams was still overlooked.

An evaluation was made of the 1973 Integrated Transport Scheme by the technical and financial commission of the State Planning Committee [*Gosudarstvenyi Komitet po Planirovaniiu*] of the RSFSR, or Gosplan RSFSR. These experts expressed concerns about the poor development of public transport in the city, there being too few trams not only in current reality but even in the plans. The opinion of this group of technical and financial experts (GARF, 1972a, p. 3) concerning the rapid tramway planning in Yaroslavl was clear.

> *"At the present day in Yaroslavl, it is not just a case of all expansion of this means of transport, the second most effective after a metro, having been suspended. Even the pre-existing meagre network of tram lines is in the process of being cut back."*[44]

Development of the tramway system was justified above all by the longitudinal layout of, and consequent considerable distances in, a basically industrial city. In the Urban Plan some residential areas such as Zavolzhskiy in the east and the large industrial area in the northwest were left without tramways. One of the conclusions of the Gosplan experts was to supplement the plan with new tram lines to these areas (GARF, 1972a, p. 9). Another transport expert E. V. Ovechnikov also underlined the strangeness of eliminating trams from the city (GARF, 1972b, p. 17):

> *"Yaroslavl has an elongated rectangular shape, twenty-nine kilometres end-to-end. No expansion of tramway transport has taken place. On the con-*

44 "В настоящее время, однако, именно в Ярославле не только приостановлено в последнее время развитие этого самого мощного после метро вида транспорта, но даже ранее существовавшая весьма слабая сеть линий трамвая подвергается сокращению."

trary, tramways have recently been cut back, even though the city is growing rapidly in terms of territory and population. Urban passenger transport services cannot be considered satisfactory."[45]

Despite these comments, there was no study or general project for a rapid tramway. Not even technical criteria were fully defined. Only one characteristic element was understood, that tracks ideally should be separated from the streets (Kovalev, 2005, p. 235). Other features usually required for high-speed tramways, such as those mentioned by Ovechnikov, like intersections with underpasses or overpasses, and pedestrian subways to cross the line, were not put in place (GARF, 1972b, p. 17). Rapid tramway construction was carried out with limited criteria, adjusting the lines to the already built-up urban area. There was no space reserved for trams in streets or on bridges, so it was not possible to attain high speeds. Thus, it was not possible to create a coherent system, and what was installed served only to increase passenger carrying capacity, and not very efficiently, at that.

In conclusion, both in the planning of mass public transport and in decisions on major urban construction, short-term approaches were adopted, and social and environmental criteria were not even considered. In fact, rapid tramways were successfully introduced in the largest cities, which were major industrial centres and territorial capitals, while middling cities like Yaroslavl, being of smaller size and political weight, did not receive as much attention from the State in respect of the development, control and funding of high-speed tramway projects. Delays in the implementation of urban and transport plans, local prejudices against tramways and difficulties in gaining State investment led to feeble progress in fast tramway systems, with an outcome of few, inconsistent and discontinuous interventions.

4.1.3.3. The Rapid Tramway in Erfurt as a Tool for Maintaining the Coherence of the Urban Model

Erfurt is a middling city located in Thuringia in the western part of the former GDR. The river Gera runs through the city, dividing it into two parts. The population of the city remained steady at around 200.000 inhabitants from the 1950s to the 1970s. The main industries were building materials, foodstuffs, textiles, and electrical and mechanical engineering. The city was not bombed during the Second World War, so it retained unreconstructed narrow streets of mediaeval origin in the central old town area. There was no large amount of rebuilding or urban growth, and the city kept an unaltered layout. Its territory was quite compact, with a linear configuration, seven kilometres long by two-and-a-half wide (Saitz, Mende, 1974, p. 406). It did not constitute a conurbation, since dependent outlying settlements were mostly some fifty kilometres away (Saitz, Mende, 1974, p. 406). Nevertheless, there were a few smaller towns around Erfurt such as Weimar, Arnstadt and Gotha, which generated passenger traffic to Erfurt, mostly catered for by suburban and regional train services. The compact structure of the city made it feasible to keep ac-

45 "Ярославль имеет прямоугольную вытянутую форму 29 км. Развитие трамвайного транспорта не получил, а наоборот, в последнее время хозяйство трамвая сократилось, несмотря на то что город получает большое развитие и территориально и по населению, а транспортное обслуживание населения городским пассажирским транспортом нельзя признать удовлетворительным."

cess times to the city centre somewhere between fifteen and thirty minutes (Federal German Archive, 1975, p. 3). This was particularly crucial and convenient because the city centre had a high concentration of social and commercial activities.

Because of the compactness of the city, there was no need for any introduction of rapid public transport. Only in the mid-1960s did there appear studies on reconstructing the city centre and proposals for extending road infrastructures. These were an outcome of the rapid expansion of the city's industries, which were gaining prominence within the national economy. There was also an intention to introduce new principles of modern planning into the existing structure of the city, especially the centre, which was seen as antiquated and not reflecting the concept of a Socialist city (Escherich, 2012, p. 129). In the discussions at the end of the 1960s, basically what was envisaged was the development of new housing areas, Johannesfeld and Juri-Gagarin-Ring, within the existing urban structure (Federal German Archive, 1967b, p. 4). All these suggestions were in accordance with the politics of those years, which paid more attention to enhancing city centres as iconic or monumental areas, with little attention paid to the provision of housing and the best use of already built-up areas.

New general transport and urban plans for Erfurt were approved in 1969. The transport plan envisaged more or less a tweaking of the arrangements in the existing public transit system, especially by investigating the possibilities of transporting passenger by suburban railway. The tramway network was to stay at a line length of around twenty kilometres, with some changes such as an extension northward to connect to the new residential area in Riethstraße and southwards to provide services to new housing in Herrnberg and Wiesenhügel (Erfurt Municipal Archive, 1969, p. 37). Nevertheless, this plan reserved the largest expansion for bus services, seen as a complementary means that would connect and feed existing tram and railway lines.

In 1970 the Deutsche Bauakademie proposed development of the urban structure of Erfurt by modernizing the existing tram system into a rapid tramway (Fig. 164). It was envisaged that there would be re-routing within the city centre and extension of the lines out to new peripheral areas. This was quite an early proposal to plan a high-speed tramway, considering that this was a city of only medium size. The idea was taken farther during the early seventies by the city transport planners Saitz and Villmow who published a study with the title *Konzeption für die Entwicklung der Straßenbahn zu einer Schnellstraßenbahn* [Concepts for the Development of Trams into Express Trams]. Finally, in 1971 the journal *Die Strasse* it was announced that it was not possible to continue with the existing public transport system and changes were needed (1971, p. 223).[46]

In the 1970s the State began to develop housing programmes on newly urbanized land. Although this was not particularly desirable because of the cost of construction of such developments, it had to be done because of the lack of vacant land within existing cities (Ladd, 2001, p. 588). This type of peripheral growth made the role of high-speed tramways more prominent, since they were an efficient means of transporting large passenger flows. Proposals for rapid tramways were announced in 1971 at the Eighth Congress of the Communist Party of East Germany, emphasiz-

46 Service speed of the tramway was quite low, around 13 km/h.

Fig. 164. Erfurt urban structure concept in 1970 by Deutsche Akademie. Source: Federal Archives of Germany (1969b) *Gestaltung des Stadtzentrums Erfurt*, DH/2/Plan, 2987, 51, M304, 56. The first proposal for a rapid tramway and the new residential centralities on the periphery.

ing their value in transporting workers (Müller, 1982). The idea had to mature over a few years and receive a final decision by the State for its implementation. Probably for this reason, the draft version of the new transport plan published by the Roads Directorate of the City Architect's Office [*Büro des Stadtarchitekten, Stadtdirektion Strassenwesen*] in 1973 did not include any suggestion of establishing high-speed tram lines (Fig. 165 and 166). The peripheral urban areas were to be connected to the city by trolleybus, bus and express bus services. It should be noted that trams did retain a substantial role within the public transport system. The plan did not consider any changes to, or elimination of, the existing tramway network. Bus services were complementary and sometimes had no direct connection to the city, operating only as feeders to nearby tram stops.

Shortly after this draft plan, in 1975 proposals for express tramways returned in the new urban and transport plans, which included schemes for new residential areas and the installation of a rapid tram system (Fig. 167). The extent of the urban zone was some 106 square kilometres (Erfurt Municipal Archive, 1975, p. 1). The main

Fig. 165 and 166. Left: Erfurt general urban plan, 1972. Right: Erfurt transport plan, 1973 edited by the Erfurt department of architecture. Source: Federal German Archives (1972) *Generalbebauungsplan Erfurt*, DH/2/Plan, 2883, 51, M304, 94. It can be appreciated a limited planning of tram lines and the extension of autobus lines to provide service for the new peripheral areas.

expansions of the city took place in a northerly direction with 20.000 dwellings and south-eastwards with 15.000 dwellings. Thus, the length of the city territory north-to-south grew from seven to fourteen kilometres (Saitz, 2001, p. 187). Furthermore, with the addition of these new residential areas, the radius of accessibility for the city centre increased from three to five kilometres. All of these changes made it imperative to upgrade the existing public transport system.

The new residential zones planned to grow northwards in the 1970s were Rieth, Berliner Platz, Moskauer Platz and Roter Berg, totalling about 70,000 inhabitants. These areas of housing were designed to be close to existing industrial zones, but there was also to be a new industrial estate at Gispersleben. In the south-easterly direction there was to be housing at Herrenberg, Drosselberg, Buchenberg and Wiesenhügel, providing for about 45,000 inhabitants, a proposal for a new industrial zone for the "Karl Marx" Micro-electronics Group or *Kombinat Mikroelektronik* (Saitz, 2001, p. 183; Federal German Archives, 1975, p. 24), as shown in Fig. 168. Overall, the plans envisaged building or rebuilding around 50.000 dwellings by 1990 (Erfurt City Council, 1987, p. 7).

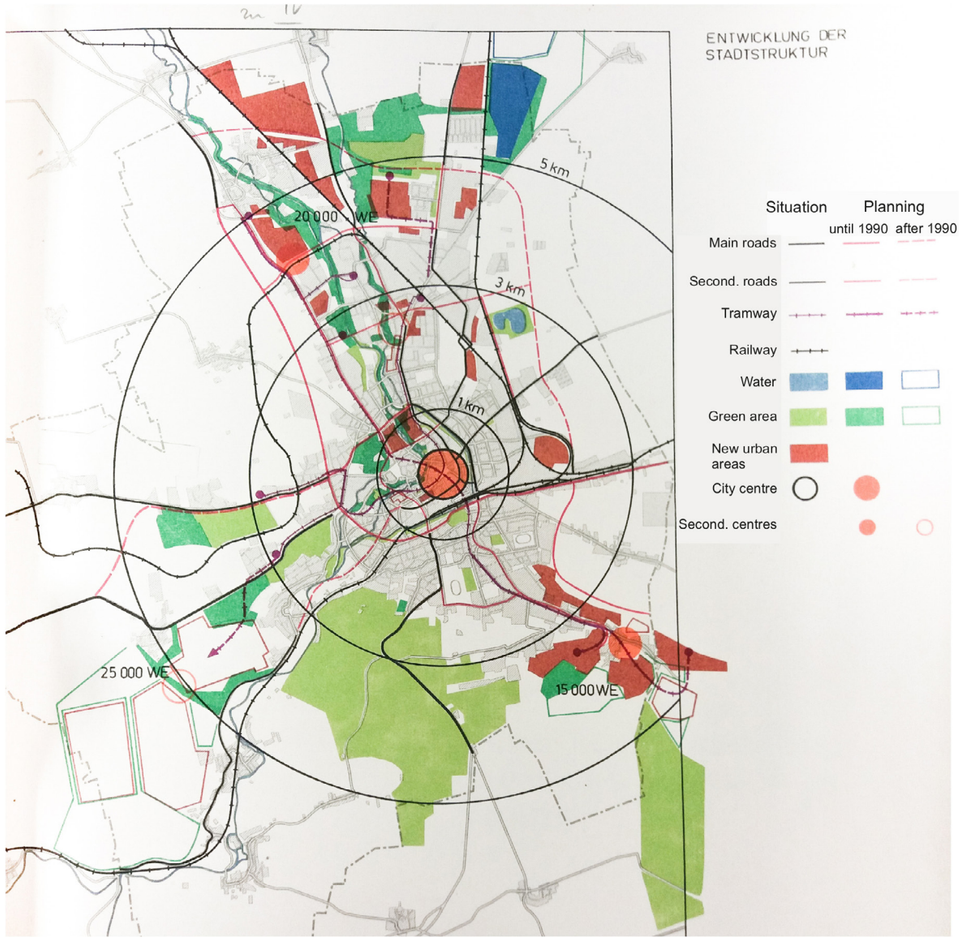


Fig. 167. The development of the urban structure of Erfurt in 1975. Source: Federal German Archives (1975) *Generalbebauungsplan der Stadt Erfurt,* DH/2/Plan, 2888, 51, M304, 56. The extension of the tram lines can be seen together with the new residential areas in the north and south-east direction.

It should be noted that the construction of these new residential areas was related not so much to population growth as to a redistribution of inhabitants, mainly from the city centre to the outskirts. The anticipated change in the overall population was quite small, with an increase from 195.696 in 1975 to 217.000 in 1990 (Federal German Archives, 1975, p. 8). There was a housing shortage because many dwellings were ageing and becoming unusable. The construction of new homes on the outskirts, combined with renovation of existing housing, was intended to improve the living conditions of inhabitants (Fig. 169 and 170).

This growth of the city raised the important question of reconsidering the urban pattern. The growing urban layout had to be addressed by designing rapid tram lines. Two directions had been chosen for development: towards the north and the south-east. Expansion in a westerly direction was limited by agricultural lands.

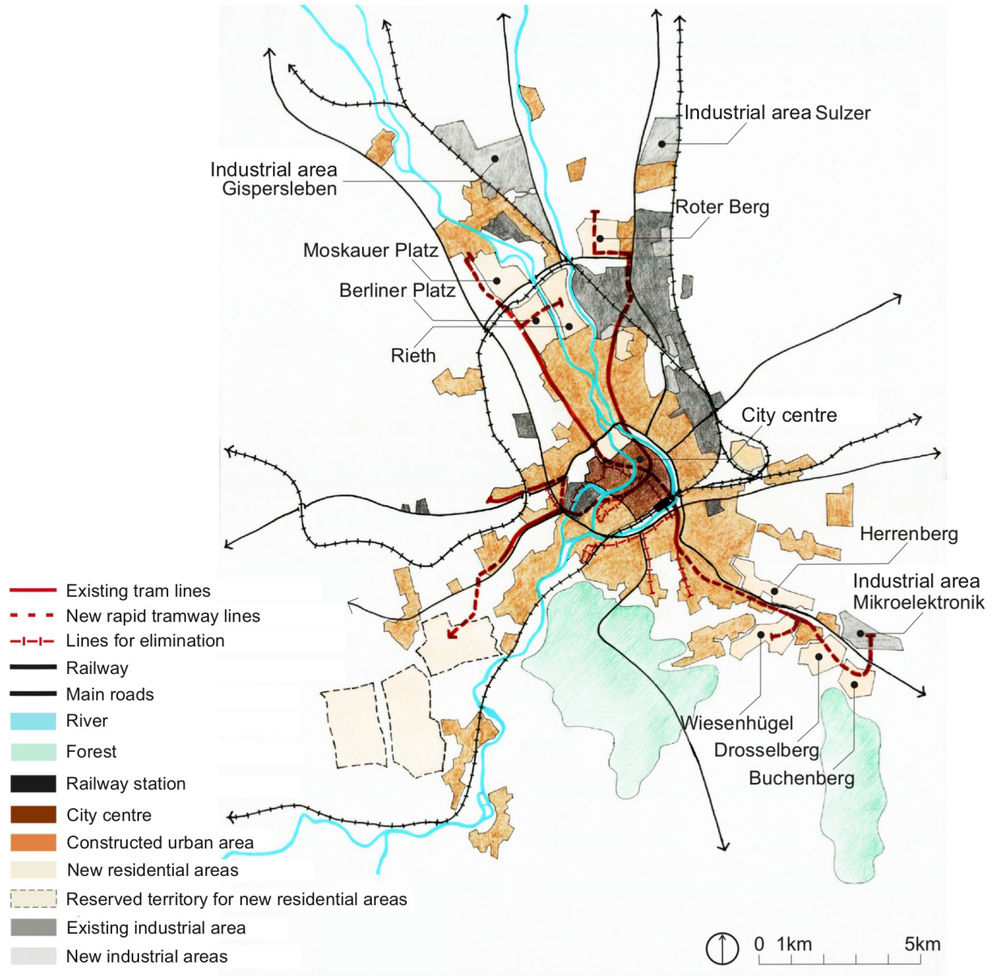


Fig. 168. Scheme of Erfurt's urban growth and the proposed development of the rapid tramway. It envisaged the elimination of tram lines in the central area and new industrial areas close to residential areas. Source: Author's elaboration based on the urban plan of 1973, the urban plan of 1975, the public transport scheme of 1975 and reading of related literature.

With new residential areas to be located in the north and south, their integration with the existing transport system was one of the main criteria addressed (Federal German Archives, 1975, p. 19).

To prevent urban sprawl, wasteful of land, and to enhance the efficiency of the proposed express tramway, the intention was that extensions to the city should remain compact and concentrated (Saitz, Mende, 1974, p. 406). This was a common strategy in the urban areas of European countries, both Communist and capitalist. Rapid transit required an economic approach in urban planning. In Erfurt, and in the GDR in general, a feasible solution was sought in the maintenance of travel times, compactness of the city and the creation of new poles of attraction on the periphery. New residential areas were to be concentrated around rapid public transport stops. This concept was related to the experiences of Hamburg and Stockholm,

Fig. 169 and 170. The functioning of KT4D tram model in the new residential areas of Erfurt: (top) in the south-eastern direction Mikroelektronik and Wiesenhügel in 1989 and (bottom) in the northern part of the city in 1976. Source: Federal German Archives, Bild_183-1989-0715-006, author Himdorf Heinz; German Municipal Archive, Bild_183-R0501-0038, author Ludwig Jürgen.

with their high-speed transit corridors, but also of several cities more similar in size to Erfurt, such as Kassel (FRG) with its successful rapid tramway project (Saitz, 2001, p. 181).

In order to provide a better understanding of the relationship between the city and a rapid tramway network, fresh thoughts on the matter were incorporated in a document entitled *Konzeption zur Entwicklung einer Schnellstraßenbahnstrecke in Erfurt* [Concepts for the Development of Express Tram Routes in Erfurt], published in April 1975. The objective was to maintain the average speed of public transport even as the city grew and changed in layout. One factor militating against retention of the tram system had been a reduction in the running speed in service of tramcars from 17.5 kph in 1960 to 15.4 kph in 1974 (Erfurt Municipal Archive, 1975, p. 3). As the city expanded, and lines grew in length by as much as 70%, the maximum travel time increased to sixty minutes (Erfurt Municipal Archive, 1975, p. 4). To compensate for the enlargement of the city, trams had to run faster so as to counteract any increases in travel time.

Two basic conditions for achieving success with the rapid tramway concept were stressed: 1. Separation of the tramway, with tracks segregated from car traffic and 2. Improvements in the performance and speed of the rolling stock (Erfurt Municipal Archive, 1975, p. 6). Implementation of these ideas was intended to create a coherent high-speed tramway system. It was therefore crucial not only to build lines to outlying districts, but also gradually to rebuild existing lines on space reserved exclusively for them. Thus, in 1970 segregated tracks amounted to 27.5% of the total in the city, but the plans were to increase this to about 74% by the year 1990 (Erfurt Municipal Archive, 1975, p. 8).

For the north-south tram line, the aim was to achieve a service speed of 23 to 26 kph and to keep the maximum journey time below thirty-five minutes (Erfurt Municipal Archive, 1975, p. 21). In contrast, on the shorter east-west route, the service speed was envisaged as around 18 kph, with a carrying capacity between 8.000 and 10.000 passengers per hour in one direction (Erfurt Municipal Archive, 1975, p. 23).

Meanwhile, construction of new tramway lines was planned in the following order: an extension in a northerly direction of 4.77 km by 1976, a south-eastwards addition of 5 km by 1980, and in the south-western direction a further 2.5 km by 1990 (Saitz, Mende, 1974, p. 409). Growth in length of the tram lines between 1972 and 1978 was planned to be approximately 4.8 km northwards, and over the course of the 1980s and 1990s some 5.7 km towards the south-east (Erfurt Municipal Archive, 1975, p. 45).

The general transport plan of 1975 established a clear hierarchy of public transport modes and networks. The rapid tramway was to be the core of the system, while the bus network was to complement it on the peripheries in low-density areas. In addition, buses were to provide links in the area covered by suburban rail and in the centre, where some tram lines were to be eliminated. As in other GDR cities, trolleybuses were seen as a means of transport that duplicated the functions of buses, and therefore they were taken off the road in 1975.

The plans for the high-speed tramway concept also included the aim of modernizing rolling stock. This began in the mid-1970s with the introduction of new *ČKD*

KT4D tramcars. The aim was to implement multiple-unit running, setting up three-car rakes that would increase passenger capacity to 440. In addition, the number of new KT4Ds was to grow from 14 vehicles in 1975 to 102 between 1976 and 1980, with a further 70 cars between 1981 and 1985 (Erfurt Municipal Archive, 1975, p. 5). Until the 1980s, however, KT4D trams were still being operated in a mix with older "Gotha" models (Saitz, 1984, p. 181).[47]

Moreover, special attention was given to the organization of the rapid tramway in the city centre. This was an issue arousing not a little conflict and debate. One of the proposals in the early 1970s was to eliminate trams from the city centre, replacing them with buses, particularly with the new "Ikarus"model, which seemed comparable in efficiency to trams (Saitz, 2001, p. 185). The removal of most of the tram lines from the centre would avoid too dense a network. However, it would worsen the level of accessibility and travel comfort, as tramways not only connected the city centre to the outskirts, but also provided connections within the centre itself.

Retention of trams in the centre would be justified by the concentration there of activities that needed access for large passenger flows (ZFIV, 1975b, p. 9). There were three varying options for trams in the central zone: 1. They could run on the same level as pedestrians, with the consequent low speeds here being compensated for by the high density of urban areas. 2. They could be run in tunnels, permitting a true express tramway. 3. Finally, a combined solution would see both tunnel and ground-level running, justifiable at intersections where it was not possible to mix pedestrian, road and tram traffic (ZFIV, 1975b, p. 11).

The main concerns expressed were pedestrian safety, ensuring conditions were right for high tram speeds, and improving the quality of the environment. Consequently, the construction of a tramway tunnel with a length of 2.1 km was proposed (Erfurt Municipal Archive, 1975, p. 21). It should be noted that the idea of building a subsurface stretch of line in the city centre was rather novel in a place like Erfurt with only 200,000 inhabitants. Usually, in other countries, both Communist and Western, such an approach was taken only in conurbations exceeding 500.000 inhabitants.

Despite this well-developed project, a combination of rapid trams and pedestrian traffic on one level continued over time (Fig. 171 and 172). This was to be explained both by financial difficulties and by the order of priority of implementation of facilities for the new residential areas. The preservation of tram lines within the city centre was explained by H. H. Saitz as a temporary solution (2001, p. 192):

> *"Nevertheless, high costs, the technical and technological deficiencies of GDR industry, and emerging concerns about the appropriateness of such actions and their right scale."*[48]

It is possible to detect a patient, orderly approach on the part of the GDR planners. There was no expectation of immediate, superlative results from rapid tram-

47 It is interesting to note that it was considered the possibility of production of the articulated tram model by the manufacturer Gotha, which was constructed at the end of the 1950s. This was probably due to difficulties in the development of articulated models at Tatra.

48 "Dennoch sorgten die hohen Kosten, das technisch-technologische Unvermögen der DDR-Bauwirtschaft und die doch aufkommenden Bedenken hinsichtlich der Verantwortbarkeit derartiger Eingriffe für den rechten Maßstab."

Fig. 171 and 172. Top: The KT4D model in the consolidated area of Erfurt, the city centre in 1983. Bottom: KT4D tram in the the railway station in 1990. Source: Federal German Archives, Bild_183-1983-0513-018, author Jürgen Ludwig; Federal German Archives, Bild_183-1990-0215-314, author Heinz Hirndorf.

ways. It was recognized that the modernization of the tram network would require time, together with a coherent handling of the whole system, with solutions to be found for infrastructures, rolling stock and integration with town planning. In 1984, the first operational study of progress with the rapid tramway was undertaken. The results revealed an increase in the average speed on the north-to-south axis from 13.1 kph in 1970 to 20.2 kph in 1983, and east-to-west a rise from 13.4 kph in 1970 to 15.8 kph in 1983 (Saitz, 1984, p. 181). It was also noted that in the city centre the combination of trams and pedestrians was working, since even there the average speed had gone up to 14 kph (Saitz, 1984, p. 181). By the end of the 1980s the overall length of the tram network had grown to 25.9 km, with 62% of the tracks segregated, whereas in the early 1970s the equivalent Fig. had been 25% (Müller, 1982, p. 28; Erfurt City Council, 1987, p. 7).

In conclusion, it can be said that in Erfurt the idea of working towards a rapid tramway emerged relatively early, but was not implemented quickly, being held up by political decision-making. Nevertheless, several planning proposals from the first half of the 1970s were of value and contributed to the development of a coherent vision and better integration between the rapid tramway and the city. Erfurt is an interesting example, since it is a much smaller city than Ostrava or Yaroslavl, and has no large conurbation or extensive surrounding built-up areas. The case study shows that the criteria for the planning a rapid tramway were not just the size of the city, but also the concentration of areas and the travel times and distances. This made it feasible to recognize passengers' needs speedily and to improve the quality of public transport services.

4. 1. 4. COMPARISON OF THE THREE CASES

An analysis of the three cases presented reveals both differences and similarities in the planning of tramway systems in three medium-sized industrial cities in three different European countries under Communist rule. One of the few coincidences is that existing lines were initially retained to a considerable degree, with the aim of ensuring connections to industrial areas, although this was done to a greater extent in Ostrava and Erfurt. Another coincidence between the three cases were the financial constraints that prevented a full, coherent development of infrastructures and rolling stock for the express tramway.

In terms of differences, the most striking point is the divergence in the choice of modes of public. In Yaroslavl in the 1960s, a higher proportion of passenger flows was assigned to buses and trolleybuses, with tram lines were removed fully, or kept only on routes where they were no hindrance to road traffic. This is to be explained by the paucity of State funding, the negative opinions of trams on the part of the local authorities and the limited extent of State oversight of the implementation of decisions. In Ostrava and in Erfurt, in the 1960s and 1970s trams were chosen as the main means of public transport, while buses and trolleybuses were to play a complementary role. In Ostrava the preference for a rapid tramway was seen as an outcome of the need to improve access out into the city's extensive conurbation. In Erfurt, in contrast, the goal was to maintain the coherence of urban structure. In

both cases, unanimity on the choice of trams and agreement between local and State authorities led to the retention of tram lines and their modernization at an early stage.

A second difference relates to variations in the implementation of integrated planning. In Yaroslavl, the General Transport Plan followed a General Urban Plan with sparse details about transport planning, which made it difficult to co-ordinate solutions. In addition, the transport study carried out during the implementation of the General Urban Plan did not reflect the opinions of traffic specialists, just as their subsequent recommendations for tramways were not taken into account. In Ostrava, likewise, there was for a while no integrated urban and transport planning, although efforts were made, at both a national and a local level, to co-ordinate zoning decisions with the rapid tramway project. Erfurt's urban and transport plans were put in place in 1975, at the same time as the option of rapid trams was adopted, which facilitated the integration of ideas between town and traffic planners. It should also be noted that in Erfurt, as in many other GDR cities, the construction of new residential areas and new tram lines was integrated, at least for a time.

A further difference between the three cases is the major factor of the availability of the necessary rolling stock. In Ostrava, T2, T3 and K2 models had already been in service since the middle of the 1960s, and this had facilitated a significant increase in passenger-carrying capacity. In Erfurt, efforts were made to supply the new KT4D model by the early 1980s, and the operation of multi-car trains using T4D and B4D models was continued. In Yaroslavl, and indeed in the whole of the USSR, however, there were technical and financial restrictions on the development of rolling stock. At the beginning of the 1970s in the USSR there was a lack of tramcars that could operate in multiple-unit mode and there were shortages of the *ČKD* models from that enterprise's "Tatra" range, those available being sent by priority to larger cities. All of this increased the doubts affecting State authorities when deciding whether to choose trams as the main means of public transport.

Finally, there were differences in technical approaches and thinking between the planners and the politicians in these three cities. Ostrava's fragmented urban pattern created difficulties for communications. Consequently, a tram network had grown up and had traditionally been valued as a way of overcoming distances. The new attitudes arising in the 1970s against allowing unlimited growth in car traffic strengthened the role of the tramway in Ostrava. In Erfurt the conviction that a rapid tramway was capable of improving speeds and capacities as the urban model evolved gave an impetus to its development in the 1970s. In contrast, Yaroslavl in the 1960s had a fairly compact urban pattern, which in principle encouraged the idea that trolleybus and bus services would be sufficient. The new General Urban Plan in 1969 proposed residential and industrial growth, accompanied by changes in the urban model, which would necessitate the introduction of rapid tramway lines. This requirement was not fulfilled simultaneously with the construction of the new residential areas. It took a long time to implement, not merely because of financial and technical difficulties, but also because ideas from the 1960s continued to be accepted, leading to the removal of tram lines from the principal streets and the city centre, as well as fostering a belief that public transport could continue as before, using road vehicles.

From this comparison it can be concluded that Ostrava and Erfurt represent cases in which several factors coincided, proving vital to the development of their tram systems. First, national public transport policy envisaged tramway modernization, this being happily accepted by local authorities and planners, and made feasible by the availability of the necessary supplies of trams and related material. Secondly, a solution using high-speed trams was supported not only by financial, but also by social and environmental arguments. In contrast, Yaroslavl constitutes an instance in which the local authorities resisted the retention of conventional tramways or the introduction of high-speed lines, despite unsatisfactory communications between urban areas. In the 1960s it was still just possible to defend this attitude on the basis of the nominal policy of containment of urban growth. In the 1970s, although a rapid tramway system was planned, its implementation was delayed by a mix of vague State policy on the actual development of urban public transport, poor organization of planning processes, and opposition from the local authorities, intensified by the prevalence of Modernist criteria for efficiency in transport planning.

4. 1. 5. DISCUSSION AND CONCLUSIONS

It can be concluded that there was scepticism about modernizing tramway systems in European countries, both Communist and capitalist. Such an action was not put into practice in any extensive way until critical situations were identified. A general analysis of Western European countries gives support for the claims by Moraglio (2015) and Petkov (2020) that in these States decisions to develop light rail were the result of a confluence of a range of factors, economic, political, social and environmental. The present research explores the considerations that encouraged the development of fast trams in European countries under Communist regimes. It has proved possible to demonstrate that the solutions adopted are to be explained, firstly, by an urgent need to increase the speed and capacity of collective public transport, and secondly, by major financial constraints. The role of high-speed tramways grew as urban expansion led to the planning of new residential areas on the periphery of existing cities. Attention was paid to the considerably increased needs for the provision of accessibility between areas where workplaces and residences were concentrated, and to the problems of fragmented or elongated urban structures.

Hence, urban growth from the 1960s onwards turned express tramways into a viable and feasible solution, even though the preferred option would have been light rail. The main differences between high-speed tramways and light rail lay in the standard of track construction and the degree of separation at intersections between lines and other traffic flows. Depending on local conditions and possibilities, technical criteria were adapted and mixed systems were created. In the transport policy of European cities under Socialist rule, trams were not always seen as the principal means of public transport. The functional role assigned to them was an outcome of whether or not it was feasible to modernize infrastructures and rolling stock, and to matters related to the perceived modernity of a city.

Nevertheless, trams were not a quick fix, since administrative, legislative, technical and ideological issues needed to be solved in order to create a basis for establishing lines. This confirms the statements made by Schmucki (2010) and Shpakov (2013) in respect of the technical and financial difficulties that arose during the implementation of rapid tramways. Articulated tramcars were scarce, and existing vehicles did not fully match the characteristics required for an express tram network. There were also difficulties in funding the extensive infrastructures required and in providing rolling stock.

In this sub-chapter the various attempts made to increase the capacity and speed of the existing rolling stock have been outlined. However, performance, availability of low-floor models, and service speeds did not improve sufficiently, which made it difficult to operate the fast trams within cities. The carrying abilities and general characteristics of rapid trams were sometimes even seen as not much different from articulated trolleybuses and buses. The limitations on the velocity and capacity of high-speed trams led to delays in taking the decision to employ them.

The meagre development of high-speed tramways was explained not only by financial difficulties, but also by the continuance of Modernist ideas that trams were incompatible with an up-to-date city. The tramway lines were extended in response to concepts of urban models that seemed more rational in terms of transport. In all cases, the rapid tramway was a powerful tool for controlling the development of urban model, and its routing maintained the idea of prioritizing the connection of certain residential and work areas. This was due to the scarcity of financial resources and to the intention of avoiding networks with many branches, with the intention of preserving more space for motor vehicles.

This explains the limited developments in the USSR, where there was no unanimity of opinion in favour of rapid tramways. It likewise indicates why they were installed only to a modest extent in the CSR, where high-speed trams were an exceptional, more than a general, solution. In comparison, the philosophy of GDR planners was based on short- and medium-term planning for a transport system based on a solution known to be feasible, rapid trams, with a confident expectation that their speeds and capabilities could be gradually improved. Thus, the level of acceptance of high-speed tram lines was different from one European Communist country to another, this transport solution being applied on an experimental basis in the USSR in large conurbations, some with only a single line, and the CSR in two medium-sized cities, whilst in the GDR it was adopted on a widespread basis in many cities, even those populations of only around 100,000 inhabitants.

Thus, during the 1970s in the European Communist countries there was no common urban public transport planning policy, contrary to what is commonly believed. It was difficult to arrive at any generalized principles because the main priority was the individual national economy and production capacity. The differences between countries lay in the political interpretation of the role of urban transport, in the organization of the planning system, in the level of technical development and availability of rolling stock, and also in professional approaches and political attitudes to traffic planning. These public transport policies, implemented during a period of significant economic development, were decisive in the consolidation of tram network in the cities under State Socialism and had a certain continuity afterwards.

4. 1. 6. BIBLIOGRAPHICAL REFERENCES

Academy of Urban Services named after K. D. Panfilov (1965) *Tekhnicheskoe zadanie na proektirovanie podvizhnogo sostava skorostnogo tramvaia*, Moskva.

Anonymous(1963) The Return to Rapid Transit, *Financial Analysts Journal*, 19(1), pp. 33-37, www.jstor.org/stable/4469449.

Anonymous(1969) Rapid Transit in Ruhr-2: Stadtbahn, *Railway Gazette International*, 125 (18), pp. 708-710.

Anonymous(1971) Die prognostische Entwicklung des öffentlichen Massenverkehrs in der Bezirksstadt Erfurt, *Die Strasse*, 11 (5), pp. 223-227.

Anonymous(1981) *Railway Gazette International*, 137 (5), p. 362.

Anonymous(1977) Time to standartise LRT car designs, *Railway Gazette International*, 133 (5), pp. 180-185.

Archive of the Museum Yarget (1966) *Ulitsa Sovetskaia*, anonymous.

Barton, M. (1975) *Ostrava 1945-1975*, Ostrava: Útvar Hlavního Architekta Města Ostravy.

Bauer, G., Linert, S., Losos, L., Mahel, I. (1995) *Straßenbahnen in der Tschechischen und Slowakischen Republik.Von der Pferdebahn zum Tatrawagen*, Praha: NADATUR.

Berhge, M., Heiner, M. (1978) *Die Straßenbahnen in der DDR. Geschichte Technik Betrieb*, Berlin: Motorbuch Verlag.

Boquet, Y. (2017) The renaissance of tramways and urban redevelopment in France, *Miscellanea Geographica – Regional Studies on Development*, 21 (1), pp. 5-18.

Bolchynek, F., Leyer, L., Krause, L. (1977) *Erkenntnisse und Erfahrungen aus der Begutachtung von Generalbebauungsplänen ausgewählter Städte*, Zentrale Forschungsinstitut des Verkehrswesens der DDR, Berlin: Verlagsort.

Bolonenkov, G. V. (1971) *Sistema skorostnogo obshestvennogo transporta v planirovochnoi strukture bolshogo goroda*, Moskva: GOSINTI.

Bolonenkov, G. V. (1972a) *Skorostnoi Obshestvennyi Transport Krupnogo Goroda*, Moskva: Gosgrazhdanstroi SSSR.

Bolonenkov, G. V. (1976) *Problema optimizatsii razvitiia sistem skorostnogo passazhirskogo transporta bolshikh gorodov*, Moskva: GOSINTI.

Bondarevskii, D. I., Chertok, M. S., Ponomarev, A. A. (1975) *Tramvainye vagony RVZ-6M i KTM-5M3*, Moskva: Transport.

Brzezinski, A., Suchorzewski, W. (2004) *Tramways in Poland - from Neglect to Recognition of Great Potentials*, Conferencia Codatu XI, Bucarest. 7.

Butina, T. I. (1978) Skorostnoi tramvainii vagon, *Tekhnicheskaia estetika*, 10.

Československá Vědeckotechnická Společnost (1977) *Perspektivy moderních tramvají*, Internatinal Conference, 4-6 October, Praha: Československá Vědeckotechnická Společnost.

COMECON Standing Commission for Construction (Ständige Kommission für Bauwesen des RGW, Rat für gegenseitige Wirtschaftshilfe), (1974) *Grundsätze zur Vervollkommnung des städtischen Verkehrssystems unter verschiedenen städtebau-planerischen Bedingungen bei Berücksichtigung der Entwicklungstendenzen der Verkehrsmittel*, Berlin: Ministerium für Verkehrswesen der DDR.

Dewees, D. N. (1979) A Comparison of Streetcar and Subway Service Quality, *Journal of Transport Economics and Policy*, 13 (3), pp. 295-303.

Diamant, E. S. (1976) *Light Rail Transit: A State-of-the-Art Review*, Executive Summary, Washington: U.S. Department of Transportation.

Dietzschold, G. (1967) Grundsätze für die Entwicklung des Verkehrs in den Städten der DDR, *Die Strasse*, 7 (6), pp. 243-247.

Dresden Municipal Archive (1968) *Basisstruktur der verkehrsanlagen,* Bericht Zentrale Arbeitskreis für Forschung und Technik, 1.3, 043.

Efremov, I. S., Gushe-Malkov, B. P. (1970) *Teoriia i raschet mekhanicheskogo oborudovaniia podvizhnogo sostava gorodskogo elektricheskogo transporta*, Moskva: Izdatelstvo literatury po stroitelstvu.

Erfurt City Council (1987) *Verkehr in Erfurt*, Suhl: Freies Wort.

Erfurt Municipal Archive (1969) *Generalbebauungsplan, Generalverkehrsplan der Stadt Erfurt*, Rat der Stadt Erfurt.

Erfurt Municipal Archive (1975) *Generalverkehrsplan Erfurt 1975*, 7 / 161-10 Bl. 40.

Escherich, M. (2012) Planungen für eine verschont gebliebene Stadt Erfurter Innenstadtkonzeptionen, *Bulletin der Polnischen Historischen Mission*, 7, pp. 115-147.

Federal German Archives (1967b) *Protokoll über die m 9. und 10.2.1967 in Erfurt durchgeführte Beratung der Arbeitsgruppe des Politbüros alt Vertretern der Stadt Erfurt über die Probleme der Ausarbeitung des Generalverkehrs- und Generalbebauungsplanes der Stadt Erfurt unter besonderer Berücksichtigung der Umgestaltung der Innenstadt*, Rat der Stadt Erfurt, DH/2/, 21435, 52, M304, 49.

Federal German Archives (1969a) *Der Hauptabmessungen des vierachsigen Strassenbahn Kurzgelenktriebwagen KT4D des einer Wagenkastenlange 17,0 m*, Praha: CKD Tatra Smíchov, DM1, 8563, 51, M306.

Federal German Archives (1969b) *Gestaltung des Stadtzentrums Erfurt*, DH/2/ Plan, 2987, 51, M304, 56.

Federal German Archives (1970) *Projekt. Der Erprobung (Null-ten) - Serie des vieracheigen Strassenbahn - Kurzgelenktriebwagens mit geteilten Wagenkasten - Typen Nummer 200*, DM1, 8703, 51, M306.

Federal German Archives (1972) *Generalbebauungsplan Erfurt*, DH/2/Plan, 2883, 51, M304, 94.

Federal German Archives (1975) *Generalbebauungsplan Erfurt*, DH/2/Plan, M304, 51.

Federal German Archives (1976) Bild_183-R0501-0038, Jürgen, L.

Federal German Archives (1983) Bild_183-1983-0513-018, Jürgen, L.

Federal German Archives (1989) Bild_183-1989-0715-006, Heinz, H.

Federal German Archives (1990) Bild_183-1990-0215-314, Heinz, H.

Federální ministerstvo dopravy ČSR (1976) *Prozatimní směrnici pro plánováni a projektováni tratí staveb a zařízení pro provoz rychlé tramvaje*.

Federální shromáždění Československé socialistické republiky (1976) Zákon č. 50 ze dne 27 dubna 1976 o územním plánování a stavebním řádu, částice 9.

GAE (State Archive of Economy of Russia), (1963) *Proekt postanovlemiia Soveta Ministrov SSSR ob uluchshenii obsluzhivaniia naseleniia gorodskim transportom*, Sovet Ministrov SSSR, 5, 1, 69.

GAE (1968) *Osnovnye napravleniia po razvitiiu gradostroitelstva i zhilishchno-grazhdanskogo stroitelstva v 1971-1975 godakh*, Doklad predsedatelia Gosgrazhdanstroia SSSR, 5, 1, 1210.

GARF (1966b) *Dokumenty po Perspektivnomu Razvitiiu Gorodskogo Obshestvennogo Transporta 1966-1975*, Ministertvo Zhilishchno-Kommunalnogo Khoziaistva, A-314, 3, 8103.

GARF (1967a) *Perepiska CK KPSS i SMRSFSR i SSSR po voprosam tramvaino-trolleibusnogo khoziaistva*, vol. 3, A-314, 3, 8589.

GARF (1972a) *Materialy po rassmotreniiu kompleksnoi skhemy razvitiia vsekh vidov gorodskogo passazhirskogo transporta Yaroslavlia*, GOSPLAN RSFSR, Sovet Tekhniko-ekonomicheskoi ekspertizy, A-262, 16, 1431.

GARF (1972b) *Zakliuchenie po rabote vypolnennoi Lengiprogorom v 1972 godu, Kompleksnaia skhema razvitiia vsekh vidov gorodskogo passazhirskogo transporta v gorode Yaroslavle, v chasti skorosnogo tramvainogo transporta*, GOSPLAN RSFSR, Sovet Tekhniko-ekonomicheskoi ekspertizy, A-262, 16, 1431.

Gesetzblatt der DDR (1959) *Bau- und Betriebsordnung für Straßenbahnen (BoStrab)*, Dezember, 8, Berlin: Deutscher Zentralverlag.

Gesetzblatt der DDR (1969) *Bau- und Betriebsordnung für Straßenbahnen (BoStrab)*, Marzo 25, Berlin: Staatsverlag.

Glissmeyer, H. (1970) *Versuchs- und Entwicklungsstelle des Straßenwesens. Prognostische Verkehrsprobleme im Städtebau der DDR*, Generalbebauungsplanung der Städte der Deutschen Demokratischen Republik, Fachtagung der Zentralen Fachgruppe “Gebiets-, Stadt- und Dorfplanung” des BDA 20. und 21. Februar 1969 in Magdeburg, Berlin: Deutsche Bauinformation.

Gosstroi SSSR (1977) *Elektrifitsirovannii gorodskoi transport. Tramvainye i troleibusnye linii*, SNIP II-41-76, Moskva: Stroiizdat.

Gosstroi SSSR (1976) *Planirovka i zastroika gorodov, poselkov i selskikh naselennykh punktov*, SNIP II-60-75, Moskva: Stroiizdat.

Grieder, P. (2012) *The German Democratic Republic*, New York: Palgrave Macmillan.

Groche, G. (1979) *Die Stadtbahn. Ein Verkehrssystem der Zukunft*, International Congress UITP, Helsinki, pp. 4-35.

Habarda, D. (1966) *Mestská a Cestná Doprava I. Tramvaje.*, Bratislava: Vysoká Škola Dopravná v Žiline v Slovenskom Vydavatestve Technickej Literatúry, N. P.

Hass Klau, C., Crampton, G., Benjari, R. (2004) *Economic Impact of Light Rail: The Results for 15 Urban Areas in France, Germany, UK and North America*, Brighton: Environmental and Transport Planning.

Hondius, H. (1993) The Development of Low-Floor Trams, *Journal of Advanced Transportation*, 27 (1), pp. 79-102.

Honzík, A. (1967) *Mezinárodní Konference o Vývoji Městské a Příměstské Kolejové Dopravy po roce 1970*, Praha: ČKD Praha.

Interview with Ulrich Rabe in 2020.

Ivanov, M. D., Ponomarev, A. A., Ieropolski, B. K. (1977) *Tramvainye vagony T-3*, Moskva: Transport.

Jansa, F. (1967) *Městské Dráhy Elektrické*, Bratislava: Vydavateľstve technickej literatúry. N. P.

Jarausch, K. (1999) Care and Coercion: The GDR as Welfare Dictatorship, in Jarausch. K., (ed.), *Dictatorship as Experience: Toward a Socio-Cultural History of the GDR*, New York: Berhahn Books, pp. 47-69.

Joyce, J., Prigmore, B. J. (1979) Tram to Supertram, *Electronics and Power*, 25 (3), pp. 207-211.

Keul, D. -J. (1969) Einordnung der Straßenbahn in den Straßenraum, *Die Strasse*, 9 (6), pp. 266-268.

Khitzenko, V. V. (1970) Osnovnye napravleniia razvitiia skorostnogo tramvaya, in Fishelson, M. S. (ed.), *Kompleksnoe razvitie gorodskogo passazhirskogo transporta*, Leningrad: Znanie, pp. 74-79.

Khitzenko, V. V. (1975) *Rol premetropolitenov i skorostnogo tramvaia v reshenii transportnoi problema krupnykh gorodov*, in Fishelson, M. S. (ed.), Gorod i passazhir, Gradostroitelnye problemy razvitiia passazhirskogo transporta, III Scientific Conference in Leningrad, pp. 154-160.

Khitzenko, V. V. (1976) *Skorostnoi tramvai*, Leningrad: Stroiizdat.

Kominarov, Z. L. (1970b) Sfera primeneniia razlichnykh vidov gorodskogo passazhirskogo transporta v krupnykh gorodakh, in Artinov, A. P. (ed.), *Sostoianie i perspektivy razvitiia skorostnogo passazhirskogo transporta v Leningrade*, Leningrad: LOCHTO, pp. 31-42.

Komunistická strana Československa (1977) *15. sjezd komunistické strany Československa*, Praha 12. dubna - 16. dubna 1976, Praha: Svoboda.

Kott, S. (2004) Review: Everyday Communism: New Social History of the German Democratic Republic, *Contemporary European History*, 13 (2), pp. 233-247.

Kovalev, A. D. (2005) *Na elektricheskoi tiage. Ocherki Istorii Yaroslavskikh tramvaia i trolleibusa*, Yaroslavl: Izdatelstvo Aleksandra Rutmana.

Kreschnak, W. (1981) *Geschichte der Dresdner Straßenbahn*, Berlin: Verlag Tribüne.

Lacek, M. (1982) *Městská Doprava. Základy teorie a praxe*, Praha: Nadas.

Ladd, B. (2001) Socialist Planning and the Rediscovery of the Old City in the German Democratic Republic, *Journal of Urban History*, 27 (5), pp. 584-603.

Lammert, U. (1979) *Städtebau. Grundsätze, Methoden, Beispiele, Richtwerte*, Berlin: Verlag für Bauwesen.

Lengiprogor (1971) *Generalnii Plan goroda Yaroslavl 1971*, Archive of the Department Architecture and Land Relations of the Yaroslavl city.

Liebmann, H. (1965) *Straßenbahn oder Omnibus im Stadtverkehr*, Deutsche Bauakademie, Berlin: VEB Verlag für Bauwesen.

Mannová, E. (2000) *A Concise History of Slovakia*, Bratislava: Historický ústav SAV.

Maynard, W. P. (1969) The busway to make rapid transit work – now, *Traffic Quarterly*, 23, pp. 353-363.

McDermott, K. (2015) *Communist Czechoslovakia, 1945-1989: A Political and Social History*, New York: Palgrave Macmillan.

Meuschel, S. (2000) The other German Dictatorship: Totalitarianism and Modernization in the German Democratic Republic, *Thesis Eleven*, 63, pp. 53-62.

Ministerium für Bauwesen, Institut für Städtebau und Architektur (1976) *Komplexrichtlinie für die städtebauliche Planung und Gestaltung von Neubauwohngebieten*, Berlin: Bauinformation DDR.

Ministerstvo dopravy ČSR (1971) *Pravidla technického provozu městských drah,* Praha: Nakladatelství Dopravy a Spojů.

Ministerstvo zhilishchno-kommunalnogo khoziaistva RSFSR (1967) *Vremennye tekhnicheskie usloviia proektirovaniia eksperimentalnykh linii skorostnogo tramvaia*, Moskva.

Ministerstvo zhilishchno-kommunalnogo khoziaistva RSFSR (1971) *Tekhnicheskie ukazaniia po proektirovaniiu i sooruzheniiu puti skorostnykh linii tramvaia*, Leningrad.

Molodykh, I. A. (1973) *Voprosy organizatsii raboty i razvitiia gorodskogo passazhirskogo transporta*, Moskva: Institut Kompleksnykh Transpotnykh Problem.

Moraglio, M. (2015) Shifting Transport Regimes. The strange case of Light Rail Revival, in Kopper, C., Moraglio, M. (eds.), *The Organization of Transport. The History of Users, Industry and Public Policy*, New York and London: Routledge, pp. 155-172.

Müller, K. D. (1982) *Von der Pferdebahn zum Tatrazug: 100 Jahre Erfurter Strassenbahn; 1883 – 1983*, Erfurt: SED-Betriebsparteiorganisation, VEB (K) Erfurter Verkehrsbetriebe.

Norley, K. (2010) *Light rail: the semi-metro concept*, 33rd Australasian Transport Research Forum (ATRF), Canberra, Australia.

Novák, M. (1982) *Doprava a životní prostředí v Ostravě*, Ostrava: UDIMO.

Ostrava Municipal Archive (1965) *Směrné Uzemní Plan Mesta Ostravy, Revize*, NVO, Krajský Projektový Ustav "Stavo Projekt" - Ostrava.

Ostrava Municipal Archive (1972) *Prognostická studie vybavení ostravsko-karvinské aglomerace,* VÚVA, UDIMO.

Ostrava Municipal Archive (1973) *Generel Dopravy Ostrava*, UDIMO, 1424.

Ostrava Municipal Archive (1974a) *Dlouhodobý Výhled Rozvoje Dopravy v ČSR do Roku 1990*, NVO, 2208, Ministerstvo Vnútra ČSR.

Ostrava Municipal Archive (1974b) *Studie Přehodnocení Koncepce MHD v Ostravě,* UDIMO, Inženýrské Služby ČSSI v Brně.

Ostrava Municipal Archive (1976) *Rychlá Hromadná Osobní Doprava v Ostravské Aglomeraci*, UDIMO.

Ostrava Municipal Archive (1977) Výstavba Systému Rychlé Tramvaje v Brně a Ostravě, Návrh pro jednání vlády ČSR, UDIMO.

Ostrava Municipal Archive (1978a) *Záznam, výrobního výboru k úkolu II - 4.01/78 - Rešení rychlé tramvaje v příměstských oblastech města Ostravy*, UDIMO.

Ostrava Municipal Archive (1978b) *Návrh usnesení Vlády ČSR, Výstavba Systému Rychlé Tramvaje v Brně a Ostravě*, UDIMO, Vláda ČSR.

Ostrava Municipal Archive (1978c) *Návrh usnesení Vlády ČSR. Pracovní material. Duvodová Zpráva. O Zajištění Přípravy a Realizaci Systému Rychlé Tramvaje v Brně a Ostravě*, UDIMO, Vláda ČSR.

Ostrava Municipal Archive (1978d) *Komplexní řešení dopravy v Ostravské aglomeraci*, UDIMO.

Ostrava Municipal Archive (1979) *Schema Územního Plánu Města*, Útvar Hlavního Architekta Města.

Patricelli, R. (1976) LRT can offer an attractive level of service at significantly lower capital cost, *Railway Gazette International*, 132 (7), p. 251.

Petkov, D. (2020) *Tramway Renaissance in Western Europe. A socio-technical analysis*, Wiesbaden: Springer VS.

Pithardt, J. K. (1975) Vývoj a Stav Městské Hromadné Dopravy v ČSSR, in Pithardt, J. K., Thoř, V., Vandas J. (eds.), *Městská Hromadná Doprava*, Praha: Společnost Dopravy a Spojů, pp. 10-113.

Pollack, D. (1999) Modernization and Modernization Blockages in GDR Society, in Jarausch. K., (ed.), *Dictatorship as Experience: Toward a Socio-Cultural History of the GDR*, New York: Berhahn Books, pp. 27-46.

Ponomarev, A. A. (1973) Povyshenie efektivnosti ispolzovaniia podvizhnogo sostava gorodskogo elektricheskogo transporta, in Sheinin, A. N. (ed.), *Uluchshenie raboty gorodskogo passazhirskogo transporta*, Moskva: MDNTP, pp. 28-33.

Ponomarev, A. A., Ieropolski, B. K. (1981) *Podvizhnyi sostav i sooruzheniia gorodskogo elektrotransporta*, Moskva: Transport.

Pucher, J. (1999) The transformation of urban transport in the Czech Republic, 1988-1998, *Transport Policy*, 6, pp. 225–236.

Rapport de la trente-huitième table ronde d'économie des transports tenue à Paris (1977) *Possibilités offertes par certaines techniques traditionnelles pour les transports urbains. Trams et trolleybus*, Conférence Européenne des Ministres des Transports.

Retzko, H.-G. (1978) Transportation Planning Trends in the Federal Republic of Germany, *Traffic Quarterly*, 32, pp. 583-597.

Reznik, M. Y., Kulakov, B. M. (1977) *Tramvainii vagon LM-68*, Moskva: Transport.

Rubin, E. (2008) *Synthetic Socialism: Plastics and Dictatorship in the German Democratic Republic*, Chapel Hill: The University of North Carolina Press.

Rüger (1968) Die Rolle der Straßenbahn im System des großstädtischen Schnellverkehrs, *Die Strasse*, 8 (4), pp. 172-173.

Rzhavinskii, B. A. (1973) Novyi podvizhnii sostav dlia gorodskogo relsovogo passazhirskogo transporta, in Sheinin, A. N. (ed.), *Uluchshenie raboty gorodskogo passazhirskogo transporta*, Moskva: MDNTP, pp. 63-75.

Saitz, H. H., Villmow, D. (1971) *Konzeption für die Entwicklung der Straßenbahn zu einer Schnellstraßenbahn*.

Saitz, H. H., Mende, M. (1974) Der öffentliche Personennahverkehr in Erfurt, *Deutsche Eisenbahntechnik*, 22 (9), pp. 406-409.

Saitz, H. H. (1984) Die Auswirkungen des Ausbaus der Straßenbahn in Erfurt auf die Reisegeschwindigkeit, *DDR-Verkehr*, 17 (6), pp. 180-182.

Saitz, H. (1988) Erfurt city and traffic: An example of traffic policy and planning in the German Democratic Republic, *Transport Reviews*, 8, (1), pp. 1-17.

Saitz, H. H. (2001) 50 Jahre Stadtverkehrsplanung in Erfurt, in Archiv für die Geschichte des Strassen-und Verkehrswesens (ed.), *Straßen- und Verkehrsgeschichte deutscher Städte nach 1945. Dresden - Leipzig - Halle - Chemnitz – Erfurt*, Heft 16, Bonn: Kirschbaum Verlag, pp. 173-204.

Scheelhaase, K. (1982) Experience with German Light Rail Systems, *Traffic Quarterly*, 36, pp. 45-56.

Schmucki, B. (1997) Individualisierte kollektive Verkehrssysteme und kollektivierte individuelle Verkehrssysteme. Die Vision von Neuen Technologien zur Lösung der Verkehrsnot der Städte in den 1970er Jahren, in Dienel, H. -L. and Trischler, H. (eds.), *Geschichte der Zukunft des Verkehrs. Verkehrskonzepte von der Frühen Neuzeit bis zum 21. Jahrhundert*, Frankfurt/New York: Campus Verlag, pp. 147-169.

Schmucki, B. (2010) Fashion and Technological Change Tramways in Germany after 1945, *Journal of Transport History,* 31 (1), pp. 1-24.

Shapilov, E. (1980) Vtoroe stoletie tramvaia?, *Tekhnika-Molodezh*, 6.

Sheinyuk, G. S. (1971) *Skorostnoi tramvai*, Moskva: GOSINTI.

Shpakov, I. V. (2013) Istoriia proektirovaniia otechestvennykh sochlenennykh tramvainykh vagonov na Ust-katavskom vagonostroitelnom zavode imeni S. M. Kirova, *Gramota*, 4 (71), pp. 212-214.

Shpakov, I. V., Zyuzin, P. V. (2016) Sostoianie otrasli gorodskogo elektrotransporta v RSFSR v kontse 1980: Problemy y perspektivy, in Tretyakov, A. (ed.), *Kraevedcheskie zapiski. Sbornik statei*, Kursk: Investsfera, pp. 61-68.

Skorobogatov, B. V., Sleptzov, B. V., Shtundel, E. V. (1974) *Opyt proektirovaniia kompleksnykh transportnykh skhem*, Kiev: Budivelnik.

Smith, W. S. (1977) The Energy Crisis Today: A Perspective, *Traffic Quarterly*, 31, pp. 5-19.

Stewart, F. T. (1980) Light Rail Transit in the United States, *Transportation*, 9, pp. 67-74.

Straßburg, H. (1976) Test der Schienenschlenkis: Ab Ende nächsten Jahres Tatra-Wagen im Linienverkehr, *Berliner Zeitschrift*, 13. 04.1976.

Stramentov, A. E., Fishelson, M. S. (1963) *Gorodskoe dvizhenie*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu, arkhitekture i stroitelnym materialam.

Surový, R. (1969) *Generálne Riešenie Mestskej Hromadnej Dopravy v Bratislave*, Dopravoprojekt Bratislava, Archivo Municipal de Bratislava, UDIMB.

Taplin, M. (1976) Eastern Europe leads in tramcar standartization, *Railway Gazette International*, 132 (7), pp. 255-259.

Taplin, M. R. (1984) *Light Rail Transit Today*, Milton Keynes: Light Rail Transit Association.

Taylor, S. F. (1980) Light Rail Transit in The United States, *Transportation*, 9, pp. 67-74.

Topp, H. H. (1999) Innovations in tram and light rail systems, *Proceedings of the Institution of Mechanical Engineers*, 213 (3), pp. 133-141.

Transportation Research Board, United States Department of Transportation (1977) *Light Rail Transit, Technology Sharing, State-of-the-Art Overview*, May.

Tumanov, A. (2014) *Dzerzhinskii raion. Sobitiia i liudi*, Yaroslavl: Yarnovosti.

UITP (1967) *Theorie und Praxis der Stadtverkehrswirtschaft*, XXXVII internationaler Kongress, Barcelona.

Útvař Dopravního Inženýrství Města Ostravy (1982) *Doprava a Životní Prostředí v Ostravé*, Ostrava: UDIMO.

Vandas, J. (1977) *Üloha Mestské Hromadné Dopravy v Rozvoji Mést*, in Československá Vědeckotechnická Společnost (ed.), International Conference Perspektivy Moderních Tramvají, 4 – 6 october, Praha: Československá Vědeckotechnická Společnost, pp. 1-19.

Vucnic, V. (1972) *Light Rail Transit Systems: A Definition and Evaluation*, United States, Department of Transportation Urban Mass Transportation Administration.

Výskumný ústav výstavby a architektury (VÚVA), (1979) *Zásady a Pravidla Územního Plánování*, Brno: Urbanistické Pracoviště.

Waschulewski, H., Hasse, K. (1975) Erste Schnellstraßenbahntrasse in Schwerin, *DDR-Verkehr*, 11, pp. 453-456.

White, H. P. (1967) The Rapid Transit Revival—A Comparative Review of Overseas Practice, *Urban Studies*, 4 (2), pp. 137-148.

Yaroslavl Regional Archive (1969) *Protokol i stenogramma zasedniia po generalnomu planu goroda Yaroslavlia*, Gosstroi RSFSR, P-872, 5, 35.

Yaroslavl Regional Archive (1972) *O plane razvitiia mestnogo khoziaistva oblasti na 1971-75gg. i o planovom razvitii khoziaistva na 1972 god*, P-1358, 1, 265.

Young, A. P., Maltby, D., Constantine, T. (1969) Urban Transit Systems: Choice for Investment, *Official Architecture and Planning*, 32 (12), pp. 1454-1460.

Zakharov, V. I. (1970) Perspektivy stroitelstva linii skorostnogo tramvaia v Leningrade, in Artinov, A. P. (ed.), *Sostoianie i perspektivy razvitiia skorostnogo passazhirskogo transporta v Leningrade*, Leningrad: LOCHTO, pp. 98-103.

Zakopal, D. (1977) Priorita Rýchlé Tramvaje v Městské Hromadné Dopravě v Ostravě, in Československá vědeckotechnická společnost (ed.), *Perspektivý Moderních Tramvají*, Praha: Československá vědeckotechnická společnost.

Zelezny, R. (2013) *Le tramway et le piéton au cœur des quartiers résidentiels d'aujourd'hui: pouvons-nous en tirer des enseignements du passé? Un contexte de comparaison franco-tchèque*, Colloque International du LABEX Futurs urbains: Enjeux interdisciplinaires émergents pour comprendre, projeter et fabriquer la ville de demain, Marne-la-Vallée, France.

Zelezny, R. (2014) *Tramway-oriented development: what results in what context? Comparative approach between France and the Czech Republic*, Transportation Research Arena (TRA), Paris - La Défense.

ZFIV (1974) *Richtlinie für die Verkehrliche Anbindung und Erschließung von Neubau Wohngebieten*, Berlin: ZFIV.

ZFIV (1975b) *Methodik der Generalverkehrsplanung – Begutachtung der GVP für Städte der DDR*, Gutachterliche Stellungnahme zum GVP Erfurt vom März 1975, Berlin: ZFIV.

ZFIV (1976c) *Richtlinie für die Planung und Gestaltung der verbesserten Strassenbahn - Schnellstrassenbahn*, Berlin: ZFIV.

Zouhar, W. (1968) *Městská hromadná doprava*, Praha: ČKD.

Internet sources:

www. transphoto.org., Vazhenin, S.

www. transphoto.org. Murashov, S.

http://www.liepajastramvajs.lv/ru/vagoni.

https://techlibrary.ucoz.ru/_ld/0/1_lm68.jpg.

https://www.wikiwand.com/de/Boeing_LRV

www.yargid.ru

4.2. RAPID TRAMWAYS FOR NEW RESIDENTIAL AREAS: THE COMBINATION OR SEPARATION OF ROAD AND TRAMWAY INFRASTRUCTURE. CASE STUDIES OF BRNO, DRESDEN AND LVIV

From the mid 1960s and into the 1970s new programmes for large residential areas were initiated around Europe (Monclús, Díez Medina, 2016, p. 534; Hess, Tammaru, van Ham, 2018a, p. 12). In the West there was some criticism of these programmes. Among the problems emphasized were the lack of urban life and even dehumanization, reflected in architectural monotony, insufficient facilities and services, and the large size of residential blocks. In addition, there were often other difficulties related to the remoteness and even isolation of these new areas of housing, an outcome of inadequate public transport services. In order to forestall such drawbacks, various proposals were formulated in which the planning principles for urban growth were reconsidered. Thus, with an eye to strengthening public transport services in large residential projects in Sweden, the United Kingdom, France, Denmark, Finland, and the Netherlands, new spatial concepts and solutions were developed. To this end, the relationship between public transport and land use became crucial, with public transport being given relative priority over private vehicles. The principal modes that were adopted tended to be express buses, light rail, metros or full-blown underground railways, depending on distances and traffic calculations.

Similarly, in European Socialist countries, too, massive construction programmes for residential areas were initiated from the beginning of the 1970s. These initiatives responded to political objectives, directed towards achieving a certain degree of social peace and greater support for the regime, and stabilizing political calm after attempts to change the course of Socialist policies (Skřivánková, 2017, p. 44, Maaß, 2006, p. 31). However, they also had the social goal of improving the quality of life of the population. There were no radical changes in the way new housing areas were conceived. At first, the focus was merely the qualitative improvement of residential architecture, but, as in Western European countries, a trend to reinforce the role of public transport quickly arose. One feature was the implementation of rapid tramways, a rather novel and unexpected experience, at least in part an outcome of the impossibility of opting for other, more futuristic transport systems. Despite political and financial limitations, there was a certain range of solutions in plans for transport for the new residential areas. This variety can perhaps be explained by general differences between countries, the unequal degree of professionalism and criticism brought to bear, and differing levels of integration of the work of urban planners and transport specialists.

There are very few studies from the period devoted to the analysis of the differences in public transport planning applied to new residential areas in European Communist countries. There is, however, a good body of literature given over to post-Socialist experiences and the regeneration of these zones of housing (Meerovich, 2017b; Muliček, Seidenglanz, 2019). It should be noted that it is not possible to evaluate practices adopted without a solid understanding of certain key issues or without the distinguishing of certain conceptual differences between Communist countries. The focus should be placed not only on the design of residential spaces and the architecture of housing, but also on urban structure, especially interrelationships with public transport, urban amenities, and green areas, as well as links to the overall structure of cities.

The hypothesis of this chapter is that the ideas of tramway planning in new residential areas were diverse. In the USSR and to a large extent in the CSR, they remained focused on Modernist concepts of residential units, based on the strict separation of traffic and priority for motor vehicles. In the GDR, in contrast, new ideas of planning residential areas based on rapid tram lines gradually arose. Two tendencies in developing public transport for new housing areas can be distinguished: 1. A combination of road and tram infrastructures in a communication corridor located on the edges of residential zones, and 2. Segregation of roads and tram routes with an internal location for the tram line.

Thus, the objective of this chapter is to understand how tramway planning solutions for new areas of housing differed, and why this was so. Moreover, there is an aim to understand the level of paradigm change in urban transport planning in the 1970s. For this purpose, Western housing theories and projects from the UK, France, and Sweden are analysed alongside the plans for new residential areas in the three Communist countries under study. The conclusion is that tramway planning was the variegated result of a mixture of centralized political interventions, and the most widely established professional ideas in each country, combined with differing levels of influence from Western ideas.

4.2.1. WESTERN EXPERIENCE IN PLANNING NEW RESIDENTIAL AREAS AND CITIES

In the middle of the 1960s, there started to be growing social problems in the residential areas built during the immediate post-war period (Newsome, 2004, p. 816). Town planning in Western European countries had been functionalist and car-oriented. Poor accessibility and difficulties with mobility on the part of residents emerged as a problem. Low levels of service and traffic congestion were caused not only by suburban traffic to and from city centres, but also by movements arising within the new areas of housing themselves. In an attempt to resolve this situation a number of fresh angles on spatial organization were adopted from the mid 1960s onwards. The idea of proper provisions for public transport services became prominent, especially in terms of connections between new housing estates and the cores of cities. A desire to improve the attractiveness of public transport led to consideration of the time required to get to the nearest stops, the integration of land uses with public transport lines, and enhancing the share of public transport in the split between modes. In addition, the value of clustering central facilities around rapid transit stops was emphasized. Thus, a link between centrality and accessibility at nodes was evaluated as a strong point in town planning.

However, movements within newly built-up areas and in satellite towns were not always considered in much detail, usually being left reliant on bus services. In the UK, new towns were located relatively far from London and other large cities, and were of considerable size. They had external connections through suburban train services, but provisions for internal public transport were often inadequate. In

France, the *grands ensembles* and some *villes nouvelles* were located close to Paris, and external access was provided by extending the Paris metro, and later by suburban trains of the regional express network. Internal mobility was based on bus services. In Sweden, the new cities were connected to Stockholm by suburban trains and especially the metro, while within them, thanks to their small size, movement on foot was the prime method.

The importance of these experiences for theoretical studies in European Communist countries lay in the massive, centralized, integrated character of housing programmes, with planning, funding and evaluation of residential projects controlled by the State in tandem with subsidiary administrations. To gain a better understanding of the concepts that developed in the Western world and their possible influence on the ideas of European Communist countries, it is of value to analyse the experiences in planning new towns and residential areas in the UK, France and Sweden.

a. The British New Towns Experience

The provision of external access for the British New Towns[49] of the 1950s and early 1960s was solved by commuter train services. However, within these new settlements insufficient attention was paid to the development of public transport. This was exacerbated by the low density at which they were planned, which undoubtedly fomented car use. Integrating the assignment of land functions with a grid system of streets and roads was perceived as an appropriate response to urban transport problems. Although some negative consequences of this type of urban planning were recognized, it was not possible to change approach quickly. From the middle of the 1960s onwards, a number of proposals were put forward to encourage the use of public transport in these new British settlements (Fig. 173).

Public transport lines could be installed as an axis giving structure to new urban spaces, independent of road infrastructures, which are mainly dedicated to private transport. Redditch and Runcorn were among the first cities to develop this concept (Fig. 174). While earlier Swedish approaches also separated suburban rail and metro lines from road routes, the British approach introduced public transport within the New Towns, which may have been an outcome of their larger size, as many as 30.000 to 40.000 inhabitants almost from the start. Furthermore, in these British cases, attention was paid to a mode of land transport mode that contrasted with the general trend to plan either underground or elevated public transport. This was express buses with dedicated lanes, thanks to their inexpensive requirements for capital investment and their efficiency of service.[50]

The main idea behind this proposal was the search for a certain balance between private and public transport (Potter, 1976, p. 203). This balance was to be achieved by increasing the attractiveness of collective transport, despite doubts

49 The population did not always work in the nearby industrial areas, which implied intensive flows of workers to the medium-sized and large cities (Merlin, 1975, p. 87).

50 This tool was used relatively frequently in countries such as the United Kingdom, the United States and France, which extensively abandoned trams. One of the first bus transit proposals was made in 1937 in Chicago. For the Western experience with express bus, see Highway Research Board (1973) *Bus Use of Highways. State of the Art*, National Cooperative Highway Research Program Report, Washington.

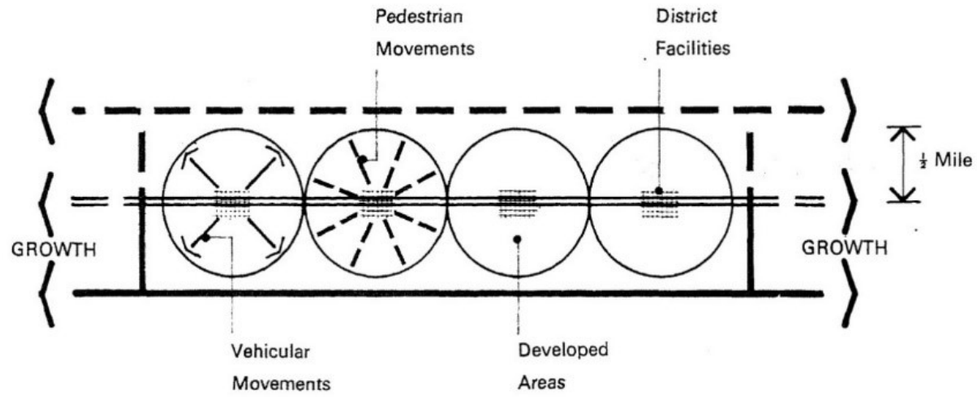


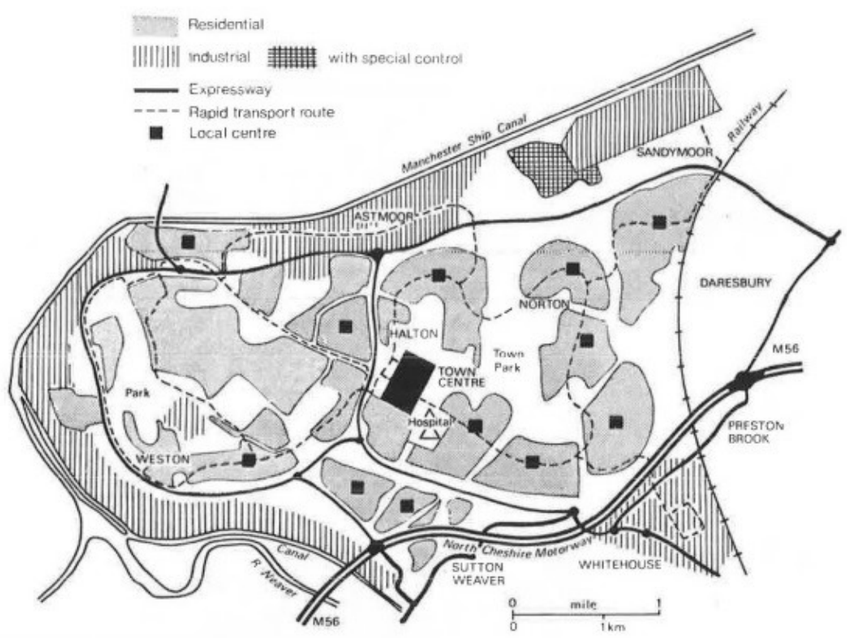
Fig. 173. Proposed structure for new British cities. Source: Wilson, H., Womersley, L. (1966) *Irvine New Town, Final Report on Planning Proposals*, Edinburgh: Her Majesty's Stationary Office, p. 14. It was a solution prompted by the problem of car traffic congestion, which was aimed at giving spatial priority to public transport.

about whether the population would use it and whether it would solve day-to-day traffic problems (Harrison, 2015, pp. 177-178). It was proposed to provide direct pedestrian access to all stops, to site stops at central or key locations, and to ensure speed and frequency of service. This was a relatively radical approach, justified by the goal of solving the problem of traffic congestion quickly, more efficiently and more safely. However, another objective was to maintain rapid circulation on roads, freeing them from public transport traffic and not siting amenities on them (Potter, 1984, p. 211).

It should be noted that such solutions were not widespread in the UK and that there was a long debate about the planning of public transport in the New Towns. Furthermore, the development of new technologies applicable to public transport inspired utopian and futuristic proposals, for example, those based on monorails[51] (Fig. 175). These came to be considered as a desirable, ideal solution to the social problems of urban accessibility, and to ensuring fluid circulation of cars (Ortolano, 2011, p. 477). There were also proposals based on the grid model of streets where public transport received no special consideration or privileges in urban structure, as in the case of Milton Keynes and the surrounding zones in North Buckinghamshire.

In conclusion, the United Kingdom offered a great variety of planning concepts and technical possibilities for new settlements. On the one hand, Modernism was frequently very influential, but on the other, there was a certain orientation towards enhancing the role of public transport. It is interesting to note how both these approaches to developing public transit services were known to, and studied by, urban planners in Communist countries. They were particularly interested in solutions related to the issues of integrating land use with road infrastructures, and of

51 In Milton Keynes, for example, despite the initial idea of installing a monorail and adapting its urban structure to public transport, it did not materialise, among other factors, due to the importance of the ideas of the Modern Movement (Ortolano, 2011).



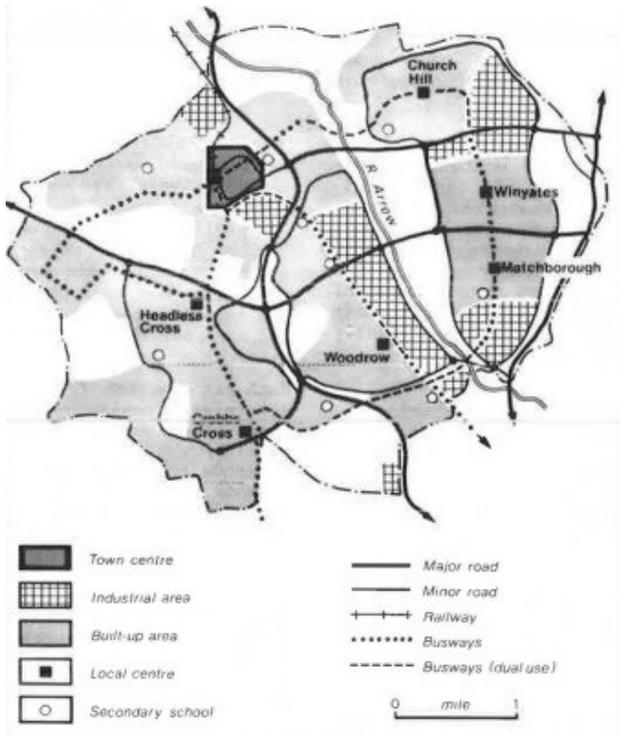


Fig. 174. The British new towns Runcorn and Redditch, planned in the mid-1960s, which were focused on the integration of land uses and reserved bus lanes. Source: Potter, S. (1984) The Transport Versus Land Use Dilemma, *Transportation Research Record*, 964, p. 14. It was proposed to provide the internal mobility of new towns with reserved platform express bus service to anticipate private traffic congestion and improve service frequency.

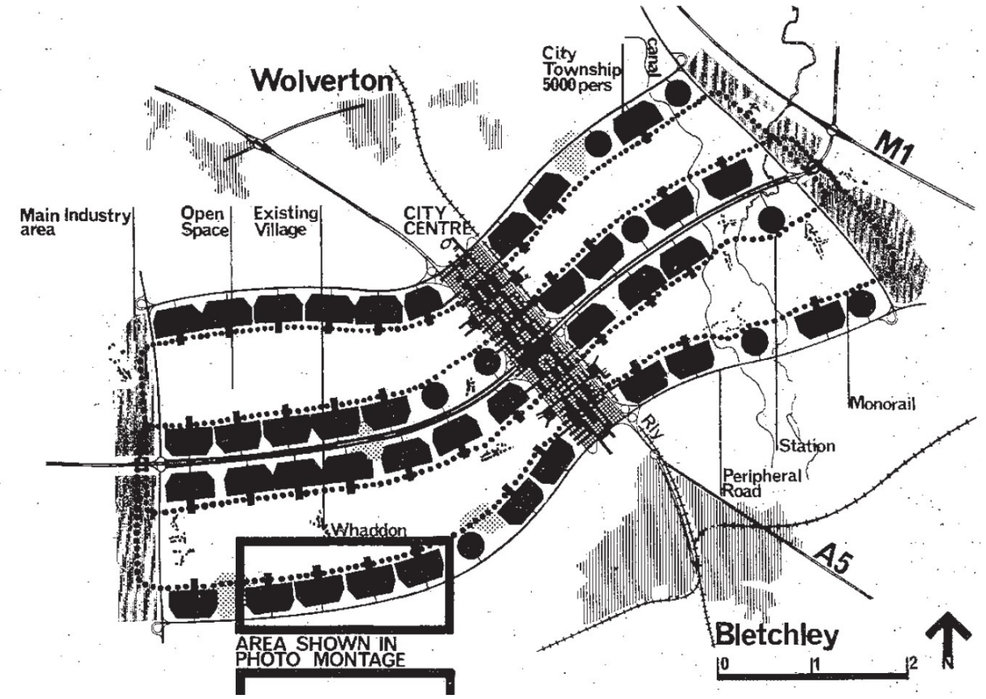


Fig. 175. Proposed monorail in the new town of North Bucks (250,000 inhabitants), realised in 1965. Source: Ortolano, G. (2011) Planning the Urban Future in the 1960s Britain, *The Historical Journal*, 54 (2), p. 479. It was one of the proposals aimed at the separation of road infrastructure and public transport infrastructure.

spatial priority for rapid transit routes. In the Soviet Union, attention was paid to the example of Milton Keynes, seen as an important benchmark for the planning of new cities and residential areas. In contrast, the approach establishing horizontal separations between public and private transport found its most extensive applications and implementations in the GDR, and to a lesser degree in some experimental projects in the CSR.

b. The Experience of Nya Städer, New Residential Areas in Sweden

The most striking characteristic of the planning for new Swedish towns starting in the post-war period was the development of access by suburban rail, or principally metro. This was explained both by the crucial need for fast communications with the city centre and by the large number of daily trips, as the new residential areas had no fixed workplaces (Merlin, 1975, p. 117). There was a strict criterion of traffic separation and differentiation in the new town centres, supported by ample State funding (Hall, Vidén, 2005, p. 311). The new towns had housing zones and central services where vertical or other separations of traffic flows were arranged, this being considered at the time an ideal modern solution.

Sweden was one of the countries most influenced by modern American ideas (Hall, Vidén, 2005, p. 304). For European countries it represented a paradigmatic example of how transport and traffic planning should be resolved (Fig. 176 and 177).

In the 1960s Sweden initiated its "Million Programme" (*Miljonprogrammet*) aimed at alleviating social problems in a context of economic prosperity and increased social awareness, which had led to intensifying criticisms of the quality of life in certain existing residential areas (Hall, Vidén, 2005, p. 301). One of the features of the new towns built from 1965 to 1975 was their fairly substantial size,[52] which required the provision of road infrastructures on a larger scale (Vidén, Botta, 2004, p. 209), to solve the problem of traffic congestion and insufficient parking space (Crimson Historians and Urbanists, 2021, p. 202). This period may hence be seen as continuing existing trends to complete separation of pedestrians, and of private and public transport.

The new residential areas of the 1960s and 1970s in Stockholm, such as Rinkeby, Tensta, Husby, Kista or Akalla, were planned around metro stations (Fig. 178). Stops on the metro lines were separated by only short distances, between 500 and 900 metres, this high density being intended to achieve better efficiency in the public transport service. The construction of mass public transit lines was a priority in the implementation of projects for new areas of housing. The idea of combining nodes and central features with socio-cultural facilities and some workplaces was also maintained, while road infrastructures ran right into the residential areas, providing free access for car traffic.

The application to Swedish new towns of ideas such as the integrity of housing zones, the organization of urban space around the public transport system, rapid connections to the heart of the city, the creation of central facilities, and the autonomy of new residential areas, had a significant influence on Socialist urban planning. These modern solutions, based on a metro system, the "tunnel railway" or *tunnelbana*, running within new residential districts, became a paradigmatic example for Communist politicians and planners. Vertical separation of transport and social nodes was extensively discussed in Communist countries' publications. However, while in Sweden this was possible thanks to abundant State funding, in the European Communist countries it remained for many years an unattainable aspiration or a solution feasible only in a few exclusive instances.

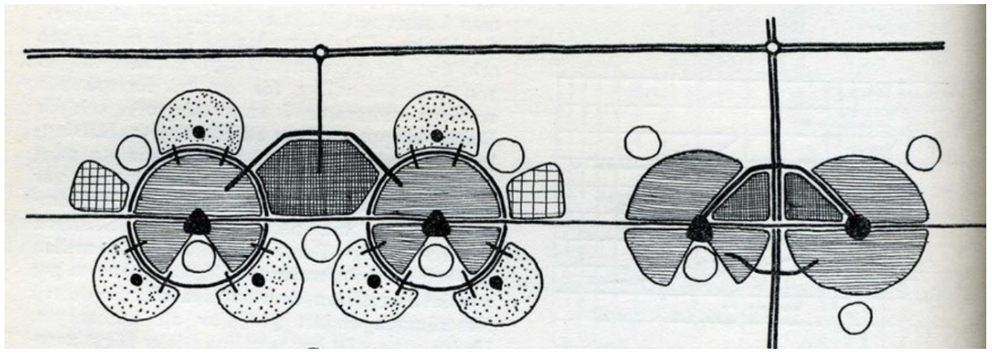


Fig. 176. The T-bana (suburban railway) concept for new towns near Stockholm from the 1952 master plan. Source: Crimson Historians and Urbanists (eds.) *New towns on the old War Frontier*, Rotterdam (in progress), p. 97. The towns were organised around the suburban railway stations, which entered inside the residential areas, while the roads remained outside.

52 However, even so, the size was not as large as, for example, in the case of the UK, with populations ranging from 15.000 to 60.000.

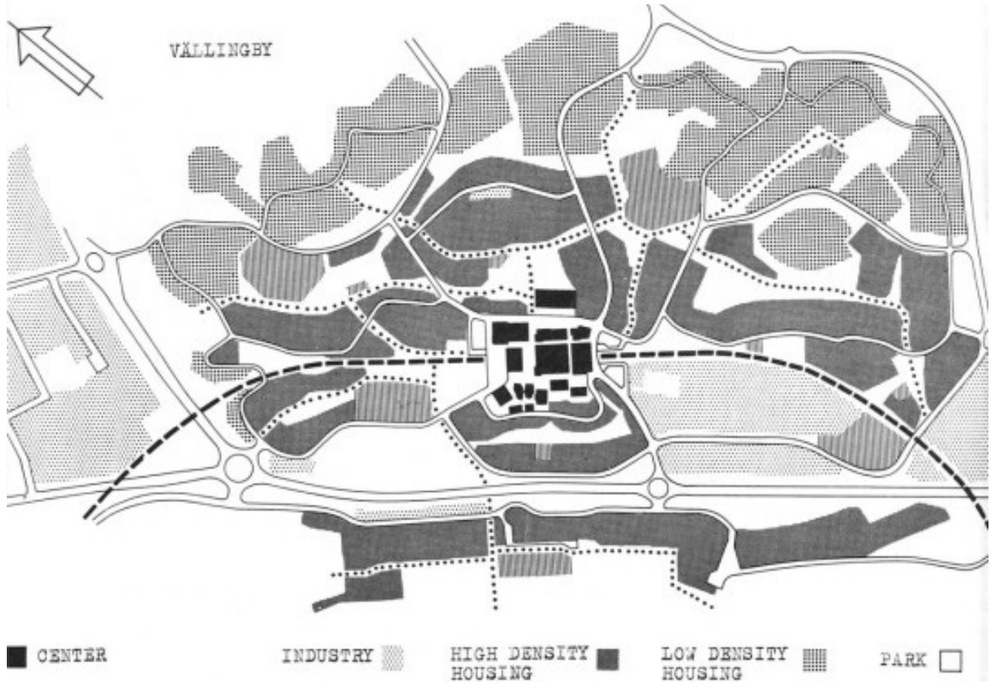


Fig. 177. Representative plan of the new town of Vällingby, 1954. Underground railway station, combined with the urban centrality and pedestrian areas free of transport traffic, constituted the example of a perfect solution of that period. Source: Merlin, P. (1975): Merlin, P. (1975) *Novie Goroda. Raionnaya Planirovka i Gradostroitelstvo*, Moskva: Progress, p. 122 (original French edition 1969). In the 1970s this example still remained an important reference.

Fig. 178. Urban plan of the new residential area Tensta-Rinkeby in the Stockholm metropolitan area, 1965. Source: Crimson Historians and Urbanists (eds.) *New towns on the old War Frontier,* Rotterdam (in progress), p. 212. There were three metro stations around which were organised centralities with amenities, whilst the streets crossed the residential area by means of several bridges.

c. The Experience of the Villes Nouvelles in France

In France, a State programme of New Town planning started in 1965. The most notable examples are Évry, Cergy-Pontoise, Saint-Quentin-en-Yvelines, Melun-Sénart and Marne-la Vallée in the Île de France, as well as other New Town projects near Lyons, Lille and Marseilles. The initial size of the planned new cities ranged from 150.000 to 500.000 inhabitants. The aim was to respond to previous problems related to the inadequacy of urban services, transport, and spatial quality, and the need to improve integrity and coherence (Tuppen, 1983, p. 13). These New Towns were intended to avoid a continuing expansion of existing cities, nibbling away at land on their outskirts, and to provide for the planning of relatively autonomous new cities in an orderly manner (Rubenstein, 1978, p. 19). These new settlements were created with functions complementary to their main city and were located at distances of between ten and twenty-five kilometres from it (Wilson, 1986, p. 28). In other words, they were semi-autonomous, having workplaces, but rapid transport to the chief city available. This idea necessitated a reconsideration of the role of public transport, which had to be high-capacity, multi-branched and rapid.

The new settlements were very densely populated urban spaces and their central facilities were designed around metro or commuter train stations. The provision of mass public transport services was related to the social objective of meeting the population's needs without the use of cars and to the environmental goal of avoiding motor traffic to central areas (Merlin, 1975, p. 239). Transport within these residential areas, on the other hand, was based primarily on private cars and public buses (Fig. 179).

Mass public transport was combined with an extensive road infrastructure plan. The new settlements had a more or less rectangular grid structure for their streets and roads, oriented towards providing space, and allowing good speeds, for cars. These French examples of New Towns were studied in Communist European countries as progressive and modern solutions. This marked the direction in which transport developed in their new residential areas dating from the 1970s. Thus, for example, new residential areas in the CSR had road transport networks similar to those in the French New Towns.

4.2.2. PROGRAMMES FOR NEW RESIDENTIAL DEVELOPMENT IN THE RDA, THE CSR AND THE USSR

Before the programme of construction of new housing in the 1970s, the development of rapid public transport did not receive much attention in European Communist countries. Until then, connections to city centres were provided by existing transport infrastructures: buses, trolleybuses, trams, suburban trains or conventional regional commuter trains. New housing estates were intended to be located close to pre-existing public transport infrastructures, avoiding any need to build extensive new systems.

However, because of their large size and greater distance from city centres, the new residential areas of the 1970s required the introduction of new, fast means of mass public transport. The high cost and limitations inherent in the construction of metros and commuter lines emphasized the importance of rapid tramways, which

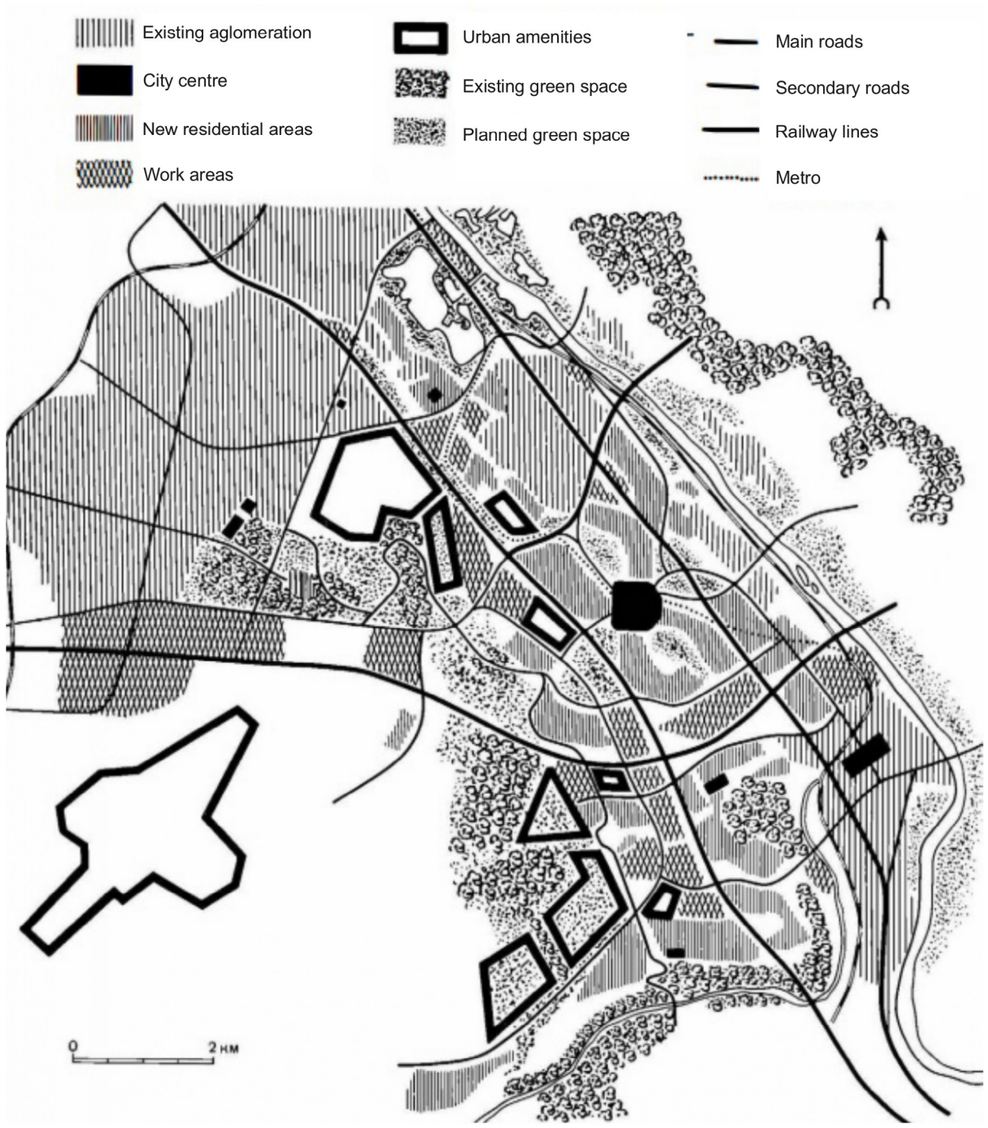


Fig. 179. Scheme of the new town of Evry planned in 1965. Source: Merlin, P. (1975) *Novye Goroda. Raionnaia Planirovka i Gradostroitelstvo*, Moskva: Progress, p. 238. One can notice the grid structure and high permeability of streets and roads, as opposed to the irrelevance of the underground metro line.

became a rational, economical mode of transport, although it should be noted that their actual implementation differed considerably from city to city and country to country. Therefore, projects for new residential areas should be analysed in terms of both their theory and their causes. This is in order to understand what the differences and similarities in rapid tramway solutions were, how urban structures and residential spaces were organized in relation to this means of transport, how road and pedestrian traffic was planned, and, finally, whether there were qualitative changes in the planning of new residential areas.

This sub-chapter, 4.2.3., is devoted to the GDR, 4.2.4. covers the CSR and 4.2.5. refers to the USSR. This order is related to the chronology and the importance of the novel initiatives. Indeed, according to Rubin (2016, p. 29) East German planners were not just looking for quick and easy solutions to building as many units of housing as possible; they were looking at the solution to the housing crisis holistically. Such a search for an integrated solution was the key to some of the most important changes initiated in the 1960s.

4. 2. 3. NEW RESIDENTIAL AREAS IN THE GDR: THE RELATIONSHIP BETWEEN TRAMS, RESIDENCE AND PEDESTRIANS

In the 1960s there was widespread criticism in the GDR of the monotony and poor quality of new residential areas (Urban, 2018, p. 110). Western critiques were also available in German and studied by GDR planners (Ladd, 2001, p. 589). Thus, from the late 1960s onwards, there was an awareness of a need for change, essentially for improvements in the quality of new residential areas. Consequently, in the housing programme of the 1970s, an effort was made to improve the urban worth of new residential areas. However, the simplistic understanding of cultural and aesthetic criteria was criticized as worsening the quality of everyday life (Wauer, 1977, pp. 444-445). This relative margin allowed in the expression of criticism was decisive in the conceptual variation on the new residential areas of the 1970s and 1980s. Thus, the new housing programme was seen as an opportunity for qualitative change in urban structure and residential space.

A major home building programme [*Wohnungsbauprogramm*] was launched in October 1973 after approval at the Tenth Congress of the East German Communist Party. In accordance with this programme, around three million dwellings were to be built or renovated between 1976 and 1990 (Lammert, 1975, p. 136; Sammartino, 2016, p. 500). As was noted by the architect Ule Lammert, the aim of the building programme was not only to eliminate homelessness, but also to bring about radical changes in planning principles and methods in order to create a new type of urban environment and thereby transform people's way of life (Lammert, 1975, p. 16). Social development needed to have a positive effect on the level of industrial development, which was referred to as the unity of social and economic policies [*Einheit von Wirtschafts- und Sozialpolitik*], (Maaß, 2006, p. 30).

A number of studies such as *Sozialistische Umgestaltung der Städte und Siedlungszentren* [The Socialist Transformation of Cities and Towns] (Deutsche Bauakademie, 1971b), or *Sozialistische Umgestaltung der Arbeits- und Wohnumwelt* [Socialist Transformation of the Working and Living Environment] (Deutsche Bauakademie,

1972), were influential in this field, having as their main theme this combination of the economic and the social. The planning of new residential areas was seen as a tool for social change. Certain basic ideas were to be reconsidered in residential areas, such as their structure, the quality of public spaces and accessibility, with attempts also being made to solve social and environmental issues.

In general, in the division of residential zones with an eye to the organization of amenities, the concepts of *Wohnunsgkomplex* (housing complex, with around 2.000 to 4.000 inhabitants) and of *Neubaugebiet* (new residential area, around 8.000 to 16.000 inhabitants) were maintained, (Lammert, 1979, p. 94). One novelty was the extensive use of prefabricated panel technology, called *Plattenbau*. One innovative idea was the reorganization of the internal structures of such residential divisions. The first criterion for this restructuring was the establishment of stable, varied, accessible communications between the new housing estates and the existing city, using techniques termed *verkehrliche Anbindung* [transport linkage] and *verkehrliche Erschließung* [transport development] to satisfy residents' travel needs. This type of development was called *Entwicklung der Stadt als Ganzes* [development of the city as a whole] with mention of *harmonische Zusammenhänge* [harmonious links] in various studies from the 1960s on (Pfau, 1986), as indicated in Fig. 180. These fresh projects always took into consideration the population's needs to travel to the city centre, to workplaces and to other residential areas.

The Central Institute for Transport Research [*Zentrales Forschungsinstitut des verkehrswesesens der DDR*], abbreviated ZFIV, modified the approach from earlier years, based on a physical combining of tram and road infrastructures, essentially trams on roads. This had been criticized for its negative aspects, such as the frontier effects generated in urban spaces, the creating of obstacles for pedestrians crossing roads, the large standard distances to access stops, and the complexity of intersections (ZFIV, 1973, p. 166 and 174). A combination of rail-based transport with urban roads and expressways on the same axis started to be seen as undesirable, only feasible or acceptable in exceptional cases (ZFIV, 1971, p. 247). The alternative recommended solution was to run public transport lines through the middle of new residential areas, separately from car traffic routes (ZFIV, 1973, p. 23). This idea was recognized by both the Bauakademie der DDR and the ZFIV. The final decision was taken after an official analysis to evaluate the advantages and disadvantages of existing forms of road structure in cities and new residential areas, both Western and Eastern. This results from this study appeared as *Verkehrliche Anbindung von Wohngebieten* [Transport Connections for Residential Areas] published in 1973 by the ZFIV (Fig. 181). Various examples of housing zones were analysed, such as Lazdynai in the USSR, Mariahof in Trier, Limesstadt (Wohnstadt Limes) near Bad Schwalbach, Köln Nord, Sennestadt in the FRG, or Basingstoke in the UK. In the conclusion ZFIV proposed novel concepts for transport and traffic in new housing estates, based on a separation between infrastructures for motor traffic and those for rail-based public rail transport.

In 1974, the ZFIV published *Richtlinie für die verkehrliche Anbindung und Erschließung von Neubaugebieten* [Guidelines for Transport Connections in the Development of New Built-Up Areas], which officially established fresh concepts of urban transport for new residential areas (ZFIV, 1974, p. 14). In consequence, some 35% of new housing planned between 1971 and 1981 was designed to have public transport lines located within the residential zone (Pfau, 1986, p. 87).

Emphasis was laid upon the need to adapt the entire residential structure to the functionality of the tramway system, affecting maximum distances to reach the nearest stops, the location of civic centres, direct pedestrian access, and the like. The tram line was to serve as an axis giving structure and social coherence to future housing zones. Having public transport stops nearby and easily accessed by residents was considered an important criterion for good-quality urban design. The distance to the nearest tram stop should be between three and five hundred metres. The areas with the highest residential density and major facilities were to be organized around public transport stops, while the areas farther away from them were to have lower densities and be reserved for the location of parking for cars, parks for residents, some communal services, and the like (Fig. 182).

It was also considered important to clarify the spatial organization of residential areas, with plans for sequences of housing, green areas, pedestrianized streets, central facilities for neighbourhoods and public transport stops (Pfau, 1986, p. 93), so that there would be a direct linkage between the residential area and its centre, and from there to the existing city (Fig. 183). Furthermore, there was an intention to create an integrated system of various types of traffic and urban transport, termed the *Bewegungssystem*, or "movement system" (Rubin, 2016, p. 41). This idea was quite novel, and at one and the same time provided pedestrian accessibility alongside variety and quality of services.

The creation of pedestrianized shopping streets and some central facilities next to tram lines was a decision taken in order to improve the urban quality of new residential areas. This made it possible to combine the tramway infrastructures with flows of people on foot at the same ground level, without a need to install footbridges over main urban roads. Although pedestrian subways were still built at some points of conflict, they were no longer widespread, since they were not often necessary (Lammert, 1979, p. 174). It should be noted that this idea of siting tramway lines alongside pedestrian areas was also developed in the city centres of the FRG. It was explained by the visibility and predictability of tram operations, running along a fixed route (Taplin, 1984, p. 12), making them safer than interactions with buses and trolleybuses. At this point, it is possible to detect a certain continuity of previous ideas throughout the Socialist period, marking an approach that differed from general tendencies.

One of the earliest examples of such a solution was the 1967 combination of rapid tram and suburban train in the new residential area of Grünau in Leipzig. The transport planners Ackermann and Stein underlined the lack of a feeling for giving priority to collective public transport in developments (1975, p. 99):

> *"Since no convincing examples of rapid tramways were to be found in residential areas in the GDR, there were at first considerable doubts about this solution. After extensive discussions, in which other transport experts were also involved, a decision was finally made in favour of this option."*[53]

53 "Wohngebieten der DDR keine überzeugenden Beispiele vorhanden waren, gab es zunächst erhebliche Bedenken gegen eine solche Lösung. Schließlich fiel nach umfangreichen Diskussionen - auch unter Einbeziehung weiterer Verkehrsexperten - die Entscheidung doch zugunsten dieser Variante da."

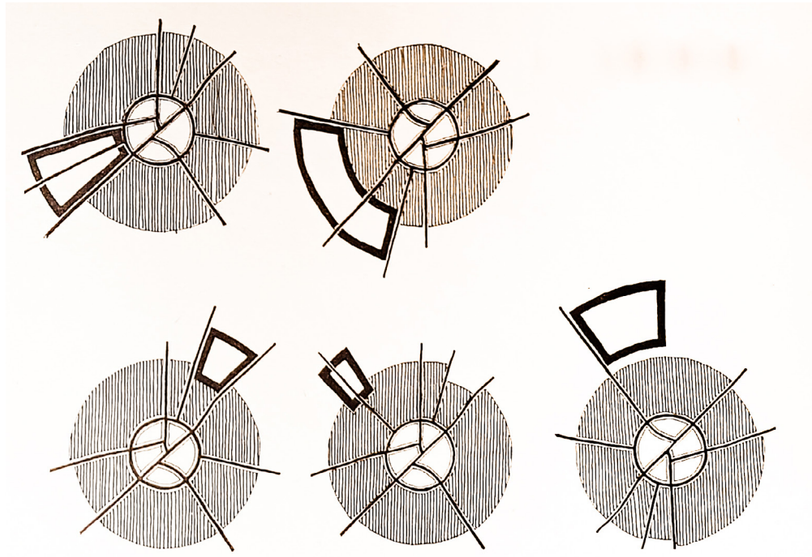


Fig. 180. The main forms of transport organisation of residential areas in the city proposed by GDR planners. Source: Pfau, W. (1986) *Zur Wohngebietsplanung in der DDR seit dem VIII. Parteitag der SED Ergebnisse und Tendenzen der Planung und Gestaltung von Wohngebieten unter besonderer Berücksichtigung des Zusammenhangs zwischen Wohngebiet und Stadt*, Berlin: Bauinformation, p. 37. It can be appreciated the idea of continuity of urban structure. The new residential areas were located on the main transport lines providing mainly accessibility to city centre.

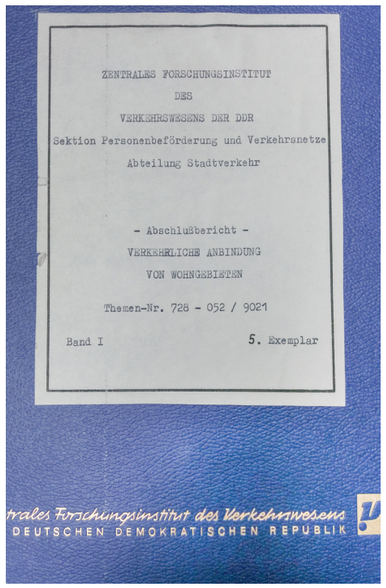


Fig. 181. Cover of the final report *Verkehrsliche Anbindung von Wohngebieten* (Transport connection of residential areas) edited by the Central Institute for Transport Research in 1973, Berlin: ZFIV. This was one of the first studies that confirmed the need for a conceptual change of transport in new residential areas.

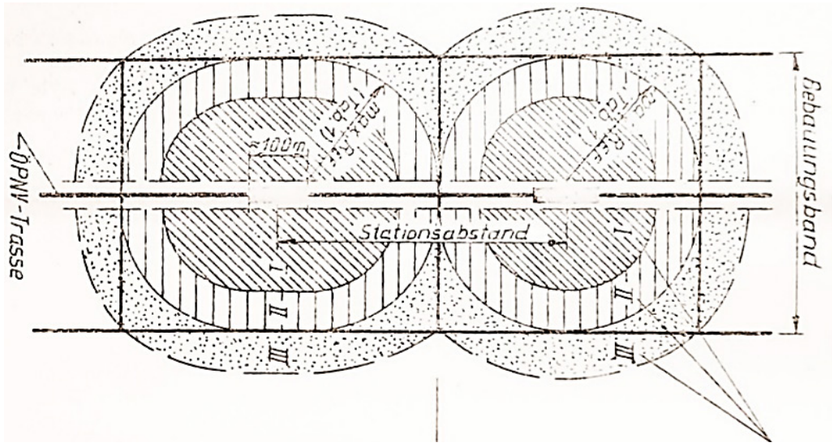
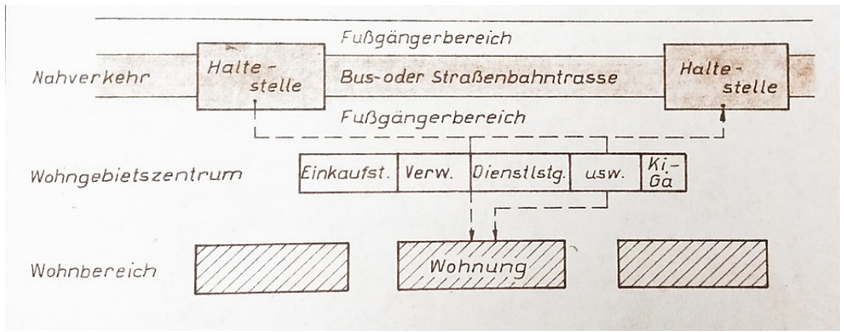


Fig. 182. Scheme of the main elements of local transport development proposed by the Central Transport Research Institute in 1974. Source: ZFIV (1974) *Richtlinie für die Verkehrliche Anbindung und Erschließung von Neubau Wohngebieten*, Berlin: ZFIV, p. 15.



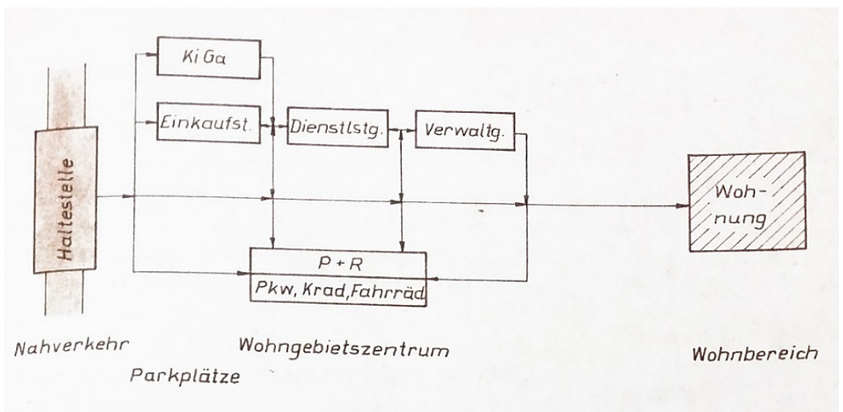


Fig. 183. Perpendicular and parallel development of the residential centre and dwellings with relation to the public transport line, where the issue of the distance between the residence and the public transport stops was elucidated. Source: ZFIV (1973) *Verkehrsliche Anbindung von Wohngebieten*. Abschußbericht, Berlin: ZFIV, p. 163.

Another even more coherent example, in which the structure of a residential area was affected, was the project carried out in Schwerin in 1973.[54] A high-speed tramway created a central corridor giving a structure to the whole area of housing, while the road infrastructures were located on the edge of the estate. It was also intended to avoid any through traffic by road, reserving only some spaces for residents' cars and pedestrian walkways. From the mid-1970s onwards, the success of this concept was recognized (Gläser, 1976). Consequently, plans were drawn up for Großer Dreesch and Mueßer Holz in Schwerin, Roter Berg in Erfurt, Toitenwinkel in Rostock and Marzahn in Berlin, although the paradigmatic case was the Gorbitz residential area in Dresden, proposed at the end of the 1970s.

The Case of Gorbitz in Dresden

The planning of Gorbitz, intended for 40.000 inhabitants, started in 1972 with tendering for projects announced by the Bauakademie der DDR. The housing area was to be located on vacant land close to the city on its south-west side (Fig. 184). Six groups of planners submitted their proposals in 1973, but none of these were accepted. In most of these competing projects, the tramway was arranged alongside major road infrastructures and the residential area was criss-crossed by roads, as in had been usual in previous decades (Fig. 185). After the competitive tendering ended, the Bauakademie der DDR formulated fresh criteria for developing the final project. On the one hand, peripheral spaces should be used for motor traffic, with a public transport corridor in the middle of the residential area (Lammert, 1979). On the other hand, intersections of where road traffic met public transport lines should be avoided (Michalk, Lässig, 1976, p. 334). Town planning was carried out in co-operation with the Bauakademie der DDR and the Dresden Municipal Architectural Office, while the transport plan for the area was developed by the Municipal Department of Transport (Kress, Michalk, 1976, p. 342).

The importance of Gorbitz lies in the fact that for the first time the new principles of the 1974 Guidelines for Transport Connections in the Development of New Built-Up Areas were applied in a coherent way (Kress, Michalk, 1976, p. 343). The final urban project was led by architect Günter Trepte as a piece of collective work by the *Wohnungsbaukombinat Dresden* [Dresden Construction Undertaking], although the planning concept derived from the Municipal Architectural Office of the City of Dresden [*Büro des Stadtarchitekten der Stadt Dresden*] and the Bauakademie der DDR (Fig. 186).

The use of rapid trams, rather than other means of transport, was explained by the large size of the residential area and the distant location of the nearest suburban railway line (Dresden Municipal Archives, 1977b, p. 2). The transport study for Gorbitz started in 1973 and was completed in 1975 (Dresden Municipal Archives, 1976). The project was carried out by the City's Department of Transport. One of the peculiarities of Gorbitz was that it lacked any industrial areas, with a consequent imperative need for inhabitants to travel to their workplaces outside the neighbourhood, which increased the crucial status of the high-speed tramway system. This rapid line was planned to be 3.5 km long, having eight stops and a distance between

54 Fue considerado el proyecto de tranvía rápido donde pudo desarrollarse la velocidad comercial más alta, 25 km/h, frente a los habituales 15-18 km/h (Gläser, 1976, p. 373).

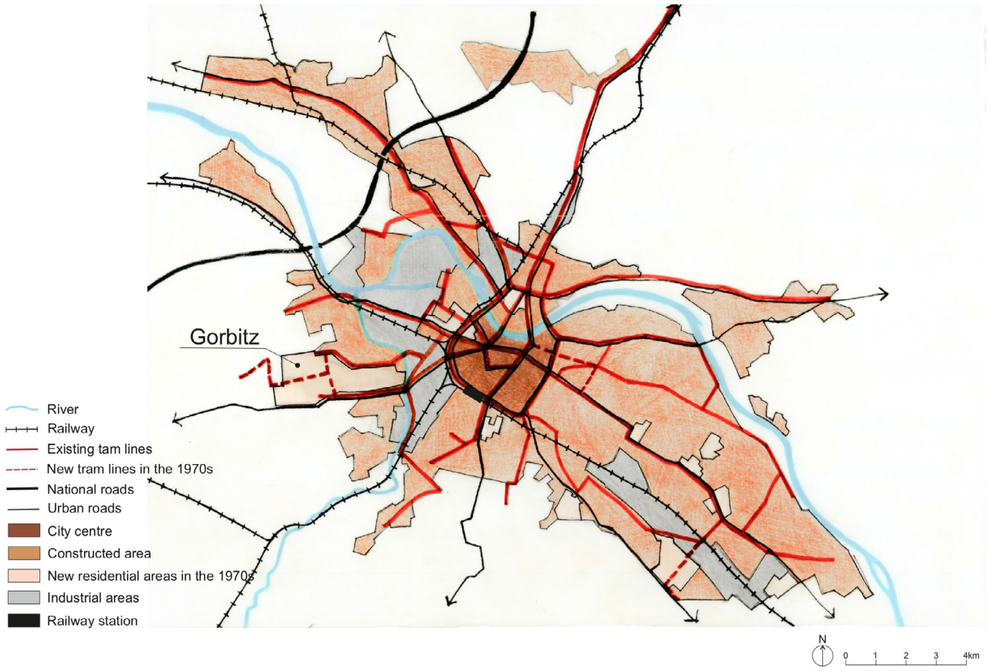


Fig. 184. Summary plan of Dresden with the location of the new residential areas in the 1970s. Source: Author's elaboration on the basis of the overlay of the general city plan of 1975 and the transport plan of 1975. Gorbitz was the only large residential area where the planning of the rapid tramway and the new residential area concept could be realised without any limitations.

stops of about five hundred metres (Abel, 1984, p. 220), previous bus services in the area near Gorbitz being retained unchanged (Dresden Municipal Archive, 1977b, p. 3).

A mingling of trams with motor traffic was no longer acceptable to the city authorities. The location of tram lines in the centre of urban roads was seen as hindering free access of passengers to tram stops. In addition, account was taken of the operational difficulties for trams caused by car traffic congestion (Dresden Municipal Archives, 1977b, p. 1).

A further area of housing, Residential Complex 4, was added in 1976 as the project was under way (Fig. 187, 188 and 189), this necessitating changes in the planned tramway route. It was proposed to keep the tramway line running through the middle of Residential Complexes 2 and 3, while at the end of Residential Complex 3 the line swung below the new Residential Complex 4. An additional tram line running towards Coventrystraße to connect with Residential Complex 4 was not considered a good solution from the point of view of transport management (Dresden Municipal Archive, 1977b, p. 5), since the ideal solution was a central straight line that demonstrated better capacities for service coverage.

In addition, the construction of the new Residential Complex 4, which was located off the Nordtangenten road, impeded the organization of obstacle-free pedestrian movement. Therefore, this residential area was not considered well-integrated (Dresden Municipal Archive, 1978, p. 4). To resolve this situation, pedestrian sub-

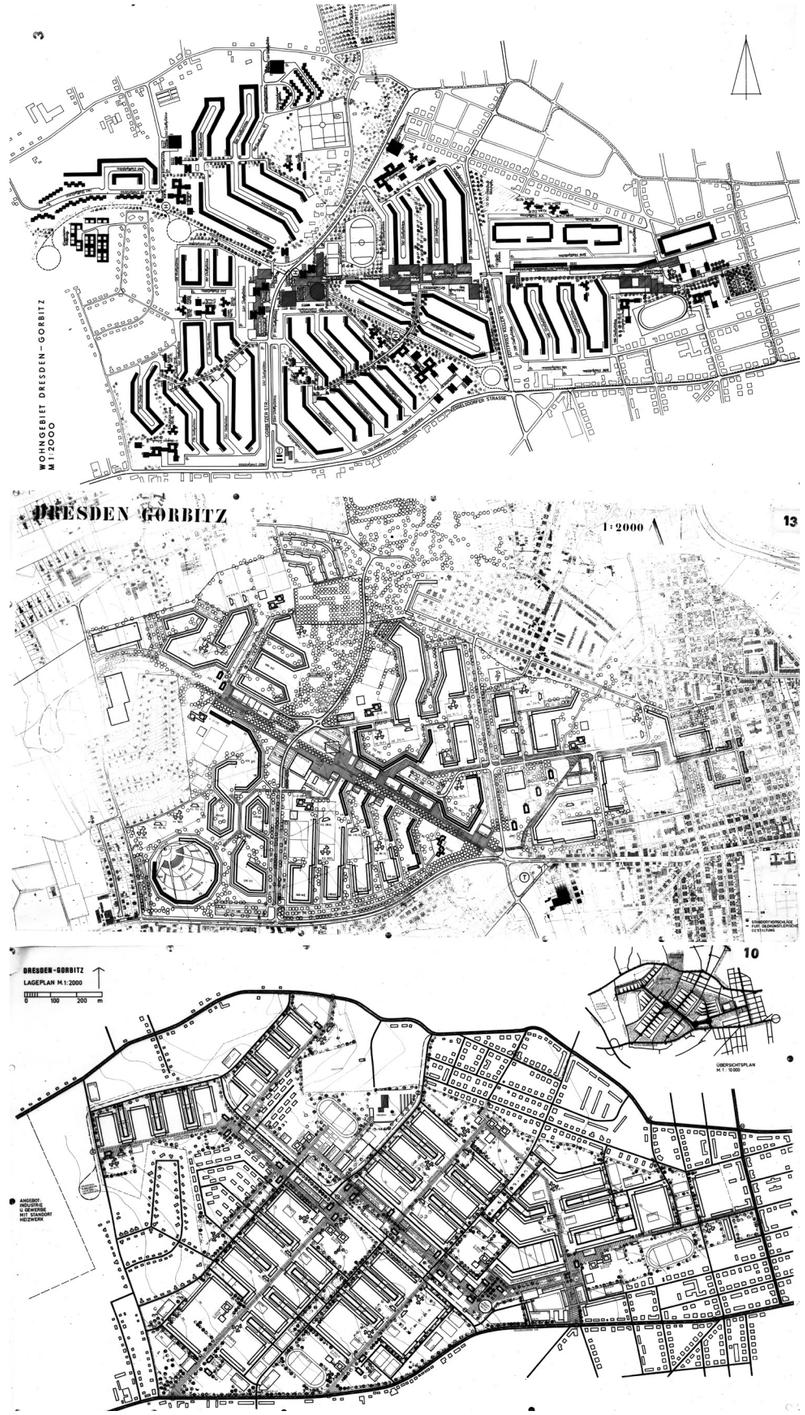


Fig. 185. Initial competition proposals for the new Gorbitz residential area presented in 1975. 1. Project of the Technical University of Dresden, W. Hunig, E. Seeling, U. Zimmerman, 2. Project of the Municipal Office of Architecture, R. Schrammer, E. Tillner, W. Winkler, 3. Bauakademie der DDR, B. Heber, G. Kernett, R. Heber. Source: Dresden Municipal Archive, Bild Archiv 1) 6.4.40.2-XIII2548_Rp 7303. 2) 6.4.40.2-XIII2553_Rp 7308. 3) 6.4.40.2-XIII2555_Rp 7310.

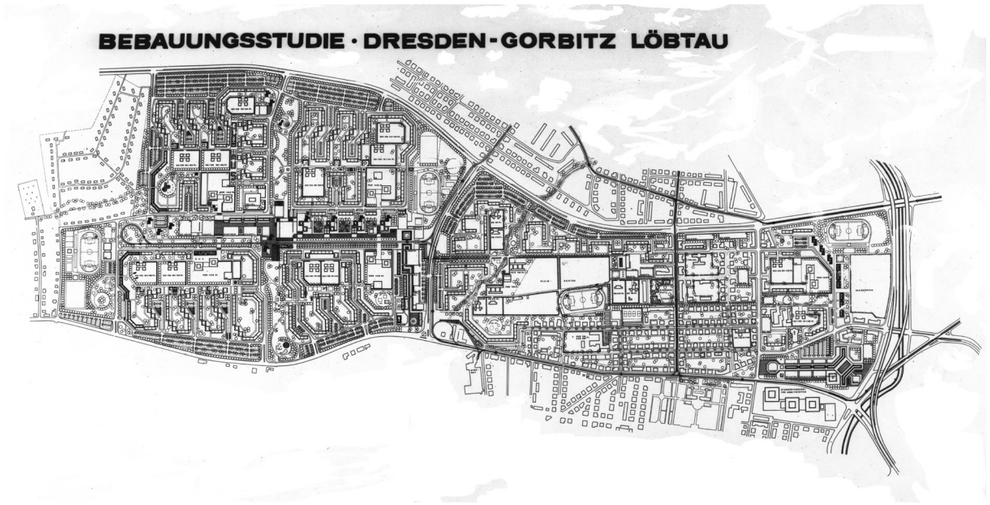


Fig. 186. Collaborative project of the Institute for Urban Planning and Architecture of the GDR Construction Academy and the Dresden Municipal Architectural Office, 1975. Source: Dresden Municipal Archive, 6.4.40.2-XIII2678_Rp 75_16. The tram line had a subway at Juluis-Vahteich-Straße. The idea was to bring the tram stop closer to the inhabitants of housing estate 1.

Fig. 187. One of the first detailed studies for Gorbitz, when the extension of the residential area was decided and the new residential complex 4 was added, carried out in 1976 by the Dresden Department of Architecture. Source: Dresden Municipal Archive (1979) *Gorbitz Erschließungsprinzip ÖPNV*, Büro für Stadtverkehr des Rates der Stadt Dresden, 4. 2. 17 - 3452. Plan-1. The route of the tram line in the Juluis-Vahteich-Straße was changed again, this time with a lateral location, approaching the residential complex 2.

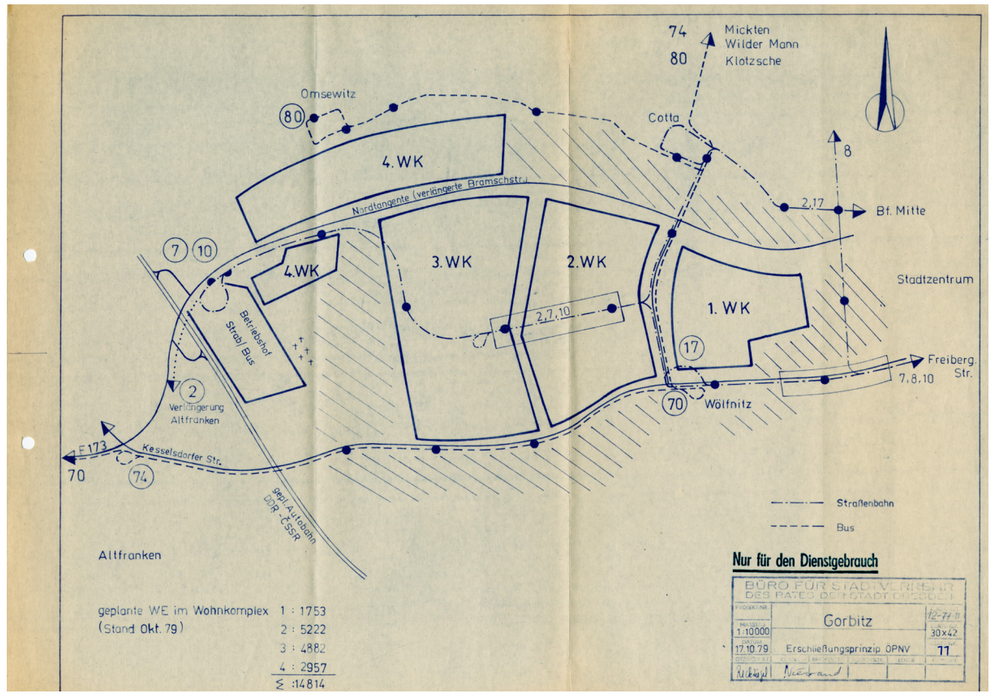


Fig. 188. Schematic diagram of the public transport connection (*Erschließungsprinzip ÖPNV*) of Gorbitz realised by the Dresden Department of Transport in 1979. Source: Dresden Municipal Archive, 9. 1. 2. - 15. It can be seen the attempt to provide a comprehensive and accessible service by combining trams and buses.

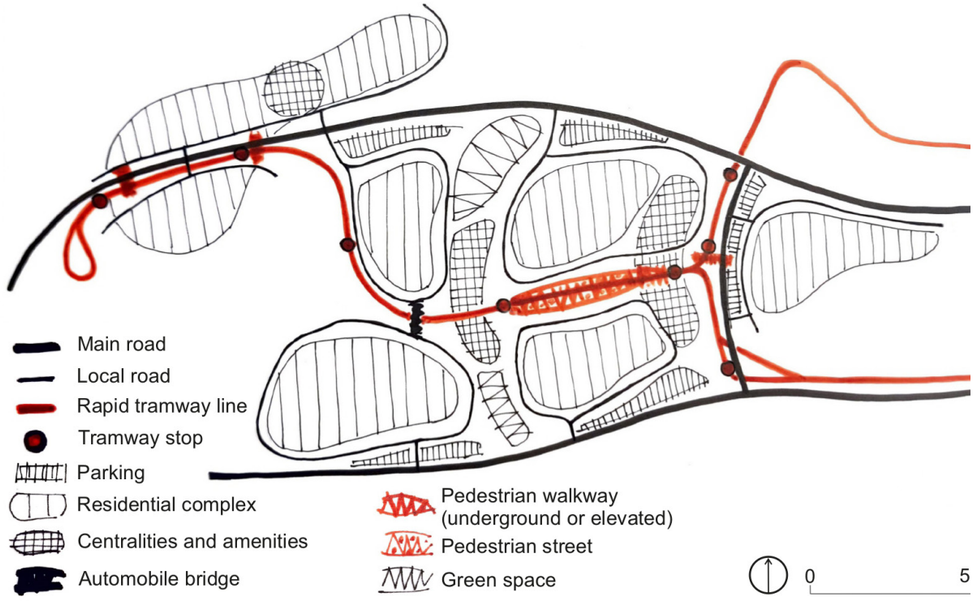


Fig. 189. Interpretative scheme of traffic organisation in Gorbitz. Source: Author's elaboration. It is possible to appreciate the differentiated structure where car transport was located outside, and tram traffic plus pedestrian traffic and facilities were oriented towards the interior of the residential area. Whereas road traffic in the residential area was limited.

ways were needed. Nevertheless, the Coventrystraße (Nordtangenten) road was not built until the middle of the 1980s, so that the requirement for these pedestrian tunnels appeared later.

The layout of tram lines within residential areas necessitated arrangements for pedestrian crossing points, using footbridges or underground subways. However, few such crossings at different levels were planned, this being explained by the limited funding available (Abel, 1984, p. 220; Michalk, 1978, p. 2). Only one pedestrian subway was planned from the very start, lying between Residential Complexes 1 and 2, which were delimited by Julius-Vahlteich-Straße and the tram line (Fig. 190).[55]

As the rapid tram project progressed, there were problems of insufficient co-ordination of construction of the residential areas with that of tramway infrastructure (Dresden Municipal Archive, 1982a, p. 2), but in comparison to the USSR and the CSR, time slippages were not very long. Although there were some delays, attempts were made to incorporate gradual construction of the tramway line into the urban structures as needed. It reached Julius-Vahlteich-Straße in 1983 (at the entrance to Gorbitz), and was planned to extend as far as the Bauarbeiter-Platz (near Residential Complex 2), and Residential Complexes 3 and 4 in 1985. The rolling stock used were T4D and B4D tramcars and trailers, with the possibility of double-ended operation (Abel, 1984, p. 221).

The area along the tram line was conceived as a pedestrianized shopping street. The stretch of tramway between the stops for Residential Complexes 2 and 4 was laid out with green areas and paved public spaces. This pedestrian street did not continue all the way to the end of the residential area because from Residential Complex 3 onwards the tram line was designed to run sub-surface. This solution was not adopted because of any desire to isolate or separate the tramway from the residential area, but was forced by the relief of the terrain, which sloped 10% (one in ten) from west to east. To reduce the gradient to the maximum with which trams could cope, approximately one in seventeen (6%), excavation was unavoidable (Abel, 1984, p. 220). In spite of this, tram stops were in all cases integrated with the central facilities and public spaces of Gorbitz (Fig. 191 and 192).

In conclusion, it can be said that the new concept of enhancing the role of trams and improving pedestrian access to them was successfully implemented in Gorbitz. A crucial factor was the co-ordination of work between the State and local authorities, as well as the continuous involvement in the project of the Municipal Department of Transport.

55 It should be noted that the organisation of the intersection of tram and pedestrian traffic on one level was considered possible with the requirement for tram speeding down near the stops. Whereas pedestrian crossings at different levels were considered necessary only in areas with high density and intensive pedestrian traffic (ZFIV, 1976, p. 39).

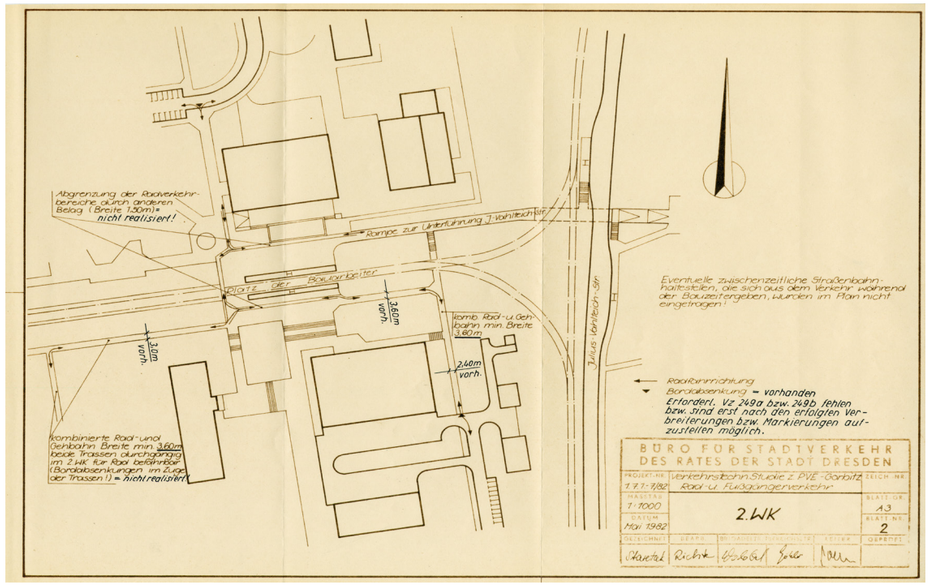


Fig. 190. Traffic study for Gorbitz, with cycling and pedestrian traffic, carried out in 1982 by the Dresden Municipal Department of Transport. Source: Dresden Municipal Archive (1982b) *Verkehrstechnische Studie z. PVE Gorbitz Rad und Fußgängergerverkehr, 2.WK*, Büro für Stadtverkehr des Rates der Stadt Dresden, 9. 1. 2. - 14. It should also be noted that the tram stop integrated with the amenities and services that formed the entrance to the residential area. The pedestrian crossings were organised on level ground, although it is also visible the subway between residential complexes 1 and 2.

Fig. 191. View of Gorbitz in the late 1980s. Source: Dresden Municipal Archive, 6.4.40.2-I7453_00025293. It can be noted the integration of the rapid tram stops with the public space and the socio-cultural amenities on the same level.

Fig. 192. View of Bauarbeiterplatz and residential complex 2: Günter, T. (1987) Wohngebiet Dresden-Gorbitz, *Architektur der DDR*, 11, p. 17. Here, it is also possible to observe the integration of the tram stop with the public space and the amenities of the residential area.

4.2.4. NEW HOUSING AREAS IN THE CSR: THE VARIETY OF CONCEPTS

From the start of the 1970s the CSR, as had the GDR, launched a large-scale programme of new house building [*Program Bytové Výstavby*]. The aim was to build some 1.3 million new dwellings between 1975 and 1980 (Kasalický, 1978, p. 9). Residential areas were called *sídlišti* [housing estates] or *sídelní útvary* [settlement units]. Their size was variable, but never less than 5,000 inhabitants (VÚVA, 1979, p. 9), so that they constituted new residential areas with high population densities located on the periphery of cities (Hrůza, 1977, p. 243). The idea of a differentiated hierarchy of residential areas was maintained during the 1970s. This involved some increase in the prominence of broad streets and roads in the structure of new residential areas.[56] Large pedestrianized housing areas were sometimes planned with limited access for motor traffic, for instance in the district of Bystrc in Brno. However, but in most cases the residential zones were easily passable for road traffic, as in Bohunice, Petržalka, Jižní Město and Jihozápadní Město in Prague.

In the CSR the 1970s saw some criticisms of the way new residential areas were conceived, mostly in relation to questions of the monotony of housing (Krivý, 2016,

56 In contemporary research dedicated to the planning of residential areas this period is referred to as the "technocratic phase" (Skřivánková, 2017, p. 41; Sirisornpattapon, 2019, p. 61).

p. 78). This led to a search for adjustments to the existing planning approaches. Various researchers stress the different nature of new residential areas planned and built after the early 1970s (Sirisornpattapon, 2019). However, during this decade there was no coherent, well-structured approach to the planning of new housing, since the major changes started in the early 1980s. Improvements in the 1970s focused on some partial aspects of planning, such as parks, public spaces, urban design, and so forth (Krivý, 2017; Dostalík, 2020), later extending to other aspects like pedestrian streets or the relationship between private and public space (Krivý, 2016, p. 84). In any case, while there did seem to be some attempt to seek continuity with the historical form of the city, transport and traffic issues continued to be largely overlooked.

Thanks to their distance from the city and the buffer zones generated by green areas, housing zones on city peripheries could be considered suburban in nature (Logan, 2019, p. 98). It was essential to arrange for communications between such residential areas and city centres using some rapid means of mass public transport. The futuristic proposals of the CSR planners were distilled in 1967 in plans for a proposed satellite town called Etarea near Prague. They foresaw an underground corridor for trains and extensive space for cars to circulate. Two other Prague projects, Jižní Město and Jihozápadní Město, were also based on metro lines, but several decades were to go by before they actually came into being (Dostalík, 2020). However, in most cases, the approach adopted were plans to combine tramway systems with road infrastructures at ground level.

Tram transport was extremely important in providing access to industrial areas and in transporting large flows of workers (Muliček, Seidenglanz, 2019, p. 167). Pedestrian mobility was solved by means of subways or footbridges. Examples are to be seen at Karlova Ves in Bratislava, Ostrava-Jih in Ostrava, Bystrc in Brno and smaller residential areas such as Ďáblice in Prague and Bolevec in Pilsen. In fact, some degree of futuristic aspiration was always present in transport planning in the CSR, as evidenced by the proposals to run trams underground or on elevated tracks to avoid same-level intersections with other types of traffic. However, there were significant time lags, since tramway systems were slow to implement, and this required the organization of temporary bus services (Muliček, Seidenglanz, 2019, p. 167). For some residential areas, the construction of related tram lines was not completed until after the post-Socialist period arrived (Mulíček, Seidenglanz, 2019, p. 169).

Czechoslovak planners did engage in some debate on what the appropriate approaches to planning new residential areas might be. In the book *Koncepce Dopravy v Obytných Zónách* Concepts of Transport in Residential Areas) published in 1968 by J. Štastný and J. Soukup, it was stated that it was desirable to combine road and tram infrastructures, so the idea of running public transport of the roads within residential areas was still seen as one possible option. This ambiguity may be explained by the fact that rapid tramways were believed not to be compatible with pedestrian safety (Štastný, Soukup, 1968, p. 84). Hence, the authors advised the combining of road and tram traffic on one infrastructure (Fig. 193), an idea that was further developed and applied in the 1970s, for instance, in the project for public transport in Bratislava from 1974 (Fig. 194).

It is worth noting that one of the striking features in the CSR was the emphasis laid on arranging for green space, and this, together with road infrastructures, was part of the technocratic planning of the 1970s (Dostalík, 2020). In most of the proposals from this period, mass public transport was to be combined with cars on the same transport corridor, so as not to interrupt pedestrian flows. This approach had already been in existence in the 1960s and was bolstered by confidence in the supposed new and unlimited possibilities for technological development in transport. This became even more widespread as large residential areas were planned in the 1970s.

In the 1974 transport study for Ostrava, for example, attention was paid to innovative solutions in urban transport, with Brian Richards' *New Movement in Cities* (1966)[57] treated as a benchmark. Richards was one of the advocates of the possibilities arising from the technical revolution in urban transport and the planning of fully motorized cities.

Several examples of novel means of urban transport were suggested as possibilities for future development in Czechoslovakian cities (Fig. 195). In respect of fast tramways, stress was laid on the fact that in order to achieve maximum efficiency they should have no barriers to free circulation (Lukášika, 1974, p. 210).[58] This is likely to have been why pedestrian subways and footbridges, together with some underground stretches for rapid tramways, were widespread solutions in housing projects in the CSR.

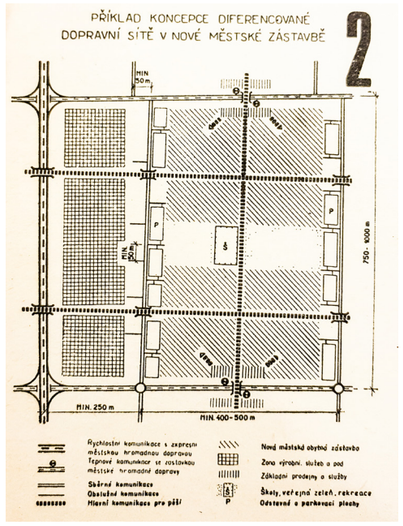
Although they do not include the changes in concepts mentioned above, a couple of experimental projects from the middle 1970s located in Brno, Líšeň and Bohunice, are worthy of note. These schemes were based on a separation between trams and road traffic. The concept of Líšeň dates from the "Beautiful" or "Humanist" period, when considerable attention was paid to large green spaces, while Bohunice was developed during the "technocratic" period when pride of place was assigned to road infrastructure planning (Skřivánková, Švácha, Lehkoživová, 2017, p. 44). The ideas for public transport in these residential areas were quite similar to the concepts developed in the GDR in the 1970s, in which tram lines were separate from road infrastructures and ran through the centre of the zone of housing. Another interesting example would be the new residential area Nový Barrandov in Prague in the early 1980s. It is considered to be the clearest example of a planning paradigm change from Modernist to post-Modernist.[59] The layout for housing went back to more traditional ideas with tower blocks occupying smaller surface areas. However, the tramway system here remained somewhat lacking in integration with the structure of the residential area and associated spaces.

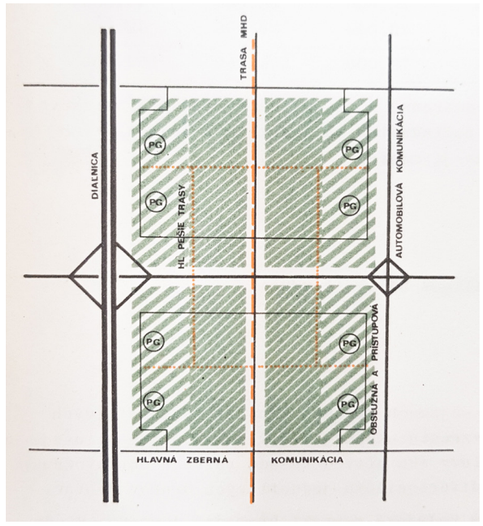
Thus, it can be said that there was a variety of ideas in the concepts deployed for new residential areas during the 1970s in the CSR. There were no planning prin-

57 See reference in Lukášika, 1974. Regarding transport solutions in residential areas, Brian Richards recommended avoiding location of tram lines in the middle of roads, because of difficult pedestrian access to stops, while emphasising the possibility of complete separation or independence of railway line (Richards, 1966, p. 29).

58 It was exemplified by the negative practice in Ostrava, where the rapid tram lost its attractiveness due to mixing with other types of urban traffic.

59 According to Skřivánková, L., Švácha and R., Lehkoživová, 2017, this project relates to the post-modernist period.





Left, Fig. 193. A concept of combining road infrastructure with public transport. Source: Štastný, J. (1971) Zásady pro Uspořádání Dopravního Vybavení Měst, *Architektura ČSR*, 4, p. 46. The space within the residential area was preserved for pedestrian traffic and parks. The centres are located on the periphery of the residential area next to public transport stops and road infrastructure.

Right, Fig. 194. Concept of solution of new residential areas based on the combination of automobile and public transport infrastructure and located in the middle of the residential area. Source: Útvar Dopravného Inžinierstva Mesta Bratislavy (1974) *Návrh Ďalšieho Rozvoja Mestskej Hromadnej Dopravy v Hlavnom Meste SSR Bratislave*, Bratislava: Kartografia, n. p., p. 36. It can be noticed that, next to the public transport line, it was proposed to increase the housing density and locate the facilities. A similar concept was applied in the planning of the new residential area Petržalka in Bratislava in the 1970s.

Fig. 195. One of the ultra-modern solutions included in Miroslava Lukášika's study. Fast railway cabins for individual use with a speed of up to 80-115 km/h. Source: Lukášika, M. (1974) Dopravní Prostředky a Systémy, jejich Vývoj, Inovace, in Zmija, K. (ed.), *Studie Přehodnocení Koncepce MHD v Ostravě*, Ostrava: Útvar Dopravního Inženýrství Města Ostravy, p. 230. One can notice the spatial solution of the stop where there is a differentiation of levels to provide conditions for the development of high speeds. A similar solution was applied in Líšeň and Bohunice in Brno.

ciples established by the state or generalized among planners. To overcome the power of the ideas put forward by Modernism, an integrated and well-developed approach was needed. The separation of traffic and the extensive construction of roads were ultimately the main ideas in the conceptualization of new residential areas. Nonetheless, there were also some experiments in tramway planning, which will be discussed further.

a. The Case of Líšeň in Brno

A decision to set up a new residential area at Líšeň in Brno was included in the general plan for that city 1970. It was located in the eastern part of the urban area, close to an existing industrial zone (Fig. 196). The ideas for Líšeň were included in the *Stavoprojekt Brno* [Construction Project for Brno] in 1972, with the intention of housing around 23.500 people (Fig. 197). In the project, stress was laid on providing an ample town centre with a station, and having an underground fast tramway line, although the main priority was for the road infrastructure (Fig. 198). However, the Líšeň project was postponed, not being completed until 1978 (Fig. 199). Both the initial and the final forms of the project retained the concepts of segregating trams from road traffic, and of setting the tram line within the residential area.

The main thrust of the Líšeň project was to keep the tramway separate from the road infrastructure. It is likely that one of the benchmarks for this project was the new English town of Runcorn, started in 1966. The architect Jiří Hrůza studied this case in a 1968 publication *Runcorn - Nové "Nové Město"* [Runcorn, a New "New Town"] emphasizing the separation of flows of private and public transport, and pedestrians. A further account of experiences in the second generation of English New Towns, in this case Runcorn and Redditch, was published in 1967 in the journal *Urbanismus a územní plánování* [Town and Country Planning], focusing particularly on solutions for public transport systems.

In order to integrate the new residential areas of Líšeň into the main the city, it was necessary to incorporate a rapid tramway. Initially, the tram line was planned to follow ulice Bubeníčkova [Bubeníčkova Street], but later the route was changed to ulice Táborská (Brno Municipal Archive, 1972a, p. 3). Running the tramway along Bubeníčkova Street in the northern part was seen as undesirable if green spaces were to be preserved. In any case, the construction of the tram line would involve considerable cost.

The tram route was not planned as an axis giving a structure to Líšeň (Fig. 200). The residential blocks were not built around the tram stops, rather, they were oriented towards the roads, while green areas and amenities were located in the vicinity of the tramway. The effective maximum distance to access tram stops thus grew to some 500 to 600 metres. It was stressed that the intention was to have a service coverage area reaching out 400 metres either side of the tramway, while remaining zones outside this swathe were to be served by buses (Brno Municipal Archive, 1972b, p. B8). The tramway thus lost any principal role in the residential area, serving only 60% of its inhabitants.

The tram stops did not have the urban setting that might have been expected. Although there were direct pedestrian connections to each stop, they were quite far from the residential blocks (Fig. 201), which was a factor discouraging wide use

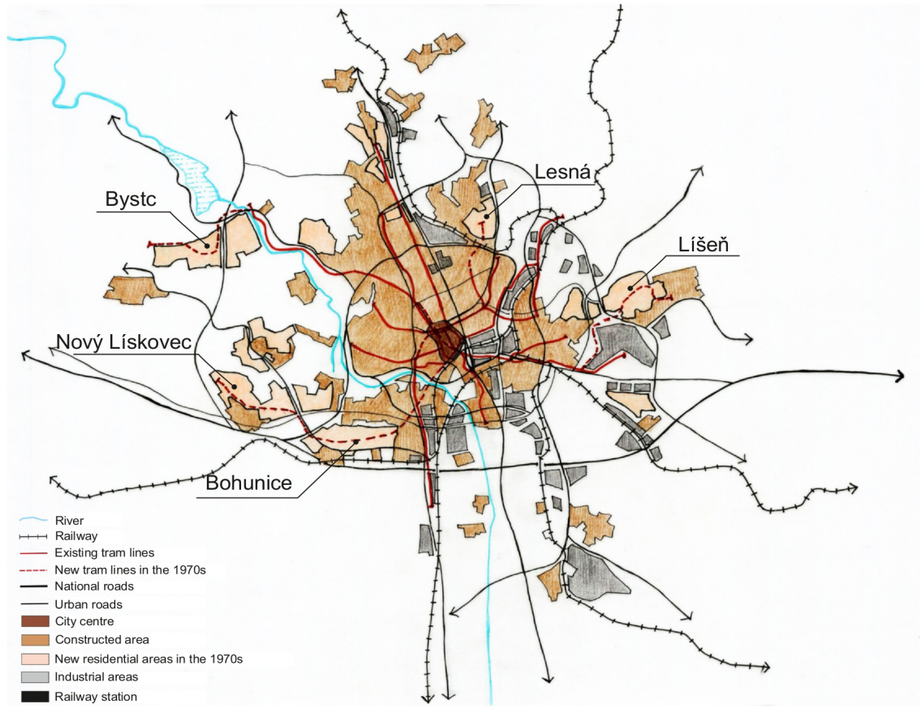


Fig. 196. Summary plan of Brno showing the location of new residential areas and the extension of the rapid tramway lines. Source: author's elaboration based on the urban plan of 1981 and the rapid tramway project for Brno of 1978, as well as the doctoral thesis of Pecka, L. (2013) *Brno Housing Estates and their Urban Structure*, PhD thesis, Brno University of Technology. It can be seen that new residential areas were not always located close to residential areas, so the planning of the rapid tramway was certainly important in order to organise workers' movements.

of tram services. A similar situation affected amenities and public spaces. This situation is probably to be explained by the objective of running the trams at high speeds within the residential area. The planned maximum velocity for the tramway was 80 kph (Brno Municipal Archive, 1972b, p. 3), which is a strikingly high value. It was not possible at the same time to achieve such speeds and have good integration of stops into the residential area. Hence, the technical functional role of the tramway was prioritized over any potential part to play in providing a structuring element for the district.

It should be noted that there were differences of opinion between the town planners and transport specialists during the planning of Líšeň. Transport solutions were developed within the urban project by *Stavoprojekt Brno* in 1973, while the transport planning organisations, *Dopravně inženýrská organizace města Brna* [the Transport Engineering Department of the City of Brno] and *Odbor Dopravy Národního Výboru Mesta Brna* [the Traffic Section of the National Committee for the City of Brno] were involved only in the initial discussions of the residential project and had almost no decision-making competence.

Fig. 197. Tramway in the Líšeň residential area realised by Stavoprojekt Brno, 1972. Source: Brno Municipal Archive (1972a) *PÚP Sídliště Líšeň, Stavoprojekt Brno*, Útvar Územního Plánování a Architektury, NV města Brna. In the initial project of November 1972, it can be seen that there was a concentration of housing near the road infrastructure, while in the central area there was a large amount of green space, with a low residential density.

Fig. 198. Scheme of the spatial organisation of the centre of Líšeň. Source: Brno Municipal Archive (1972a) *PÚP Sídliště Líšeň*, Stavoprojekt Brno, p. 11. It can be noticed the implementation of the underground access to the tram stop, liberating the ground space for the circulation of automobile traffic, car parking and pedestrian area.

Fig. 199. Urban project of Líšeň, (*PÚP, Podrobný územní plán*), modified in 1978 by Stavoprojekt Brno. Among the main changes was the relocation of a secondary centre in the eastern direction, in order to take advantage of the accessibility of the intersection of two major roads. The traffic solution in this centre was similar to that of the main centre, with the organisation of the underground route of the rapid tramway, the underground car parking and traffic-free pedestrian area. Source: Brno Municipal Archive (1978) *Sídliště Brno - Líšeň, Situace, Stavoprojekt Brno*, Útvar Územního Plánování a Architektury, NV města Brna.

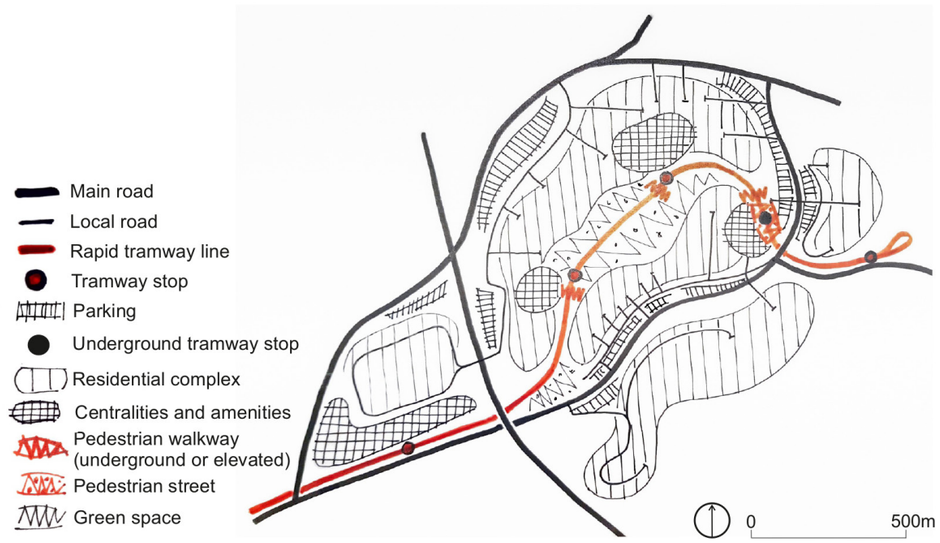


Fig. 200. Interpretative scheme of transport and traffic in Líšeň. Source: Author's elaboration. It can be noted a relatively well-defined residential structure. The residential complexes with car parking were oriented towards the peripheral roads, while the centres and the park had an internal orientation along with the tram line. Pedestrian tunnels and overpasses were important elements for the organisation of rapid tramway stops.

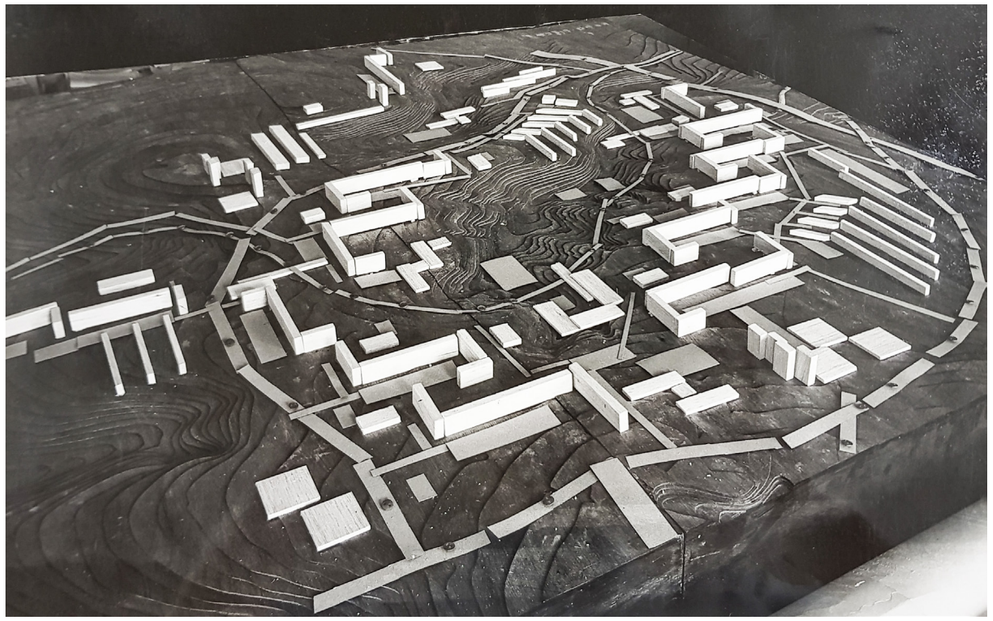


Fig. 201. Model of Líšeň, realised in 1974 by Stavoprojekt Brno. Source: Brno Municipal Archive, Útvar Územního Plánování a Architektury, NV města Brna. In the centre of the residential area, it is possible to discern green space that endowed the tramway line with a certain suburban character. This was reinforced by the trenched route of the tram line.

In a letter to the Department of Urban Planning and Architecture of Brno from a group of transport specialists, there was mention of the need to reconsider the relative location of residential blocks. The transport planners advised the concentration of housing around tram stops so that 90% of residents would be covered by tram services (Brno Municipal Archive, 1974a, p. 1), rather than the inadequate 60% then envisaged, which could make the tram service uneconomical (Brno Municipal Archive, 1974a, p. 1), as may be seen from Fig. 202. They doubted there was any necessity to establish complementary bus routes if the relevant adjustments to planning for the tramway could be made (Brno Municipal Archive, 1974a, p. 1). They advised differentials in population densities, so that 45% of potential passengers would live within 300 metres of a tram stop. In order to achieve this, an adjustment to the tramway route was necessary. However, all these ideas were ignored in the project, which showed not only a lack of co-operation and communication between urban and transport planners, but also a lack of integrated understanding of the two fields of planning.

The Líšeň project is a good example of the application of fresh transport ideas in the Czechoslovak concepts for new residential areas. However, although the tram line ran through the middle of the housing zone, town planning took no account of technical criteria from transport planning, and vice versa. This resulted in a limited integration with the residential area and poor siting of the tram stops. The line was conceived of as suburban, and spatially separated amenities and public spaces from the housing areas, which intensified the problem of dehumanization of resi-

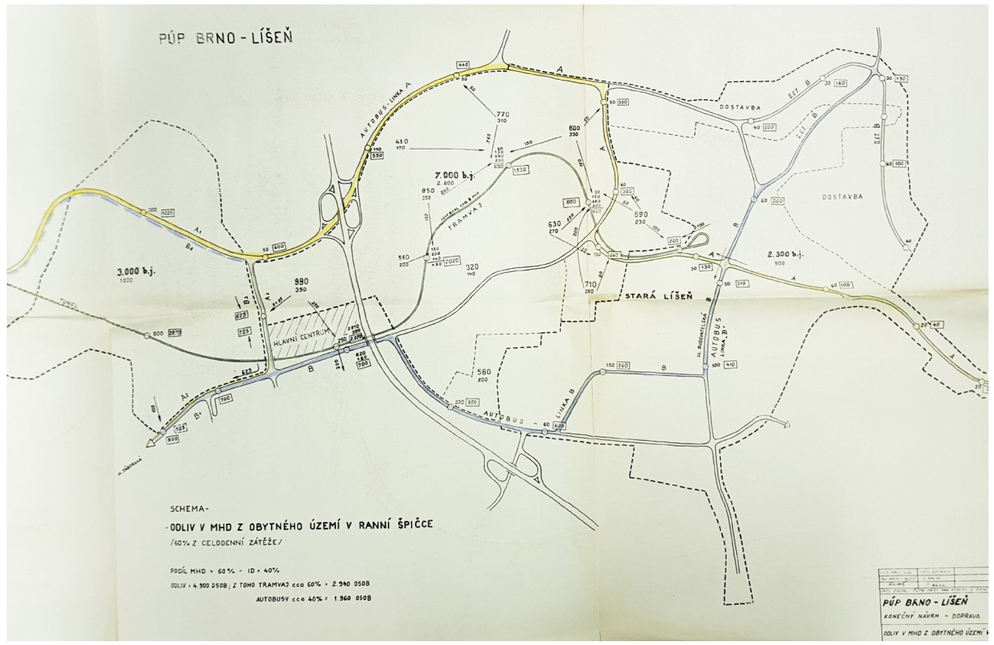


Fig. 202. Traffic scheme in the morning rush hour in Líšeň [*Schema Odliv v MHD z obytného území v ranní špičce*]. Source: Brno Municipal Archive (1973) *PÚP Brno-Líšeň, Konečný Návrh - Doprava, Schema Odliv v MHD z obytného území v ranní špičce*, Stavoprojekt Brno, Útvar Územního Plánování a Architektury, NV města Brna. In this work Stavoprojekt Brno developed the proposal on the division of public transport traffic, 60% for trams and 40% for autobuses.

dential zones. Access for pedestrians was impeded by distance and the unevenness of the terrain. Thus, although direct access on foot to stops was arranged, the advantages and opportunities of a rapid tramway were not fully exploited.

b. The Case of Bohunice in Brno

Another example of a new residential area with a solution based on independence from the tram line is Bohunice, dating from 1972 and housing 30.000 inhabitants. It was located south-west of the heart of Brno, close to an existing industrial zone, but owing to the considerable distances to be covered it was not possible for residents to go on foot to the industrial estate. Hence, the fast tramway had to provide for access both to workplaces and to the historical city centre. Similarly to Líšeň, in Bohunice central facilities for the district were located close to the tram line, but were isolated from it by a difference in ground levels. To get from the housing blocks to tram stops required using a stairway, which limited any integration between the tramway and residences. Also, as in Líšeň, the tramway was seen as a rapid transit system that should pass quickly through residential areas, while ensuring good conditions for pedestrian safety. To achieve this, the tramway was set in a cutting, with crossing points for people on foot being on a different level from the tracks (Fig. 203).

Although there were many similarities to Líšeň, there were also differences in the solutions adopted for the rapid tramway. First, since there was no central park

Fig. 203. Model of Bohunice, 1972. Source: Brno Municipal Archive, Útvar Územního Plánování a Architektury, NV města Brna. The compactness of residential units and blocks can be seen in relation to the tram line. It can also be seen that, for most of its route, the tram line was accompanied by a local street which, despite its transitory character, was a barrier to pedestrian access to the stops.

next to the lines, residential blocks could be set close to the tram route. Secondly, the urban structure of Bohunice was not as coherent and clear as in Líšeň. The streets and roads that traversed Bohunice impeded communications between residential complexes and tram stops; in fact, the housing located in the western part of the district had no direct access to the tramway. In consequence, there was a need to build various pedestrian subways and footbridges, as well as underpasses and flyovers for cars (Fig. 204 and 205).

To gain a better understanding of the patchy way in which the concept of tram segregation was established in both Bohunice and Líšeň, it is of interest to consider the theoretical study published in 1976 by the GDR planner S. Gramzov (Fig. 206). In this document, different levels of integration of tram infrastructures into residential areas were analysed. He offered several instances of the planning of an independent tram line through the middle of a residential area, which nevertheless did not take full advantage of trams in the town planning solutions adopted. Residential areas and amenities were closer to tram stops than to the road infrastructure, but some stops had no central facility planned near them, being merely pick-up and drop-off points for passengers. Gramzov assessed these as acceptable solutions, although he considered them far from perfect.

Moreover, once again there were problems of a lack of integrated implementation of the tramway line, leading to delays in construction. Thus, when the city published transport development plans in 1974 and in 1979, they mentioned the desir-

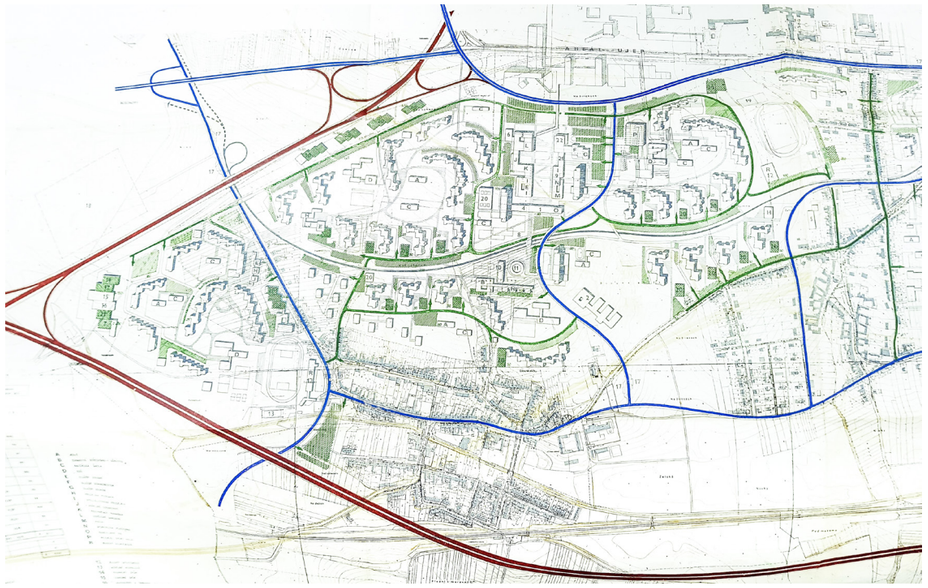


Fig. 204. Bohunice Project realised in 1972 by the Department of Architecture of Brno. Source: Brno Municipal Archive (1972) *General Solution of the Czechoslovak-Soviet Friendship Housing Estate Brno-Bohunice*, Stavoprojekt KPO Brno, Department of Planning and Architecture, Brno City Council.

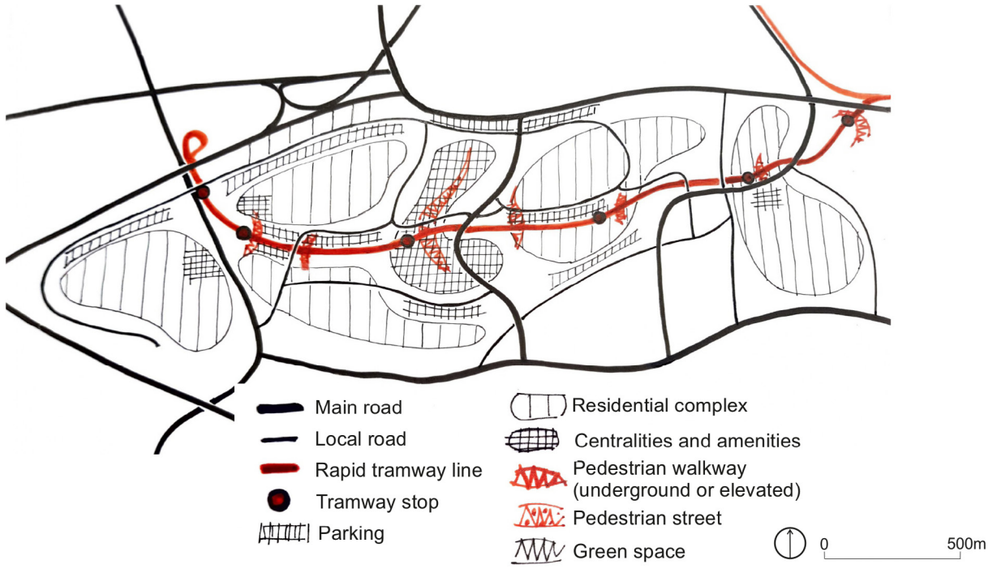


Fig. 205. Interpretative scheme of Bohunice. Source: Author's elaboration. The route of the road infrastructure was planned next to the tramway line. The residential area was divided by the large streets and a variety of local streets surrounding the living spaces. Also notable is the variety of pedestrian crossings in tunnels and overpasses.

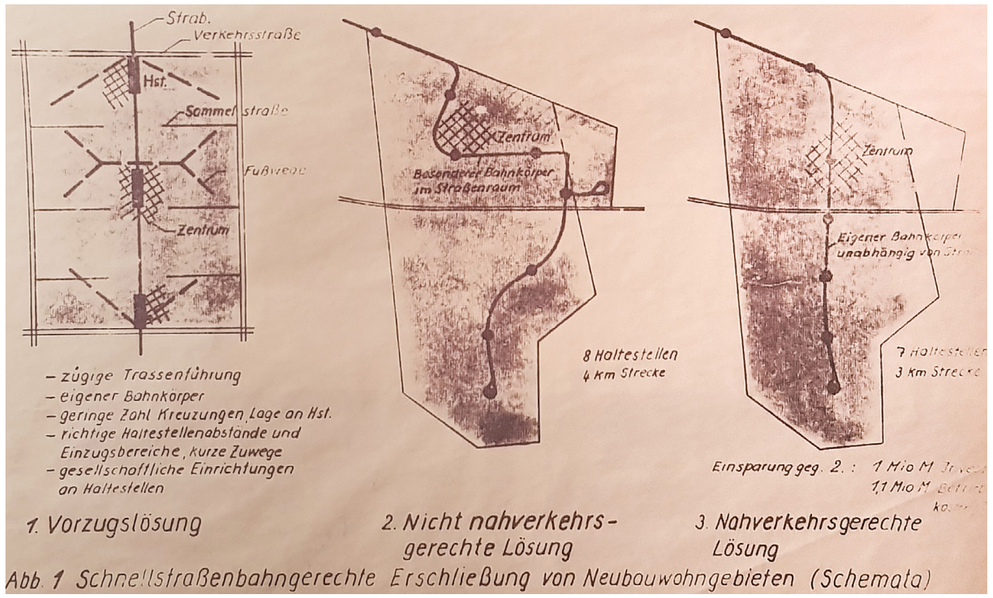


Fig. 206. Gramzov's theoretical scheme similar to Bohunice's concept. Source: Gramzov. S. (1976) *Information für leitende Kader des Verkehrswesens*, Berlin: ZFIV, p. 11. Gramzov indicated here different levels of integration of the rapid tramway with residential areas. The first example shows a perfect case, when land use planning is integrated with the tram system, the second example shows an unacceptable case as uneconomical and less integrated, and the third demonstrates a possible solution.

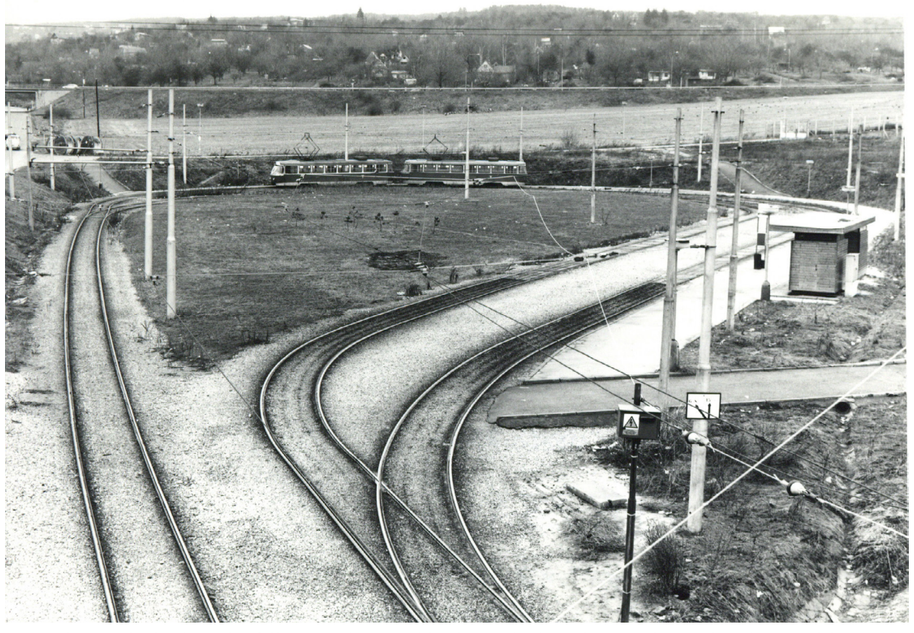


Fig. 207. The technical end-of-line station and its loop, belonging to the Bohunice rapid tramway in 1985. Source: Brno Municipal Archive, AMB-U5-XXIa57-01, Útvar Územního Plánování a Architektury, NV města Brna. It can be noted the large space consumed by the tramway loop, which is strictly necessary for trams with a single cabin. The existence of double-cab trams in the communist countries of that period was limited, so that loops were frequently applied.

ability of providing tramways for Bohunice and other large residential areas such as Líšeň and Bystrc (Brno Municipal Archive, 1974b, p. 3; Brno Municipal Archive, 1979, p. 7). In the meanwhile, accessibility to these areas was ensured in the shape of bus services, and the building of the tramway lines in the end was postponed until the 1990s. This also affected the project for an end-of-line tram loop, which required a large space and so was to be set up on free land outside the residential area (Fig. 207).

It can be concluded that, like Líšeň, Bohunice was not a successful development, as it was based on the idea of rapid circulation of trams, whilst integration of lines into town planning was neglected. Thus, the tram line did not act as an element giving urban structure, but was merely a transport feature. Its location roughly in the centre of the residential area was probably encouraged with the aim of enhancing access to the tram stops from the spatially isolated residential complexes. Not all of this housing had direct pedestrian access to stops, being separated by streets. Another obstacle was the unevenness of the terrain, which sat first sight seemed to be of use in separating the rapid tramway from residential spaces.

c. The Case of Nový Barrandov in Prague

The Nový Barrandov project in Prague was conceived in 1981 by the architects Z. Hölzel and J. Kerel to house some 17,000 people. It has usually been characterized as a post-Modernist project as it has an enclosed layout with conventional residential blocks (Němcová, 2014; Koukalová, 2017). It has thus been seen as exemplifying the paradigm shift in Czechoslovak town planning.

Several novel ideas were applied in designing this area of housing. One feature was that the road infrastructure apparently allowed for greater access to the residential blocks. The inclusion of a pedestrian corridor was intended to give a clearer structure to the residential area and to improve its urban character. This corridor was to connect amenities, public spaces and tram stops. At the points where roads and tram lines met, there were proposals for footbridges or elevated crossings, this addressing both pedestrian safety and rapid traffic flows. Hence, the idea of strict separation of road traffic, trams and people on foot remained unchanged.

As in the two previous instances, the tramway layout was established in combination with road infrastructures and was poorly integrated into the residential area. The same sorts of solutions were applied to conceal the tram line, at least in part or at points, in order to avoid any kind of conflict between flows. The idea was to establish links to tram stops by siting facilities and public open spaces close to them. However, these connections were indirect and the principal aim was to avoid mixing such functions with traffic. Thus, it can be said that, although Nový Barrandov has been seen as a prime example of the paradigm shift in town planning, there were in fact no really salient changes in transport and traffic plans here (Fig. 208).

From this analysis of Czechoslovak cases it can be seen that during the 1970s and early 1980s there were several attempts to respond to the needs of new residential areas. The solutions focused on the development of green areas, on the improvement of the quality of residential spaces, on the creation of pedestrianized streets and more attractive public open spaces, and on changes in the composition, size and design of residential blocks. In contrast, fresh concepts for transport

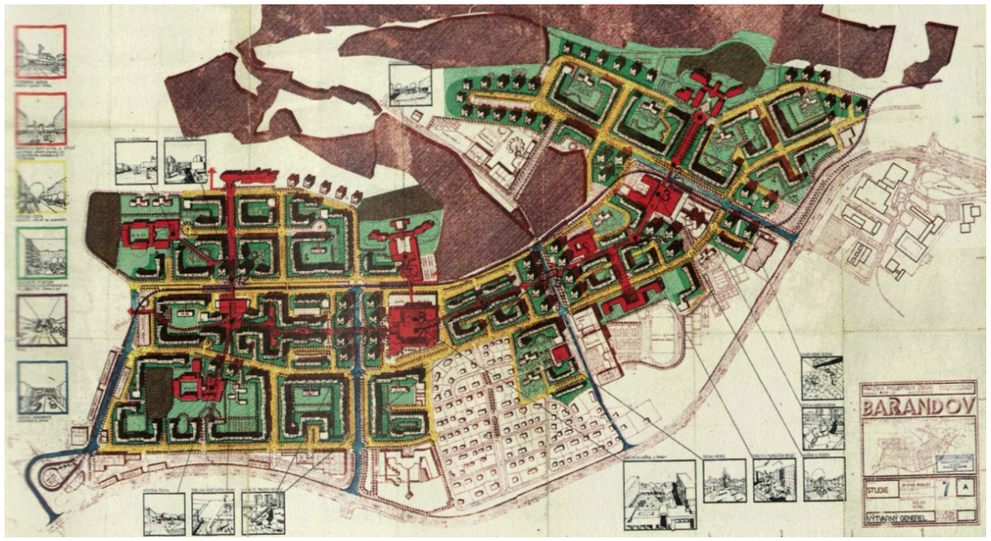


Fig. 208. General plan of the Nový Barrandov project realised in 1981 by Zdeněk Hölzel and Jan Kerel. Source: Koukalová, M. (2017) Prague-Nový Barandov, The phase of "Late Beautiful" and Postmodernist Estates, in Skřivánková, L., Švácha, R., Lehkoživová, I. (eds.), *The Paneláks, Twenty-Five Housing Estates in the Czech Republic*, Prague: The Museum of Decorative Arts in Prague, p. 215. This is one of the attempts to create pedestrian streets and urbanity within the new residential areas, sharing the space of the facilities with the tram stops.

and traffic solutions were scarce. Trams maintained their role as a functional tool in the general structure of new housing areas, but remained an intrusive element in the residential space. At the same time, the supposed requirements of motor traffic and Modernism continued to shape the solutions chosen, with stress laid on a strict separation of functions, together with fast, fluid and barrier-free traffic circulation.

4.2.5. NEW RESIDENTIAL AREAS IN THE USSR: THE PERMANENCE OF THE OLD CONCEPTS

In the 1970s State programmes for mass housing construction [Gosudarstvennaia zhilishchnaia programa] continued in the USSR. Between 1971 and 1975, some eleven million flats were built, and in the next five years there were plans for the construction of 550 million square metres of housing, with a further eleven million flats to be erected by 1980 (Kosygin, 1976, p. 9, p. 16). The construction of extensive residential areas was one of the quickest methods to provide such large amounts of housing.

Although in the 1960s there had been some criticisms of the quality of new residential areas, the planning of the 1970s continued to work with the earlier concepts of *mikroraion* [neighbourhood] and *zhiloi raion* [residential district]. The neighbourhood was the main unit in residential planning, since it incorporated primary services and was reserved for pedestrians only. Use of this type of unit enabled conflicts between pedestrian, car and public transport flows to be avoided, leading to a simple structure and rapid construction. The Soviet architect Vasilii Shkvarikov's book

Mikroraion i zhiloi raion [Neighbourhood Unit and Residential District], which was published in 1971, highlighted once again the importance of the concepts of these two units in Soviet experience. Shkvarikov defended the concept of the *mikroraion* or neighbourhood as the best means for providing people with a comfortable and well-organized lifestyle. Such neighbourhood units were planned to house some 6.000 to 12.000 people in medium-sized cities and some 12.000 to 20.000 residents in larger cities, while the number of inhabitants housed in a *zhiloi raion* was to be 25.000 to 40.000 in middling cities and 40.000 to 80.000 in large (SNIP, 1975, p. 15), as may be seen from Fig. 209.

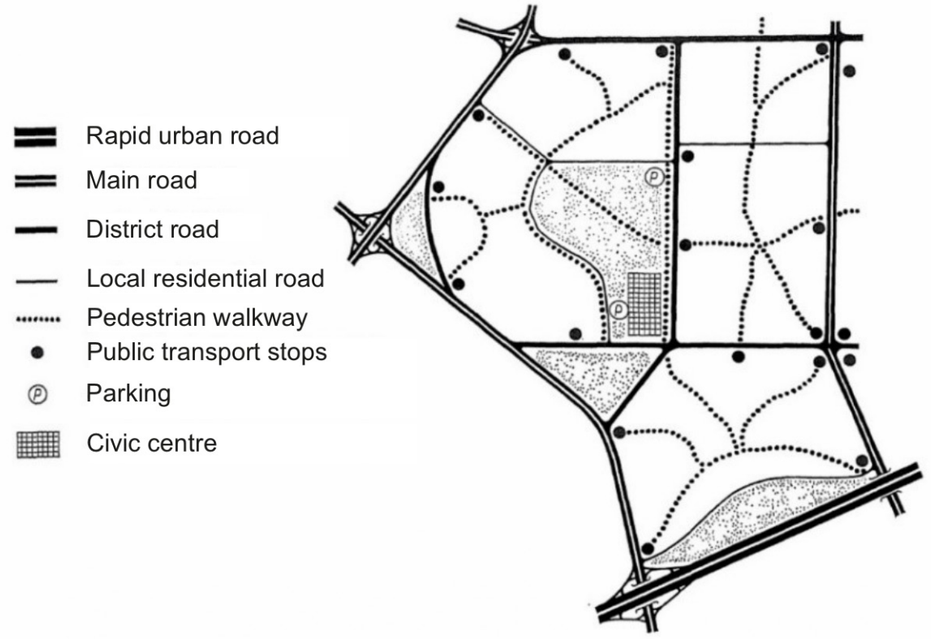


Fig. 209. Road and street network in a new residential area: Soviet example of structuring and classification of elements from 1971. Source: Shkvarikov, V. A. (1971) *Zhiloi Raion i Mikroraion*, TSNIIP Gradostroitelstva, Moskva: Izdatelstvo literatury po stroitelstvu, p. 39. It can be seen that residential area was defined by a grid structure of roads, while there was no specification about the means of public transport, most probably envisaging buses or trolleybus services

As happened in other Communist countries, in the USSR, too, the quality of new residential areas built in the 1950s and 1960s was criticized, advantage being taken of changes in the supreme leadership. In connection with this, in 1969 a Decree of the Council of Ministers of the USSR was issued on 28 May with the title *O merakh po uluchsheniiu kachestva zhilishchno-grazhdanskogo stroitelstva* [On Measures for Improving the Quality of Housing and Civil Construction]. The main objectives of this decree were as stated in its title. Nevertheless, the proposals for improvement were on a very limited scale. They were primarily directed at the idea of breaking up monotony through constructional development, enhancing compositional variety and facades, integrating buildings into their surroundings, providing more amenities, and strengthening the coherence of the planning and construction process. Solutions relating to architecture and urban design were explored, but there was no questioning of the overall urban structure of these residential areas.

Moreover, in comparison with other Socialist countries, in the USSR it was more difficult to make any criticism of established planning principles. State control over urban planning issues was omnipresent. Once again, the main objective was to achieve economically optimal solutions.[60] Productive capacity and productivity were key factors that outweighed other possible factors, and speed and quantity prevailed over quality. More attention was paid to the numbers of flats built than to any question of the quality of this housing (Gunko, Bogacheva, Medvedev, Kashnitsky, 2018, p. 295), so that there were hardly any changes in the views of the relationship between public transport and town planning. Similarly, in the designing of public transport networks there were no relevant changes either; roads and major streets remained the principal elements giving their structures to all residential areas.[61]

The key idea for new housing estates in the USSR was the optimization of passenger flows through proximity to workplaces or the provision of mass public transport. However, neither closeness to places of employment nor decent public transit services were actually in place, which contributed to the problems of isolation in new residential areas (Hess, 2018b, p. 198). Plans for public transport in zones of new housing were limited to cheap, low-capacity types of vehicle such as buses and trolleybuses. This was because arrangements for rapid public transport in new housing zones were still in their infancy, and little was done to provide the spatial conditions for higher speeds.[62]

This problem was aggravated by the fact that in the 1970s the USSR lacked well-organized studies on concepts and criteria for the urban and transport structures of new residential areas.[63] The housing programme accepted there was a requirement for rapid means of collective transport, but this was not accompanied by the evolution of fresh principles for public transport in urban planning. Moreover, one of the most crucial issues that still remained to be resolved was the lack of analyses of the influence of the siting of rapid transit stops in terms of the areas that their services could cover (Rudneva, 1979). This can be seen in the uniformity or rigidity of the concept of the zone of influence of stops, without any attempt to differentiate access times or consider densities of population in the housing constructed. Nonetheless, there were some attempts to put central facilities for new residential areas near tram stops, although they continued to be poorly related to the overall structure of the zones.

This scarcity of theoretical studies of the structure of residential areas had a negative influence on practices in town planning. The inadequacy of approaches to, and debates about, this topic tended to lead to the retention of pre-existing ideas, although a deeply-rooted belief in scientific and technical progress facilitated the

60 One of the attempts to break the rigidity of these ideas was undertaken by the NER group. It was formed by young planners who started their activity in the late 1960s. In their proposals they tried to reconsider human nature and to develop a greater variety of uses and activities, architecture and urban space. As for public transport, pedestrian traffic was not to be disturbed, so stops should be located below civic centres (Bocharnikova, 2019, p. 641).

61 About public transport problems in residential areas in the Baltic countries, see Hess, 2018b.

62 The problem of large differences between communication and construction speeds caused by poor organisation of public rapid transit routes was studied by Vorobiev, 1978.

63 It should be noted that more studies were developed about new towns than about new residential areas.

application of a few modern solutions from Western countries. Among those studies that were undertaken, comparisons between two basic concepts of transport planning in new residential areas were prominent. According to the Soviet architect Rudnitskii, the first, novel concept of transport infrastructure segregation through horizontal separation of road and tram traffic required major changes and revisions in urban structures (Rudnitskii, 1976, p. 34), as shown in Fig. 210.

The independent location of a tramway within a residential area was considered to be difficult to achieve, since it required spatial separation of the entire rapid public transport network by means of tunnels, elevated sections or cuttings (Smolyar, 1972, p. 124), as may be observed from Fig. 211. The appropriateness of tramway segregation was not denied, but seen as suitable only in the form of underground routes, which were not possible in a context of a policy aimed at maximizing rational use of economic resources.

The second concept was based on a combination of private and public transport infrastructures, and was supported by most Soviet planners, as this was considered more conventional and appropriate (Rudnitskii, 1976, p. 30):

> *"The contemporary method based on the routing of combined urban traffic flows along an integrated transport corridor yields one major advantage: in architectural and planning terms, a city using this approach is focused on a single, universal street system. Consequently, the overall architectural solutions for such a city need not go beyond conventional views."*[64]

Backing for this came from a conviction that running public transport underground or in cuttings would be an advantageous solution architecturally (Rudnitskii, 1976, p. 34), as may be observed from Fig. 212.

Thus, the creation of a modern, iconic image for streets gained prominence. The creation of what were described as *mnogoiarusnoe slozhnoe sooruzhenie* [multi-tiered complex structures] (Bolonenkov, Savina, 1972c, p. 76) was seen as one of the most acceptable solutions for developing a modern image in new residential areas (Fig. 213 and Fig. 214).

In this connection, another Soviet architect, Gennadii Bolonenkov, also stressed that it was crucial to insulate residential areas from noise, and to ensure pedestrian safety (1972b, p. 27). Consequently, for those planning new Soviet residential areas combined routes seemed more appropriate than segregated (Bolonenkov, 1972b, p. 36):

> *"This principle for arranging the network of roads and streets meets all the functional requirements for such a layout by distributing flows of motor traffic, and accommodating transport with differing speeds, over a range of thoroughfares of diverse classes and hierarchical ranks."*[65]

64 Современная прокладка городских транспортных потоков по одному комплексному транспортному коридору дает важное преимущество: в архитектурно-планировочном отношении такой город ориентирован лишь на одну систему универсальных улиц. Поэтому ансамблевое решение города здесь не выходит за пределы традиционных представлений.

65 "Этот принцип решения улично-дорожной сети отвечает всем требованиям функционального назначения дорожной сети, распределения машинопотоков и изменения скоростей движения транспорта по сети улиц и дорог различного класса."

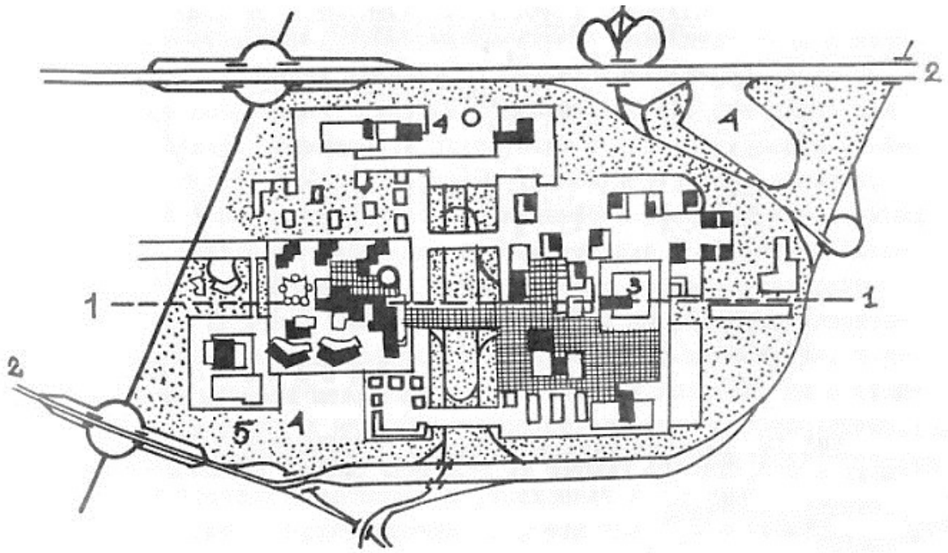


Fig. 210. One of the first Soviet concepts based on the differentiation of road and tram infrastructure. 1. Rapid public transport in tunnels, 2. Roads, 3. Civic centre, 4. Service area, 5. Green space. Source: Bolonenkov, G. (1972b) Vliianie razvitiia transportnykh sistem na strukturu goroda, in Bolonenkov G. B., Smykovskaia G. Y. (eds.), *Transport v planirovke gorodov*, Moskva: TSNIIP Gradostroitelstva, p. 25.

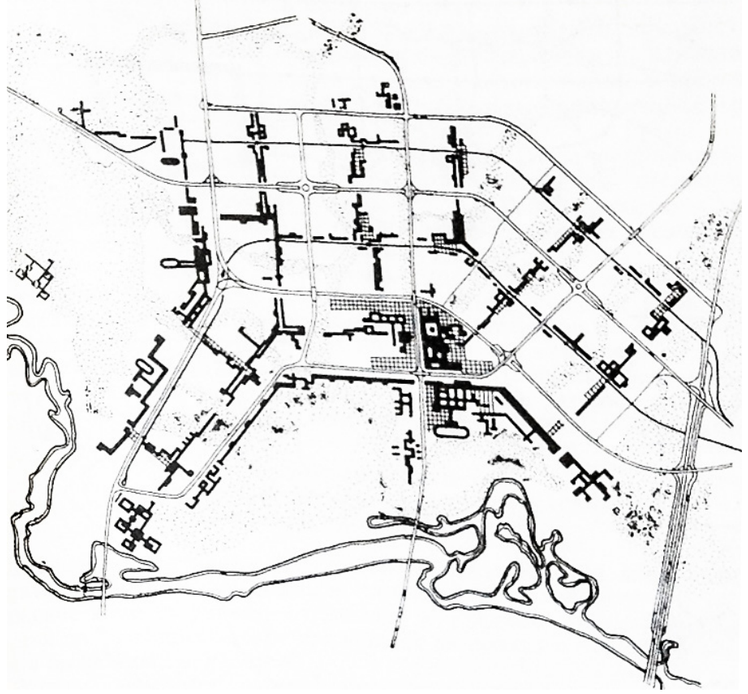


Fig. 211. Structure of the new residential areas of Novolipetsk. One of the few proposals aimed at differentiating public and private transport. Source: Smolyar, I. M. (1972) *Novye goroda*, Moskva: Izdatelstvo literatury po stroitelstvu, p. 125. It was proposed in the early 1970s as one of the appropriate solutions to improve the accessibility of social centres and their public transport stops, as well as to avoid costly construction of intersections and tunnels. The rapid tramway within these residential areas had an underground route.

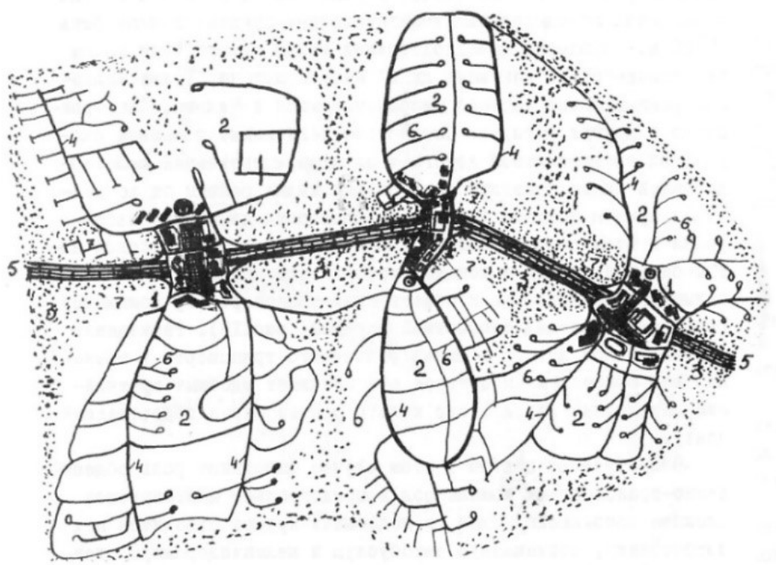


Fig. 212. The second Soviet concept based on the combination of road and tram infrastructure in a communication corridor, 1972. 1. Civic and transport centre, 2. Residential areas, 3. Green spaces, 4. Residential streets, 5. Roads with suburban railway lines, 6. Local valleys, 7. Service area. Source: Bolonenkov, G. (1972b) Vliianie razvitiia transportnykh sistem na strukturu goroda, in Bolonenkov, G. B., Smykovskaia, G. Y. (eds.), *Transport v planirovke gorodov*, Moskva: TSNIIP Gradostroitelstva, p. 28.

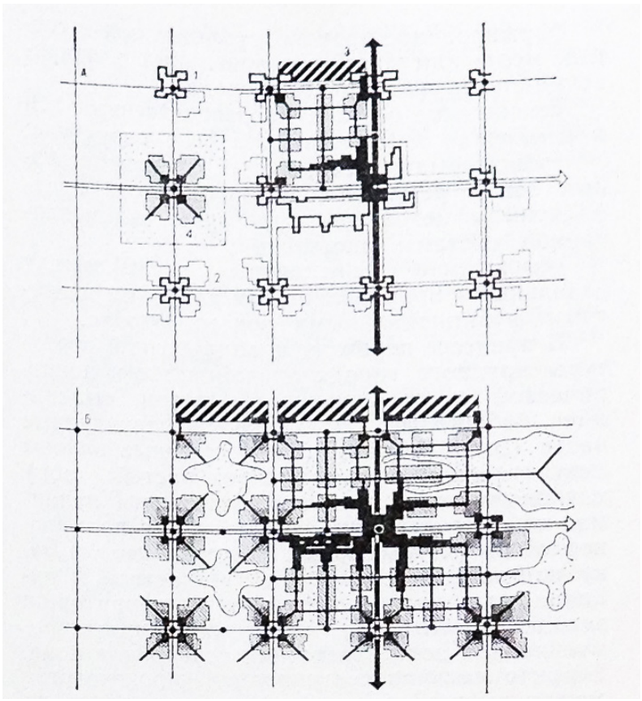


Fig. 213. Organisation of residential areas on the basis of transport nodes, one of the novel Soviet proposals of the late 1970s. Source: Lavrov. V. (1979) *Preobrazovanie sredy krupnykh gorodov i sovershenstvovanie ikh planirovochnoi struktury*, Moskva: Stroiizdat, p. 83.

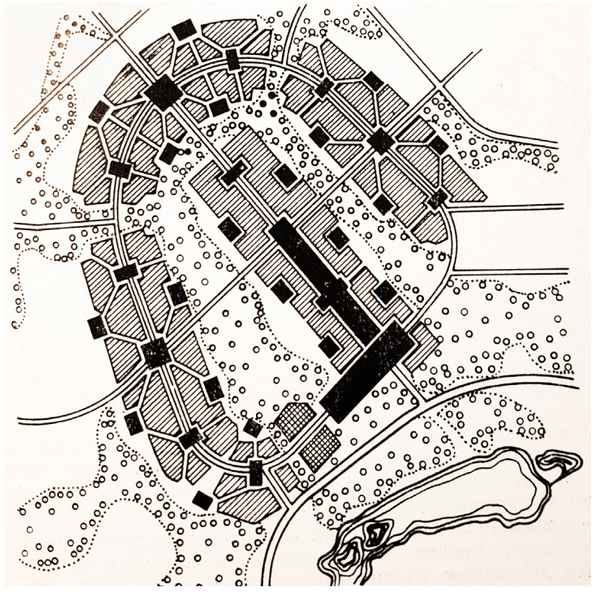


Fig. 214. Soviet example of a contemporary city solution based on a single communication corridor, 1976. Architects: A. Urbakh, S. Rzyanin, V. Lakhtin. Source: Rudnitskii, A. M. (1976) *Transport v planirovke gorodov*, Kiev: Budivelnik, p. 25. This model was generally accepted among Soviet planners and applied in new residential areas.

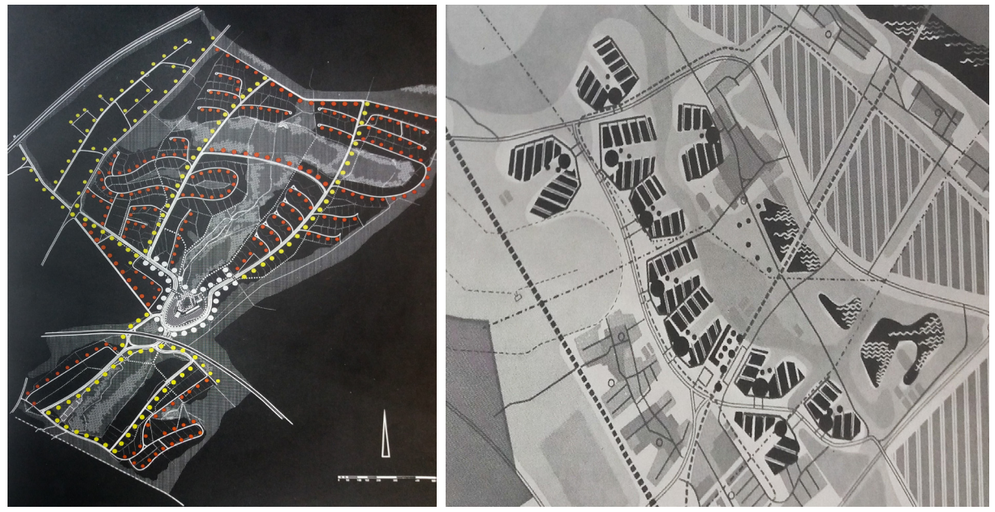


Fig. 215. Examples of organic transport development in residential areas, according to Hans Bernhard Reichow, published in the book *Die autogerechte Stadt: Ein Weg aus dem Verkehrs-Chaos*, in 1959, Ravensburg: Otto Maier Verlag, p. 25 and p. 29. The ideas of the 1950s were still current in the 1970s for the planning of new residential areas in the USSR.

Similar Western concepts proved influential in Soviet town planning, such as the residential areas of Rosengård in Malmö or Vällingby in Stockholm, which were based on the idea of creating transport nodes. American and British examples of planning for transport nodes and social centres were also studied (Bolonenkov, 1972b, pp. 3-32). Additionally, French examples based on routing rapid public transport underground within residential areas and establishing new central facilities around stations were used as a reference.[66] The proposals for organic transport planning made by Reichow, a German planner from the Federal Republic of Germany, in his 1959 book *Die Autogerechte Stadt* [The Car-Friendly City] are equally relevant. They are very similar and oriented towards the idea of rapid circulation of car traffic (Fig. 215).

The generally accepted approach in the Soviet Union in the 1970s was to plan for a single communications corridor [*edinii kommukatsionnii koridor*]. The decision to take this approach was backed by hopes that in the future it would be possible to build metros, suburban railways or even monorails, which for the moment were not feasible because of the expense involved. Thus, the combining in one space of motor vehicle and tram traffic may often have been a solution forced on planners by financial constraints.

The incongruence of running tramways along major road axes was intended to be mitigated by the construction of pedestrian crossings not at street level at tram stops, but in most cases these solutions were not put in place owing to a lack of funds. However, even subways and footbridges were unattractive ways of reaching stops, and this created both physical and psychological barriers for people on foot.

a. The Case of Sykhiv in Lviv

The Sykhiv urban sector in the Ukrainian city of Lviv was a paradigmatic example of the tramway approach in the USSR. A housing project was initiated in the middle of the 1960s in the city's urban plan from 1966 (Mysak, 2018a, p. 14). It was intended that Lviv would grow from 500.000 inhabitants in 1965 to 700.000 in 1990 (Posatskyi, Cherniak, 2019, p. 235). Detailed development work on the project was carried out in the 1970s by *DIPROMISTO* [the State Technical Institute for Urban Projects] as indicated by Fig. 216.

The Sykhiv project was located in south-east of Lviv near an industrial zone, a railway line and a natural park (Fig. 217). The planned size was to be approximately 120,000 inhabitants. One of the objectives in planning this extensive new residential area was to improve access to the industrial zone for workers employed there (Mysak, 2016, p. 8). As the industrial zone and the residential area were close to each other, there was initially no need for mass public transport links between them, but it was important to provide fast, direct connections to the city centre.

A range of options were laid out in a general scheme for all modes of transport, which drawn up in 1975 by Giprograd, a network of planning institutes with its base in Kyiv (Tregubova, Mykh, 1989, p. 210). This scheme primarily developed proposals for a rapid tramway with both routes and stops underground, connecting peripheral areas with the city centre (Posatskzi, Cherniak, 2019, p. 238). This idea was carried

66 French urban geographer Pierre Merlin's book about the *nouvelles villes* was translated into Russian in 1975.

Fig. 216. Conceptual scheme of Sykhiv in the 1970s. Architects Novakivskii, Y., Pidlisnii, Z., Petrova, A., Krupa, P., Dubina, V., and others. Source: Cherkes, B. (2015),p. 2.

Fig. 217. Synoptic plan of Lviv with the location of new residential areas in the 1970s and the extension of tramway lines. Source: Author's elaboration based on the military plan of the city of 1985, schemes from R. Lubitskii (underground tramway development scheme of 1981 and development scheme of underground and overland rapid tramway lines of 1983), the model of 1975 and the tourist scheme of 1989. It can be seen that around Sykhiv a large industrial area was located in between and that the rapid tramway communication was organised only with the central area of the city.

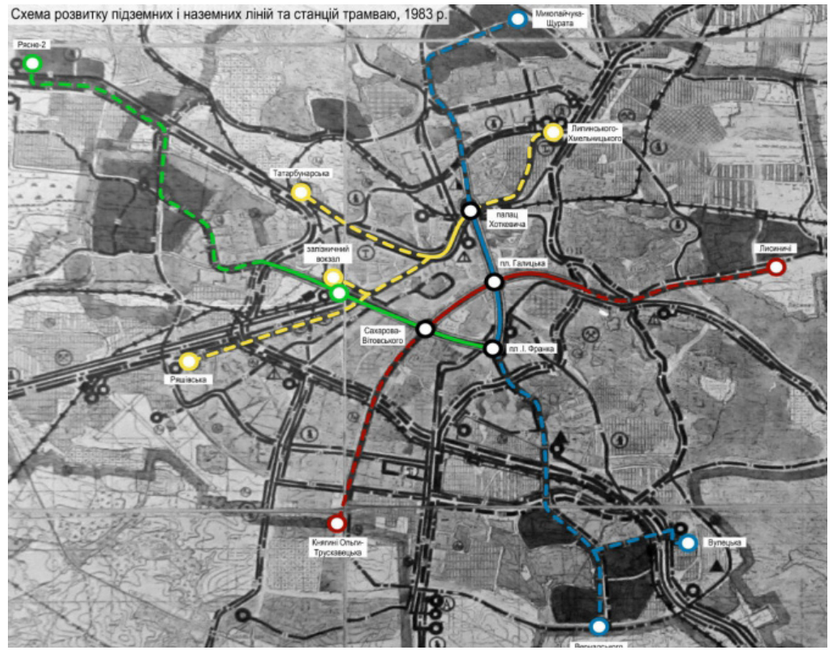


Fig. 218. Plan of development of the rapid tramway system in Lviv in 1983. Source: Mistoproekt municipal archive (retrieved fromhttp://tvoemisto.tv/exclusive/smilyve_rishennya_yak_shvydkisnyy_tramvay_mozhe_rozvantazhyty_Leópolis_92840.html).

over into a detailed project for the tramway system in 1981, which considered the feasibility of constructing of an underground tram line in Sykhiv. However, it soon became clear that this was impossible because of financial constraints. A 1983 project replaced the previous idea, the basis for it being a surface tramway route along the centre of the main ulitsa Krivorozhskaia or Krivorozhskaia Street (Lyubitskii, 2018, p. 163), as shown in Fig. 218, Fig. 219 and Fig. 220.

Krivorozhskaia Street was planned to be the main arterial route for the area (Mysak, 2016, p. 9), private and public transport passenger flows concentrated there. This accumulation of traffic flows and activities meant that the urban complexity and representative image of this street was intensified. In relation to this, the new district's central core was expected to play an important role in the structure of the city. The central node was intended to have different levels for the various modes of transport. For this, several possible options were proposed.

The initial solution was based on running motor vehicle and tram transport underground, reserving the surface level for pedestrians (Musak, 2016, p. 104). In contrast, the 1979 model envisaged cars travelling on an elevated level, with trams sharing ground level with flows of people on foot, and with pedestrian access to tram stops via bridges (Fig. 221).

The intended main arterial route, rather than giving a structure to the urban space, divided the residential area into two parts, making it necessary to install pedestrian subways between them. Similarly, access to tram stops from the "mikroraions", or neighbourhood units, had to be provided via similar subways. An added

Fig. 219. Interpretative scheme of transport and traffic organisation in Sykhiv. Source: Author's elaboration based on the superimposition of the conceptual scheme of the area from the 1970s, the interpretation of the image of the model-model of 1975 and the rapid tramway plan of 1983. A long distance between the rapid tram stops, around 800-1000m, can be seen. One can also notice a certain disorder in the organisation of the residential complexes, especially in the organisation of the local streets running through the residential complexes. Two pedestrian overpasses were indicated in the plan, while the location of the pedestrian tunnels was not specified, although there were some sketched proposals. Thus, it can be said that the pedestrian communication over the transport corridor was not concretely considered or resolved.

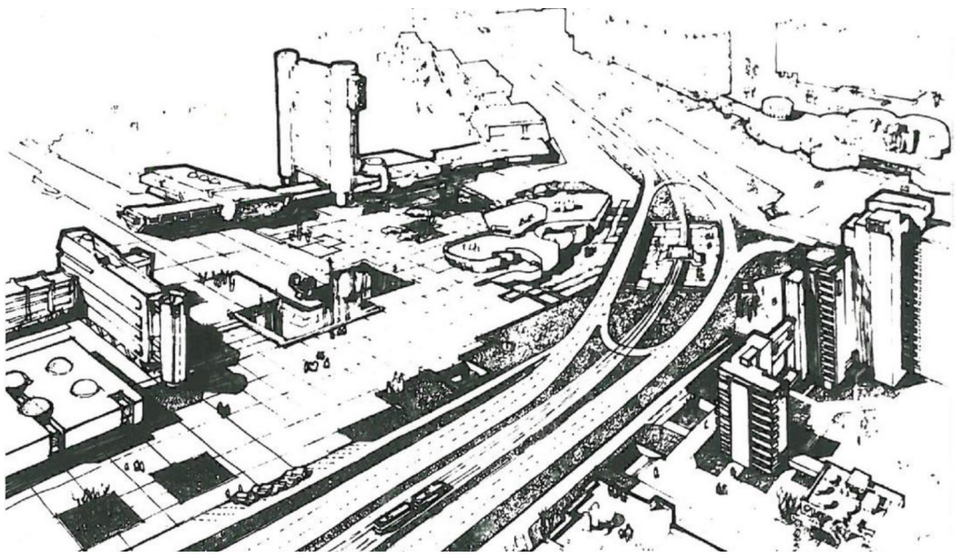


Fig. 221. View of the civic centre and transport node in Sykhiv, Author: Krupa, P. in 1975. Source: Mysak, N. (2018b) *Formuvannya identichnosti raionov masovoi zhitlovoi zabudovi 1960-1980-kh roku*, PhD thesis, Polytechnic University of Lviv; original source, the archive of Petrova, A. It is possible to appreciate the solution of the main node, the elevation of the roadway and the combination of the tram stop with the pedestrian area.

Fig. 220. Sykhov's model in 1975. Source: Cherkes, B. (2015) Development of the largest residential district of Lviv-Sykhiv, *Architectural Studies*, 1 (1), p. 2.

Fig. 222. Krivorozhskaia Street in Sykhiv, a view from the city entrance to the residential area. Author: Krupa, P., 1975. Source: Mysak, N. (2018b) *Formuvannya identichnosti raionov masovoi zhitlovoi zabudovi 1960-1980-kh roku*, PhD thesis, Polytechnic University of Lviv, original source archive of Petrova, A. It can be seen the organisation of pedestrian subways under car and tram transport corridor.

difficulty for the construction of such crossings was the enormous width of the road axis, approximately seventy to eighty metres, which was detrimental for pedestrian accessibility and required greater financial outlays (Fig. 222).

Transport planning in the new Sykhiv residential area exemplifies a typical solution applied in the USSR in the 1970s and 1980s. An approach based on the combination of road and tram traffic on the same axis was maintained, with priority given to the rapid movement of motor vehicles. In the decision-making process, the prevailing criteria were cheapness of construction, clarity of structure and a modern appearance. Financial constraints intensified the incongruity of leaving futuristic solutions part-finished or faulty, with two crucial aspects, easy access on foot to stops and the integrity of the residential area, being neglected.

4.2.6. DISCUSSION AND CONCLUSIONS

This analysis of the theoretical approaches and practices in the three countries being considered has demonstrated both differences and similarities in transport planning in new residential areas in the 1970s. Concepts in town planning were shaped by several influences. There was an understanding of the need to improve areas of new housing, but there was likewise strong political and ideological control over approaches to town planning. There was some influence from Western practices, which in that time were going through a period of transition, evolving but simultaneously reconsidering the ideas of Modernism. Thus, in Socialist town planning there were certain aspects that changed and others that remained unaltered.

This goes to confirm the views of Kulakov and Trofimenko (2016), and Roubal (2018) that in the 1970s strict State control meant that there were no significant adjustments to town planning in the USSR and the CSR. Nevertheless, the current piece of research has made it feasible to add a qualification that this control did not always put a damper on proposals for novel concepts in the CSR, some of which even led to projects that were implemented. However, most planners thought that existing trends should be continued. In contrast, in the USSR there was a rather reticent assessment of the possibilities for putting into effect new designs of residential area oriented towards tram lines. This analysis has shown that State control and the implementation of old concepts were not always responsible for the limitations, but rather that there were actually few such proposals and ideas in the theoretical debates of planners, who still mostly supported Modernist approaches.

Furthermore, the research has confirmed the ideas of Rubin (2016), Engler (2020) and Assmann (2020) that there was a certain decline of the concept of the car city in the 1970s, to be explained by contacts with, and the learning of ideas from, the FRG and other Western countries. This sub-chapter has pointed out that there were two specific factors aiding assimilation of certain Western ideas in the GDR, professional interest and State support. Within the Communist dictatorship of the GDR there was still some room for a number of relatively independent professional decisions, and for initiatives and studies that aimed at reconsidering existing ideas. Hence, there was theoretical developments and implementations of new solutions that gave priority to public transport and pedestrian traffic.

In the USSR, applications of tramways were adapted to a combined approach, giving priority to the criteria of urban architectural modernity and with a strict separation of transport and traffic options. In the CSR the same idea of large road infrastructures was also pursued, although it was accompanied by a few experiments on the layout of the tramway networks. It may be stated that in the 1970s the CSR and the USSR saw a continuation of the emergence of futuristic scientific and technical ideas which hindered the evolution of novel, but more realistic concepts in urban transport planning. In the GDR, in contrast, a different path was taken, with a more down-to-earth view of the possibility of rapid implementation of new transport technologies in the foreseeable future. Feasible solutions were sought for the short and medium term, and the real availability of funding was very much kept in mind. Consequently, there was a rethinking of the approach to planning new residential areas. The main criteria utilized were an improvement in conditions for pedestrians, especially the provision of unencumbered access to tram stops, and priority for the tramway over motor traffic.

In relation to the homogeneity of the concepts and approaches adopted in the three Communist countries, it should be noted that in the GDR and the USSR there was a certain homogeneity. The situation in the CSR was quite diverse: there were a range of different ideas and experiments in the planning of new residential areas. In addition, extensive use was made of pedestrian crossing points using subways or footbridges, this not being so widespread in the USSR, mainly because of funding constraints, or in the GDR, to a great extent likewise because of a lack of financial resources, but also because a combination of trams with people on foot was considered workable.

These two approaches to the urban transport in new residential areas, combination versus separation, both had their advantages and disadvantages. A combined road and tram infrastructure met its greatest disadvantage in the difficulty of access on foot to stops, while its strength was its lower cost and lesser impingement upon residential areas, being more isolated from them. On the other hand, an independent route for trams running into a housing district found its greatest advantage in bringing pedestrians closer to public transport stops, while its weakness was the need to arrange for bridges or tunnels where those on foot had to cross the line. From a historical evaluation of these two approaches, it emerges that there were also other aspects in planning practice that differed.

In the combined approach, because roadways passed through residential areas, it was not possible for these to achieve integrity or unity. In contrast, with separation, tram lines within areas of housing were not always a spatial barrier requiring differentiation of levels at pedestrian crossing points. In the GDR, for example, when tramways were integrated into pedestrianized areas, the trams ran at lower speeds and were not seen as dangerous to foot-travellers. On the other hand, in the Czechoslovak projects at Líšeň and Bohunice, mingling people on foot with tram traffic was considered impossible because of risks to the safety of pedestrians and the desire to maintain high speeds for trams. This made it indispensable to plan for subways or footbridges wherever tram lines intersected foot passenger routes.

Although the plans for the tram system in the new residential areas were seen as a temporary measure to be improved upon over time, these solutions still remain

relevant to this day and continue to shape the spatial structure of these housing zones. An abundance of pedestrian subways and tram tunnels, the limited linkages between residential space and tram stops, their separation on different levels and the predominance of motor transport remain the main characteristics in the residential zones in the Czech Republic and Slovakia (Fig. 223, Fig. 224, Fig. 225 and Fig. 226). Similar states of affairs prevail in ex-Soviet countries, but schemes often remain incomplete, with conflicts between pedestrians and motor transport at tram stops continuing unresolved. (Fig. 227 and Fig. 228). In the cities of the former East Germany, on the other hand, trams still have priority over motor traffic. The tramway system dominates public space in residential areas from that period. However, even there were attempts to improve the clarity of structure and urban facilities, such features are still lacking, mostly because of the large extent of these estates. This is probably why Gorbitz is perceived not so much as a lively residential area, but rather as a quiet place suitable as a sanatorium (Fig. 229 and Fig. 230).

Fig. 223. Aerial view of Líšeň, the centre of the residential area with the underground tram stop, in 2007. Source: Letecké snímky staré Líšně a sídliště pořízené v roce 2007, https://www.brno-lisen.cz/letecke-snimky-lisne/t1177. It can be seen a complex solution for a centre of the residential area, with various levels and priority of pedestrian traffic.

Fig. 224. Aerial view of Líšeň, the centre of the residential area with the underground tram stop, in 2007. Source: Letecké snímky staré Líšně a sídliště pořízené v roce 2007, https://www.brno-lisen.cz/letecke-snimky-lisne/t1177. It can be seen a complex solution for a centre of the residential area, with various levels and priority of pedestrian traffic.

Fig. 225. Pedestrian tunnel at the Dunajská tram stop in the residential area of Bohunice. Source: Author's photo, 2020. It can be seen as a long, dark and unattractive passage for pedestrians.

Fig. 226. Pedestrian crossing at the Dunajská tram stop, residential area of Bohunice, organised at a later stage due to the inconvenience of the pedestrian tunnel. Source: Author's photo, 2020. A small change in level can also be seen between the tram stop and the residential area.

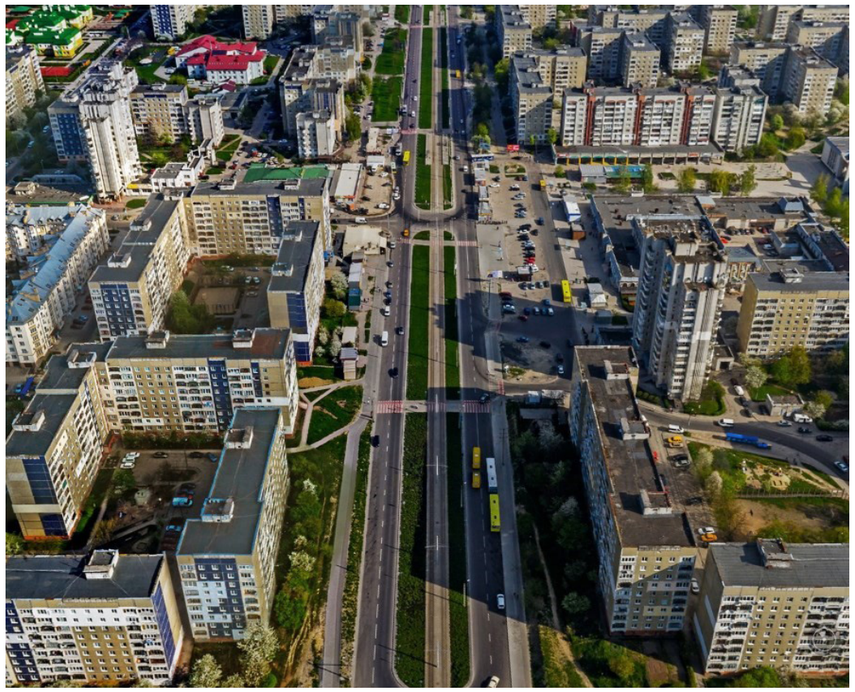


Fig. 227. Combined road-rail corridor in Sykhiv: tram stops located at ground level between the carriageways of the urban highway. Source: Sykhiv Media, http://sykhiv.media/mif-spalnogo-rayony-abo-sykhiv-vzhe-ne-toy-blog/. The pedestrian access to and from the tram stops is organised by means of pedestrian crossings without traffic light regulation.

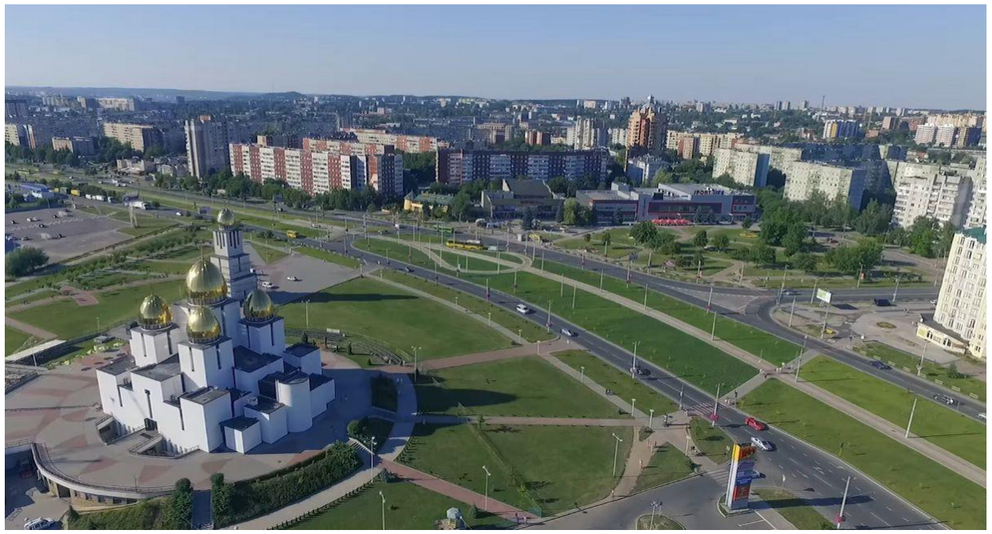


Fig. 228. Central part of Sykhiv, where a transport node had to be organised combined with a service centre. Source: Screenshot from the video Blog 360. It can be seen how difficult or uncomfortable it is for pedestrians to cross the tram stops due to the wide width of the urban highway.

Fig. 229. Tram stop in Gorbitz between residential complexes 2 and 3. Source: Author's photo, 2020. It can be noted the proximity of the residential blocks to the tram stop, but also the tranquillity and the lack of pedestrian movement.

Fig. 230. Tramway in Gorbitz: the change from a tramway route integrated into the residential area to an isolated route on topographically unfavourable terrain. Source: Author's photo, 2020.

4.2.7. BIBLIOGRAPHICAL REFERENCES

Abel, P. (1984) Stand der Verkehrserschließung des neuen Wohnstandorts Dresden-Gorbitz, *Kraftverkehr*, 27 (6), pp. 219-221.

Ackermann, K., Stein, W. (1975) Die verkehrliche Anbindung des Wohngebietes Leipzig-Grünau, *DDR-Verkehr*, 3, pp. 97-100.

Brno Municipal Archive (1972a) *PÚP Sídliště Líšeň*, Stavoprojekt Brno, Útvar Územního Plánování a Architektury, NV města Brna.

Brno Municipal Archive (1972b) *Program výstavby. Pro vyprocování podrobného územního plánu Sídliště Líšeň*, Útvar Územního Plánování a Architektury, NV města Brna.

Brno Municipal Archive (1972c) *Generální Řešení Sídliště Československo-Sovětského Přátelství Brno-Bohunice*, Stavoprojekt KPO Brno, Útvar Územního Plánování a Architektury, NV města Brna.

Brno Municipal Archive (1973) *PÚP Brno-Líšeň, Konečný Návrh – Doprava, Schema Odliv v MHD z obytného území v ranní špičce,* Stavoprojekt Brno, Útvar Územního Plánování a Architektury, NV města Brna.

Brno Municipal Archive (1974a) *Koncepci dopravního řešení PÚP Lišen*, Společné vyjadrení odboru dopravý NVmB a Dopravně inženýrské ořganizace města Brna, Útvar Územního Plánování a Architektury, NV města Brna.

Brno Municipal Archive (1974b) *Základní Směry Rozvoje Mestské Hromadné Dopravy v Brně na léta 1976-1980*, Dopravní podnik města Brna, Útvar Územního Plánování a Architektury, NV města Brna, G10, 729.

Brno Municipal Archive (1978) *Sídliště Brno – Líšeň, Situace*, Stavoprojekt Brno, Útvar Územního Plánování a Architektury, NV města Brna.

Brno Municipal Archive (1979) *Hlavní Směry Rozvoje Městské Hromadné Dopravy v Brně do roku 1985*, Dopravní podnik města Brna, Útvar Územního Plánování a Architektury, NV města Brna, G10, 730.

Brno Municipal Archive (1985) AMB-U5-XXIa57-01, Útvar Územního Plánování a Architektury, NV města Brna.

Dresden Municipal Archive (1976) *Primäre Verkehrserschließung des Wohnungstrandortes Gorbitz-Dresden*, Verkehrstechnische Studie, Büro für Stadtverkehr des Rates der Stadt Dresden, 9.1.2.-013.

Dresden Municipal Archive (1977b) *Die Verkehrserschließung für den Wohnungsbaustandort Gorbitz einschließlich der Sicherung der Vorbereitung*, Beschlußvorlage Rat der Stadt Dresden, 4.2.17.-34.52.

Dresden Municipal Archive (1978) *Gutachterliche Stellungnahmen zu der Studie für das Stadtgebiet Dresden Gorbitz. 1. und 2. Wohnkomplex*, Bauakademie de DDR, Institut für Städtebau und Architektur, 4.2.17.-34.95.

Dresden Municipal Archive (1979) *Gorbitz Erschließungsprinzip ÖPNV*, Büro für Stadtverkehr des Rates der Stadt Dresden, 9. 1. 2. – 15.

Dresden Municipal Archive (1982a) *Zur primären Verkehrserschließung für den Wohnungsbaustandort Dresden-Gorbitz 1981 – 1985*, Heumann, G., 9.1.2.- 6, p. 2.

Dresden Municipal Archive (1982b) *Verkehrstechnische Studie z. PVE Gorbitz Rad und Fußgängerverkehr, 2.WK*, Büro für Stadtverkehr des Rates der Stadt Dresden, 9. 1. 2. – 14.

Dresden Municipal Archive, 6.4.40.2-I7453_00025292.

Dresden Municipal Archive, 6.4.40.2-I7453_00025293.

Dresden Municipal Archive, 6.4.40.2-IX311_00033886.

Dresden Municipal Archive, Bild Archiv, 6.4.40.2-XIII2548_Rp 7303.

Dresden Municipal Archive, Bild Archiv, 6.4.40.2-XIII2553_Rp 7308.

Dresden Municipal Archive, Bild Archiv, 6.4.40.2-XIII2555_Rp 7310.

Dresden Municipal Archive, Bild Archiv, 6.4.40.2-XIII2678_Rp 75_16.

Bocharnikova, D. (2019) The NER project: a vision of postindustrial urbanity from post-Stalin Russia, *The Journal of Architecture*, 24 (5), pp. 631-654, DOI: 10.1080/13602365.2019.1667401.

Bolonenkov, G. V. (1972b) Vliianie razvitiia transportnykh sistem na strukturu goroda, in Bolonenkova G. B., Smykovskaia G. Y. (eds.), *Transport v planirovke gorodov*, Moskva: TSNIIP Gradostroitelstva, pp. 3-32.

Bolonenkov, G. V, Savina, V. (1972c) Gradostroitelnye usloviia primeneniia razlichnykh sistem skorostnogo transporta, in Bolonenkova G. B., Smykovskaia G. Y. (eds.), *Transport v planirovke gorodov*, Moskva: TSNIIP Gradostroitelstva, pp. 53-84.

Cherkes, B. (2015) Development of the largest, Residential District of Lviv – Sykhiv, *Architectural Studies*, 1 (1), pp. 1-6.

Crimson Historians and Urbanists (eds.) *New towns on the old War Frontier*, Rotterdam (book in progress), consulted 1.03.2021 in https://www.crimsonweb.org/spip.php?mot12.

Deutsche Bauakademie (1971b) *Forschungsvorhaben.- Sozialistische Umgestaltung der Städte und Siedlungszentren*, Berlin: Deutsche Bauinformation.

Deutsche Bauakademie (1972) *Sozialistische Umgestaltung der Arbeits- und Wohnumwelt,* Berlin: Deutsche Bauinformation.

Dostalík, J. (2020) The natural environment in socialist modernity: three case studies of new urban areas in Czechoslovakia (1966–1991), *Planning Perspectives*, 35 (5), pp. 895-907, DOI: 10.1080/02665433.2020.1801494.

Engler, H. (2020) Social movement and the failure of car-friendly city projects: East and West Berlin (1970s and 1980s), *The Journal of Transport History*, 41(3), pp. 353–380.

Gläser, H. (1976) Zur Verbesserung des öffentlichen Personennahverkehrs in den Großstädten der DDR, *Architektur der DDR*, 6 (5), pp. 372-376.

Gosstroi SSSR (1976) *Planirovka i zastroika gorodov, poselkov i selskikh naselennykh punktov*, SNIP II-60-75, Moskva: Stroiizdat.

Gramzov. S. (1976) *Information für leitende Kader des Verkehrswesens*, Berlin: ZFIV.

Gunko, M., Bogacheva, P., Medvedev, A., Kashnitsky, I. (2018) Path-Dependent Development of Mass Housing in Moscow, Russia, in Hess, D. B., Tammaru, T., van Ham, M. (eds.), *Housing Estates in Europe Poverty, Ethnic Segregation and Policy Challenges*, Cham: Springer Open, pp. 289-311.

Günter, T. (1987) Wohngebiet Dresden-Gorbitz, *Architektur der DDR*, 11, pp. 16-22.

Hall, T., Vidén, S. (2005) The Million Homes Programme: A Review of the Great Swedish Planning Project, *Planning Perspectives*, 20 (3), pp. 301-328, DOI: 10.1080/02665430500130233.

Harrison, R. S. (2015) *Urban Planning and the Motor Car, 1955-1977: Responses to the growth of private motoring in Leicester and Milton Keynes*, PhD thesis, Centre for Urban History, University of Leicester.

Hess, B. D., Tammaru, T., van Ham, M. (2018a) Lessons Learned from a Pan-European Study of Large Housing Estates: Origin, Trajectories of Change and Future Prospects, in Hess, B. D., Tammaru, T., van Ham, M. (eds.), *Housing Estates in Europe Poverty, Ethnic Segregation and Policy Challenges*, Cham: Springer Open, pp. 3-31.

Hess, B. D. (2018b) Transport in Mikrorayons: Accessibility and Proximity to Centrally Planned Residential Districts during the Socialist Era, 1957–1989, *Journal of Planning History*, 17(3), pp. 184-204.

Highway Research Board (1973) *Bus Use of Highways. State of the Art*, National Cooperative Highway Research Program Report, Washington.

Hrůza, J. (1968) Runcorn - Nové "Nové Město," *Architektura ČSR*, 7, pp. 439-442.

Hrůza, J. (1977) *Slovník Soudobého Urbanismu*, Praha: Odeon.

Interview with Rabe Ulrich, 2020.

Kasalický, V. (1978) Bydlení, komplexní bytová výstavba, obylné prostředí, *Architektura ČSR*, 3, pp. 7-9.

Kosygin, A. N. (1976) *Osnovnye napravleniia razvitiia narodnogo khoziaistva SSSR na 1976-1980 gody*, XXV siezd Kommunisticheskoi partii Sovetskogo Soiuza, vol. 2, Moskva: Izdatelstvo politicheskoi literatury.

Koukalová, M. (2017) Prague-Nový Barandov, The fase of "Late Beuatiful" and Postmodernist Estates, in Skřivánková, L., Švácha, R., Lehkoživová, I. (eds.), *The Paneláks, Twenty-Five Housing Estates in the Czech Republic*, Prague: The Museum of Decorative Arts in Prague, pp. 212-219.

Kress, S., Michalk, H. (1976) Beispielplanung Dresden-Gorbitz/Löbtau, *Architektur der DDR*, 6, pp. 342-353.

Krivý, M. (2016) Postmodernism or Socialist Realism? The Architecture of Housing Estates in Late Socialist Czechoslovakia, *Journal of the Society of Architectural Historians,* 75 (1), pp. 74-101.

Krivý, M. (2017) Quality of Life or Life-in-Truth? A Late-Socialist Critique of Housing Estates in Czechoslovaquia, in Moravánszky, Á, Lange, T. (eds.), *Re-framing Identities, Architecture's Turn to History, 1970-1990*, Basel: Birkhäuser, pp. 303-318.

Kulakov, A., Trofimenko, K. (2016) Transport Planning and Transport Modeling, in Blinkin, M., Koncheva, E. (eds.), *Transport Systems of Russian Cities. Ongoing Transformations*, Cham: Springer International Publishing, pp. 1-37.

Ladd, B. (2001) Socialist Planning and Rediscovery of the Old City in German Democratic Republic, *Journal of Urban History*, 27 (5), pp. 584-603.

Lammert, U. (1975) Aufgaben des Städtebaus zur Erfüllung des langfristigen Wohnungsbauprogramme bis 1990 als Beitrag zur Lösung der Hauptaufgabe des VIII. Parteitages, *Architektur der DDR*, 4 (5), pp. 135-142.

Lammert, U. (1979) *Städtebau. Grundsätze, Methoden, Beispiele, Richtwerte*, Berlin: Verlag für Bauwesen.

Lavrov. V. (1979) *Preobrazovanie sredy krupnykh gorodov i sovershenstvovanie ikh planirovochnoi struktury*, Moskva: Stroiizdat.

Logan, S. (2019) Learning from the Socialist Suburb, in Güney, K. M., Keil, R. and Üçoğlu, M. (eds.), *Massive Suburbanization: (Re)Building the Global Periphery*, Toronto: University of Toronto Press, pp. 94-102.

Lukášíka, M. (1974) Dopravní Prostředky a Systémy, jejich Vývoj, Inovace, en Zmija, K. (ed.), *Studie Přehodnocení Koncepce MHD v Ostravě*, Ostrava: Útvar Dopravního Inženýrství Města Ostravy, pp. 171-254.

Lyubitskii, P. I. (2018) Urban planning concepts of the underground tram network creation in Lviv in the 70–80s of the 20th century, *Visnik Nacionalnogo universitetu Lvivska politeknika, Seriia Arkhitektura*, 893, pp. 159-166.

Maaß, A. (2006) *Wohnen in der DDR. Dresden-Prohlis Wohnungspolitik und Wohnungsbau 1975-1981*, München: Martin Maidenbauer Verlagsbuchhandlung.

Meerovich, M. (2017b) Renovation of the Panel House-Building of the 1960-1980s in Germany, *Project Baikal*, 51, pp. 154-161.

Merlin, P. (1975) *Novye Goroda: Raionnaya planirovka i Gradostroitelstvo* (Les Villes Nouvelles: Urbanisme Regional et Aménagement), trad. Topuridze, K. T., Zaizev, V. N., Moskva: Progress.

Michalk, H., Lässig, K. (1976) Variantenvergleich zur städtebaulichen Gestaltung eines Wohnbereiches in hängigem Gelände am Beispiel des Wohnkomplexes 2 in Dresden-Gorbitz, *Architektur DDR*, 5 (15), pp. 334-341.

Michalk, H. (1978) *Fußgängertunnel bzw. Fußgängerbrücken*, Niederschrift. über eine Beratung am 12. 9. 78 beim Büro des Stadtarchitekten zum Wohnkomplex Dresden Gorbitz, Archivo Municipal de Dresde, 9.1.2.- 002, p. 2.

Monclús, J., Díez Medina, C. (2016) Modernist housing estates in European cities of the Western and Eastern Blocs, *Planning Perspectives*, 31 (4), pp. 533-562, DOI: 10.1080/02665433.2015.1102642.

Mulíček, O., Seidenglanz, D. (2019) Public transport in Brno, from socialist to post-socialist rhythms, in Tuvikene, T., Sgibnev, W., Neugebauer, C. S. (eds.), *Post-Socialist Urban Infrastructures*, London: Routledge, pp. 158-177.

Mysak, N. P. (2016) Reinterpretatsiia modernistkikh morphologii: Zhiloe prostranstvo raiona Sykhov vo Lvove, *Labirint*, 5, pp. 8-16.

Mysak, N. P. (2018a) Sykhiv: An Overview, in Otrishchenko, N. (ed.), *Sykhiv: Spaces, Memories, Practices*, pp. 14-15.

Mysak, N. (2018b) *Formuvannya identichnosti raionov masovoi zhitlovoi zabudovi 1960-1980-kh roku*, PhD thesis, Univesidad politécnica de Leópolis, Ukraina.

Newsome B. W. (2004) The Rise of the Grands Ensembles: Government, Business, and Housing in Postwar France, *The Historian*, 66 (4), pp. 793-816, DOI: 10.1111/j.1540-6563.2004.00097. x.

Němcová, A. (2014) *Panelová výstavba v Praze v 80. letech 20. století: srovnání sídliště Barrandov a Žižkov*, Diplomová práce, Univerzita Karlova v Praze.

Ortolano, G. (2011) Planning the Urban Future in the 1960s Britain, *The Historical Journal*, 54 (2), pp. 477-507.

Pecka, L. (2013) *Brno Housing Estates and their Urban Structure*, PhD thesis, Brno University of Technology.

Pfau, W. (1986) *Zur Wohngebietsplanung in der DDR seit dem VIII. Parteitag der SED Ergebnisse und Tendenzen der Planung und Gestaltung von Wohngebieten unter besonderer Berücksichtigung des Zusammenhangs zwischen Wohngebiet und Stadt*, Berlin: Bauinformation.

Posatskyi, B., Cherniak, I. (2019) New Objects in the Space of Lviv (1956–1990), *Przestrzeń i Forma*, 40, pp. 232-264.

Potter, S. (1976) *Transport and New Towns. The transport assumptions underlying the design of Britain's New Towns, 1946-1976*, Milton Keynes: The Open University, New Towns Study Unit.

Potter, S. (1984) The Transport Versus Land Use Dilemma, *Transportation Research Record*, 964, pp. 10-17.

Reichow, H. B. (1959) *Die autogerechte Stadt: Ein Weg aus dem Verkehrs-Chaos*, Ravensburg: Otto Maier Verlag.

Richards, B. (1966) *New Movement in Cities*, London: Studio Vista.

Roubal, P. (2018) The Crisis of Modern Urbanism under the Socialist Rule: Case Study of the Prague Urban Planning between the 1960s and 1980s, *Czech Journal of Contemporary History*, VI, pp. 100-124.

Rubenstein, J. M. (1978) *The French New Towns*, Baltimore: Johns Hopkins Press.

Rubin, E. (2016) *Amnesiopolis. Modernity, Space, and Memory in East Germany*, Oxford: Oxford University Press.

Rudneva, N. A. (1979) Formirovanie zony vliianiia skorostnogo relsovogo transporta, in Soiuz Arkhitektorov SSSR (ed.), *Gorod i transport*, Moskva: Soiuz Arkhitektorov SSSR, pp. 57-61.

Rudnitskii, A. M. (1976) *Transport v planirovke gorodov*, Kiev: Budivelnik.

Sammartino, A. (2016) Mass Housing, Late Modernism, and the Forging of Community in New York City and East Berlin, 1965–1989, *The American Historical Review*, 121, (2), pp. 492–521, https://doi.org/10.1093/ahr/121.2.492.

Shkvarikov, V. A. (1971) *Zhiloi Raion i mikroraion*, Moskva: Izdatelstvo literatury po stroitelstvu.

Sirisornpattapon, P. (2019) *Czechoslovak Housing Estates in the Late Socialism: Ideology, Practice, and Criticism*, master thesis, Charles University, Prague.

Skřivánková, L. (2017) Understanding Housing Estates, in Skřivánková, L., Švácha, R., Lehkoživová, I. (eds.), *The Paneláks. Twenty-Five Housing Estates in the Czech Republic,* Prague: Museum of Decorative Arts in Prague, pp. 9-11.

Skřivánková, L., Svacha, R., Lehkozivova, I. (2017) *The Paneláks: Twenty-Fiwe Housing Estates in the Czech Republic*, Prague: The Museum of Decorative Arts in Prague.

Smolyar, I. M. (1972) *Novye goroda*, Moskva: Izdatelstvo literatury po stroitelstvu.

Sovet Ministrov SSSR (1969) *O merakh po uluchscheniiu kachestva zhilishchno-grazhdanskogo stroitelstva*, Postanovlenie N392, 28.05.1969.

Štastný, J., Soukup, J. (1968) *Koncepce Dopravy v Obytných Zónách,* Praha: VÚVA.

Štastný, J. (1971) Zásady pro Uspořádání Dopravního Vybavení Měst, *Architektura ČSR*, 4, pp. 42-46.

Taplin, M. R. (1984) *Light Rail Transit Today*, Milton Keynes: Light Rail Transit Association.

Trehubova T., Mykh R. (1989) *Lviv. Arkhitekturno-istorychnyi narys*, Kyiv: Budivelnyk.

Tuppen, J. N. (1983) The Development of French New Towns: An Assessment of Progress, *The Urban Studies*, 20, pp. 11-30.

Urban, F. (2018) *Berlin's construction groups and the politics of bottom-up architecture,* Cambridge: Cambridge University Press.

Útvar Dopravného Inžinierstva Mesta Bratislavy (1974) *Návrh Ďalšieho Rozvoja Mestskej Hromadnej Dopravy v Hlavnom Meste SSR Bratislave*, Bratislava: Kartografia, n. p.

Vidén, S., Botta, M. (2004) The Transformation of Large Postwar Housing Areas in Sweden: Adaptation to a Blend of New and Old Planning Ideas, in Stanilov, K. and Sheer, B. C. (eds.), *Suburban Form: An International Perspective*, New York and London: Routledge.

Vorobiev, V. V. (1978) *Problemy povysheniia skorostei dvizheniia i sovershenstvovaniia relsovykh putei elektrotransporta v bolshikh gorodakh*, Moskva: GOSINTI.

VÚVA (1967) Nové rysy v územních plánech některých britských nových měst, *Urbanismus a Územní Plánování*, 3, pp. 116-127.

Wauer, R. (1977) Urbanisierung und Urbanität. Gedanken über die städtische Lebensweise und die Architektur, *Architektur DDR*, 16, pp. 444-445.

Wilson, H., Womersley, L. (1966) *Irvine New Town, Final Report on Planning Proposals*, Edinburgh: Her Majesty's Stationary Office.

Wilson, I. B. (1986) The French new towns — Les Villes Nouvelle, *Planning Outlook*, 29 (1), pp. 26-34, DOI: 10.1080/00320718608711762.

ZFIV (1971) *Gestaltung städtische Schnellverkehrsstrassen. Abschußbericht*, Berlin: ZFIV VÚVA.

ZFIV (1973) *Verkehrsliche Anbindung von Wohngebieten. Abschußbericht*, Berlin: ZFIV.

ZFIV (1974) *Richtlinie für die Verkehrliche Anbindung und Erschließung von Neubau Wohngebieten*, Berlin: ZFIV.

Internet sources:

http://tvoemisto.tv/exclusive/smilyve_rishennya_yak_shvydkisnyy_tramvay_mozhe_rozvantazhyty_Leópolis_92840.html.

https://www.brno-lisen.cz/letecke-snimky-lisne/t1177

http://sykhiv.media/mif-spalnogo-rayony-abo-sykhiv-vzhe-ne-toy-blog/

Youtube, Screenshot of video Blog 360.

Dresden: View of the Elbe metropolis, 1976. Source: Dresden Stadtmuseum, SMD_Ph_01668_05.

V. DISCUSSION AND CONCLUSIONS

This thesis is a piece of research into urban history, bringing together issues of town planning and of transport, with problematic interrelationships that are hard to analyse. This approach has been applied to a historical problem, the differences in tramway systems in Communist cities, especially those of middling size, in the central historical period of the European Communist dictatorships.

The subject under study was of great complexity and breadth, and posed demanding linguistic requirements. Nevertheless, it proved possible to reach the following findings and conclusions, which may be of value for the knowledge of urban history, in particular that of urban transport systems:

- There was a low level of development of public transport and tram systems in Communist countries in general, together with differences between individual States.

- There was Western influence in the area of transport engineering and town planning, perceived as technical, non-ideological disciplines.

- There was only a weak concept of integrated or comprehensive planning in Socialist countries and only meagre results in the interrelation of town planning and transport engineering.

- There were common principles for urban growth and models in the European Communist countries, with a strong influence on transport models.

- There were different solutions chosen for planning cities and transport in the USSR, the GDR and the CSR.

- There were differences, likewise, in projects for rapid tramways and difficulties in incorporating them into cities.

Several studies point to the low level of development of public transport in European countries under Communist regimes. Among these are the pieces of research undertaken by White (1978), Voigt (1988) and Pucher (1990) who underlined a range of problems with public land transport in the USSR and the GDR. After analysis, it has proved possible to confirm a number of their conclusions relating to increasing journey times, antiquated rolling stock, low levels of service and a lack of co-ordination between town and transport planning. This last notion was mentioned only briefly in previous work, so the present research has attempted to go into it in greater depth. In this way, it has been feasible to define variations in the levels and procedures for co-ordinating transport and town planning in the three countries under study, as also to identify initiatives in the USSR for the technical development of tramway rolling stock.

The current research has also confirmed Crouch's (1975) views about public transport policy in the USSR, which was oriented towards the preferential development of trolleybuses and buses, and the extensive abandonment of tramway systems. It also proved feasible to provide backing for his conclusions on the difficulty of modernizing trams in the 1970s, after many years of neglect and poor co-ordi-

nation of public transport systems. The present investigation has made it possible to gain greater knowledge of planners' opinions and the criteria for public transport policy in relation to the decommissioning of tramways.

Moreover, it has also provided corroboration for some of Schmucki's (2011) ideas about the importance of suburban rail in the GDR in the 1960s, seen as having the potential to become the main means of urban public transport. This she explained as a spin-off of an intention to minimize tram networks in the cities of the GDR. Additionally, this research has confirmed the crucial influence of the policy of rationalization of public transport that prevented the development of any extensive tram network in the GDR in the 1970s. In the current work it has been possible to nuance these ideas with the discovery that in the 1960s there was already some belief in the crucial role of tramways in cities. This was complemented by the opinion of the majority of professionals who supported the retention and modernization of tramway systems.

In respect of rapid tramways, another opinion of Schmucki (2011) is borne out: the limited level of technical development prevented proper implementation of this concept. This present research attempts to go deeper into technical aspects, especially the planners' aspiration to modernize rolling stock and the studies of the KT4D model. This technical development was more organized and integrated in the GDR than in the USSR or the CSR, one of the peculiarities which is not so visible if comparisons are with developed Western countries.

It should be noted that this issue of the diversity in public transport planning, especially for tramway systems within European Communist countries, is quite new and has not previously been investigated. Various notions about a few aspects are mentioned in research by Émangard (2012). The analysis of several case studies made it possible to confirm his ideas about tendencies to eliminate tramways in Western and Eastern Europe. In his opinion, political regimes were not the determining factor for getting rid of trams. The present research has complemented this view by identifying various national factors and logics that influenced decision-making in respect of tramways. This analysis also made it feasible to give further, more complete, explanations of the similarities and differences in tramway planning between Western and Communist countries. There is some support in studies by Zarecor (2011), Bocharnikova (2014), Guerra (2015) and Rubin (2016) for the presence of divergent town-planning solutions in Communist regimes, although theses scholars did not address the specific topic of tramways in cities.

In the light of the above, it becomes possible to refute the ideas of Taplin (1984) and González, Otón and Wollf (2013) when they suggest that tram systems were well developed in European Socialist countries. Moreover, the results of the present research run counter to the claims made by Supernak (1980), Thomas (1988), Machon and Dingsdale (1989) and Lowe (1990) that their public transport systems were in full bloom, in the light of the size of networks and the number of passengers carried.

A number of authors, such as White (1978), Fuchs (1980) or Hague and Prior (1991), have pointed out that there was no integrated planning, emphasizing the failures and limitations of Communist regimes. It should be noted that the present

investigation has nuanced this debate, showing variety in the evolution of theoretical ideas, the level, methods and criteria for integrated planning development in the countries studied.

This present research has taken on board the ideas of Beyer (2011) and Meier (2014) on the learning and direct application of Western concepts by Communist countries to their city centres and in new Soviet cities in the 1960s. Moreover, it concurs with ideas put forward by Siegelbaum (2009, 2011) on the complexity of motor vehicle policies in countries with Communist regimes, and with the views of Schmucki (2003), Beyer (2011) and Bernhardt (2017) on the paradigm of the car city in Socialist urban areas. It rounds these out with novel explanations of the triumph of Modern Movement principles and methods in the Communist lands investigated.

It also confirms several other notions put forward by different authors. Among these would be Yakushenko (2016) on the intensive learning of Western ideas by the USSR, Ward (2012) on the impact of British ideas of a utopian and futuristic character in the USSR, and Khrupin (2016) and Wakeman (2014) with their idea that the learning of Western ideas was based on generalized concepts, but was nevertheless selective. The investigation has fleshed out these views with an analysis of the 1970s and has demonstrated that this learning was not direct, since the States in question formed their own theoretical bases and professional developments. Furthermore, this study explores a new topic, the exchange of knowledge on public transport planning between capitalist and Communist European countries. In addition, it has corroborated the views of Ward (2016) and Engler (2020) that the West had more influence on town planning in the European Socialist countries than may have been generally thought. The main causes noted by this research were a desire to solve practical problems of traffic congestion, but also a considerable amount of critiquing of the solutions adopted in Western countries, which allowed progress in the field of urban transport planning.

A further issue relates to the influence of fast trams over models for a "Socialist city", another topic that has hitherto received little attention. The research of Schmucki (2003), Beyer (2011) and Logan (2015) makes it feasible to endorse ideas concerning the impact of traffic engineering principles in the town-planning solutions adopted by Communist countries. Nonetheless, it cannot be fully accepted that this approach was valid for the 1970s, which were a period of changes in town planning and of the development of rapid public transport. This present study has demonstrated that there was some influence from plans for rapid tramways upon town-planning solutions, especially in the case of issues related to the urban economy.

In connection with this, confirmation has been provided for the ideas of Musil (2005), Khairullina (2015), Zarecor (2018) and Hess (2018b) regarding the importance of the functioning of an organized or planned Socialist city that eventually influenced the configuration of the entire urban infrastructure. The current research offers a more profound understanding of the relationship between urban models and the layouts chosen for tram lines, which in the 1970s started to be seen as the backbone of the urban structure of some cities.

Finally, the investigation provided backing for the claims made by Ladd (2001), Rubin (2016) and Assmann (2020) regarding the beginning of changes in GDR planners' thinking about the car city in the 1970s. In the present research it proved fea-

sible to demonstrate this change through analyses of planning for new residential areas. In the housing areas of the GDR, a number of solutions were developed that prioritized collective public transport, this contrasting with concepts that evolved in the USSR and the CSR.

In brief, this research project bears out a number of conclusions reached in earlier studies, and develops and deepens various aspects of these, but additionally it puts forward new theories. This can be seen in the following paragraphs covering the proposed objectives and the four hypotheses tested.

With regard to the two objectives set for the work, it may be stated that the interrelationships of, and models for, transport and cities, and the solutions applied in the three countries studied, sometimes similar, sometimes different, form the main subject in each chapter, and have always underlain and guided the analyses in this thesis. However, the complexity of the relationships between a range of disciplines rendered it essential to verify at all times that the analysis responded to the interdisciplinary and transnational perspective proposed. In respect of the motivation for the research, past experiences were evaluated in Chapter IV, highlighting a number of points relevant to technical and professional knowledge.

In relation to the first objective, it was found that the linkages between urban transport planning and town planning were complex. First, it was observed that theoretical studies performed in the three countries analysed the conditions for integrated planning quite well, but in practice this approach could not be completely fulfilled, mainly because of administrative issues. Nonetheless, within this trend there were a number of ideas and initiatives that were indeed put in place in order to enhance co-operation between professionals and the integration of urban and transport solutions. Secondly, the research has made it possible to specify and differentiate the levels of relationship between rapid tramways and urban planning. In general, the potential interplays between trams, urban spaces and structures were not always well understood. Rapid tramways often followed the earlier tendencies of thought based on separating them from the urban fabric and limiting the number of access points. Within this trend, it proved feasible to highlight several attempts to humanize urban space and integrate higher-speed tramways into cities, a challenge still faced by contemporary town planning. Thus, a definition of general trends often made it possible to find ideas that stood out as peculiar or novel, yielding a better understanding of the topic and the period under study.

With regard to the second objective, it proved possible to define several regularities and differences in the urban and transport models proposed for the "Socialist city". The common feature in the urban models was access to all parts of the city by public transport and attempts to keep the times taken to reach given areas as low as could be. It should be noted that urban growth supported by rapid public transport was also relevant to the urban models of various Western countries. However, these approaches were combined with low-density urban areas with access exclusively by car. It can be said that capitalist cities did not always deploy the same strict and absolute predetermination of spatial and social relations, or such detail and rigidity in the integrated functioning of cities. This difference in the development of urban infrastructures is largely to be explained by the divergent socio-economic systems.

In the European Communist countries, it is also possible to determine some individual and some shared logics in planned urban models. Urban growth in middle sized cities mostly took a linear form, whilst in larger conurbations it was sometimes circular, sometimes based on extensions in specific directions, the motivation being economic efficiency. In the GDR, on the other hand, urban expansion was organized as a continuum, the argument for which was the need to economize land, keeping principal areas of cities close to one another, and urban cohesion. This model for cities relied on rapid public transport, with urban structures and spaces oriented around its lines and stops. This decision is explicable by the intention to solve problems of traffic congestion even over the longer term. In the USSR, as in the GDR, there was some preference for continuous urban expansions, motivated by the cheapness of infrastructure construction and the proximity of urban areas. However, rapid public transport was not given absolute priority, having to share space with urban streets. This was an outcome of the emphasis laid on the modern image of roads and on maintaining rapid traffic circulation. A similar approach with combined infrastructures was applied in the CSR, but in this case the urban growth model had a fragmented form, the aspiration being to develop modern urban structures with direct access to nature.

As for transport, the GDR moved to models mainly oriented towards high-speed public transit. In the CSR and the USSR, the tendency was to adapt such rapid transport to existing approaches and to maintain the primacy of road infrastructures. In general, in drawing up plans for urban development the GDR was principally concerned with economic efficiency, quality of public transport services and the urban environment. In contrast, the USSR did pay special attention to economic factors, but at the same time aspired to modernistic solutions, whilst in the CSR the choices made were mostly inspired by an idea of modernity.

With regard to the motivation of making a contribution to technical and professional knowledge, it is possible to highlight weaknesses and strengths that may serve as guidelines for present-day urban projects. On the one hand, negative points can be identified, such as the isolation and limited accessibility of tram lines and stops, the low density and connectivity of tram networks, poor integration with urban spaces, and the like. It is feasible to work to palliate or eliminate such weaknesses. This would avoid the decommissioning of tram lines and increase their attractiveness for passengers. On the other hand, positive aspects are to be seen, such as integration of tramways with planned urban structures, ensuring accessibility of stops for pedestrians and siting them close to central facilities, providing good connections to city centres, arranging for high population densities in the urban areas served, and so forth. An appreciation and enhancement of these concepts would be an excellent starting point for the modernization of existing tramway systems.

It proved feasible to verify most of the hypotheses, by supporting them with new historical facts, factors, aspects and explanations. This would provide guidelines or pave the way for further discussions. However, there remained several points within the hypotheses that could not be fully borne out, primarily because detailed study of the issues revealed a more complex reality.

1. The first hypothesis, that there was a low level of public transport services in Communist European countries, has been demonstrated. The triumph of the ideas

of Modern Movement in the 1960s brought about changes not only in town planning and traffic management, but also in policies for public transport in cities. There was a marked contradiction between transport models favouring motor vehicles and those giving preference to rapid public transport. Moreover, the lack of clear decisions on exactly what means of public transport should be chosen, in terms of road or rail infrastructures, meant that urban and public transport policy remained poorly defined. The principles, criteria for evaluation and areas of application for certain means of public transport were changeable, often leaving problems of level of service unresolved. In some respects, Communist countries may be said to have had problems similar to those in certain Western States. There was little or no possibility of building metros, trolleybuses and buses had reached their maximum in terms of capacity and speed, suburban train services could not meet passenger demands, and there was a need for some means of public transport that would offer intermediate passenger-carrying capabilities.

As in most Western countries, trams were seen as a means of transport that brought with it spatial conflicts and that created barriers to the fluid circulation of urban traffic. During the 1950s, tramways served to maintain urban mobility in the absence of good road infrastructures and other well-developed means of public transport. During the 1960s their role was downgraded and their future was unclear and indeterminate. The greatest area of conflict was city centres, where the choices tended to be either reducing the concentration of tram lines or replacing them entirely with buses and trolleybuses. Elsewhere in cities, tram networks were kept, but with few extensions, preference being given to the organization of bus services. This was the short period during which trams were marginalized, lasting roughly from 1960 to 1964. After that, the general trend was to retain and just occasionally to upgrade tramway infrastructures, to a greater extent in the GDR and CSR, and to a lesser extent in the USSR. This restricted retention and modernization of tramway infrastructures and rolling stock was the main factor explaining the poor level of public transport services in most Socialist cities in the 1960s.

From the end of the 1960s onwards, as also occurred in Western countries, the view taken of trams gradually changed. City growth and car traffic congestion in many cases created new social problems that needed urgent solutions. Although there were some theoretical discussions in favour of installing rapid tramways, a clear political decision was needed before they could be implemented, and this took almost a decade in coming. The construction programmes for new residential areas that took place from the early 1970s on gave an impetus to the choice of rapid tramways as the main means of public transport.

Although political decisions were taken to set up high-speed tram lines with some priority and widespread extent, there were subsequently a number of difficulties blocking the achievement of this intention. Firstly, the ideas of Modern Movement still had a strong influence on the thinking of planners and of politicians. Solutions that would be convenient for road traffic were sought, avoiding conflicts by installing flyovers, underpasses and tunnels, and moving tram tracks out of major streets and city centres. Secondly, there was a lack of guidelines for planning rapid tramways and for their relationship to urban transport systems as a whole, as well as of studies on how to integrate them into town planning. Thirdly, there were technological and industrial difficulties in building and modernizing rolling stock, especially in improving its performance characteristics.

In the 1970s, manufacturers concentrated mostly on standardizing rolling stock and on developing a few experimental articulated models. Finally, there were financial obstacles to wholesale modernization of tramway infrastructures. The policy of complex rationalization aimed at increasing the efficiency of use of resources and materials, and this put a brake on the renovation and growth of rapid tram lines. The result was significant impairment of the coherence and continuity of tram networks, and of connectivity between urban areas.

Apart from problems specific to tramways, there were difficulties in the co-ordination of operations between different modes of collective transport. Urban and suburban public transport services, just like roads and utilities, were not completely integrated. Different operators, departments and ministries did not co-operate well, which led to discontinuities in services, with journeys often requiring several transfers. It should also not be forgotten that there was a shortage of vehicles, which decreased the frequency and quality of services, and led to overcrowding. Thus, it can be seen that the problems of public transport continued into the seventies, solutions for them gradually emerging only in later decades.

The case studies demonstrate the complexities of integrating trams into cities, especially in communications between State and local authorities, and ensuring that traffic planners and town planners talked to one another. There were some common trends, such as local political decisions that were not based on professional logic, the adaptation of transport plans to the current situation of cities and the limited State funding for express tram projects. Full advantage was not always taken of the benefits of tramway transport through proper integration into urban structures, because planners treated tram lines merely as a functional route for passengers. Co-ordination of the implementation of urban and transport plans was weak, which led to poor levels of public transport service in new residential areas and their relative isolation from the cores of cities.

On the other hand, some of the problems faced by public transport were due to difficulties in integrating transport and city planning. It is worth noting that integrated planning would appear to be easy to achieve in a context of a centralized economy and systematized town planning. However, the reality was not so; the European countries under Socialism had similar difficulties to those in Western European countries. Transport planning was considered mostly from an exclusively technical viewpoint, with little thought given to the factors and needs affecting its interrelationships with urban spaces and structures. Complexities in the relationships between transport infrastructures and cities developed gradually, being accompanied by changes in the urban planning paradigm, starting in the 1970s. In earlier years, integration was taken into account for only a few restricted aspects, and with a somewhat superficial understanding. Spatial features of the interrelationship were prioritized, whilst co-operation between transport planners and town planners was poorly organized. Despite centralized planning, there was little clarity in the division of labour between different ministries, departments and professionals. There was still a lack of a sufficient theoretical basis in both town and public transport planning, as well as an absence of an integrated view linking the two disciplines, for these ideas on the integration of transport infrastructures into urban structures and forms to attain any depth.

The need for integration between transport and cities at legislative, organizational, administrative, and other levels with the aim of providing long-term solutions was grasped mostly after the 1970s ended. Nonetheless, a few attempts were made to integrate central facilities, streets, pedestrian crossings and access, and other urban structures with rapid tram lines. These solutions were still simple, and primarily were a case of prioritizing the segregation of transport infrastructures from the urban fabric, emphasizing the role of high-speed trams.

Integration also continued to be limited because of technical and financial factors, State control, and rigidity in the relationships between town planners and traffic engineers. There was a lack of experience and maturity in integrated work, as well as difficulties in arranging discussions between planners, in the sequencing of planning processes, in evaluating results so as to make any needful changes, and in the fragmentation of authorities charged with town planning and the making of decisions on transport, the outcome of which were inconsistent and incoherent results.

However, in the context of this hypothesis it should be noted that there were cases where public transport worked well, and aspects that can be considered in a positive way. First, there were generally adequate connections at least to the main poles of attraction, such as city centres, workplaces and recreational areas, which was a matter of some importance. It is true that often there may have been no range of alternative routes, with only moderate levels of service on those that did exist, and some lack of comfort, but nevertheless there were basic public transport services. It cannot be denied that this was a positive point. The outstanding case was the GDR, where there was simultaneous planning and implementation of tramways and new residential areas, and where co-ordination of public transport systems was largely achieved. Similarly, the policies of the GDR and the CSR coincided in ensuring that tram lines did provide direct connections to city centres. In the USSR, there was always at least some attempt to arrange for public transport services to workplaces. Therefore, the policies that led to limited or basic levels of public transport in Communist countries do not always come off worst in comparisons with the policies of Western European countries, since in these States there were sometimes not even such minimum collective public transport services.

2. Analysis also confirmed the second hypothesis, that a diversity of solutions had been adopted by the three countries under study. The USSR had a considerable influence over its satellite regimes in defining of town-planning approaches. Among common themes, for example, there were: the weight assigned to iconic city centres, the provision of social facilities, the crucial role of public transport, the limited acceptance of private cars, attempts to keep the majority of places in cities close enough to be accessible on foot, or the dense populations aimed at in urban areas. However, when looked at in more detail, it becomes clear that there was no such thing as a single Socialist town-planning theory, nor were planning processes coherent or generalized. Urban planning ideas were more generic and imprecise than they were concrete or detailed. There was constant change in the planning approaches taken during the 1950s, 1960s and 1970s, partly coinciding with a period when the disciplines of town and transport planning became formally established.

Public transport policies were even less universalized than those for town planning. Each country took its own line in the light of pre-existing infrastructures, technological possibilities and professional approaches. Nevertheless, it should not be forgotten that there were some similarities between the three countries studied, such as the provision of accessibility and connectivity for urban areas, or the assumption that surface tramways were inappropriate for city centres, where lines should be run underground. On the other hand, it is true that there were more shared features between two of the countries under consideration, the GDR and the CSR, while policies in the third, the USSR, were more of an outlier.

In the GDR and the CSR, economic criteria influenced the long-term development of transport systems and the weight set on the operating costs of public transport. The cities of these countries mostly already had dense, well-developed tram networks. There was hence less of a need for new lines or extensions. In comparison with the USSR, they faced fewer difficulties, having a smaller number of cities, and requiring less capital investment. They also put into practice the potential for increasing tramway capacity by using multiple-unit rolling stock, which offered prospects for future modernization.

It should also be noted that among planners in the GDR and the CSR there was a certain tradition or established culture of including trams in transport planning. Segregated tram tracks gradually came to be seen as a useful tool for warding off future traffic congestion. In long-term urban transport planning, despite the consequent difficulties for integration into the city, segregation of tram lines made it easier to give priority to public transit. Trolleybuses and buses then started to be seen as secondary means of transport. This led to decisions to retain and to extend tramway lines. One shared idea was that it was crucial to ensure direct connections between city centres and outlying areas; another was the primacy of trams over other means of public transport. Nevertheless, some uncertainty about the modernity and efficiency of rapid tramways still persisted.

In their turn, the USSR and the CSR had several concepts in common, for example a belief in the incompatibility of rapid trams with residential areas. This was explained by the stress laid on high speeds for trams, the priority of road infrastructures, and concerns about pedestrian safety. In contrast, there were fewer overlaps between the GDR and the USSR. This is probably because the USSR laid great emphasis on modern, even futuristic ideas, while the GDR was more oriented towards realistic approaches based on continuing current public transport policies that had shown themselves to work.

Overall, though, the USSR was more distinct than were the GDR and the CSR, having several peculiarities in its policy for collective public transport. For instance, the USSR was more inclined to follow the ideas of Modern Movement. Its urban planning logic was more radical and eschewed continuation of inherited solutions. Trams were seen as a functional tool, their role being to transport large flows of passengers, without impeding in any major way the free flow of car traffic. This led to the practices of eliminating tramway lines from city centres, replacing them with trolleybuses and buses, of moving lines, and of limited development for tram networks. There was a certain reluctance in the USSR to invest in trams in compar-

ison with the more industrialized European countries within its imperial orbit. The trolleybus was the answer in the USSR, because it better matched the principles of Modern Movement to the provision of fast circulation for road traffic.

Differences in public transport policy can also be explained by variations in short-, medium- and long-term economic objectives. In the USSR, the favoured means of transport were those that required the least capital investment, such as buses and trolleybuses. The combining of public transport and private vehicles on a city's road infrastructure was valued as an economically efficient solution. Backing for this came from improvements in the capacities and speeds of buses and trolleybuses, which once again bought into question the need for continuing to retain tramways.

The impact of Modern Movement and financial restrictions also explain the meagre development of rapid tramways in the USSR, where there was no unanimity of opinion about installing them in cities. This explains why they were limited in their spread in the CSR, too, with fast trams a relatively exceptional solution. In comparison, although there were funding constraints in the GDR as well, here the philosophy of the planners was essentially to plan transport, even over the short and medium term, on the basis of a system known to be feasible, the high-speed tramway.

On the other hand, it should be highlighted that some conceptual approaches were indeed shared between the GDR and the USSR with regard to the development of residential areas. The CSR was quite diverse in its actions of this sort: a range of various ideas and experiments were put in place in the planning of new housing. In addition, it made extensive use of pedestrian crossing points with subways or footbridges, employed much less in the USSR, mainly because of financial constraints, and in the GDR, because here it was considered possible to combine tram and pedestrian flows safely.

In terms of the practice of integrated planning, even under similar conditions different cities evinced diverging objectives and approaches. From the middle of the 1960s onwards, theoretical studies in the three countries studied pointed to a similar idea, the co-ordination of urban transport systems. In the 1970s, however, the level of integrated planning was very different from one to another. In the case of the GDR, State organization of the process allowed for a certain clarity in co-ordination, co-operation and the evaluation of the outcomes of urban and transport plans, accompanied by a willingness on the part of planners to work together. The former parallel and independent development of urban and transport plans was overcome by enhanced, high-level co-operation between planning agencies. As a result, both town and transport planners had a voice in the process and a share in decision-making in city planning. This contributed to harmony of objectives and conformity of solutions, as well as improving the quality of the relationship between transport and cities.

In the CSR and the USSR, organization at State level was deficient, and the relations between administrations and between planners were not well defined, rendering the outcomes of integrated planning less effective. In the CSR, preliminary transport studies were very important documents in defining alternatives for town, and for general transport, plans. Although there was a solid model for integrated planning, actual processes were uneven, especially in the organization of collaborative work and the discussion of the results. In reality, transport plans were evaluated by town-planning offices, whilst urban plans were not subjected to any scrutiny by transport departments. As a result of this one-sided relationship, a number of utopian solutions, unrelated to urgent transport needs, triumphed.

In the USSR, there were also attempts at integration, using a provisional transport plan drawn up for town-planning use. However, this failed in its purpose, since it saw transport planning as an easy matter, taking a superficial view of its long-term development. Consequently, preliminary drafts could not serve as a basis for general transport plans, so integrated planning was deficient. There were no links between transport and cities, and urban plans were still strongly shaped by their own internal logic, and technical and financial criteria.

Thus, during the 1970s in the European Socialist countries there was no common urban public transport planning policy, contrary to what has usually been thought. It was difficult to arrive at widespread principles, because the main priority was given to individual national economies and productive capacities. The differences between countries lay in the political interpretation of the role of urban transport, in the organization of planning systems, in the level of technical development and the provision of tram rolling stock, and also in professional approaches and political attitudes to traffic planning. These public transport policies, implemented during a period of significant economic growth, were decisive in consolidating tram networks in the cities of Communist countries and achieved a certain continuity thereafter.

3. It also proved feasible to verify the third hypothesis, concerning the impact of Western conceptualizations on transport planning in Socialist cities. This research permitted the identification of strong influences from the idea of the car-oriented city. Communist European countries, having the aim of rationalizing urban structures, absorbed notions about the need for major road infrastructures, zoning, and transport models oriented towards fast, convenient car traffic. The 1960s and 1970s were a period in which the disciplines of town planning and urban transport planning took shape and became consolidated. In addition, this was period of rapid growth in cities and urban traffic, with the emergence of common difficulties. Consequently, exchanges of ideas and knowledge were one of the prime tools for dealing with urgent problems.

However, Communist countries also learned from discussions about the priority of rapid public transport in the light of the challenges of traffic congestion. The rapid tramway was a temporary invention in a few Western European countries which subsequently proved to be highly efficient, and in consequence was installed in other European countries, both Western and Communist. Analysis of international congresses showed solidarity among professionals. Questions of architecture were often ideologically constrained, but transport planning was mainly considered as a technical matter with rather little ideological significance. This can be explained by the period during which town planning developed into a more rigorous method, with scientific techniques for the development of urban structure and morphology. The strategy in the Socialist countries was to be preventive and to seek economical solutions, which heightened the value of learning from good Western practices.

British views attracted particular interest in Communist European countries, especially the USSR. The reason is the experience of the New Towns schemes in

which the ideas of Modern Movement could be extensively applied. In this movement, the first attempts were made to give a structure to, and to exemplify, modern principles of transport and traffic planning in cities. On the other hand, contemporary French and Swedish New Town solutions were also studied as paradigmatic examples. The French instances were paid considerable attention in the CSR. In all these cases, private cars were given priority in the structuring of cities, presenting a modern, progressive image. This concept also proved an aspiration for societies under Socialist regimes. However, while cars and their infrastructures were a symbol of modernity, public transport had economic and ideological priority. This duality constituted a blatant contradiction, which made it hard to provide a coherent narrative and difficult to take a penetrating critical view of Western approaches, this on occasion affecting the way they were assimilated and applied. Western concepts, such as pedestrianizing central streets, urban grid structures, zoning, underground public transport, and several levels of transport in central areas, were introduced.

When the West, analysing its problems with traffic congestion, came to realize the importance of collective public transport and railways, a similar discourse appeared in the European Communist countries. The potential for modernizing trams emerged by learning from the experiences of West Germany, Switzerland, Belgium, Austria and the Netherlands, although Communist countries were not faced with the same degree of traffic congestion. In consequence, decisions were not quickly reached, and there were some years of hesitancy about the appropriateness of this solution. Only when an urgent need arose to provide accessibility for new peripheral areas in an inexpensive way was the development of fast tramways initiated.

It is crucial to highlight the theoretical discussions in the GDR and the CSR from the late 1960s onwards, since from them there emerged a degree of certainty about the potential for the application of rapid tramways. It is worth noting that in the CSR this approach was strongly related to suburban areas, while in the GDR the necessity of creating such a system materialized in discussions. This may perhaps have been one of the factors leading to acceptance of this idea in the USSR, where there were relatively few studies on this topic at that time. However, the question of possible influences from the GDR and the CSR upon the USSR remains a moot point. Since no direct confirmatory evidence could be found, it must be seen as a maximalist hypothesis. Nevertheless, it did prove feasible to demonstrate views differing from one country to another and to note several temporal sequences in theoretical discussions and the implementation of ideas.

As for the exchange of knowledge at international congresses, an incongruous mixture of learning and dissimulation proved more important than sharing. The European Communist countries built up a triumphalist discourse, in which any difficulties with public transport were hidden, but technical achievements were publicized. A similar line was followed in internal discussions, no admissions being made about problems and glitches. This created a kind of barrier that prevented the proper interpretation and application of Western ideas in Socialist cities. There was too much confidence in the centralized planning of Communist regimes, which was expected to solve by itself all the drawbacks that might afflict the capitalist system. However, Western difficulties were often related to the organization of town-planning processes, which was an equally unresolved issue in Communist countries.

4. Although the strong part played by transport planning concepts in town planning seemed obvious, no full confirmation could be provided for the fourth hypothesis. Road infrastructure planning was crucial in urban morphology, especially in the 1960s. The main task of town planners in the 1970s was spatial expansion and changes in urban patterns. Rapid tramways with their large passenger flows became lines giving structure to urban development, a sort of re-run of what had happened at the start of the twentieth century when trams were electrified. Any spatial extensions to cities on the basis of road transport services were insignificant. The existing hierarchies of urban structures and spaces had to be reconsidered in relation to the large capacities and high speeds of high-speed tramways. However, although an intimate relationship with urban structure was recognized from the beginning, the solutions for such an interrelationship were not always well defined and balanced.

With its specific functional interests, the logic of the planning of rapid tramway lines did not always coincide with that of town planning. Projects for fast tram routes influenced the population densities expected in residential areas and the accessibility of peripheral or suburban areas, thus providing coherence for urban models. However, standards for so-called Socialist cities were defined by criteria such as optimum economy, efficiency, compactness and coherence in urban structures. The technical requirements of transport were barely considered. Zoning, decisions on urban structure, the density of population in various areas, the organization and accessibility of tram stops were often decided without thought for transport and its needs, which had to be adapted to fit urban planning decisions. Hence, at this period, rapid tramways did become a tool for controlling urban form and maintaining the coherence of city structures. Their technical characteristics, however, were considered only when they matched solutions felt to be economically efficient or ideologically beneficial. This often reduced the efficiency and convenience of their operations.

This problem can also be explained by the poor organization of theoretical research into the relationship between rapid transit and cities. The influence of higher-speed public transport upon urban structures was often analysed in an abstract way, whilst express tramways were not studied in any detail. Moreover, although there was some investigation of the potential impacts of rapid transit on urban space, the results were not followed up in practice. This was caused by a mismatch between the results obtained and official town planning regulations and guidelines. The one exception was the GDR, where several studies on the integration of high-speed tramways into urban structures and forms were undertaken, and subsequently included in regulations and planning practice.

To conclude the discussion of the four hypotheses, it is worth mentioning that care was taken to seek out any common features in Socialist urban planning. It was hence of relevance to study significant cases and the differences between them. Nevertheless, the general or shared, and particular or individual, features discovered were mainly used as tools of value for the recognition of trends in thinking and opinions of the period. This is because ideas, even if not always put into practice, stimulate other ideas and fresh solutions, in other words, they can explain people's style of thinking, which is a representation of their way of being, and the level and orientation of human development.

It should be also noted that this research has not attempted to provide an exhaustive account of all features of the research topic, nor could this realistically have been done. It is likely that several issues of some relevance have not been analysed in the desirable depth, owing to the difficulty of accessing materials and the limited research time available. Had this been feasible, it might have been advantageous to include fast tram projects in the larger cities of the USSR, or to expand the number of case studies relating to the GDR and CSR. It might have been of interest to incorporate details of further medium-sized cities, such as Košice, Plzeň (Pilsen), Olomouc, Schwerin or Rostock, in order to round out the picture of rapid tramway planning solutions in these countries. Extension of the analysis to cover the experiences of Western European countries which also modernized their tramways, had it been possible, might have provided interesting conclusions in respect of the similar and different ideas found in divergent political systems. In brief, this thesis is intended to offer the outcome of what was intended to be intensive, rigorous research, but it has a necessarily limited level of explanatory coverage, which is due to the complexity and breadth of the topic.

In spite of these limitations, the research breaks down, or helps to dismantle, various generalized assertions. It demonstrates that there were differing solutions for public transport policy among Communist countries, but also some similarities with Western countries. It gives evidence that alongside the factors often quoted as contrasts between Western and Communist countries, such as the dissimilar speed of the introduction of cars, the difficulty of co-ordinating private interests, the centralized economy, or the priority of collective public transport, there were other major aspects that also had a significant influence. These included: the size of a given city concerned, pre-existing urban structures, established transport networks, the extent of a city's territory and the density of its population, the availability of energy resources, geographical characteristics, the level and nature of industrial development, and the political decisions, technical culture and professional ideas in each country studied.

Furthermore, the interdisciplinary approach taken and the transnational scope of the research permit an understanding of the relevance of collective public transport policy in the "Socialist city". This is a subject that has hitherto received little attention, probably because it had been assumed to be a relatively homogeneous and uncomplicated topic. The present research has established a relationship between a group of elements: city planning, land use, urban models and rapid public transport. Previously these had mostly been subsumed within town planning, architecture or road infrastructures. The focus on public transport has permitted better contextualization and explanation of urban transit planning and town-planning decisions. In relation to this, a range of methodological approaches were put forward, and perspectives on the diversity of "Socialist Modern" and the significance of the so-called "Socialist city" have been broadened. In this way, the research may be seen as having taken a step forward in the direction of building up a trustworthy urban history of the European Communist cities.

Views from the southern heights of Dresden towards the city centre. Source: Dresden Stadtmuseum, SMD_Ph 768_05

VI. GENERAL BIBLIOGRAPHY

Abel, P. (1984) Stand der Verkehrserschließung des neuen Wohnstandorts Dresden-Gorbitz, *Kraftverkehr*, 27 (6), pp. 219-221.

Abercrombie, P. (1944) *Greater London Plan*, London: University of London Press.

Abercrombie, P. (1945) *Greater London Plan 1944*, London: Stationary Office.

Ackermann, K., Stein, W. (1975) Die verkehrliche Anbindung des Wohngebietes Leipzig-Grünau, *DDR-Verkehr*, 3, pp. 97-100.

Ackermann, K., Johne, G. (2001) 50 Jahre Stadtverkehr und Stadtverkehrspolitik in Leipzig, in Archiv für die Geschichte des Strassen und Verkehrswesens (ed.), *Strassen und Verkehrsgeschichte deutscher Städte nach 1945: Dresden, Leipzig, Halle, Chemnitz, Erfurt*, 16, Bonn: Kirshbaum Verlag, pp. 57-103.

Adams, T. (1935) *Noveishie Dostizheniia v Planirovke Gorodov*, trans. Perchik, L. M., Moskva: Izdatelstvo Vsesoiuznoi Akademii Arkhitektury.

Akademia de Servicio Urbano de K. D. Panfilov (1965) *Tekhnicheskoe zadanie na proektirovanie podvizhnogo sostava skorostnogo tramvaia*, Moskva.

Aleksandrov, A. P., Polyakov, A. A. (1936) *Trolleibusy*, Moskva: Akademiia Kommunalnogo Khoziaistva.

Aman, F. T. (1911) The Trackless Trolley System: Some General Observations, *The Town Planning Review,* 1 (4), pp. 299-302.

Anbalakan, K. (2016) Objectivity in History: An Analysis, *Kemanusiaan*, 23 (1), pp. 21–33.

Anonymous (1900) A Combined Automobile and Tramway Omnibus, *Scientific American*, 16 (82), pp. 245-246.

Anonymous (1945) Quiet Trolley Described Before Michigan Section, *Electrical Engineering*, 64 (3), p. 122.

Anonymous (1958) Piatii Kongress Mezhdunarodnogo Soiuza Arkhitektorov, III Plenum Pravleniia Soiuza Arkhitektorov SSSR, *Arkhitektura SSSR*, 7, pp. 1-2.

Anonymous (1961) Streit um die Strassenbahn in der Jakobstraße, *Volksstimme*, 8 de noviembre.

Anonymous (1963) The Return to Rapid Transit, *Financial Analysts Journal*, 19(1), pp. 33-37, www.jstor.org/stable/4469449.

Anonymous (1969) Rapid Transit in Ruhr-2: Stadtbahn, *Railway Gazette International*, 125 (18), pp. 708-710.

Anonymous (1971) Die prognostische Entwicklung des öffentlichen Massenverkehrs in der Bezirksstadt Erfurt, *Die Strasse*, 11 (5), pp. 223-227.

Anonymous (1972) Z výskumných pracovísk, Architektúra a Urbanizmus, 2, pp. 56-59.

Anonymous (1977) Time to standartise LRT car designs, *Railway Gazette International*, 133 (5), pp. 180-185.

Anonymous (1981) Railway Gazette International, 137 (5), p. 362.

Anzola Salom, R. B. (1999) *La Investigación como el Proceso Creativo*, Anuario Universidad de Carabobo Facultad de Ciencias Jurídicas y Políticas Instituto de Derecho Comparado, Valencia -Venezuela, 22, pp. 365-372.

Archiv für die Geschichte des Strassen- und Verkehrswesens (2001) *Straßen - und Verkehrsgeschichte deutscher Städte nach 1945: Dresden - Leipzig - Halle - Chemnitz – Erfurt,* 16, Bonn: Kirschbaum Verlag.

Archive of the Museum Yarget (1966) *Ulitsa Sovetskaia*, Anonymous.

Archive of the Slovak Academy of Science (1963) *Smerný Uzemní Plán Bratislavy.*

Arnóth, L. (1981) *Architecture – the Workplaces and their Environment*, in XIV World Congress of the International Union of Architects, Reports and Contributions, Warszawa, 15-21 June, pp. 92-95.

Aróstegui, J. (2001) *La Investigación Histórica: Teoría y Método*, Barcelona: Crítica.

Baburov, V. (1956) *Planirovka i zastroika gorodov*, Moskva: Literatura po stroitelstvu i arkhitekture.

Balassa, B. (1992) Economic Integration in Eastern Europe, *Structural Change and Economic Dynamics*, 3 (1), pp. 3-15.

Bartholomew, H. (1959) *Ispolzovanie territorii v amerikanskich gorodakh*, trans. Volfenzon, E. Y., Moskva, Gosstroiizdat.

Barton, M. (1975) *Ostrava 1945-1975*, Ostrava: Útvar Hlavního Architekta Města Ostravy.

Bass, M. G. (1961) *XI Mezhdunarodnii dorozhnii Kongress*, Moskva: Avtotransizdat.

Bauer, G., Linert, S., Losos, L., Mahel, I. (1995) *Straßenbahnen in der Tschechischen und Slowakischen Republik. Von der Pferdebahn zum Tatrawagen*, Praha: NADATUR.

Bächtiger, A. (1940) Die moderne Strassenbahn als wirtschaftliches Transportmittel, *Schweizerische Bauzeitung*, 115/116 (20), pp. 227-231.

Becklett, L. (1958) *Land Use and Circulation in Relation to Areas for Renewal Action*, in Report of International Seminar on Urban Renewal, IFHP, The Hague.

Berhge, M., Heiner, M. (1978) *Die Straßenbahnen in der DDR. Geschichte Technik Betrieb*, Berlin: Motorbuch Verlag.

Belin, R. (1975) 41st Congress, *Railway Gazette International,* 131(5), pp. 173-174.

Bennet R., Elmberg C. (1977) *Priority for Surface Public Transport*, 42nd UITP International Congress, Montreal.

Belousov, V. N. (1978) Spravochnik proektirovshika. Gradostroitelstvo, Moskva: Stroiizdat.

Berkenkopf, P. (1950) Zur Frage der Koordinierung der Verkehrsmittel, *Zeitschrift für Verkehrswissenschaft*, 3, pp. 143-152.

Bermúdez, E. (1995) *La Investigación y los Procesos Creativos*, documento presentado para Rectoral Research Commission in University of Colombia.

Bernhardt, C. (2017) Längst beerdigt und doch quicklebendig. Zur widersprüchlichen Geschichte der "Autogerechten Stadt," *Zeithistorische Forschungen/Studies in Contemporary History*, 14 (3), pp. 526-540.

Berton, M. (2017) Saving the City: Harland Bartholomew and Administrative Evil in St. Louis, *Public Integrity*, 20 (2), pp. 194-206.

Bevir, M. (1994) Objectivity in History, *History and Theory*, 33 (3), pp. 328-344.

Beyer, E. (2011) Planning for Mobility Designing City Centers and New Towns in the USSR and the GDR in the 1960s, in Siegelbaum, L. H. (ed.), *The Socialist Car Automobility in the Eastern Bloc*, Ithaca: Cornell University Press, pp. 71-91.

Blair, L. H. (1975) *Session Chairman s Report, in Papers and Proceedings International Congress*, IFHP, Integrated Planning and Plan Implementation in Urban Areas, vol. 2, Amsterdam, 24-30 August.

Blazek, M. (1975) Tendentsii urbanizatsii v socialisticheskikh stranakh Evropy, in Sumnik, Z. A. (ed.), *Urbanizatsiia i rasselenie*, Moskva: Statistika.

Blomkvist, P. (2004) Transferring Technology-Shaping Ideology: American Traffic Engineering and Commercial Interests in the Establishment of a Swedish Car Society, 1945-1965, *Comparative Technology Transfer and Society*, 2 (3), pp. 273-302.

Blum, O. (approx. 1930) *Gutachten Inwieweit ist der Ersatz von Strassenbahnen im Stadtinnern durch Omnibus zulässig*, Hannover: Technische Hochschule Hannover.

Blum, O. (1941) *Städtebau*, second edition, Berlin: Verlag von Julius.

Blum, O., Potthoff, H., Risch, K. (1942) *Straßenbahn und Omnibus im Stadtinnern*, Jena: Verlag von Gustav Fischer.

Bocharov, Y. P., Kudryavtsev, O. K. (1972) *Planirovochnaia struktura sovremennogo goroda*, Moskva: Izdatelstvo literatury po stroitelstvu.

Bocharnikova, D. (2014) *Inventing Socialist Modern: A History of the Architectural Profession in the USSR, 1932-1971*, PhD thesis, Florence, European University Institute.

Bocharnikova, D., Harris, S. E. (2018) Second World Urbanity: Infrastructures of Utopia and Really Existing Socialism, *Journal of Urban History*, 44(1), pp. 3–8.

Bocharnikova, D. (2019) The NER project: a vision of postindustrial urbanity from post-Stalin Russia, *The Journal of Architecture*, 24 (5), pp. 631-654, DOI: 10.1080/13602365.2019.1667401.

Bockemühl R., Bandi F. (1963) *Discussion on the Report of Traffic Committee: Horizontal and vertical separation of public and private transport to improve the fluidity of urban traffic*, 35th International Congress Viena.

Bolchynek, F., Leyer, L., Krause, L. (1977) *Erkenntnisse und Erfahrungen aus der Begutachtung von Generalbebauungsplänen ausgewählter Städte*, Berlin: Verlagsort.

Boletín Oficial del Estado (1940) *Ley de 5 de octubre de 1940 por la que se regula la concesión administrativa de líneas de transporte realizado por trolebuses*, 285, pp. 7.34 - 7039.

Bolonenkov, G. V. (1971) *Sistema skorostnogo obshestvennogo transporta v planirovochnoi strukture bolshogo goroda, Moskva: GOSINTI.*

Bolonenkov, G. V. (1972a) *Skorostnoi obshestvennii transport krupnogo goroda*, Moskva: GOSINTI.

Bolonenkov, G. V. (1972b) Vliianie razvitiia transportnykh sistem na strukturu goroda, in Bolonenkova G. B., Smykovskaia G. Y. (eds.), *Transport v planirovke gorodov, Moskva: TSNIIP Gradostroitelstva, pp. 3-32.*

Bolonenkov, G. V, Savina, V. (1972c) Gradostroitelnye usloviia primeneniia razlichnykh sistem skorostnogo transporta, in Bolonenkova G. B., Smykovskaia G. Y. (eds.), *Transport v planirovke gorodov,* Moskva: TSNIIP Gradostroitelstva, pp. 53-84.

Bolonenkov, G. V. (1976) *Problema optimizatsii razvitiia sistem skorostnogo passazhirskogo transporta bolshikh gorodov,* Moskva: GOSINTI.

Bondarevskii, D. I., Chertok, M. S., Ponomarev, A. A. (1975) *Tramvainie vagony RVZ-6M i KTM-5M3,* Moskva: Transport.

Bordukov, I. V. (1974) O razrabotke kompleksnykh skhem razvitiia gorodskogo passazhirskogo transporta, in Giprograd (ed.), *Kompleksnye transportnye skhemy gorodov*, Kiev: Budivelnik, pp. 3-6.

Boquet, Y. (2017) The renaissance of tramways and urban redevelopment in France, *Miscellanea Geographica – Regional Studies on Development*, 21 (1), pp. 5-18, DOI: 10.1515/mgrsd-2017-0005.

Böhme, U. (1971) Personenverkehr in Städten — ein Umweltproblem, *Deutsche Architektur*, 7, pp. 440-445.

Bratislava Municipal Archive (1963) *Štúdia rozvoja mestkej hromadnej dopravy: Prognóza a návrh 1 etapy,* Útvar hlavného architekta mesta Bratislavy.

Bratislava Municipal Archive (1969) Generálne Riešenie Mestskej Hromadnej Dopravy v Bratislavy, Útvar hlavného architekta mesta Bratislavy.

Bratislava Municipal Archive (1975) *Návrh Dalsieho Rozvoja Mestskej Hromadnej Dopravy v Hlavnom Meste SSR Bratislave*, Útvar Dopravného Inzínierstva Mesta Bratislavy, Zápisanice rady NVB, I.

Bratislava Municipal Archive (1980) *Generel Dopravy hlavného mesta SSR Bratislavy*, Útvar Dopravného Inzínierstva Mesta Bratislavy, Zápisanice rady NVB, I.

Braudel, B. (1970) *La Historia y las Ciencias Sociales*, trans. Mendoza, J. G., Madrid: El Libro del Bolsillo.

Braun, T. (1963) *Stúdia Rozvoja Mestkej Hromadnej Dopravy*, Archivo Municipal de Bratislava, Útvar hlavného architekta mesta Bratislavy.

Brause, G., Jacob. R., Löber, J., Schrödl, E. (1965) Die Stadtregion Leipzig und ihre städteplanerische Entwicklung, *Deutsche Architektur*, XIV, pp. 496-499.

Brno Municipal Archive (1972a) *PÚP Sídliště Líšeň*, Stavoprojekt Brno, Útvar Územního Plánování a Architektury, NV města Brna.

Brno Municipal Archive (1972b) *Program výstavby. Pro vyprocování podrobného územního plánu Sídliště Líšeň*, Útvar Územního Plánování a Architektury, NV města Brna.

Brno Municipal Archive (1972c) *Generální Řešení Sídliště Československo-Sovětského Přátelství Brno-Bohunice*, Stavoprojekt KPO Brno, Útvar Územního Plánování a Architektury, NV města Brna.

Brno Municipal Archive (1973) *PÚP Brno-Líšeň, Konečný Návrh – Doprava, Schema Odliv v MHD z obytného území v ranní špičce,* Stavoprojekt Brno, Útvar Územního Plánování a Architektury, NV města Brna.

Brno Municipal Archive (1974a) *Koncepci dopravního řešení PÚP Lišen*, Společné vyjadrení odboru dopravý NVmB a Dopravně inženýrské organizace města Brna, Útvar Územního Plánování a Architektury, NV města Brna.

Brno Municipal Archive (1974b) *Základní Směry Rozvoje Mestské Hromadné Dopravy v Brně na léta 1976-1980*, Dopravní podnik města Brna, Útvar Územního Plánování a Architektury, NV města Brna, G10, 729.

Brno Municipal Archive (1978) *Sídliště Brno – Líšeň, Situace*, Stavoprojekt Brno, Útvar Územního Plánování a Architektury, NV města Brna.

Brno Municipal Archive (1979) *Hlavní Směry Rozvoje Městské Hromadné Dopravy v Brně do roku 1985*, Dopravní podnik města Brna, Útvar Územního Plánování a Architektury, NV města Brna, G10, 730.

Brno Municipal Archive (1985) AMB-U5-XXIa57-01, Útvar Územního Plánování a Architektury, NV města Brna.

Bronshtein, L. A. (1940) *Organizatsiia dvizheniia gorodskogo passazhirskogo transporta*, Moskva-Leningrad: Gostransizdat.

Brown, R. G. (1966) *The Integration of Metropolitan Transportation Planning with a Comprehensive Development Policy: A Coordinated Approach*, Master Thesis, University of British Columbia, April.

Bruton, M. J. (1983) The Traffic in Towns Philosophy: Current Relevance, *Built Environment*, 9 (2), pp. 99-103.

Brunton, L. (1992) The Trolleybus Story, *The Institution of Electrical Engineers Review*, 38 (2), pp. 57-61.

Brzezinski, A., Suchorzewski, W. (2004) *Tramways in Poland - from Neglect to Recognition of Great Potentials*, Conference Codatu XI, Bucarest. 7.

Buchanan, C. (1963) *Traffic in Towns: A Study of the Long-Term Problems of Traffic in Urban Areas*, London: H.M. Stationery Office.

Buchanan, C. (1964) *Traffic in Towns*, Harmondsworth: Penguin Books.

Buchanan, C., and Partners (1971) South Hampshire Study, in Lewis, D. (ed.), *Urban Structure*, Architects' Year Book – 12, London: Elek Books, pp. 17-40.

Buchanan, C., Crow, G. (1974) An Integrated Transport System, *Journal of the Royal Society of Arts*, 122 (5211), pp. 117-128.

Buckley, R. J. (1989) Capital Cost as a Reason for the Abandonment of First-Generation Tramways in Britain, *Journal of Transport History*, 10 (2), pp. 99-112.

Budapester internationale wissenschaftliche Beratung für Stadtverkehrsplanung und Verkehrstechnik (1976) *über Verkehrsplanung und Lebensweise, Lebensqualität*, 21-23 April, Budapest: Verkehrswissenschaftliche Verein.

Budapester internationale wissenschaftliche Beratung für Stadtverkehrsplanung und Verkehrstechnik (1977) *über Entwicklung der Methodik der Generalverkehrsplanung*, 13-15 April, Budapest: Verkehrswissenschaftliche Verein.

Budapester internationale wissenschaftliche Beratung für Stadtverkehrsplanung und Verkehrstechnik (1978) *über Menschengerechte Stadtverkehrsentwicklung*, 12-14 April, Budapest: Verkehrswissenschaftliche Verein.

Buehler, R., Pucher, J., Dümmler, O. (2018): Verkehrsverbund: The evolution and spread of fully integrated regional public transport in Germany, Austria, and Switzerland, *International Journal of Sustainable Transportation*, 13 (1), pp. 1-15.

Burov, A. (1944) Voina i Arkhitektura, *Znamia*, 9, pp. 100-114.

Busch, F. (1948) Transportation in Postwar Germany, *The Annals of the American Academy of Political and Social Science*, 260, pp. 80-89.

Butina, T. I. (1978) Skorostnoi tramvainyi vagon, *Tekhnicheskaia estetika*, 10.

Butyagin, V. A. (1974) *Planirovka i blagoustroistvo gorodov*, Moskva: Stroiizdat.

Capuzzo, P. (1998) Transportation system and urban space. Vienna 1865-1938, *Jahrbuch für Wirtschaftsgeschichte / Economic History Yearbook*, 39 (2), pp. 153-168.

Capuzzo, P. (2003) Between Politics and Technology: Transport as a Factor of Mass Suburbanization in Europe, 1890-1939, in Divall, C., Bond, W. (eds.), *Suburbanizing the Masses. Public Transport and Urban Development in Historical Perspective,* Burlington: Ashgate, pp. 23-47.

Cano Rodríguez, J. M. (1943) Construcción y explotación de trolebuses en España, *Revista de Obras Públicas*, 91 (2733), pp. 1-4.

Carr, E. H. (1987) *What is history?* second edition, Harmondsworth: Penguin Books.

Central Committee of the CSR (1962) *O zvýšení úlohy vědy a techniky v rozvoji výrobních sil v ČSSR*, Resolution N147/1962.

Cervero, R. (1997) Paradigm shift: from automobility to accessibility planning, *Urban Futures (Canberra)*, 22, pp. 9-20.

Cheape, C. W. (1976) The Evolution of Urban Public Transit, 1880-1912: A Study of Boston, New York and Philadelphia, *The Journal of Economic History, 36 (1), pp. 259-262.*

Cheape, C. W. (1980) *Moving the Masses: Urban Public Transit in New York, Boston, Philadelphia 1880-1912,* Harvard University Press, Cambridge, MA.

Cherepanov, V. A. (1964) *Transport v Gradostroitelstve*, Moskva: Izdatelstvo Literatury po Stroitelstvu.

Cherkes, B. (2015) Development of the largest, Residential District of Lviv – Sykhiv, *Architectural Studies*, 1 (1), pp. 1-6.

Chorley, R. J., Haggett, P. (1971a) *La geografía y los modelos socio-económicos*, trans. Carlos Ferran Alfaro, Madrid: Instituto de estudios de administración local.

Chorley, R. J., Haggett, P. (1971b) *Modeli geografii, sbornik statei*, trans. Barlas, V. Y., Moskva: Progress.

Clark, D. K. (1878) *Tramways. Their Construction and Working,* London: Crosby Lockwood and Co.

Clark, C. (1958) Transport: Maker and Breaker of Cities, *The Town Planning Review,* 28 (4), pp. 237-250.

Collein, E. (1963) Grundsätzliche ideologische und politische Probleme in Städtebau und Architektur, in 7. Plenartagung, *Ideologische Fragen des Städtebaues und der Architektur*, Berlin: Deutsche Bauakademie.

Comité de Redacción (1938) Výsledek soutěže na vyřešení komunikačních spojů z vnitřního města do severozápadní a západní oblasti hl. města Prahy, *Architect SIA*, XXXVIII, pp. 1-13.

Committee on Highway Capacity. Department of Traffic and Operations (1950) *Highway Capacity Manual: Practical Applications of Research*, Washington: US Government printing office.

Cook, I. R., Ward, S. V., Ward, K. (2014) A springtime journey to the Soviet Union: Postwar planning and policy mobilities through the Iron Curtain, *International Journal of Urban and Regional Research,* 38 (3), pp. 805-822.

Corbusier, L. (1946) *Propos d'Urbanisme,* Paris: Editions Bourrelier.

Corbusier, L. (1980) *A propósito del urbanismo*, trans. Roser Berdaqué, Barcelona: Poseidon.

Corbusier, L. (1981) *Los tres establecimientos humanos*, trans. Albert Junyent, Barcelona: Poseidon.

Corbusier, L. (2003) *Cómo concebir el urbanismo*, trans. Enrique L. Revol, first edition in 1946, Buenos Aires: Ediciones Infinito S. R. L.

Costa, A., Fernandes, R. (2012) Urban Public Transport in Europe: Technology Diffusion and Market Organization, *Transportation Research Part A: Policy and Practice*, 46 (2), pp. 269-284.

Couch, C., Fowles, S. (1978) Britain: Runcorn. A Tale of Two Centres, *Built Environment*, 32 (1), pp. 88-102.

Cowan, P. (1976) *Budushchee planirovki*, trans. Yaroshevski, B. E., Moskva: Stroiizdat.

Crawford, M. (1995) Building the Workingman's Paradise: The Design of American Company Towns, London-New York: Verso.

Crimson Historians and Urbanists (eds.) *New towns on the Cold War Frontier*, Rotterdam (book in progress), consulted 1.03.2021in https://www.crimsonweb.org/spip.php?mot12.

Crouch, M. (1979) Problems of Soviet Urban Transport, *Soviet Studies*, 31 (2), pp. 231-256.

Cullingworth, B., Nadin, V. (1989) *Town and Country Planning in the UK*, London: Routledge.

Československá Vědeckotechnická Společnost (1977) *Perspektivy moderních tramvají*, Internatinal Conference, 4-6 October, Praha: Československá Vědeckotechnická Společnost.

Daniels, P. W., Warnes, A. M. (1983*) Movimiento en Ciudades, Transporte y Tráfico Urbanos*, trans. Tellez, S., Madrid: Instituto de Estudios de Administración Local.

Dassbach, C. H. A. (1994) The Social Organization of Production, Competitive Advantage and Foreign Investment: American Automobile Companies in the 1920s and Japanese Automobile Companies in the 1980s, *Review of International Political Economy*, 1 (3), pp. 489-517.

Davidova, Y, A., Gromenko, V. V. (2014a) Dinamika promyshlennogo razvitiia SSSR v 1960 – 1970-e gody, *Ekonomika*, 5, pp. 22-24.

Davidova, Y, A., Gromenko, V. V. (2014b) Ekonomicheskie reformy v period zastoia, 1964-1985, *Teoriia i praktika obshestvennogo razvitiia*, 7, pp. 1-5.

Davidovich, V. G. (1960) *Rasselenie v promyshlennikh uzlakh*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu, arkhitekture i stroitelnym materialam.

Davidovich, V. G. (1968) *Rasselenie v gorodakh*, Moskva: Mysl.

Dawson, A. H. (2015) *Planning in Eastern Europe*, New York: Routledge Revivals.

Deutsche Bauakademie (1960a) *Probleme des Städtebaus und der Architektur im Siebenjahrplan*, erste theoretische Konferenz, Berlin: Deutsche Bauakademie.

Deutsche Bauakademie (1960b) *Städtebau in der Sowjetunion. Materialen der Allunionkonferenz zu Fragen des Städtebaus*, Berlin: Institut für Gebiets-, Stadt- und Dorfplanung.

Deutsche Bauakademie (1965) Grundsätze der Planung und Gestaltung der Städte der DDR in der Periode des umfassenden Aufbaus des Sozialismus, *Deutsche Architektur*, 1, Berlin, pp. 4-8.

Deutsche Bauakademie (1967) *Stadtzentren: Beiträge zur Umgestaltung und Neuplanung*, Berlin: Deutsche Bauinformation.

Deutsche Bauakademie (1968) *Stadt und Verkehr: Verkehrs- und Stadtplanung in den USA und in Westeuropa*, Berlin: Deutsche Bauinformation.

Deutsche Bauakademie (1969) *Generalbebauungsplanung der Städte der DDR*, Berlin: Deutsche Bauinformation.

Deutsche Bauakademie (1971a) *Entwicklung des sozialistischen Städtebaus und der sozialistischen Architektur in der Deutschen Demokratischen Republik*, Berlin: Deutsche Bauakademie.

Deutsche Bauakademie (1971b) *Forschungsvorhaben.- Sozialistische Umgestaltung der Städte und Siedlungszentren*, Berlin: Deutsche Bauinformation.

Deutsche Bauakademie (1972) *Sozialistische Umgestaltung der Arbeits- und Wohnumwelt,* Berlin: Deutsche Bauinformation.

Dewees, D. N. (1979) A Comparison of Streetcar and Subway Service Quality, *Journal of Transport Economics and Policy*, 13 (3), pp. 295-303.

Diamant, E. S. (1976) *Light Rail Transit: A State-of-the-Art Review*, Executive Summary, Washington: U.S. Department of Transportation.

Diefendorf, J. M. (1989) Artery: Urban Reconstruction and Traffic Planning in Postwar Germany, *Journal of Urban History*, 15 (2), pp. 131-158.

Diefendorf, J. M. (2014) Urban transportation planning influences and legacies: Kurt Leibbrand, Germany's acclaimed postwar traffic planner, *The Journal of Transport History*, 35 (1), June, pp. 35-56.

Dienel, H. -L., Schmucki, B. (1997) *Mobilitat für Alle. Geschichte des offentlichen Personennachverkehrs in der Stadt zwischen technischem Fortschrittund sozialer Pflicht*, Stuttgart: Franz Steiner Verlag.

Dietzschold, G. (1967) Grundsätze für die Entwicklung des Verkehrs in den Städten der DDR, *Die Strasse*, 7 (6), pp. 243-247.

Dikanskii, M. G. (1915) *Postroika gorodov, ikh plan i krasota, Petrograd: Izdanie N. P. Karbasnikova.*

Divall, C., Schmucki, B. (2003) Introduction: Technology, (Sub)urban Development and the Social Construction of Urban Transport, in Divall, C., Bond, W. (eds.), *Suburbanizing the Masses. Public Transport and Urban Development in Historical Perspective,* Burlingtone: Ashgate, pp. 1-19.

Divall, C., George, R. (2005) Cultures of transport: representation, practice and technology, *Journal of Transport History*, 26 (1), pp. 99-111.

Divall, C., Hine, J., Pooley, C. (2017) Introduction. Why does the past matter? in Divall, C., Hine, J., Pooley, C. (eds.), *Transport Policy: Learning Lessons from History*, London: Routledge, pp. 1-14.

Dopravní Podnik Města Ostravy, (1969) *U Divadla Zd. Nejedlého, k 70 výročí založení městké dopravy v Ostravé,* Ostrava: DPMO.

Dorotjak, D. (1969), Mesto a jeho funkcné vztahy, *Architektura a Urbanizmis*, 2, pp. 39-49.

Dostalík, J. (2017) The organicists: planners, planning, and the environment in Czechoslovakia 1914–1949, *Planning Perspectives*, 32 (2), pp. 147-173.

Dostalík, J. (2020) The natural environment in socialist modernity: three case studies of new urban areas in Czechoslovakia (1966–1991), *Planning Perspectives*, 35 (5), pp. 895-907, DOI: 10.1080/02665433.2020.1801494.

Dresden City Council (1967) *Generalbebauungsplan und Generalverkehrsplan der Stadt Dresden*, Dresden: EMZ-Druck.

Dresden City Council (1977) *Generalverkehrsplan der Stadt Dresden*, Dresden: Polydruck.

Dresden Municipal Archive (1961a) *Protokoll über die 3. Tagung der Zentralen Sozialistischen Arbeitsgemeinschaft "Komplexe Verkehrsplanung",* am 2.2.1961.

Dresden Municipal Archive (1961b) *Anordnung der komplexen Verkehrsplanung für die Stadt Dresden*, Rat der Stadt Dresden, Stadtarchitekt, Brigade Komplexe Verkehrsplanung.

Dresden Municipal Archive (1967) *Generalverkehrsplan der Stadt Dresden*, Bericht über den Stand und noch offener Probleme des Generalverkehrsplanes der Stadt Dresden, 9.1.2 – 041.

Dresden Municipal Archive (1968) *Basisstruktur der Verkehrsanlagen*, Bericht Zentrale Arbeitskreis für Forschung und Technik, 1.3. – 043.

Dresden Municipal Archive (1970) *Die Hauptprobleme der GVP der Stadt Dresden*, Rat der Stadt Dresden, Vorlage für die Beratung des Arbeitskreises Gesellschaftsprognose der Bezirksleitung Dresden der SED am 30. 06. 1970, 9.1.2 - 046.

Dresden Municipal Archive (1973) *Konzeption zur weiteren Arbeit am GVP der Stadt Dresden im Rahmen der Langfristigen Planung*, Rat der Stadt Dresden, Abteilung Verkehrs und Strassenwesen, 002537 - A.

Dresden Municipal Archive (1974) *Generalbebauungsplan, Entwurf unter besondere Berücksichtigung der Langfristigen Planung der Komplexen Wohnungsbaus*, Büro für Stadtarchitekten des Rates der Stadt Dresden 28.06.1974, 001859 - 4.

Dresden Municipal Archive (1975a) *Verkehrspolitische Grundsätze für die GVP und die strategische Ausbaukonzeption bis 1980 und danach*, Rat der Stadt Dresden, Stadtrat für Verkehrs und Nachrichtenwesen, 9. 4.

Dresden Municipal Archive (1975b) *Generalverkehrsplan Dresden*, *Erschließungsnetz Dresden Stadt,* 1.5.3.1. - 982-2-16 - B 23.

Dresden Municipal Archive (1975c) *Generalverkehrsplan Dresden, Geplantes Erschließungsnetz Dresden Stadt 1990*, 2.5.3.1. - 982-2-16 - B 27.

Dresden Municipal Archive (1976) *Primäre Verkehrserschließung des Wohnungstandortes Gorbitz-Dresden*, Verkehrstechnische Studie, Büro für Stadtverkehr des Rates der Stadt Dresden, 9.1.2.-013.

Dresden Municipal Archive (1977a) *Konzeption zur Vorberatung Stadtverordnetenversammlung*, 4.2.1 - 212.

Dresden Municipal Archive (1977b) *Die Verkehrserschließung für den Wohnungsbaustandort Gorbitz einschließlich der Sicherung der Vorbereitung*, Beschlußvorlage Rat der Stadt Dresden, 4.2.17.-34.52.

Dresden Municipal Archive (1978) *Gutachterliche Stellungnahmen zu der Studie für das Stadtgebiet Dresden Gorbitz. 1. und 2. Wohnkomplex*, Bauakademie de DDR, Institut für Städtebau und Architektur, 4.2.17.-34.95.

Dresden Municipal Archive (1979) *Gorbitz Erschließungsprinzip ÖPNV*, Büro für Stadtverkehr des Rates der Stadt Dresden, 9. 1. 2. – 15.

Dresden Municipal Archive (1982a) *Zur primären Verkehrserschließung für den Wohnungsbaustandort Dresden-Gorbitz 1981 – 1985*, Heumann, G., 9.1.2.- 6, p. 2.

Dresden Municipal Archive (1982b) *Verkehrstechnische Studie z. PVE Gorbitz Rad und Fußgängerverkehr, 2. WK*, Büro für Stadtverkehr des Rates der Stadt Dresden, 9. 1. 2. – 14.

Dresden Municipal Archive, 6.4.40.2-I7453_00025292.

Dresden Municipal Archive, 6.4.40.2-I7453_00025293.

Dresden Municipal Archive, 6.4.40.2-IX311_00033886.

Dresden Municipal Archive, Bild Archiv, 6.4.40.2-XIII2548_Rp 7303.

Dresden Municipal Archive, Bild Archiv, 6.4.40.2-XIII2553_Rp 7308.

Dresden Municipal Archive, Bild Archiv, 6.4.40.2-XIII2555_Rp 7310.

Dresden Municipal Archive, Bild Archiv, 6.4.40.2-XIII2678_Rp 75_16.

Dresden Stadtmuseum, SMD_Ph 795_05_Pirnaischer Platz_August.

Dresden Stadtmuseum, SMD_D-1971-11.1, Stadtaussichten, Ph-787-05.

Dresden Stadtmuseum, SMD_Ph_01668_05.

Dresden Stadtmuseum, SMD_Ph 768_05.

Dryubin, G. (1935) *Metodologia planirovaniia gorodskikh transportnykh setei*, Leningrad: Nauchno tekhnicheskii institut kommunalnogo i zhilishchnogo khoziaistva i stroitelstva.

Dubelir, G. D. (1908) *Gorodskie elektricheskie tramvai*, Kiev: Pechatnya S. P. Yakovleva.

Eberstadt, R. (1909) The Problems of Town Development, *Contemporary Review*, 96, pp. 660-667.

Efremov, I. S. (1969) *Troleibusy. Teoriia, Konstrukciia i raschet*, Moskva: Vysshaia Shkola.

Efremov, I. S., Gushe-Malkov, B. P. (1970) *Teoriia i raschet mekhanicheskogo oborudovaniia podvizhnogo sostava gorodskogo elektricheskogo transporta*, Moskva: Izdatelstvo literatury po stroitelstvu.

Efremov, I. S., Kobozev, V. M., Yudin, V. A. (1980) *Teoriia gorodskikh passazhirskikh perevozok*, Moskva: Vysshaia Shkola.

Elliot, J. E., Dowlah, A. F. (1994) Gorbachev, Perestroika and Democratizing Socialism Origins, Institutions and Policies, *International Journal of Social Economics*, 21, pp. 73-115.

Emanuel, M. (2012) Constructing the cyclist: Ideology and representations in urban traffic planning in Stockholm, 1930–70, *The Journal of Transport History*, 33 (1), pp. 67-91.

Émangard, P.-H. (2012) Les tramways en Europe: une vision diachronique, *Groupement pour l'Étude des Transports Urbains Modernes, Transports urbains*, 1 (120), pp. 3-8.

Engler, H. (2020) Social movement and the failure of car-friendly city projects: East and West Berlin (1970s and 1980s), *The Journal of Transport History*, 41(3), pp. 353–380.

Enyedi, G. (1990) Specific Urbanization in East-Central Europe, *Geoforum,* 21 (2), pp. 163-172.

Erfurt City Council (1987) *Verkehr in Erfurt*, Suhl: Freies Wort.

Erfurt Municipal Archive (1969) *Generalbebauungsplan, Generalverkehrsplan der Stadt Erfurt*, Rat der Stadt Erfurt.

Erfurt Municipal Archive (1975) *Generalverkehrsplan Erfurt 1975*, 7/161-10 Bl. 40.

Escherich, M. (2012) Planungen für eine verschont gebliebene Stadt Erfurter Innenstadtkonzeptionen, *Bulletin der Polnischen Historischen Mission*, 7, pp. 115-147.

Fabian Society (1898) Municipal Tramway, *Fabian Tract, 33, pp. 1-4.*

Fassmann, H. (1986) City-Size Distribution in The Austrian-Hungarian Monarchy 1857-1910: A Rank-Size Approach, *Historical Social Research/Historische Sozialforschung,* 38, pp. 3-24.

Fava, V. (2011) The Elusive People's Car. Imagined Automobility and Productive Practices along the "Czechoslovak Road to Socialism" (1945-1968), in Siegelbaum, L. H. (ed.), *The Socialist Car: Automobility in the Eastern Bloc,* Ithaca and London: Cornell University Press, pp. 17-29.

Febvre, L. (1982) *Combates por la Historia*, trans. Francisco, J., Fernández Buey y Enrique Argullol, Barcelona: Editorial Ariel.

Federal German Archives (1961a) *Gebietsplanung Bezirke Halle*, DH 2/21466.

Federal German Archives (1961b) *Städtebauliche Planung Dresden*, Diskussionsgrundlage für die Sitzung der Kommission Städtebau und Architektur, DH/2, 21414, 51, M304, 48.

Federal German Archives (1964) *Der wichtigsten Entwicklungstendenzen der Wissenschaftlich-Technischen Grundrichtung für die Entwicklung des Verkehrswesens*, Ministerium für Verkehrswesen, Zentrale Abteilung Forschung und Entwicklung, DM/1/, 8346, 51, 39.

Federal German Archives (1967a) Bild 183-F0413-0013-001, photo of Koard Peter.

Federal German Archives (1967b) *Protokoll über die am 9. und 10.2.1967 in Erfurt durchgeführte Beretung der Arbeitsgruppe des Politbüros alt Vertretern der Stadt Erfurt über die Probleme der Ausarbeitung des Generalverkehrs- und Generalbebauungsplanes der Stadt Erfurt unter besonderer Berücksichtigung der Umgestaltung der Innenstadt*, Rat der Stadt Erfurt, DH/2/, 21435, 52, M304, 49.

Federal German Archives (1969a) *Der Hauptabmessungen des vierachsigen Strassenbahn Kurzgelenktriebwagen KT4D des einer Wagenkastenlange 17,0 m*, Praha: CKD Tatra Smichov, DM1, 8563, 51, M306.

Federal German Archives (1969b) *Gestaltung des Stadtzentrums Erfurt*, DH/2/Plan, 2987, 51, M304, 56.

Federal German Archives (1970) *Projekt. Der Erprobung (Null-ten) - Serie des vierachsigen Strassenbahn - Kurzgelenktriebwagens mit geteilten Wagenkasten - Typen Nummer 200*, DM1, 8703, 51, M306.

Federal German Archives (1971) *Forschungsvorhaben Sozialistischer Städtebau. Programm 1971 bis 1975*, Forschungsverband Städtebau, Berlin: Deutsche Bauinformation, DH/2/, 21312, 51, M304, 48.

Federal German Archives (1972) *Generalbebauungsplan Erfurt*, DH/2/Plan, 2883, 51, M304, 94.

Federal German Archives (1973) DH/2/Plan, 2804, 51, Haus 901/EG, 9.

Federal German Archives (1974) DH/2/Plan, 2804, 51, Haus 901/EG, 9.

Federal German Archives, 183-GO613-0008-001, photo of U. Richter.

Federal German Archives (1975) *Generalbebauungsplan Erfurt*, DH/2/Plan, M304, 51.

Federal German Archives (1976) Bild_183-R0501-0038, Jürgen, L.

Federal German Archives (1983) Bild_183-1983-0513-018, Jürgen, L.

Federal German Archives (1989) Bild_183-1989-0715-006, Heinz, H.

Federal German Archives (1990) Bild_183-1990-0215-314, Heinz, H.

Federální ministerstvo dopravy ČSR (1976) *Prozatimní směrnici pro plánováni a projektováni tratí staveb a zařízení pro provoz rychlé tramvaje*.

Federální shromáždění Československé socialistické republiky (1976) Zákon č. 50 ze dne 27 dubna 1976 o územním plánování a stavebním řádu, částice 9.

Fedor, T. S. (1975) *Patterns of Urban Growth in the Russian Empire, Chicago: The University of Chicago Department of Geography.*

Feindt, G. (2012) Making and Unmaking Socialist Modernities: Seven Interventions into the Writing of Contemporary History on Central and Eastern Europe, in Lutz, R., Anselm, D.-M. (eds.), *Nach dem Boom: Perspektiven auf die Zeitgeschichte seit 1970*, Göttingen: Vandenhoeck & Ruprecht, pp. 133–154.

Fichert, F. (2017) Transport policy planning in Germany - An analysis of political programs and investment masterplans, *European Transport Research Review*, 9 (2), pp. 1-12.

Filarski, R. (2011) The Emergence of the Bus Industry Dutch Transport Policy during the Interwar Years, *Transfers*, 1(2), pp. 61–82, doi: 10.3167/trans.2011.010205.

Fischer, T. B., Smith, M., Sykes, O. (2013) Can less sometimes be more? Integrating land use and transport planning on Merseyside (1965–2008), *Urban, Planning and Transport Research*, 1 (1), pp. 1-27.

Fishelson, M. S. (1970) *Kompleksnoe razvitie gorodskogo passazhirskogo transporta*, Materialy po kratkosrochnomu seminaru, Leningrad: Stroiizdat.

Fishelson, M. S. (1975) *Gorod i Passazhir. Gradostroitelnye problemy razvitiia passazhirskogo transporta*, III nauchnaia konferentsiia v Leningrade, Leningrad: Stroiizdat.

Flink, J. J. (1990) *The Automobile Age*, Massachusetts – London: The MIT Press.

Foster, M. S. (1981) *From Streetcar to Superhighway: American City Planners and Urban Transportation, 1900–1940*, Philadelphia: Temple University Press.

Freeman, M. J., Aldcroft, D. H. (1988) *Transport in Victorian Britain, Manchester and New York: Manchester University Press.*

French, R. A., Ian Hamilton, F. E. (1979) Is there a Socialist city? in French, R. A., Ian Hamilton, F. E. (eds.), *The Socialist city: Spatial Structure and Urban Policy*, London: John Wiley and Sons. Ltd.

Friedmann, J. (1971) *The Future of Comprehensive Urban Planning: A Critique*, Public Administration Review, 31 (3), Special Symposium Issue: Changing Styles of Planning in Post-Industrial America, May - June, pp. 315-326.

Foster, M. S. (1981) *From Streetcar to Superhighway: American City Planners and Urban Transportation*, 1900–1940, Philadelphia: Temple University Press.

Fronneau, M. (2007) La concurrence tramway-automobile au cours de l'entre-deux-guerres à Paris. Pour une relecture des représentations liées à la disparition des chemins de fer urbains, *Revue d'histoire des chemins de fer*, 36-37, pp. 279-303, http://journals.openedition.org/rhcf/155 ; DOI : 10.4000/rhcf.155.

Fuchs, R. J. (1980) Urban Change in Eastern Europe: The Limits to Planning, *Urban Geography*, 1 (1), pp. 81-94.

GAE, (1963) *Ob Uluchshenii obsluzhivaniia naseleniia gorodskim transportom*, *proekt postanovleniia Soveta Ministrov SSSR,* 5, 5, 69.

GAE (1968) *Osnovnye napravleniia po razvitiiu gradostroitelstva i zhilishchno-grazhdanskogo stroitelstva v 1971-1975 godakh*, Doklad predsedatelia Gosgrazhdanstroya SSSR, 5, 1, 1210.

GAE (1979a) *Predlozheniia k osnovnim napravleniiam razvitiia edinoi transportnoi sistemy SSSR na 1976-1990 gody*, svodnyi tom, Institut kompllеksnykh transportnykh problem pri Gosplane SSSR, 403, 1, 218.

GAE (1979b) *Razvitie Gradostroitelstva v SSSR 1971-1977 gody*, TSNIIP Gradostroitelstva, 5, 1, 1215.

GAE (1981) *Razvitie Gradostroitelstva SSSR 1976-1980*, Gosstroi SSSR, 5, 1, 1665.

Galasso, G. (2001) *Nada Más Que Historia: Teoría y Metodología de la Historia*, Barcelona: Ariel.

García Ruiz, J. L. (2001) La evolución de la industria automovilística espaňola,1946-1999: una perspectiva comparada, *Revista de Historia Industrial*, 19-20, pp. 133-163.

GARF (1959) *Dokumenty po razrabotke, ispytaniiu i vnedreniiu novoi tekhniki*, Sovet Ministrov SSSR, A-314, 3, 4743.

GARF (1966a) *Dokumenty po rassmotreniiu kompleksnoi skhemy razvitiia vsekh vidov gorodskogo passazhirskogo transporta v Gorkom na 1966-1970gg*., (obosnovaniia, raschety, zaklyucheniia ekspertov), Gosplan RSFSR, A-262, 8, 6024.

GARF (1966b) *Dokumenty po perspecktivnomu razvitiiu gorodskogo obshestvennogo transporta 1966-1975*, Ministertvo Zhilishchno-Kommunalnogo Khoziaistva, A-314, 3, 8103.

GARF, (1967a) *Perepiska TK KPSS i Sovet Ministrov RSFSR po voprosam tramvaino-trolleibusnogo khoziaistva, vol. 3,* A - 314, 3, 8589.

GARF, (1967b) *Perepiska TK KPSS i Sovet Ministrov RSFSR po voprosam tramvaino-trolleibusnogo khoziaistva, vol. 4,* A - 314, 3, 8590.

GARF (1972a) *Materialy po rassmotreniiu kompleksnoi skhemy razvitiia vsekh vidov gorodskogo passazhirskogo transporta Yaroslavlia*, GOSPLAN RSFSR, Sovet Tekhniko-ekonomicheskoi ekspertizy, A-262, 16, 1431.

GARF (1972b) *Zakliuchenie po rabote vypolnennoi Lengiprogorom v 1972 godu, Kompleksnaia skhema razvitiia vsekh vidov gorodskogo passazhirskogo transporta v gorode Yaroslavle, v chasti skorosnogo tramvainogo transporta*, GOSPLAN RSFSR, Sovet Tekhniko-ekonomicheskoi ekspertizy, A-262, 16, 1431.

GARF (1978) *O soglosovanii KTS vsekh vidov gorodskogo passazhirskogo transporta Gorkogo*, Sovet Ministrov RSFSR, Gosplan RSFSR, A-259, 46, 8905.

GARF (1981) *O merakh po dalneishemu razvitiiu gorodskogo passazhirskogo transporta v RSFSR*, vol. 1, Gosplan RSFS, A-259, 48, 3181.

Gatejel, L. (2011) The Common Heritage of the Socialist Car Culture, in Siegelbaum, L. H. (ed.), *The Socialist Car: Automobility in the Eastern Bloc,* Ithaca: Cornell University Press, pp. 143-156.

Gayler, H. J. (1970) Land Speculation and Urban Development: Contrasts in South-East Essex, 1880-1940, *Urban Studies, 7 (1), pp. 21-36.*

George, P. (1963) L'industrialisation de la Tchécoslovaquie, *Revue Géographique de l'Est*, 3 (2), pp.145-153, doi: https://doi.org/10.3406/rgest.1963.1818.

Gesetzblatt der DDR (1959) *Bau- und Betriebsordnung für Straßenbahnen (BoStrab)*, Dezember 8, Berlin: Deutscher Zentralverlag.

Gesetzblatt der DDR (1969) *Bau- und Betriebsordnung für Straßenbahnen (BoStrab)*, März 25, Berlin: Staatsverlag.

Giprograd (1969) *Gorodskoi transport i rasselenie*, Kiev: Budivelnik.

Giprograd (1972) Proektirovanie setei gorodskogo transporta, Kiev: Budivelnik.

Giprograd (1974a) Kompleksnye skhemy gorodov, Kiev: Budivelnik.

Giprograd (1974b) *Transportnaia sistema gorodov razlichnoi velichiny*, Kiev: Budivelnik.

Glavdorstroi SSSR (1957) *X Mezhdunarodnii dorozhnii Kongress*, Moskva: Avtotransizdat.

Gläser, H. (1976) Zur Verbesserung des öffentlichen Personennahverkehrs in den Großstädten der DDR, *Architektur der DDR*, 6 (5), pp. 372-376.

Glendinning, M. (2009) Cold-War conciliation: international architectural congresses in the late 1950s and early 1960s, *The Journal of Architecture*, 14 (2), pp. 197-217.

Glenn, Y. (2006) *The Decline of Transit. Urban Transportation in German and US Cities 1900-1970, Cambridge: Cambridge University Press.*

Glissmeyer, H. (1969) Der städtische Verkehr – eine Schwerpunktaufgabe für Forschung und Praxis, *Die Strasse*, 10 (1), pp. 68-72.

Glissmeyer, H. (1970) *Prognostische Verkehrsprobleme im Städtebau der DDR*, Fachtagung der Zentralen Fachgruppe "Gebiets-, Stadt- und Dorfplanung" des BDA 20. und 21. Februar 1969 in Magdeburg, Generalbebauungsplanung der Städte der Deutschen Demokratischen Republik, Berlin: Deutsche Bauinformation.

Gold, J. R. (1998) Creating the Charter of Athens: CIAM and the Functional City, 1933-43, *The Town Planning Review*, 69 (3), pp. 225-247.

Goldsmith, R. W. (1961) The Economic Growth of Tsarist Russia 1860-1913, *Economic Development and Cultural Change, 9 (3), pp. 441-475.*

Goltz, G. (1981) *Transport i rasselenie*, Moskva: Nauka.

Goldzamt, E. (1980) *El Urbanismo en la Europa Socialista*, trans. Madrigal, P., Barcelona: Gustavo Gili.

Goodman, D., Chant, C. (1999) *European Cities and Technology, Industrial and Post-industrial City, Milton Keynes: Routledge.*

GOSINTI (1971) *Sistema skorostnogo obshestvennogo transporta v planirovochnoi strukture bolshogo goroda*, Moskva: GOSINTI.

GOSINTI (1976) *Problemi optimizatsii razvitiia sistem skorostnogo passazhirskogo transporta krupnogo goroda*, Moskva: GOSINTI.

Gosplan SSSR (1969) *Ukazaniia po razrabotke kompleksnykh skhem razvitiia gorodskogo passazhirskogo transporta dlia gorodov s naseleniem 250.000 i bolee.*

Gosstroi SSSR (1976) *Planirovka i zastroika gorodov, poselkov i selskikh naselennykh punktov*, SNIP II-60-75, Moskva: Stroiizdat.

Gosstroi SSSR (1977) *Elektrifitsirovannii gorodskoi transport. Tramvainie i troleibusnye linii*, SNIP II-41-76, Moskva: Stroiizdat.

Gramzov. S. (1976) *Information für leitende Kader des Verkehrswesens*, Berlin: ZFIV.

Gravagnuolo, B. (1998) *Historia del Urbanismo en Europa 1750-1960*, trans. Calatrava, J., Madrid: Ediciones Akal, S.A.

Grieder, P. (2012) *The German Democratic Republic*, New York: Palgrave.

Grimm, F., Kroenert, R., Luedemann, H. (1974) *Aspects of Urbanization in the German Democratic Republic*, Conference National Settlement Strategies East and West, Schloss Laxenburg, Austria, December 1974, pp. 74-85.

Groche, G. (1979) *Die Stadtbahn. Ein Verkehrssystem der Zukunft*, International Congress UITP, Helsinki, pp. 4-35.

Gross, W., Rehbein, G. (1989) *Geschichte der Hochschule für Verkehrswesen "Friedrich List" Dresden*, Berlin: Transpress VEB Verlag für Verkehrswesen.

Guise, E. (1917) *Schnellstraszenbahnen*, Berlin: Verlag von W. Moeser Buchhandlung.

Gullberg, A., Kaijser, A. (2004) City-building regimes in post-war Stockholm, *Journal of Urban Technology, 11 (2), pp. 13-39, DOI: 10.1080/10630730412331297297.*

Gunko, M., Bogacheva, P., Medvedev, A., Kashnitsky, I. (2018) Path-Dependent Development of Mass Housing in Moscow, Russia, in Hess, D. B., Tammaru, T., van Ham, M. (eds.), *Housing Estates in Europe Poverty, Ethnic Segregation and Policy Challenges*, Cham: Springer Open, pp. 289-311.

Gunn, S., Townsend, S. C. (2019*) Automobility and the City in Twentieth-Century Britain and Japan, London and New York: Bloomsbury Publishing Plc.*

Gutnov, A. E. (1984) *Evolutsiia gradostroitelstva*, Moskva: Stroiizdat.

Günter, T. (1987) Wohngebiet Dresden-Gorbitz, *Architektur der DDR*, 11, pp. 16-22.

Habarda, D. (1966) *Mestská a Cestná Doprava I. Tramvaje*, Bratislava: Vysoká Škola Dopravná v Žiline v Slovenskom Vydavatestve Technickej Literatúry, N. P.

Habarda, D. (1971) *Discussion on the reports*, 39th UITP International Congress, Rome, pp. 49-51.

Hague, C., Prior, A. (1991) Planning in Czechoslovakia: Retrospect and prospects, *Planning Practice & Research*, 6 (2), pp. 19-24.

Hall, P. (1976) Kadry i obrazovanie, in Cowan, P. (ed.), *Budushchee planirovki,* trans. Yaroshevskii, B. E., London: Heinemann, pp. 56-74.

Hall, P. (1982) *Great planning disasters*, Los Angeles, University of California Press.

Hall, P. (1992) *Urban and Regional Planning*, 3rd edition, London: Routledge.

Hall, P. (1996) *Ciudades del mañana: historia del urbanismo en el siglo XX*, Barcelona: Ediciones del Serbal.

Hall, P. (2003) The Buchanan Report 40 years on, *Transport*, 157(1), pp. 7-14.

Hall, T., Vidén, S. (2005) The Million Homes Programme: A Review of the Great Swedish Planning Project, *Planning Perspectives*, 20 (3), pp. 301-328, DOI: 10.1080/02665430500130233.

Hallenberg, M., Linnarsson, M. (2017) The quest for publicness: political conflict about the organisation of tramways and telecommunication in Sweden, c. 1900–1920, *Scandinavian Economic History Review, 65 (1), pp. 70-87, DOI:10.1080/03585522.2016.1258007.*

Hanson, P. (1990) The Soviet Union, in Graham, A., Seldon, A. (eds), *Government and Economies in the Postwar World: Economic Policies and Comparative Performance, 1945-1985*, London and New York: Routledge.

Hanson, P. (2003) *The Rise and Fall of the Soviet Economy*. *An Economic History of the USSR 1945 – 1991*, New York: Routledge.

Hard, M., Stippak, M. (2008) Progressive Dreams: The German City in Britain and The United States, in Hard, M., Misa, T. J. (eds), *Urban Machinery: Inside Modern European Cities, Cambridge and Massachusetts: The MIT Press, pp. 121-139.*

Harris, C. D. (1971) Urbanization and Population Growth in the Soviet Union, 1959-1970, *Geographical Review*, 61 (1), pp. 102-124.

Harrison M. (2002) Economic Growth and Slowdown, in Bacon E., Sandle M. (eds.) *Brezhnev Reconsidered. Studies in Russian and East European History and Society*, London: Palgrave Macmillan, https://doi.org/10.1057/97802305010893.

Harrison, R. S. (2015) *Urban Planning and the Motor Car, 1955-1977: Responses to the growth of private motoring in Leicester and Milton Keynes*, doctoral thesis, Centre for Urban History, University of Leicester.

Hass-Klau, C. (1986) Environmental Traffic Management in Britain — Does It Exist? *Built Environment*, 12 (1/2), pp. 7-19.

Hass Klau, C., Crampton, G., Benjari, R. (2004) *Economic Impact of Light Rail: The Results for 15 Urban Areas in France, Germany, UK and North America*, Brighton: Environmental and Transport Planning.

Häußermann, H. (1996) *Stadtentwicklung in Ostdeutschland: soziale und räumliche Tendenzen*, Opladen: Westdt. Verlag.

Hebbert, M. (2005) Engineering, Urbanism and the Struggle for Street Design, *Journal of Urban Design*, 10 (1), pp. 39-59, DOI: 10.1080/13574800500062361.

Heimes, A. (1956) Die Koordinierung im Verkehr, *Zeitschrift für Verkehrswissenschaft*, 2, pp. 74-80.

Heinzmann, J., Karrasch, P. (1990) Spatial Patterns of Technological Change in the GDR, *Geoforum*, 21 (2), pp. 193-201.

Hendlmeier, W. (1988) Gesichtspunkte der Umweltverträglichkeit beim Straßenbahnbetrieb – Vergleich mit anderen Verkehrsmitteln, *Stadtverkehr*, 1, pp. 1-30.

Hendlmeier, W., Slotta, R. (1993) Der städtische Nahverkehr, *ICOMOS – Hefte des Deutschen Nationalkomitees*, 9, pp. 28-32.

Hensher, D. A. (1979) Urban Transport Planning – The Changing Emphasis, *Socio-Economic Planning Sciences*, 13 (2), pp. 95-104.

Herce Vallejo, M. (1995) *Las formas de crecimiento urbano y las variantes de carretera*, tesis doctoral, Universitat Politècnica de Catalunya.

Herce Vallejo, M. (2002) *La ingeniería en la evolución de la urbanística*, Barcelona: Ediciones UPC.

Herce Vallejo, M. (2009) *Sobre la movilidad en la ciudad. Propuestas para recuperar un derecho ciudadano*, Barcelona: Editorial Reverté.

Hernández Marco, J. L. (2006) *La derrota provisional de los ferrocarriles urbanos frente al automóvil: la eliminación del tranvía y el triunfo del autobús en España a mediados del siglo XX*, IV Congreso Historia Ferroviaria, Málaga, 20 – 22 de septiembre.

Hess, B. D., Tammaru, T., van Ham, M. (2018a) Lessons Learned from a Pan-European Study of Large Housing Estates: Origin, Trajectories of Change and Future Prospects, in Hess, B. D., Tammaru, T., van Ham, M. (eds.), *Housing Estates in Europe Poverty, Ethnic Segregation and Policy Challenges*, Cham: Springer Open, pp. 3-31.

Hess, B. D. (2018b) Transport in Mikrorayons: Accessibility and Proximity to Centrally Planned Residential Districts during the Socialist Era, 1957–1989, *Journal of Planning History*, 17(3), pp. 184-204.

Hietala, M. (1987) *Services and Urbanization at the turn of the Century. The Diffusion of Innovations, Helsinki: SHS.*

Highway Research Board, National Academy of Sciences (1965) *Highway Capacity Manual*, Washington.

Highway Research Board (1973) *Bus Use of Highways. State of the Art*, National Cooperative Highway Research Program Report, Washington.

Hilton, G. W. (1969) Transport Technology and the Urban Pattern, *Journal of Contemporary History*, 4 (3), pp. 123-135.

Hirszson, H. (1900) *Gorodskie dorogi bolshoi skorosti. Sooruzhenie, Ekspluatatsia i Finansovoe polozhenie*, trans. Yablonskii, P. O, Sankt Peterburg: Leshtukovskaia Parovaia Skoropechatnya.

Hondius, H. (1993) The Development of Low-Floor Trams, Journal of Advanced *Transportation*, 27 (1), pp. 79-102.

Hons, J. (1973) Jednota Dopravní Soustavy v Plánovitém Řízení Rozvoje Socialistické Dopravy, *Doprava*, 4, pp. 296-300.

Honzík, A. (1967) *Mezinárodní Konference o Vývoji Městské a Příměstské Kolejové Dopravy po roce 1970*, Praha: ČKD Praha.

Horák, P. (2017) *Urbanizmus 20. storočia na Slovensku Prípadová štúdia Bratislava*, tesis doctoral, Slovenská Technická Univerzita v Bratislave, Fakulta Architektúry, Ústav urbanizmu a územného plánovania.

Howe, F. C. (1913) *European Cities at Work, New York: Charles Scribner's Sons.*

Howe, F. C. (1915) Municipal Ownership-The Testimony of Foreign Experience, *The Annals of the American Academy of Political and Social Science,* 57, pp. 194-208.

Hrůza, J. (1958) *Gradostroitelstvo v Chekhoslovakii*, Praga: Soiuz arkhitektorov Chekhoslovatskoi Respubliki.

Hrůza, J. (1965) *Teorie města*, Praha: Nakladatelství Československé akademie věd.

Hrůza, J. (1968) Runcorn - Nové "Nové Město," *Architektura ČSR*, 7, pp. 439-442.

Hrůza, J. (1970) Teoretické aspekty dlouhodobého plánování městských regionů, Architektúra a Urbanizmus, IV-1, Bratislava: Vydavatelstvo Slovenskej akademie vied.

Hrůza, J. (1972) *Teoriia Goroda*, trans. Mostovaya, L. B., Moskva: Izdatelstvo literatury po stroitelstvu.

Hrůza, J. (1977) *Slovník soudobého urbanismu*, Praha: Odeon.

Hruška, E. (1936) *Nové Úkoly v Soudobém Urbanismu*, Praha: Česka Matice Technická.

Hruška, E. (1966) *Problémy súčasného urbanizmu*, Bratislava: Vydatelstvo Slovenskej Académie Vied.

Hruška, E. (1968) Rozhovor o Bratislavskej Doprave, *Project*, 3, pp. 51-57.

Hruška, E., Krásný, J. (1975) Třicet Let Urbanismu v ČSSR, Jeho Teoretický Vývoj i Praktické Realizace, Architektura ČSR, 4, pp. 152-164.

Hunter, H. (1968) *Soviet Transport Experience: Its Lessons for Other Countries*, Washington: Brookings Institution.

IFHP (1958) *International Seminar on Urban Renewal,* The Hague, 22-29 August.

IFHP (1966) *Proceedings of the XXVIIIth World Congress of the International Federation for Housing and Planning*, Tokio.

IFHP (1975) *Integrated planning and plan implementation in urban areas*, Amsterdam, 24-30 August.

IFHP (1977) *Towards a more humane urban technology*, Geneva, Switzerland, 5-10 September.

IKTP (1968) *Doklad ob osnovnikh tekhnicheskick i ekonomicheskikh napravleniyakh dalneishego razvitiya transporta*, Moskva: IKTP.

IKTP (1973) *Voprosy organizatsii raboty i razvitiia gorodskogo passazhirskogo transporta*, Moskva: IKTP.

Ilinskii, G. (1972) *Zakliuchenie v chasti uviazki skhemy s generalnym planom goroda*, in Materiali po rassmotreniiu kompleksnoi skhemy razvitiia vsekh vidov gorodskogo passazhirskogo transporta Yaroslavlia, Gosplan RSFSR, GARF, A-262, 16, 1431.

Institut für Gebietsplanung und Städtebau der Hochschule für Architektur und Bauwesen Weimar (1966) *Städtebauseminar: Verkehr und Städtebau*, 15 – 17 June, Erfurt: Fortschritt Erfurt, Zweigwerk Arnstadt.

International Union of Architects (IUA) (1958) *Construction and Reconstruction of Towns*, 1945-1957, Moscow: State Building and Architecture Publishing House.

Interview with Hunger Ditmar in 2018.

Interview with Schwarzbach Heinz in 2019.

Interview with Rabe Ulrich in 2018.

Interview with Rabe Ulrich in 2019.

Interview with Rabe Ulrich in 2020.

Ivanov, M. D., Ponomarev, A. A., Ieropolski, B. K. (1977) *Tramvainye vagoni T-3*, Moskva: Transport.

Jakob, G. (1974) Verkehrsprobleme in Zentralräumen der Deutschen Demokratischen Republik, *Wissenschaftliche Zeitschrift*, 21 (2), pp. 223-230.

Jahn, S., Saitz, H. H. (1974) *Die sozialistische Verkehrspolitik unter Beachtung der ständig steigenden Motorisierung*, in Budapester internationale wissenschaftliche Beratung für Stadtverkehrsplanung und Verkehrstechnik über Qualität des Stadtverkehrs, 17-19 April, Budapest, Hungary, pp. 5-18.

Jamieson, G. B., Mackay, W. K., Latchford, J. C. R. (1967) Transportation and Land Use Structures, *Urban Studies*, 4 (3), pp. 201-217.

Jansa, F. (1967) *Městské Dráhy Elektrické*, vol. 2, Bratislava: Vysoká Škola Dopravná v Žiline v Slovenskom Vydavateľstve Technickej Literatúry.

Jarausch, K. (1999) Care and Coercion: The GDR as Welfare Dictatorship, in Jarausch. K., (ed.), *Dictatorship as Experience: Toward a Socio-Cultural History of the GDR*, New York: Berhahn Books, pp. 47-69.

Jirsák, Z. (1956) *Plánování Rozvoje Dopravy*, Praha: Dopravní Nakladatelství.

Joch, A. (2014) 'Must our cities remain ugly?' – America's urban crisis and the European city: transatlantic perspectives on urban development, 1945–1970, *Planning Perspectives*, 29 (2), pp. 165-187, DOI: 10.1080/02665433.2013.873732.

Johnson, E. R. (1907) Public Regulation of Street Railway Transportation, *The Annals of the American Academy of Political and Social Science, 29, pp. 31-47.*

Jones, P. (2014) The evolution of urban mobility: The interplay of academic and policy perspectives, *IATSS Research*, 38, pp. 7–13.

Joyce, J., Prigmore, B. J. (1979) Tram to Supertram, *Electronics and Power*, 25 (3), pp. 207-211.

Jungmann, V. (1963) Za Zvýšení Úlohy Dopravní Vědy a Techniky v Rozvoji Dopravy, Doprava, 2, pp. 1-6.

Junker, W. (1965) Städtebau, Architektur und Perspektivplanung, *Deutsche Architektur,* 2, pp. 68-70.

Kane, K. D., Bell, T. L. (1985) Suburbs for a Labor Elite, *Geographical Review, 75 (3), pp. 319-334.*

Kaleschky, W. (1998) *Magdeburger Verkehrsanlagen*, Magdeburg: Stadtplanungsamt.

Kansky, K. J. (1976) Urbanization under socialism in Czechoslovakia, *Ekistics*, 42 (249), pp. 121-129.

Karpenkova, T. V. (2016) Iz istorii reformirovaniia ekonomiki SSSR v 1970kh i 1980kh godakh, *Vestnik MIEP*, 3 (24), pp. 131-139.

Kasalický, V. (1978) Bydlení, komplexní bytová výstavba, obylné prostředí, *Architektura ČSR*, 3, pp. 7-9.

Keul, D.-J. (1969) Einordnung der Straßenbahn in den Straßenraum, *Die Strasse*, 9 (6), pp. 266-268.

Keul, D. -J. (1977) *Generalverkehrsplanung und sozialistische Intensivierung, in Generalverkehrsplanung und ihre Wechselbeziehung zum sozialistischen Städtebau*, Berlin: Verlagsort.

Khairullina, E. (2015) *Una Mirada Concentrada en la Línea del Horizonte: los Planes y Proyectos de Astana en los años 1957-1987*, Master thesis, Universidad de Granada.

Khitzenko, V. V. (1970) Osnovnye napravleniia razvitiia skorostnogo tramvaia, in Fishelson, M. S. (ed.), *Kompleksnoe razvitie gorodskogo passazhirskogo transporta,* Leningrad: Znanie, *pp. 74-79.*

Khitzenko, V. V. (1975) Rol premetropolitenov i skorostnogo tramvaia v reshenii transportnoi problemy krupnykh gorodov, in Fishelson, M. S. (ed.), *Gorod i Passazhir, Gradostroitelnye problemy razvitiia passazhirskogo transporta*, III Scientific Conference in Leningrad, pp. 154-160.

Khitzenko, V. V. (1976) *Skorostnoi tramvai*, Leningrad: Stroiizdat.

Khrupin, K. G. (2016) Nauchnye mezhdunarodnye sviazi akademicheskoi arkhitekturno-stroitelnoi nauki v seredine XX veka, *Architecture and Modern Information Technologies*, 4 (37), pp. 60-66.

KievNIIPGradostroitelstva (1977) *Voprosy sovershenstvovaniia transportnykh sistem gorodov*, Kiev: Budivelnik.

Klopotov, K. K. (1963) *Discussion of the report of the Traffic Committee: Horizontal and vertical separation of public and private transport to improve the fluidity of traffic*, 35th UITP International Congress, Vienna, pp. 42-44.

Klopotov, K. K. (1969) *Usovershenstvovanie ekspluatatsii gorodskogo transporta zarubezhom*, Moskva: Izdatelstvo literatury po stroiltelstvu.

Klopotov, K. K. (1973) *Erhöhung der Leistungsfähigkeit von U-Bahnen*, 40th UITP International Congress, The Hague.

Koester, F. (1914) *Modern city Planning and Maintenance, New York: McBride, Nast and Company.*

Kollektiv avtorov (1966) *XXIII Siezd Kommunisticheskoi Partii Sovetskogo Soiuza*, Moskva: Politizdat.

Komárek, V. (1968) K Výsledkům Dosavadních Prací na Dlouhodobém Výhledu Ekonomiky ČSSR, *Doprava*, 10, pp. 1-7.

Kominarov, A. V. (1966) *Voprosy sovershenstvovaniia kompleksnoi ekspluatatsii transporta*, Moskva: Transport.

Kominarov, Z. L. (1970a) K voprosu koordinacii razvitiia i raboty raznykh vidov gorodskogo passazhirskogo transporta, in Fishelson, M. S. (ed.), *Kompleksnoe razvitie gorodskogo passazhirskogo transporta*, Materialy po Kratkosrochnomu Seminaru, Leningrad, pp. 15-19.

Kominarov, Z. L. (1970b) Sfera primeneniia razlichnykh vidov gorodskogo passazhirskogo transporta v krupnykh gorodakh, in Artinov, A. P. (ed.), *Sostoianie i perspektivy razvitiia skorostnogo passazhirskogo transporta v Leningrade*, Leningrad: LOCHTO, pp. 31-42.

Komlos, J. (1983) *The Habsburg Monarchy as a Customs Union. Economic Development in Austria-Hungary in the Nineteenth Century, New Jersey: Princeton University Press.*

Komunistická strana Československa (1977) *15. sjezd komunistické strany Československa*, Praha 12. dubna - 16. dubna 1976, Praha: Svoboda.

Kopp, A. (1974) *Arquitectura y urbanismo soviéticos de los años veinte*, Barcelona: Editorial Lumen.

Kopper, C. (2006) Stadtverkehrs- und Fernverkehrsplanung in der Planwirtschaft der DDR, *Informationen zur modernen Stadtgeschichte*, 36 (2), pp. 60-71.

Kopper, C. (2013) Mobile Exceptionalism? Passenger Transport in Interwar Germany, *Transfers* 3(2), Summer, pp. 89–107.

Korte, J. W. (1959) *Stadtverkehr: Gestern, heute, morgen*, Berlin, Göttingen, Heidelberg: Springer-Verlag.

Korte, J. W. (1960) *Grundlagen der Straßenverkehrsplanung in Stadt und Land*, Berlin and Wiesbaden: Bauverlag GMBH.

Kosenkova, Y. L. (2000) *Sovetskii Gorod 1940 i pervoi polovine 1950 godov: ot Tvorcheskikh Poiskov k Praktike Stroitelstva*, PhD thesis, Rossiiskaia Akademiia Arkhitektury y Stroitelnykh Nauk, Moskva.

Kosenkova, Y. L. (2011) Dolgii put k gorodu. K postanovke prolemy uzucheniia sovetskogo gradostroitelstva 1950-kh - nachala 1980-kh godov, *Internet-vestnik VolgGASU*, 3 (17), pp. 1-15.

Kosinski, L. A. (1974) Urbanization in East Central Europe after World War II, *East European Quarterly*, VIII (2), pp. 129-153.

Kosygin, A. N. (1976) *Osnovnye napravleniia razvitiia narodnogo khoziaistva SSSR na 1976-1980 gody*, XXV siezd Kommunisticheskoi partii Sovetskogo Soiuza, vol. 2, Moskva: Izdatelstvo politicheskoi literatury.

Kott, S. (2004) Review: Everyday Communism: New Social History of the German Democratic Republic, *Contemporary European History*, 13 (2), pp. 233-247.

Koukalová, M. (2017) Prague-Nový Barandov, The fase of "Late Beuatiful" and Postmodernist Estates, in Skřivánková, L., Švácha, R., Lehkoživová, I. (eds.), *The Paneláks, Twenty-Five Housing Estates in the Czech Republic*, Prague: The Museum of Decorative Arts in Prague, pp. 212-219.

Kousal, M. (1965) Jednotná dopravní soustava., en *Vývoj Osobní Dopravy v ČSSR*, Celostátní conference, 12-14 October, Brno: Československa Védecko-Technickä Společnost.

Kovalev, A. D. (2005) *Na elektricheskoi tiage. Ocherki istorii Yaroslavskikh tramvaia i trolleibusa*, Yaroslavl: Izdatelstvo Aleksandra Rutmana.

Kranzberg, M. (1995) Technology and history: Kranzberg's Laws, *Technology and Society*, 15 (1), p. 5-13.

Kražek, J. (1974) Vybrané Problémy Rozvoja Jednotnej Dopravnej Sústavy na Slovensku, *Doprava*, 2, pp. 6-11.

Krejčí, J. (1972) *Social Change and Stratification in Postwar Czechoslovakia*, London and Basingstoke: The Macmillan Press Ltd.

Kreschnak, W. (1981) *Geschichte der Dresdner Straßenbahn*, Berlin: Verlag Tribüne.

Kress, S., Michalk, H. (1976) Beispielplanung Dresden-Gorbitz/Löbtau, *Architektur der DDR*, 6, pp. 342-353.

Kress, C. (2017) German Traditions of Städtebau and Stadtlandschaft and their Diffusion through Global Exchange, in Hein, C. (ed.), *The Routledge Handbook of Planning History, New York: Routledge, pp. 173*-191.

Krivý, M. (2016) Postmodernism or Socialist Realism? The Architecture of Housing Estates in Late Socialist Czechoslovakia, *Journal of the Society of Architectural Historians*, 75 (1), pp. 74–101.

Krivý, M. (2017) Quality of Life or Life-in-Truth? A Late-Socialist Critique of Housing Estates in Czechoslovaquia, in Moravánszky, Á, Lange, T. (eds.), *Re-framing Identities, Architecture's Turn to History, 1970-1990*, Basel: Birkhäuser, pp. 303-318.

Krpec, O., Hodulák, V. (2018) Industrial Policy in Relation to Automobile Production after the Founding of Czechoslovakia: A Case of Support for an Emerging Sector, *Ekonomický časopis*, 66 (1), pp. 81 – 104.

Krüger, H., Richter, K.-J., Stuhr, R. (1962) *Der Städtische Nahverkehr in der DDR*, Berlin: Transpress, VEB für Verkehrswesen.

Kucherenko, V. A. (1960) O sostoyanii i merakh uluchsheniia gradostroitelstva v SSSR, in Sovet Ministrov SSSR (ed.), *Vsesoiuznoe soveshchanie po gradostroitelstvu*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu, arkhitekture i stroitelnym materialam, pp. 7-83.

Kučerenko, V. A. (1961) Základní cesty rozvoje urbanismu v SSSR, *Architektura ČSR*, 6, pp. 411-417.

Kudryavtsev, O. K. (1963) O strukture transportnykh setei, in Akademiia Stroitelstva i Arkhitekturi SSSR, *Problemy sovetskogo gradostroitelstva*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu, arkhitekture y stroitelnym materialam.

Kulakov, A., Trofimenko, K. (2016) Transport Planning and Transport Modeling M. Blinkin and E. Koncheva (eds.), *Transport Systems of Russian Cities. Ongoing Transformations*, Cham: Springer International Publishing, pp. 1-37.

Kurenkov, P. A., Kobzar, S. G. (1937) *Transport pri Planirovke Gorodov*, Moskva-Leningrad: Glavnaia Redakciia Stroitelnoi Literatury.

Künne, H.-D. (1996) Stuttgart – 50 Jahre Verkehrsplanung im Für und Wieder, in Archiv für die Geschichte des Strassen und Verkehrswesens (ed.), *Strassen und Verkehrsgeschichte deutscher Städte nach 1945: Stuttgart, Aachen, Bayreuth*, 10, Bonn: Kirshbaum Verlag, pp. 7-49.

Kysela, L. (1930) Krise velkoměst a návrhy na její řešení, *Stavba*, IX, pp. 1-6.

Lacek, M. (1983) *Městská doprava: základy teorie a praxe*, Praha: Nakladatelství dopravy a spojů.

Ladd, B. (1990) *Urban Planning and Civic Order in Germany, 1860-1914, Harvard University Press.*

Ladd, B. (2001) Socialist Planning and the Rediscovery of the Old City in the German Democratic Republic, *Journal of Urban History*, 27 (5), pp. 584-603.

Ladewig, D. (1960) Untersuchung und Bewertung der Einsenbahnmöglichkeiten von Straßenbahn, Kraftomnibus und Obus, *Deutsche Eisenbahn Technik*, 8, Berlin: VEB Verlag Technik.

Lakomý, Z. (1970) Doprava a životní prostředí, *Architektúra a Urbanizmus*, IV (1), pp. 3-15.

Lammert, U. (1971) Städtebauforschung auf neuen Wegen, *Deutsche Architektur*, 11, pp. 647-652.

Lammert, U. (1975) Aufgaben des Städtebaus zur Erfüllung des langfristigen Wohnungsbauprogramme bis 1990 als Beitrag zur Lösung der Hauptaufgabe des VIII. Parteitages, *Architektur der DDR*, 4 (5), pp. 135-142.

Lammert, U. (1979) *Städtebau: Grundsätze, Methoden, Beispiele, Richtwerte*, Berlin: Verlag für Bauwesen, VEB.

Larroque, D. (1989) Apogée, déclin et relance du tramway en France, *Culture Technique*, 19, pp. 54-63.

Laterrasse, J. (2019) *Transport and Town Planning: The City in Search of Sustainable Development*, London: John Wiley and Sons, Inc.

Latov Y. V. (2015) Kosygin's reform — a missed opportunity of the Soviet society, *Journal of Economic History & History of Economics*, 16 (3), pp. 424–439.

Lavrov, V. A. (1976) *Metodika rekonstruktsii gorodov*, Moskva: Stroiizdat.

Lavrov, V. A. (1979) *Preobrazovanie sredy krupnykh gorodov i sovershenstvovanie ikh planirovochnoi struktury*, Moskva: Stroiizdat.

Lecht, K. W. (1968) Der Generalbebauungsplan — Prognose für die sozialistische Stadt, *Deutsche Architektur,* 4, pp. 196-203.

Lefebvre, H. (1991) *Production of Space*, trans. Nicholson-Smith, D., Oxford: Editions Basil Blackwell Ltd.

Lehner, F. (1942) Straßenbahn und Omnibus im Stadtinnern, *Verkehrstechnik*, 23 (23), pp. 337-339.

Lehrer, F. (1961) *Public Transport within the Framework of Urban General Traffic Plans*, 34th UITP International Congress, Copenhagen.

Lehrer, F. (1969) *Regional Organization of Transport and Urban Development*, in 38th UITP International Congress, London.

Leibbrand, K. (1964) *Verkehr und Städtebau*, Basel: Birkhäuser.

Leibbrand, K. (1970) *Transportation and Town Planning*, trans. Seymel, N., London: Leonard Hill.

Leiser, E. (1969) Gestaltung des städtischen Verkehrssystems, in *neue Anforderungen an Städtebau und Architektur, Städtebau und Architektur bei der Gestaltung des entwickelten gesellschaftlichen Systems des Sozialismus in der DDR*, 22. Plenartagung der Deutschen Bauakademie 16. und 17. Oktober 1968, Berlin: Deutsche Bauakademie.

Lengiprogor (1971) *Generalnii Plan goroda Yaroslavl 1971*, Archive of the Department of Architecture and Land Relations of Yaroslavl city.

Lerm, M. (1998) *Abshied vom alten Dresden*, Dresden: Hinstorff.

Lewis, R. A., Rowland, R. H. (1969) Urbanization in Russia and the USSR: 1897-1966, *Annals of the Association of American Geographers*, 59 (4) pp. 776-796.

Liebmann, H. (1965) *Straßenbahn oder Omnibus im Stadtverkehr*, Deutsche Bauakademie, Berlin: Veb Verlag für Bauwesen.

Lindner, W. (1975) Schlußwort zum 2. Symposium Stadtverkehr, in *Rolle und Aufgabendes Verkehrswesens in der sozialistischen Stadt*, 2 Symposium Stadtverkehr des ZFIV und der KDT, pp. 246-253.

Ling, A. (1967) *Runcorn New Town: Master Plan*, Runcorn: Runcorn Development Corporation.

Lisková, J., Šula, J. (1933) Zásady dopravního řešení Velké Prahy, Soutěžný Návrh "Ve Třech Etapách", *Architect SIA*, XXXII, pp. 65-70.

Logan, S. (2015) *Modernist Urbanism in the Age of Automobility: Producing Space in the Suburbs of Toronto and Prague*, doctoral thesis, York University.

Logan, S. (2019) Learning from the Socialist Suburb, in Güney, K. M., Keil, R. and Üçoğlu, M. (eds.), *Massive Suburbanization: (Re)Building the Global Periphery*, Toronto: University of Toronto Press, pp. 94-102.

Lois González, R. C., Otón, M. P., Wollf, J.-P. (2013) Le tramway entre politique de transport et outil de réhabilitation urbanistique dans quelques pays européens: Allemagne, Espagne, France et Suisse, *Annales de géographie*, 6 (694), pp. 619-643.

Lukášíka, M. (1974) Dopravní Prostředky a Systémy, jejich Vývoj, Inovace, in Zmija, K. (ed.), *Studie Přehodnocení Koncepce MHD v Ostravě*, Ostrava: Útvar Dopravního Inženýrství Města Ostravy, pp. 171-254.

Lundin, P. (2008) Planning Experts and the Making of the 'Car-Friendly' City, in Hard, M., Misa, T. J. (eds.), *Urban Machinery: Inside Modern European Cities*, Cambridge and Massachusetts: The MIT Press, pp. 257-279.

Lyubitskii, P. I. (2018) Urban planning concepts of the underground tram network creation in Lviv in the 70–80s of the 20th century, *Visnik Nacionalnogo universitetu Lvivska politeknika, Seriia Arkhitektura*, 893, pp. 159-166.

Maaß, A. (2006) *Wohnen in der DDR. Dresden-Prohlis Wohnungspolitik und Wohnungsbau 1975-1981*, München: Martin Maidenbauer Verlagsbuchhandlung.

Machon, P., Dingsdale, A. (1989) Public transport in a socialist capital city: Budapest, *Geography*, 74(2), pp. 159-162.

MacKaye, B. (1930) The Townless Highway, *The New Republic* (March 12, 1930), pp. 93–95.

Magdeburg Municipal Archive (1952) Plan Magdeburg und Umgebung, KS_I_277.

Magdeburg Municipal Archive (1969) *Generalverkehrsplan Magdeburg*, Büro für Verkehrsplanung des Rates des Bezirkes Magdeburg, 46_02326, 6.

Magdeburger Verkehrsbetriebe (1977) *100 Jahre Magdeburger Straßenbahn*, Magdeburg: Magdeburger Verkehrsbetriebe.

Mancuso, F. (1980) *Las experiencias del zoning*, Barcelona: Gustavo Gili.

Mannová, E. (2000) *A Concise History of Slovakia*, Bratislava: Historický ústav SAV.

Martin, B. V., Bayliss, D. (1977) *Transportation. New Technology for old cities*, en IFHP International Congress, Towards a more Humane Urban Technology, vol. 1, Geneva, Switzerland, 5-10 September.

Marton, Š. (1978) *25 rokov Vysokej Školy Dopravnej v Žiline*, Žilina: Vydatel'stvo Osveta.

Matoušek, V. (1965) Zkušenosti s Organizaci Urbanistického Výzkumu v Sousedních Socialistických Zemích a v Československu, *Architektura ČSR*, 7, pp. 482-484.

May, R. (2003) Planned city Stalinstadt: a manifesto of the early German Democratic Republic, *Planning Perspectives*, 18 (1), pp. 47-78, DOI:10.1080/0266543032000047404.

Maynard, W. P. (1969) The busway to make rapid transit work – now, *Traffic Quarterly*, 23, pp. 353-363.

Mayorga, M. Y. (2012) Espacios de Centralidad Urbana y Redes de Infraestructura, *Bitácora*, 21 (2), pp. 11-26.

McDermott, K. (2015) *Communist Czechoslovakia, 1945-1989: A Political and Social History*, London: Jeremy Black.

McGrath Jr., D. C. (1973) Appropriate Relationships between Comprehensive Planning and Transportation Planning for the 1970s, *Transportation*, 1 (4), pp. 403–418.

McKay J. P. (1976) *Tramway and Trolleys: The rise of Urban mass transport in Europe, New Jersey: Princeton, p. 240.*

McKay, J. P., Gicquiau, A. (1984) Les transports urbains en Europe et aux Etats-Unis. 1850-1914, *Les Annales de la recherche urbaine*, 23 (24), pp. 115-126.

McKay, J. P. (1999) Comparative perspectives on Transit in Europe and the United States 1850 – 1914, in Roberts, G. K. (ed.), *The American Cities and Technology Reader. Wilderness to Wired City, London and New York: Routledge, pp. 88-97.*

McShane, C., Tarr, J. A. (2007) *The Horse in the City*, Baltimore: The Johns Hopkins University Press.

Meerovich, M. (2017a) *Gradostroitelnaia politika v SSSR (1917-1929): Ot goroda sada k vedomstvennomu rabochemu poselku*, Moskva: Novoe literaturnoe obozrenie.

Meerovich, M. (2017b) Renovation of the Panel House-Building of the 1960-1980s in Germany, *Project Baikal*, 51, pp. 154-161.

Merkulova, Z. (1972) Prostranstvennaia neravnomernost gradostroitelnykh uslovii kak faktor, opredeliaiushchii territoriiu, potrebniiu dlia dvizheniia, in Bolonenkov, G., Smykovskaia, G. (eds.), *Transport v planirovke goroda*, Moskva: Gosudarstvennii Komitet po grazhdanskomu stroitelstvu i architecture pri Gosstroe SSSR, pp. 85-102.

Merlin, P. (1975) *Novye Goroda: Raionnaya planirovka i Gradostroitelstvo* (Les Villes Nouvelles: Urbanisme Regional et Aménagement), trans. Topuridze, K. T., Zaizev, V. N., Moskva: Progress.

Meuschel, S. (2000) The other German Dictatorship: Totalitarianism and Modernization in the German Democratic Republic, *Thesis Eleven*, 63, pp. 53-62.

Meyer H. H. (1979) *Die langfristige Rolle des öffentlichen Verkehrs*, 43th UITP International Congress Helsinki.

Meyer, J. R., Gómez Ibáñez, J. A., (1981) *Autos, Transit and Cities*, Cambridge: Harvard University Press.

Michalk, H. (1969) Einige Probleme der Generalbebauungsplanung in Magdeburg, in Deutsche Bauakademie (ed.), *Generalbebauungsplanung de Städte der DDR*, Berlin: Deutsche Bauinformation.

Michalk, H. (1972), *Zur Optimierung Der Verkehrsbezögeren Stadtstruktur*, tesis doctoral. Technische Universität Dresden.

Michalk, H., Lässig, K. (1976) Variantenvergleich zur städtebaulichen Gestaltung eines Wohnbereiches in hängigem Gelände am Beispiel des Wohnkomplexes 2 in Dresden-Gorbitz, *Architektur DDR*, 5 (15), pp. 334-341.

Michalk, H. (1978) *Fußgängertunnel bzw. Fußgängerbrücken*, Niederschrift. über eine Beratung am 12. 9. 78 beim Büro des Stadtarchitekten zum Wohnkomplex Dresden Gorbitz, Archivo Municipal de Dresde, 9.1.2.- 002, p. 2.

Mikhailov, N. (1938), Pervii sovetskii dvukhyarusnii trolleibus, *Za rulem,* 13, p. 13.

Mikuškovič, A. (1933) *Technika Stavby Měst*, Praha: Klub architektù v Praze.

Milward, A. S., Saul, S. B. (2011) *The Development of the Economies of Continental Europe 1850-1914, Oxon and New York: Routledge.*

Ministerio de obras públicas de España (1933) Decreto de 21 de julio de 1933, *Gaceta de Madrid*, 206.

Ministerium für Bauwesen, Institut für Städtebau und Architektur (1976) *Komplexrichtlinie für die städtebauliche Planung und Gestaltung von Neubauwohngebieten*, Berlin: Bauinformation DDR.

Ministry of Transport of the CSR (1966) *Koncepce rozvoje mestke hromadne dopravy do roku 1980,* Archivo Federal de República Checa, Odbor dlouhodobého plánování, Praha.

Ministry of Transport of the CSR (1967) *Prednášky z celostátního semináře o problémech hromadné dopravy ve větších městech ČSSR (kromě Prahy)*, Praha.

Ministry of Transport of the CSR (1971) *Pravidla technického provozu městských drah,* Praha: Nakladatelství Dopravy a Spojů.

Ministry of Transport of the CSR (1967) *Koncepce rozvoje mestkej hromadne dopravy do r. 1980,* Federal Archive of Cyech Republic, MDIII, 17, 10239.

Ministry of Transport of the GDR (1966) *Grundsätze für die Entwicklung des Verkehrs in den Stadten der DDR*, Berlin.

Ministry of Transport of the GDR (1968) *Basisstruktur der Verkehrsanlagen, Dresden, Leipzig, Rostock und Magdeburg,* Berlin.

Ministry of Transport of United Kingdom (1967) Rescuing Public Transport to Improve the Environment, *The Architects' Journal*, 146 (24), p. 1497.

Ministry of Urban Servicies of the RSFSR (Ministerstvo Zhilishchno-Kommunalnogo Khoziaistva RSFSR) (1967) *Vremennye tekhnicheskie usloviia proektirovaniia eksperimentalnykh linii skorostnogo tramvaia*, Moskva.

Ministry of Urban Servicies of the RSFSR (1971) *Tekhnicheskie ukazaniia po proektirovaniiu i sooruzheniiu puti skorostnykh linii tramvaia*, Leningrad.

Ministry of Urban Servicies of the RSFSR (1977) *Tendentsii Razvitiia Zarubezhnogo Gorodskogo Obshestvennogo Transporta*, Moskva.

Miralles-Guasch, C., Oyón, J. L. (1998) De casa a la fábrica. Movilidad obrera y transporte en la Barcelona de entreguerras, 1914-1939, in Oyón, J. L. (ed.), *Vida obrera de la Barcelona de entreguerras*, Barcelona: CCCB.

Miralles-Guasch, C. (2002) *Ciudad y transporte: el binomio imperfecto*, Barcelona, Ediciones Ariel.

Mirás, J. (2005) The Spanish tramway as a Vehicle for Urban Shaping: La Coruña, 1903-1962*, Journal of Transport History*, 26 (2), pp. 20-37.

Mitáš, J. (1976) Problémy Integrace Dopravního A Územního plánovaní velkých měst, *Doprava*, 18 (4), pp. 337-346.

Mlejnek, V. (1967) *Městská hromadná doprava v ČSSR*, in Prednášky z celostátního semináře o problémech hromadné dopravy ve větších městech ČSSR (kromě Prahy), Praha, pp. 1-26.

Molodykh, I. A. (1973) *Voprosy organizatsii raboty i razvitiia gorodskogo passazhirskogo transporta*, Moskva: IKTP.

Monclús, F. J., Oyón, J. L. (1996) Transporte y crecimiento urbano en España, mediados s. XIX - finales s. XX., *Ciudad y Territorio, Estudios Territoriales,* XXVIII (107-108), p. 217-240.

Monclús, J., Díez Medina, C. (2016) Modernist Housing Estates in European Cities of the Western and Eastern Blocs, *Planning Perspectives*, 31 (4), pp. 533-562.

Monteys, X. (1996) *La gran máquina. La ciudad en Le Corbusier*, Barcelona, Ediciones del Serbal.

Moraglio, M. (2015), Shifting Transport Regimes: The Strange Case of Light Rail Revival, in Kopper, C., Moraglio, M. (eds.), *Organization of Transport: A History of Users, Industry and Public Policy*, New York: Routledge International Studies in Business History, pp. 155-172.

Mulíček, O., Seidenglanz, D. (2019) Public transport in Brno, from socialist to post-socialist rhythms, in Tuvikene, T., Sgibnev, W., Neugebauer, C. S. (eds.), *Post-Socialist Urban Infrastructures*, London: Routledge, pp. 158-177.

Mulley, C. (1983) The Background to Bus Regulation in the 1930 Road Traffic Act: Economic, political and personal influences in the 1920s, *Journal of Transport History*, 4 (2), pp. 1-19.

Mumford, L. (1963) *La Carretera y la ciudad*, trans. Williams, M., Buenos Aires and Barcelona: Emecé Editores.

Musil, J. (1972) Goal-setting in urban planning: A case study from Czechoslovakia, *Journal of Social Policy*, 1 (3), pp. 227-244.

Musil, J., Link, J. (1975) Urbanizattsiia v Tchekhoslovatskoi Socialisticheskoi Respublike i nekotorie ee osobennosti, in Sumnik, Z. A. (ed.), *Urbanizatsiia i rasselenie*, Moskva: Statistika.

Musil, J. (1980) *Urbanization in Socialist Countries,* New York: M.E. Sharpe. Inc.

Musil, J. (2005) *Why Socialist and Post-socialist Cities are Important for Forward Looking Urban Studies*, European Science Foundation Conference, Forward Look on Urban Science, Helsinki, 26-28 May.

Müller, H.-G. (1967) 15 Jahre Hochschule für Verkehrswesen "Friedrich List", Wissentschaftliche Zeitschrift der Hochschule für Verkehrswesen "Friedrich List", 14 (3), pp. 623-629.

Müller, F. (1977) Die Weiterentwicklung der Generalverkehrsplanung und die Wechselbeziehungen zum sozialistischen Städtebau, en *Generalverkehrsplanung und ihre Wechselbeziehung zum sozialistischen Städtebau*, 3 Symposium Stadtverkehr des ZFIV und der KDT, 4 (11), pp. 5-13.

Müller, K. D. (1982) *Von der Pferdebahn zum Tatrazug: 100 Jahre Erfurter Strassenbahn; 1883 – 1983*, Erfurt: SED-Betriebsparteiorganisation, VEB (K) Erfurter Verkehrsbetriebe.

Mysak, N. P. (2016) Reinterpretatsiia modernistkikh morphologii: Zhiloe prostranstvo raiona Sykhov vo Lvove, *Labirint*, 5, pp. 8-16.

Mysak, N. P. (2018a) Sykhiv: An Overview, in Otrishchenko, N. (ed.), *Sykhiv: Spaces, Memories, Practices*, pp. 14-15.

Mysak, N. (2018b) *Formuvannya identichnosti raionov masovoi zhitlovoi zabudovi 1960-1980-kh roku*, PhD thesis, Univesidad politécnica de Leópolis, Ukraina.

Nadezhdin, M. (1934) Trolleibusy poluchaiut shirokoe rasprostranenie v SSSR, *Za rulem*, 2, p. 11.

Nerad, Z. (1971) Městská Hromadná Doprava, *Doprava*, 3, pp. 211-217.

Němcová, A. (2014) *Panelová výstavba v Praze v 80. letech 20. století: srovnání sídliště Barrandov a Žižkov*, Diplomová práce, Univerzita Karlova v Praze.

Nersesyantz, N. (1976) *Materialy po rassmotreniiu kompleksnykh skhem razvitiia vsekh vidov gorodskogo passazhirskogo vitransporta goroda Gorkogo*, GAE, A 262, 16, 4440.

Neutra, R. J. (1931) Ulice Rychlé Dopravy a Městské Rychlé Dráhy v Severoamerických Velkých Městech, *Architekt SIA*, XXX, originally published in Verkehrstechnik, 1931.

Newsome B. W. (2004) The Rise of the Grands Ensembles: Government, Business, and Housing in Postwar France, *The Historian*, 66 (4), pp. 793-816, DOI: 10.1111/j.1540-6563.2004.00097x.

Nickson, J. V., Batey, P. W. J. (1978) The Analysis of Transport within a Metropolitan County Structure Plan: The Greater Manchester Experience, *The Town Planning Review*, 49 (3), pp. 285-295.

Niemeyer, R. (1941) *Städtebau und Nahverkehr*, Leipzig: K. F. Koehler Verlag.

Nielsen E. (1965) *Erfahrungen aus zehnjährigem Kampf gegen die Verkehrsstockungen*, 36th internationaler Kongress, Brüssel.

Niewand, G. (1969) Der öffentliche Personennahverkehr im Generalverkehrsplan Dresden, *DDR-Verkehr*, 2, pp. 70-74.

Norley, K. (2010) *Light rail: the semi-metro concept*, 33rd Australasian Transport Research Forum (ATRF), Canberra, Australia.

Novák, M. (1982) *Doprava a životní prostředí v Ostravě*, Ostrava: UDIMO.

Ochojna, A. D. (1974) *Lines of Class Distinction. An economic and social history of the British tramcar with special reference to Edinburgh and Glasgow, tesis doctoral, University of Edinburgh.*

Organov, L. I. (1933) Raionirovanie i zonirovanie v planirovke naselennykh mest i raionov, in Popov, V. F., Efremov, N. D., Borshevski, A. M. (eds.), *Pervaia vsesoiuznaia konferentsiia po planirovke i stroitelstvu gorodov*, pp. 76-81.

Orlov, I. B. (2015) *Kommunalnaia strana: Stanovlenie sovetskogo zhilishchno-kommunalnogo khoziaistva (1917-1940), Moskva: Vysshaia Shkola Ekonomiki.*

Ortolano, G. (2011) Planning the Urban Future in the 1960s Britain, *The Historical Journal*, 54 (2), pp. 477-507.

Ortúzar, Juan de Dios., Willumsen, L. G. (2008) *Modelos de transporte*, trans. Portilla, A. P., Santander: Ediciones de la Universidad de Cantabria.

Ostrava Municipal Archive (1965) *Směrné Uzemní Plan Mesta Ostravy, Revize, NVO, Krajský Projektový Ustav "Stavo Projekt" - Ostrava.*

Ostrava Municipal Archive (1972) *Prognostická studie vybavení ostravsko-karvinské aglomerace,* VÚVA, UDIMO.

Ostrava Municipal Archive (1973) *Generel Dopravy Ostrava, UDIMO, 1424.*

Ostrava Municipal Archive (1974a) *Dlouhodobý Výhled Rozvoje Dopravy v ČSR do Roku 1990, NVO, 2208, Ministerstvo Vnútra ČSR.*

Ostrava Municipal Archive (1974b) *Studie Přehodnocení Koncepce MHD v Ostravě, UDIMO, Inženýrské Služby ČSSI v Brně.*

Ostrava Municipal Archive (1976) *Rychlá Hromadná Osobní Doprava v Ostravské Aglomeraci, UDIMO.*

Ostrava Municipal Archive (1977) *Výstavba Systému Rychlé Tramvaje v Brně a Ostravě*, Návrh pro jednání vlády ČSR, UDIMO.

Ostrava Municipal Archive (1978a) *Záznam, výrobního výboru k úkolu II - 4.01/78 - Rešení rychlé tramvaje v příměstských oblastech města Ostravy, UDIMO.*

Ostrava Municipal Archive (1978b) *Návrh usnesení Vlády ČSR, Výstavba Systému Rychlé Tramvaje v Brně a Ostravě, UDIMO, Vláda ČSR.*

Ostrava Municipal Archive (1978c) *Návrh usnesení Vlády ČSR. Pracovní material. Duvodová Zpráva. O Zajištění Připravy a Realizaci Systému Rychlé Tramvaje v Brně a Ostravě*, UDIMO, Vláda ČSR.

Ostrava Municipal Archive (1978d) *Komplexní řešení dopravy v Ostravské aglomeraci*, UDIMO.

Ostrava Municipal Archive (1979) *Schema Územního Plánu Města*, Útvar Hlavního Architekta Města.

Ovechnikov, E. V. (1972) *Materialy po rassmotreniiu kompleksnoi skhemy razvitia vsekh vidov gorodskogo passazhirskogo transporta Yaroslavlia*, Gosplan RSFSR, GARF, A-262, 16, 1431.

Oyón, J. L. (1999) Transporte público y estructura urbana. (De mediados s. XIX a mediados s. XX): Gran Bretaña, España, Francia y Países germánicos, *Ecología Política*, 17, pp. 17-35.

Paden, R. (2003) Marxism, Utopianism, and Modern Urban Planning, *Utopian Studies*, 14 (1), pp. 82-111.

Paetzold, W. (1973) Die Entwicklung des Verkehrs in den Städten der DDR - Aufgaben für Forschung und Generalverkehrsplanung, *DDR-Verkehr*, 9, pp. 357-360.

Painter, D. S. (2009) The Marshall Plan and Oil, *Cold War History*, 9 (2), pp. 159-175, DOI: 10.1080/14682740902871851.

Paschetto, A. (1975) *Gegenseitige Beeinflussung zwischen öffentlichem Verkehr und der Entwicklung von Stadt und Region*, 41th UITP International Congress, Brüssel.

Passalacqua, A. (2014) Reluctant Capitals: Transport Mobility and Tramways in London and Paris 1830-1950, *The Town Planning Review*, 85 (2), pp. 143-154.

Passalacqua, A. (2016) *Trolleybuses and the European cityscape: energy choices under environmental pressure (London, Paris, and Rome, 1930s)*, Greening History, Society for Environmental History, Versailles, France. ffhal-01374133ff.

Passalacqua, A. (2017) *De Quoi Parle-T-On Lorsque L'on Parle De Tramway En France? Cahiers géographiques de l'Ouest*, Université d'Oran, pp. 5-19.

Parcerisa, J. B. (2012) *Forma urbana: Cinco ciudades bajo sospecha*, Barcelona: Editorial: Laboratori d'Urbanisme.

Patricelli, R. (1976) LRT can offer an attractive level of service at significantly lower capital cost, *Railway Gazette International*, 132 (7), p. 251.

Pavlíček, M. (1960) Zlepšení dopravního vybavení československých měst, *Architektura ČSR*, XIX (6), pp. 428-429.

Pavlínek, P. (2002) Restructuring the Central and Eastern European, Automobile Industry: Legacies, Trends, and Effects of Foreign Direct Investment, *Post-Soviet Geography and Economics*, 43 (1), pp. 41-77.

Pavlínek, P. (2008) *A Successful Transformation? Restructuring of the Czech Automobile Industry*, Berlin: Physica-Verlag Heidelberg.

Pecka, L. (2013) *Brno Housing Estates and their Urban Structure*, PhD thesis, Brno University of Technology.

Peshekerov, P. K., Bondarevskii, D. I. (1936) *Tramvainii Spravochnik*, Moskva: OGIZ-Gostransizdat.

Petkov, D. (2020) *Tramway Renaissance in Western Europe. A Socio-technical Analysis*, Wiesbaden: Springer VS.

Petrov, V. K., Sosyantz, V. G. (1939) *Gorodskoi Transport*, Moskva - Leningrad: Izdatelstvo Narkomkhoza RSFSR.

Pfau, W. (1986) *Zur Wohngebietsplanung in der DDR seit dem VIII. Parteitag der SED Ergebnisse und Tendenzen der Planung und Gestaltung von Wohngebieten unter besonderer Berücksichtigung des Zusammenhangs zwischen Wohngebiet und Stadt*, Berlin: Bauinformation.

Photo archive of Ulrich Rabe.

Pirath, C. (1954) Das Grundproblem des öffentlichen Personen Nahverkehrs in europäischen Großstädten und seine Lösungsmöglichkeiten, *Zeitschrift für Verkehrswissenschaft*, 4, pp. 290-308.

Piryalin V. V. (1973) *Problemy skorostnogo transporta zarubezhom*, Moskva: IKTP.

Pithardt, J. K. (1969) *Discussion of the report*, 38th UITP International Congress, London, p. 48.

Pithardt, J. K. (1975) Vývoj a Stav Městské Hromadné Dopravy v ČSSR, in Pithardt, J. K., Thoř, V., Vandas J. (eds.), *Městská Hromadná Doprava*, Praha: Společnost Dopravy a Spojů, pp. 10-113.

Pithardt, J. K., Thoř, V., Vandas J. (1975) *Městská Hromadná Doprava*, Praha: Společnost Dopravy a Spojů.

Pivovarov, Y. L. (2001) Urbanizatsiia Rossii v XX veke: predstavleniia i realnost, *Obshestvennye nauki i sovremennost*, 6, pp. 101-112.

Plicka, I., Vandas, J. (1965a) *Betreffend Stadtverkehrsmittel – Straßenbahnen und Obusse*, Internationales Symposium, 19-27 Juni, Prag.

Plicka, I., Vandas, J. (1965b) Provozně technické řešeni městské hromadné dopravy – zásady, en Sborník příspěvků z celostátního semináře, *Zásady řešění městské hromadné dopravy*, Praha: Československá vědecko-technická společnost.

Pollack, D. (1999) Modernization and Modernization Blockages in GDR Society, en Jarausch. K., (ed.), *Dictatorship as Experience: Toward a Socio-Cultural History of the GDR*, New York: Berhahn Books, pp. 27-46.

Polyakov, A. A. (1935) *Tekhniko-ekonomicheskie voprosy gorodskogo dvizheniia*, Moskva-Leningrad: Gostransizdat.

Polyakov, A. (1953) *Gorodskoe dvizhenie i planirovka ulits*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu i arkhitekture.

Polyakov, A. A. (1957) *Voprosy razvitiia vnutrigorodskikh putei soobsheniia v bolshikh gorodakh*, Moskva: AN SSSR.

Polyakov, N. K. (1964) *Osnovy proektirovaniia planirovki i zastroiki gorodov*, Moskva: Stroiizdat.

Polyakov, A. A. (1967) *Transport krupnogo goroda,* Moskva: Znanie.

Ponomarev, A. A. (1973) Povyshenie efektivnosti ispolzovaniia podvizhnogo sostava gorodskogo elektricheskogo transporta, in Sheinin, A. N. (ed.), *Uluchshenie raboty gorodskogo passazhirskogo transporta*, Moskva: MDNTP, pp. 28-33.

Ponomarev, A. A., Ieropolski, B. K. (1981) *Podvizhnyi sostav i sooruzheniia gorodskogo elektrotransporta*, Moskva: Transport.

Pooley C. G., Turnbull, G. (2005) Coping with Congestion: Responses to Urban Traffic Problems in British Cities c.1920–1960, *Journal of Historical Geography,* 31, pp. 78–93.

Pooley, C. G. (2016), Balancing social justice and environmental justice: mobility inequalities in Britain since circa 1900, in Divall, C., Hine, J., Pooley, C. (eds.), *Transport policy: learning lessons from history*, Farnham: Ashgate, pp. 47-64.

Posatskyi, B., Cherniak, I. (2019) New Objects in the Space of Lviv (1956–1990), *Przestrzeń i Forma*, 40, pp. 232-264.

Potemkina, M., Gryaznov, M., Pashkovskaya, T. (2020) Public Transport and Soviet Industrialisation: The Tram Service in the Socialist City of Magnitogorsk (USSR), *Industrial Archaeology Review*, DOI: 10.1080/03090728.2020.1804159

Potter, S. (1976) *Transport and New Cities, The Transport Assumptions Underlying the Design of Britain´s New Towns, 1946-1976*, Milton Keynes: The Open University, New Towns Study Unit.

Potter, S. (1984) The Transport Versus Land Use Dilemma, *Transportation Research Record*, 964, pp. 10-17.

Price, J. H. (1967) Europe's Fastest Tramway, *Modern Tramways and Light Railway Review*, 30 (351), pp. 77-81.

Pucher, J. (1990) Capitalism, Socialism, and Urban Transportation Policies and Travel Behavior in the East and West, *Journal of the American Planning Association, 56* (3), pp. 278-296.

Pucher, J. (1999) The transformation of urban transport in the Czech Republic, 1988-1998, *Transport Policy*, 6, pp. 225–236.

Puvanachandran, V. M. (1982) *The Viability of British Urban Transport Planning in the Post Buchanan Period*, PhD thesis, University of Warwick, Department of Civil Engineering, December.

Rapport de la trente-huitième table ronde d'économie des transports tenue à Paris (1977) *Possibilités offertes par certaines techniques traditionnelles pour les transports urbains. Trams et trolleybus*, Conférence Européenne des Ministres des Transports.

Reichow, H. B. (1959) *Die autogerechte Stadt: Ein Weg aus dem Verkehrs-Chaos*, Ravensburg: Otto Maier Verlag.

Requate, J. (2009) Visions of the Future: GDR, CSSR and Federal German Republic in the 1960s, capítulo 8, in Haupt, H. G., Kocka, J. (eds.), *Comparative and Transnational History: Central European Approaches and New Perspectives*, New York – Oxford: Berghahn books, pp. 178 – 203.

Retzko, H.-G. (1973) *Verkehrsplanerische Grundsätze zur Langfristigen Verbesserung des Stadtverkehrs*, Budapester internationale wisseneohaftliche Beratung für Stadtverkehrsplanung und Verkehr, über Beeinflussung des Verkehrstechnik, 11-13. April, Budapest, Hungary, pp. 23-28.

Retzko, H.-G. (1978) Transportation Planning Trends in the Federal Republic of Germany, *Traffic Quarterly*, 32, pp. 583-597.

Reulecke, J. (1977) Growth and Urbanization in Germany in the 19th Century, *Urbanism Past & Present, 4, pp. 21-32.*

Reznik, M. Y., Kulakov, B. M. (1977) *Tramvainyi vagon LM-68*, Moskva: Transport.

RIBA (1968) Warning on Traffic and Planning, *The Architects' Journal*, 147 (25), p. 1367.

Richards, B. (1966) *New Movement in Cities*, London: Studio Vista.

Richardson, W. H. (1971) *Economía del Urbanismo*, trans. Blanca Paredes Larrucea, Madrid: Alianza Editorial.

Richter, G. (1973) Langfristige Planung des Verkehrs im Rahmen der volkswirtschaftlichen Reproduktion, *DDR-Verkehr,* 8, pp. 339-346.

Robbins R. M. (1985) *Ein Jahrhundert des öffentlichen Verkehrs: UITP, 1885-1985*, Brüssel: Internationaler Verband für öffentliches Verkehrswesen.

Robinson, C. M. (1902) The Plan of the Model City, *The Criterion*, 3, pp. 34-38.

Roth, R. (2015) Introduction, in Roth, R., Divall, C. (eds*.), From Rail to Road and Back Again? A Century of Transport Competition and Interdependency*, Farnham: Ashgate.

Roubal, P. (2018) The Crisis of Modern Urbanism under the Socialist Rule: Case Study of the Prague Urban Planning between the 1960s and 1980s, *Czech Journal of Contemporary History*, VI, pp. 100-124.

Rubenstein, J.M. (1978) *The French New Towns*, Baltimore: Johns Hopkins Press.

Rubin, E. (2008) *Synthetic Socialism: Plastics and Dictatorship in the German Democratic Republic*, Chapel Hill: The University of North Carolina Press.

Rubin, E. (2016) *Amnesiopolis. Modernity, Space, and Memory in East Germany*, Oxford: Oxford University Press.

Rudneva, N. A. (1979) Formirovanie zony vliianiia skorostnogo relsovogo transporta, in Soiuz Arkhitektorov SSSR (ed.), *Gorod i transport*, Moskva: Soiuz Arkhitektorov SSSR, pp. 57-61.

Rudnitskii, A. M. (1976) *Transport v planirovke gorodov*, Kiev: Budivelnik.

Runcorn Development Corporation (1967) *Runcorn New Town*, Nottingham: Hawthornes of Nottingham limited.

Rüger (1968) Die Rolle der Straßenbahn im System des großstädtischen Schnellverkehrs, *Die Strasse*, 8 (4), pp. 172-173.

Rzhavinskii, B. A. (1973) Novii podvizhnii sostav dlya gorodskogo relsovogo passazhirskogo transporta, in Sheinin, A. N. (ed.), *Uluchshenie raboti gorodskogo passazhirskogo transporta*, Moskva: MDNTP, pp. 63-75.

Saitz, H. H., Villmow, D. (1971) *Konzeption für die Entwicklung der Straßenbahn zu einer Schnellstraßenbahn*.

Saitz, H. H., Mende, M. (1974) Der öffentliche Personennahverkehr in Erfurt, *Deutsche Eisenbahntechnik*, 22 (9), pp. 406-409.

Saitz, H. H. (1984) Die Auswirkungen des Ausbaus der Straßenbahn in Erfurt auf die Reisegeschwindigkeit, *DDR-Verkehr*, 17 (6), pp. 180-182.

Saitz, H. (1988) Erfurt city and traffic: An example of traffic policy and planning in the German Democratic Republic, *Transport Reviews*, 8, (1), pp. 1-17.

Saitz, H. H. (2001) 50 Jahre Stadtverkehrsplanung in Erfurt, in Archiv für die Geschichte des Strassen und Verkehrswesens (ed.), *Strassen und Verkehrsgeschichte deutscher Städte nach 1945: Dresden, Leipzig, Halle, Chemnitz, Erfurt*, 16, Bonn: Kirshbaum Verlag, pp. 173-204.

Sammartino, A. (2016) Mass Housing, Late Modernism, and the Forging of Community in New York City and East Berlin, 1965–1989, *The American Historical Review*, 121, (2), pp. 492–521, https://doi.org/10.1093/ahr/121.2.492.

Santos y Ganges, L. (2007) *Urbanismo y ferrocarril. La construcción del espacio ferroviario en las ciudades medias españolas*, Madrid: Fundación de los ferrocarriles españoles.

Santos y Ganges, L., De Las Rivas Sanz, J. L. (2008) Ciudades con Atributos: Conectividad, Accesibilidad y Movilidad, *Ciudades*, 11, pp. 13-32.

Saprykina, N. S. (2006) *Sovetskaia Arkhitektura Yaroslavlia: Realnost i Virtualnost*, Yaroslavl: YGTU.

Sauder, B. (1952) Ein Großraum -Vierachser einfachster Bauart, seine Einsatzmöglichkeit und seine Wirtschaftlichkeit, in Verband Öffentlicher Verkehrsbetriebe (ed.), *Die Moderne Straßenbahn als zeitgerechtes Verkehrsmittel*, 6, pp. 21-27.

Saurer, A. (1948) Grosser Omnibus für die Städtische Strassenbahn Zürich, *Schweizerische Bauzeitung*, 66 (15), pp. 210-211.

Schleife, H.-W. (2001) Die Verkehrsplanung in den Städten der ehemaligen DDR -Zentrale Entwicklungsbedingungen und Zwänge sowie die Rolle der Büros für Verkehrsplanung der Städte, en Archiv für die Geschichte des Strassen und Verkehrswesens (ed.), *Strassen und Verkehrsgeschichte deutscher Städte nach 1945: Dresden, Leipzig, Halle, Chemnitz, Erfurt*, 16, Bonn: Kirshbaum Verlag, pp. 7-15.

Schaefer, H., Cromme, D., Pach, G., Wegmann, U. (1971) *Methodological Studies for the Establishment at the National and Regional Level of Overall Transport Plans,* Report of the Fifteenth Round Table on Transport Economics, Paris, 8-10 December.

Schaff, A. (1976) *Historia y Verdad*, trans. Sanfeliu, I. V., Barcelona: Crítica.

Scheelhaase, K. (1982) Experience with German Light Rail Systems, *Traffic Quarterly*, 36, pp. 45-56.

Schipper, F. (2007) Changing the face of Europe: European road mobility during the Marshall Plan years, *The Journal of Transport History*, 28 (2), pp. 211-228.

Schmal, H. (2003) The Historical Roots of the Daily Urban System, in Musterd, S. and Salet, W. (eds.), *The Historical Roots of the Daily Urban System*, Amsterdam: Amsterdam University Press.

Schmidt, J. (2014) Public services in Erfurt and Frankfurt am Main compared (c. 1890–1914): capabilities in Prussia? *Urban History*, 41 (2), pp. 247-264.

Schmucki, B. (1997) Individualisierte kollektive Verkehrssysteme und kollektivierte individuelle Verkehrssysteme. Die Vision von Neuen Technologien zur Lösung der Verkehrsnot der Städte in den 1970er Jahren, in Dienel, H.-L., Trischler, H. (eds.), *Geschichte der Zukunft des Verkehrs. Verkehrskonzepte von der Frühen Neuzeit bis zum 21. Jahrhundert*, Frankfurt/New York: Campus Verlag, pp. 147-169.

Schmucki, B. (2001) *Der Traum vom Verkehrsfluss: Städtische Verkehrsplanung seit 1945 im deutsch-deutschen Vergleich*, Frankfurt: Campus Verlag.

Schmucki, B. (2010) Fashion and technological change Tramways in Germany after 1945, *Journal of Transport History*, 31 (1), pp. 1-24.

Schmucki, B. (2003) Cities as Traffic Machines: Urban Transport Planning in East and West Germany, in Divall, C., Bond, W. (eds.), *Suburbanizing the Masses. Public Transport and Urban Development in Historical Perspective*, Burlington: Ashgate, pp. 149-170.

Schmucki, B. (2012) The Machine in the City: Public Appropriation of the Tramway in Britain and Germany, 1870–1915, *Journal of Urban History*, 38 (6), pp. 1060–1093.

Schott, D. (2003) Suburbanizing the Masses for Profit or Welfare: conflict and Cooperation Between Private and Municipal Interests in German Cities, 1890-1914, in Divall, C. and Schmucki, B. (eds.), *Suburbanizing the Masses: Public Transport and Urban Development in Historical Perspective, Burlington: Ashgate.*

Schott, D. (2008) Empowering European Cities: Gas and Electricity in the Urban Environment, in Hard, M., Misa, T. J. (eds), *Urban Machinery: Inside Modern European Cities,* Cambridge and Massachusetts: The MIT Press, pp. 165-186.

Schrag, Z. M. (2000) The Bus Is Young and Honest: Transportation Politics, Technical Choice, and the Motorization of Manhattan Surface Transit, 1919-1936, *Technology and Culture*, 41 (1), pp. 51-79.

Sdobnov, Y. A. (1980) *Yaroslavskii gradostroitelnii dogovor*, Moskva: Znanie.

SED (Sozialistische Einheitspartei Deutschlands), (1967) *Begrüßungsansprachen der Vertreter der Bruderparteien und Grußschreiben an den VII. Parteitag der SED*, Berlin: Dietz.

SED (1971) *Bericht des Zentralkomitees an den VIII Parteitag*, Berlin: Dietz.

Seidenfus, H. S. (1958) Rationale Verkehrspolitik, *Zeitschrift für Verkehrswissenschaft*, 4, pp. 187-197.

Seidenglanz, D., et al., (2016) Czechoslovak light rail — Legacy of socialist urbanism or opportunity for the future? *Journal of Transport Geography*, 54, pp. 414-429.

Sert, J. L. (1944) *Can our cities survive? An ABC of urban problems, their analysis, their solutions,* Cambridge: The Harvard University Press.

Shabarova. E. V. (1981) *Sistema passazhirskogo transporta v gorodakh i aglomeraciiakh*, Riga: Zinatne.

Shapilov, E. (1980) Vtoroe stoletie tramvaya?, *Tekhnika-Molodezh*, 6.

Sheinyuk, G. S. (1971) *Skorostnoi Tramvai*, Moskva: GOSINTI.

Sheleijovski, G. (1946), *Kompositsiia gorodskogo plana kak problema transporta*, Moskva: Giprogor.

Sheshtokas, V. (1968) Opredelenie parametrov perspektivnoi transportnoi seti goroda, *Architektura SSSR*, 4, pp. 44-48.

Sheshtokas, V. V. (1984) *Gorod i Transport*, Moskva: Transport.

Shkvarikov, V. V. (1970) Problemy rasseleniia na sovremennom etape, *Arkhitektura SSSR*, 10, pp. 3-9.

Shkvarikov, V. A. (1971) *Zhiloi raion i mikroraion, Moskva: Izdatelstvo literatury po stroitelstvu.*

Shpakov, I. V. (2013) Istoriia proektirovaniia otechestvennykh sochlenennykh tramvainykh vagonov na Ust-katavskom vagonostroitelnom zavode imeni S. M. Kirova, *Gramota*, 4 (71), pp. 212-214.

Shpakov, I, V., Mikhailova, E. D., Koroteeva, N. N. (2015) The Belgian Investments in Mass Transit of the Cities in Russian Empire at the End of the XIXth and at the Beginning of the XXth Centuries, *Bylye Gody, 38 (4), pp. 1019-1027.*

Shpakov, I. V., Zyuzin, P. V. (2016) Sostoyanie Otrasli Gorodskogo Elektrotransporta v RSFSR v kontse 1980 godov, in Koroteeva, N. N. (eds.), *Kraevedcheskie Zapiski*, Investsfera, pp. 61-68.

Shvidkovskii, O. A. (1963) *Gradostroitelnaia kultura socialisticheskoi Chekhoslovakii*, Moskva: Izdatelstvo Akademii Nauk SSSR.

Sica, P. (1981) *Historia del Urbanismo. El siglo XIX*, vol. 2, trans. Joaquín Hernández Orozco, Madrid: Instituto de Estudios de Administración Local.

Siegel, H. (1969) Strukturmodellen als Kernstück der Einheit von Generalbebauungsplan, Generalverkehrsplan und Plan zur Entwicklung des Bauwesens am Beispiel der Stadt Leipzig, in Deutsche Bauakademie (ed.) *Generalbebauungsplanung der Städte der DDR*, Berlin: Deutsche Bauinformation, pp. 54-57.

Siegelbaum, L. H. (2009) On the side: Car culture in the USSR, 1960s-1980s, *Technology and Culture,* 50 (1), pp. 1-23.

Siegelbaum, L. H. (2011) *The Socialist Car: Automobility in the Eastern Bloc*, London: Cornell University Press.

Simonov, N. (2017) *Nachalo elektroenergetiki Rossiiskoi Imperii i SSSR kak problema tekhnotsenoza, Moskva-Vologda: Infra-Inzheniriya.*

Sirisornpattapon, P. (2019) *Czechoslovak Housing Estates in the Late Socialism: Ideology, Practice, and Criticism*, master thesis, Charles University, Prague.

Sitin, P. V. (1926) *Kommunalnoe khoziaistvo i blagoustroistvo Moskvy v sravnenii s blagoustroistvom drugikh bolshikh gorodov, Moskva: Novaia Moskva.*

Skorobogatov, B. V., Sleptzov, B. V., Shtundel, E. V. (1974) *Opyt proektirovaniia kompleksnykh transportnykh skhem, in Giprograd (ed.), Kompleksnye transportnye skhemy gorodov*, Kiev: Budivelnik.

Skřivánková, L. (2017) Understanding Housing Estates, in Skřivánková, L., Švácha, R., Lehkoživová, I. (eds.), *The Paneláks. Twenty-Five Housing Estates in the Czech Republic,* Prague: Museum of Decorative Arts in Prague, pp. 9-11.

Skřivánková, L., Svacha, R., Lehkozivova, I. (2017) *The Paneláks: Twenty-Fiwe Housing Estates in the Czech Republic*, Prague: The Museum of Decorative Arts in Prague.

Slovak National Archive (1969a) *Informatívna Správa. O navrhu na riešenie o dopravnej koncepcie v Bratislave*, MDRT SSR (Ministerstvo Dopravy Pošt a Telekomunikácií, KM 13.1 – 10.1.

Slovak National Archive (1969b) *Správa o súbornom riešenie dopravy v Bratislave*, MDRT SSR, Ministerstvo Dopravy Pošt a Telekomunikácií SSR, KM 13.1 – 10.3.

Smith, W. S. (1977) The Energy Crisis Today: A Perspective, *Traffic Quarterly*, 31, pp. 5-19.

Smith, D. M. (1989) *Urban Inequality under Socialism: Case Studies from Eastern Europe and the Soviet Union*, Cambridge: Cambridge University press.

Smykovskaia, G. (1972) Organizatsiia gorodskoi territorii pri povyshenii strukturnoi znachimosti system skorostnogo transporta, in Bolonenkov, G., Smykovskaia, G., (eds.), *Transport v planirovke gorodov*, Moskva: TSNIIP Gradostritelstva.

Smolyar, I. M. (1972) *Novye goroda*, Moskva: Izdatelstvo literatury po stroitelstvu.

Smýkal, F. (1965) Koordinace Řízení Dopravy ve Městě, *Doprava*, 4, pp. 247-250.

Smýkal, F. (1968) Koordinace Řízení Dopravy ve Městě, *Doprava*, 10, pp. 202-205.

Smýkal, F. (1972) *Silniční a městské dopravní inženýrství*, Praha: Nakladatelství technické literatury.

Soiuz Arkhitektorov SSSR (1957) Pervoocherednie zadachi arkhitektorov, III Plenum Pravleniia Soiuza Arkhitektorov SSSR, *Arkhitektura SSSR,* 3, p. 4.

Soiuz Arkhitektorov SSSR (1979) *Gorod i Transport. Kompleksnoe razvitie transportnykh sistem krupnykh gorodov*, IV Leningradskaya nauchno – tekhnicheskaia konferentsiia, Tezisy dokladov, Leningrad

Spanish Head of State (1954) Decreto-ley de 16 de junio de 1954 por el que se faculta al Ministerio de Obras Públicas para autorizar la transformación de las concesiones de tranvías en otras equivalentes de autobuses durante el plazo de vigencia de aquéllas, *Boletín Oficial del Estado,* 177, pp. 4330-4331.

Spurný, M., Ladd, B. (2020) The Stifled Renaissance of Urbanity: Urban Preservation and the Collapse of Czechoslovak and East German Socialism, *Journal of Urban History*, pp. 1-17, DOI: 10.1177/0096144220908882.

Stadtplanungsamt Magdeburg (1998) *Städtebau in Magdeburg 1945-1990. Planungen und Dokumente,* Magdeburg: Landeshauptstadt Magdeburg, Büro für Öffentlichkeitsarbeit und Protokoll.

Starinkevich, A. K., Oleinikov, E. S. (1965) *Transport v planirovke i zastroike gorodov*, Kiev: Budivelnik.

Starinkevich, A. K., Zablotskii, G. A. (1967) Zadachi razrabotki i obosnovanie sostava materialov kompleksnykh skhem transporta krupnykh gorodov, in KievNIIPGradostroitelstva (ed.), *Transport i planirovka gorodov*, materiali nauchnoi tekhnicheskoi konferencii, Kiev: Budivelnik.

Starinkevich, A. K., Balatzkii, S. N., Rigberg, G. B., Shigol, M. M. (1977) Problemy proektirovaniya i realizatzii transportnych sistema gorodov, in KievNIIPGradostroitelstva (ed.), *Voprosy sovershenstvovaniya transportnykh system gorodov*, Kiev: KievNIIPGradostroitelstva, pp. 3-14.

Starkie, D. N. M. (1973) *Transportation planning and public policy*, Oxford: Pergamon Press.

State Archive of Orel region (1956), *Spravka o rabote tramvaia v gorode Orle*, P-15, 2, 41.

State Archive of Orel region (1959) *O Razmeshenii v plane Orla stroitelstva na 1959–1965 gody*, P-2577, 1, 359.

State Archive of Orel region (1961) *Upravlenie glavnogo arkhitektora goroda Orla*, P-2577, 1, 450.

State Archive of Orel region, 7081, *Ulitsa Komsomolskaia v seredine 60-kh*.

State Archive of Orel region (1963), *Zonalnoe soveshanie po voprosam perspektiv razvitiia goroda Orla,* 2577, 1, 457.

Statistisches Amt der Stadt Dresden (1968) *Dresden in Zahlen: Statistisches Jahrbuch der Stadt Dresden,* Dresden.

Ständige Kommission für Bauwesen des RGW (Rat für gegenseitige Wirtschaftshilfe), (1974) *Grundsätze zur Vervollkommnung des städtischen Verkehrssystems unter verschiedenen städtebau-planerischen Bedingungen bei Berücksichtigung der Entwicklungstendenzen der Verkehrsmittel*, Berlin: Ministerium für Verkehrswesen der DDR.

Steiner, A. (2010) *The plans that failed: An Economic History of the GDR*, New York and Oxford: Berghahn Books.

Stewart, F. T. (1980) Light Rail Transit in the United States, *Transportation*, 9, pp. 67-74.

Stingl, H. (1981) *Housing Development in GDR – Achievements and Future Tasks*, in XIV World Congress of the International Union of Architects, Reports and Contributions, Warszawa, 15-21 June.

Stosberg, H. (1958) *Planning Principles for Residential Improvement*, in Report of International Seminar on Urban Renewal, IFHP, The Hague.

Straßburg, H. (1976) Test der Schienenschlenkis: Ab Ende nächsten Jahres Tatra-Wagen im Linienverkehr, *Berliner Zeitschrift*, 13. 04.1976.

Stramentov, A. E. (1960) Intervención en el congreso, in Sovet Ministrov SSSR (ed.), *Vsesoiuznoe soveshanie po gradostroitelstvu*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu, arkhitekture i stroitelnym materialam, pp. 370-374.

Stramentov, A. E., Fishelson, M. S. (1963) *Gorodskoe dvizhenie*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu, arkhitekture i stroitelnym materialam.

Stramentov, A., Fishelson, M. (1964) Generalnyi plan gorodskogo dvizheniia, *Arkhitektura SSSR*, 4, pp. 15-20.

Stübben, J. (1907) *Der Städtebau*, second edition, Stuttgart: Alfred Kröner Verlag.

Sukholutsky, M. (1966) Rascheti passazhiropotokov v gorodakh, *Architektura SSSR*, 3, pp. 36-39.

Supernak, J. (1980) Urban Transport in Poland, *Habitat Intl*, 5 (3/4), pp. 477-487.

Surový, R., Hollarek, T. (1962) Problemy dopravy v Bratislave, *Doprava*, 10, pp. 348-354.

Surový, R. (1963) K Problémam Predmestskej Dopravy, *Doprava*, 5, pp. 367-371.

Surový, R. (1968) *O generálneho riešenia MHD v Bratislave predkladaný na základe uznesenia Rady,* NV3 č- 278/68 zo dňa 17.12.1968, Municipal Archive of Bratislava, Národný výbor mesta Bratislavy.

Surový, R. (1969) *Generálne Riešenie Mestskej Hromadnej Dopravy v Bratislave*, Dopravoprojekt Bratislava, Archivo Municipal de Bratislava, UDIMB.

Sovet Ministrov SSSR (1960) *Vsesoiuznoe soveshchanie po gradostroitelstvu*, Moskva: Gosudarstvennoe izdatelstvo literatury po stroitelstvu, arkhitekture i stroitelnym materialam.

Sovet Ministrov SSSR (1967) O merakh po uluchscheniiu obsluzhivaniia naseleniia gorodskim passazhirskim transportom, N1152.

Sovet Ministrov SSSR (1969) *O merakh po uluchscheniiu kachestva zhilishchno-grazhdanskogo stroitelstva*, Postanovlenie N392, 28.05.1969.

Sovet Ministrov SSSR (1980), *O merakh po dalneishemu razvitiiu gorodskogo passazhirskogo transporta*, N1138.

Szymańska, D. (2004) Some problems of Urbanization in Russia, *Current Politics and Economics of Russia*, 19 (2), pp. 75-97.

Špačková, E. (2015) *Ideální Lidé, Ideální Města, Plán krásného města na příkladu Nové Ostravy*, Brno: Časy Měst.

Štastný, J., Soukup, J. (1968) *Koncepce Dopravy v Obytných Zónách,* Praha: VÚVA.

Štastný, J. (1971) Zásady pro Uspořádání Dopravního Vybavení Měst, *Architektura ČSR*, 4, pp. 42-46.

Štván, J. (1960) K otázce přestavby městské struktury, *Architektura ČSR*, XIX (4), pp. 266-268.

Štván. J. (1965) Doxiadis-Ekistika, *Architecktura ČSR*, XXIV (3), pp. 154-159.

Štván, J. (1973) *Physical, socio-economic and environmental planning in countries of Eastern Europe. Their interaction at the city and city sub-area levels,* Stockholm: National Swedish Building Research.

Taplin, M. (1976) Eastern Europe leads in tramcar standartization, *Railway Gazette International*, 132 (7), pp. 255-259.

Taplin, M. R. (1984) *Light Rail Transit Today*, Milton Keynes: Light Rail Transit Association.

Tarkhov, S. A. (1990) *Tramvai y trolleybus v gorodakh SSSR: Spravochnik na nachalo 1990*, Moskva.

Tarkhov, S. A. (1996) *Tramway Atlas of the former USSR*, Berlin: Arbeitsgemainschaft Blickpunkt Strassenbahn e.V. Berlin in conjunction with Light Rail Transit Association London.

Tarkhov, S. A. (1997) *Gorodskoi passazhiskii transport Moskvy: Kratkii istoricheskii ocherk k 125-letiiu vozniknoveniia*, Moskva.

Tarkhov, S. (1998) *Istoriia Orlovskogo tramvaya, Orel, not edited book.*

Tarkhov, S. A. (2002) Prostransvennye Zakonomernosti Evolutsii Transportnykh Setei, *Izvestiia Seriia Geographicheskaya*, 2, pp. 15-22.

Tarkhov, S. A. (2014) Gorodskoi Transport Rossiiskoi Imperii v gody Pervoi Mirovoi Voiny, *Ekonomicheskii zhurnal, 4 (36), pp. 89-123.*

Tarr, J. A., McShane, C. (2008) The Horse as an Urban Technology, *Journal of Urban Technology, 15 (1), pp. 5-17, DOI: 10.1080/10630730802097765.*

Taylor, S. F. (1980) Light Rail Transit in The United States, *Transportation*, 9, pp. 67-74.

Taylor, N. (1999) Anglo-American Town Planning Theory since 1945: Three Significant Developments but not Paradigm Shifts, *Planning Perspectives*, 14 (4), pp. 327-345.

Tchebotarev E. V. (1969) Study of new systems of public transport: air-cushion vehicles, conveyor-belts, monorails, ropeways, etc., 38th UITP International Congress, London.

Tennent, K. D. (2017) Profit or utility maximizing? Strategy, tactics and the Municipal Tramways of York, c. 1918-1935, *Journal of Management History, 23 (4), pp. 401-422.*

Thomas, G. (1934) *Wirtschaft, Nahverkehr und Städtebau (gezeigt am Beispiel der Reichshauptstadt Berlin)*, XXIV Internationaler Verein der Strassenbahnen, Kleinbahnen und der Öffentlichen Kraftfahrunternehmen.

Thomas, C. (1988) Moscow's Mobile Millions, *Geography*, 73 (3), pp. 216-225.

Thomson, J. M. (1977) *Great Cities and their Traffic*, London: Victor Gollancz Ltd.

Thoř, V. (1975) Ovlivňování Četnosti Cest Obyvatelstva, Architektura ČSR, 2, pp. 95-96.

Transportation Research Board, United States Department of Transportation (1977) *Light Rail Transit, Technology Sharing, State-of-the-Art Overview*, May.

Trehubova T., Mykh R. (1989) *Lviv. Arkhitekturno-istorychnyi narys, Kyiv: Budivelnyk.*

Trembich, K. (1977) Generalverkehrsplanung und sozialistische Intensivierung, en *Generalverkehrsplanung und ihre Wechselbeziehung zum sozialistischen Städtebau*, 3 Symposium Stadtverkehr des ZFIV und der KDT, 4 (11), pp. 31-35.

Tripp, A. (1928) Police and Public: A New Test of Police Quality, *The Police Journal: Theory, Practice and Principles*, 1 (4), pp. 529-539.

Tripp, A. (1938) *Road Traffic and its control,* London: Edward Arnold & Co.

Tripp, A. (1943) *Town Planning and Road Traffic*, London: Edward Arnold.

Tripp, A. (1947) *Planirovka gorodov i ulichnoe dvizhenie*, Moskva: Izdatelstvo Akademii Arkhitektury SSSR.

Topp, H. H. (1998) Renaissance of Trams in Germany – Five Case Studies, *Proceedings of the Institution of Mechanical Engineers: Journal of Rail and Rapid Transit, Part F*, 212 (3), pp. 223-233.

Topp, H. H. (1999) Innovations in tram and light rail systems, *Proceedings of the Institution of Mechanical Engineers*, 213 (3), pp. 133-141.

Trautvetter, K. (1920) *Linienführung elektrischer Bahnen,* Berlin: Verlag von Julius Springer.

Trautvetter, K. (1921) *Die Notlage der deutschen Kleinbahnen und Privateisenbahnen und Mittel zu ihrer Behebung*, Berlin: Springer-Verlag.

TSNIIP Gradostroitelstva (1964) *Tselinograd. Opyt proektirovaniia*, Moskva: Izdatelstvo literatury po stroitelstvu.

TSNIIP Gradostroitelstva (1966, 1967, 1968 y 1969) *Principy sovetskogo gradostroitelstva*, Moskva: Stroiizdat.

TSNIIP Gradostroitelstva (1968) *Metodicheskie ukazaniia po proektirovaniiu setei obshestvennogo transporta, ulits i dorog*, Moskva: Stroiizdat.

TSNIIP Gradostroitelstva (1970) *Proektirovanie setei skorostnogo obshestvennogo transporta v krupnykh gorodakh*, Moskva: Rotaprint.

TSNIIP Gradostroitelstva (1972a) *Transport v planirovke gorodov*, Moskva: Rotaprint.

TSNIIP Gradostroitelstva (1972b) *Skorostnoi obshestvennii transport krupnogo goroda,* Moskva : Rotaprint.

TSNIIP Gradostoitelstva y Ministry of Residential Construction and Urban Development of the USA (1978) *Transport i gorodskaia sreda, sovmestnii sovetsko-amerikanskii doklad*, Moskva: Stroiizdat.

TSNIIP Gradostroitelstva (1979) *Transportnye problemy gruppovykh sistem rasseleniia*, Moskva: Stroiizdat.

TSNIIP, KievNIIP, BelNIIP Gradostroitelstva (1983) *Rekomendatsii po razrabotke kompleksnykh transportnykh skhem dlia krupnykh gorodov*, Moskva: Stroiizdat.

TSU (Tsentalno-statisticheskoe upravlenie pri Sovete Ministrov SSSR), (1957) *Transport i sviaz*, Statisticheskii sbornik, Moskva: Gosidarstvennoe statisticheskoe izdatelstvo.

Tumanov, A. (2014) *Dzerzhinskii raion. Sobitiia i liudi*, Yaroslavl: Yarnovosti.

Tuppen, J. N. (1983) The Development of French New Towns: An Assessment of Progress, *The Urban Studies*, 20, pp. 11-30.

UITP (1959) *Conditions of the Successful Competition of Public Transport with Individual Transport*, 33rd UITP International Congress, Paris.

UITP (1965) *Erfahrungen aus zehnjährigem Kampf gegen die Verkehrsstockungen*, 36th UITP Internatoional Congress, Tel-Aviv.

UITP (1975) *Gegenseitige Beeinflussung zwischen öffentlichem Verkehr und der Entwicklung von Stadt und Region*, 41th UITP International Congress, Nizza.

UITP (1967) *Theorie und Praxis der Stadtverkehrswirtschaft*, XXXVII internationaler Kongress, Barcelona.

Urban, F. (2018) *Berlin's construction groups and the politics of bottom-up architecture,* Cambridge: Cambridge University Press.

Útvar Dopravného Inžinierstva Mesta Bratislavy (1974) *Návrh Ďalšieho Rozvoja Mestskej Hromadnej Dopravy v Hlavnom Meste SSR Bratislave*, Bratislava: Kartografia, n. p.

Útvař Dopravního Inženýrství Města Ostravy (1982) *Doprava a Životní Prostředí v Ostravé*, Ostrava: UDIMO.

Vaerst, (1952) Abfertigungsmethoden in Großraumwagen und im Einmann-Betrieb, in Verband Öffentlicher Verkehrsbetriebe (ed.), *Die Moderne Straßenbahn als zeitgerechtes Verkehrsmittel*, 6, pp. 29-35.

Valdés, A. G. (1971) *Ingeniería de Tráfico*, Madrid: Dossat S. A.

Vaněček, J. (1934) *Stavba Měst*, Praha: České vysoké učení technické v Praze.

Vandas, J. (1971a) Systémy Městské Hromadné Dopravy, in Vandas, J., Matoušek, J., Novák, K., Plicka, I., *Městská doprava*, Praha: Státní pedagogické nakladatelství, pp. 33-39.

Vandas, J. (1971b) *Městská doprava*, Praha: Státní pedagogické nakladatelství.

Vandas, J. (1977) *Úloha Mestské Hromadné Dopravy v Rozvoji Míst*, en Československá Vědeckotechnická Společnost (ed.), International Conference Perspektivy Moderních Tramvají, 4 – 6 october, Praha: Československá Vědeckotechnická Společnost, pp. 1-19.

Vandas, J. (1978) Význam mestskí hromadní dopravy pro rozvoj míst, Doprava, 20 (1), pp. 30-40.

Van der Gragt, F. (1968) *Europe's greatest tramway network: tramways in the Rhine-Ruhr area of Germany*, Leiden: E. J. Brill.

Vávra, R. (2014) *Rozvoj nových dopravních prostředků v pražské hromadné dopravě (1918–1939): realizované a nerealizované projekty*, Bakalářská práce, Univerzita Karlova v Praze.

Vidén, S., Botta, M. (2004) The Transformation of Large Postwar Housing Areas in Sweden: Adaptation to a Blend of New and Old Planning Ideas, in Stanilov, K. and Sheer, B. C. (eds.), *Suburban Form: An International Perspective*, New York and London: Routledge.

Vlček, I. (1957) Sítě Komunikaci Motorické a Hromadné Dopravy ve Městě, *Architektura ČSR*, XVI (9), pp. 494-496.

Vlček, I. (1956) Město a automobilová doprava, *Architektura ČSR*, 19 (8), pp. 452-455.

Vlček, I. (1962) Progresívni řešení dopravních cest ve městě, *Architektura ČSR*, 21 (6), pp. 403-409.

Vlček, I. (1965) Doprava ve vztahu k sídelní struktuři, in Československa Védecko-Technickä Společnost (ed.), *Vývoj Osobní Dopravy v ČSSR*, Celostátní conference, 12-14 October, Brno: Československa Védecko-Technickä Společnost.

Voigt, W. (1976) Wohnungsbauprogramm und Stadtverkehr, *Wissenschaftliche Zeitschrift*, 23 (3), pp. 725-735.

Voigt, W., Schleife, W., Keul, D.-J. (1977) Stand und Entwicklung der Stadtverkehrsforschung in der DDR, *Die Strasse*, 17 (2), pp. 480-485.

Volkskammer der DDR (1970) *Gesetz über die planmäßige Gestaltung der sozialistischen Landeskultur in der DDR (Landeskulturgesetz),* vom 14. Mai.

Vonau, E. (2014) Garden city and "standard" layout, in Vonau, E. (ed.), *The Fabric of town planning. Garden cities, between France and Germany 1900-1924, Lille: Northern University Press, publicado en https://books.openedition.org/*

Vorel, V. (1974) *Návrh, správy do Vlády SSR o ďalšcm rozvoji mestkej hromadnej dopravy*, Archivo Municipal de Bratislava, NVB.

Vorobiev, V. V. (1978) *Problemy povysheniia skorostei dvizheniia i sovershenstvovaniia relsovykh putei elektrotransporta v bolshikh gorodakh*, Moskva: GOSINTI.

Vossius (1952) Vereinheitlichungsmöglichkeiten von Straßenbahn-Großraumwagen, in Verband Öffentlicher Verkehrsbetriebe (ed.), *Die Moderne Straßenbahn als zeitgerechtes Verkehrsmittel*, 6, pp. 11-20.

Vucnic, V. (1972) *Light Rail Transit Systems: A Definition and Evaluation*, United States, Department of Transportation Urban Mass Transportation Administration.

Vucnic, V. R. (1981) *Urban Public Transportation. Systems and Technology, New Jersey: Prentice-Hall. Inc.*

Vucnic, V. R. (2007) Urban Transit Systems and Technology, New Jersey: John Wiley and Sons.

Verbandes Deutscher Kraftverkehrsgesellschaften (1930) *Selbstkostenvergleich Straßenbahn-Omnibus*, Dortmund: Verlag Fr. Wilh. Ruhfus.

VÚVA (1963) *Směrnice pro navrhování komunikací a dopravních ploch v sídlištích,* Brno: VÚVA.

VÚVA (1967) Nové rysy v územních plánech některých britských nových měst, *Urbanismus a Územní Plánování*, 3, pp. 116-127.

VÚVA (1979) *Zásady a Pravidla Územního Plánování*, Brno: Urbanistické Pracoviště.

Wakeman, R. (2014) Rethinking postwar planning history, *Planning Perspectives*, 29 (2), pp. 153-163.

Walker, P. J. (1967) An East German Survey, *Modern Tramways and Light Railway Review*, 30 (351), pp. 379-389.

Walker, P. J. (1972) East Germany - Last of the Small Tramcar Builders, *Modern Tramways and Light Railway Review*, 34 (406), pp. 156-161.

Ward, D. (1964) A Comparative Historical Geography of Streetcar Suburbs in Boston, Massachusetts and Leeds, England: 1850-1920, *Annals of the Association of American Geographers, 54 (4), pp. 477-489.*

Ward, S. V., Freestone, R., Silver, C. (2011) Centenary paper: The 'new' planning history: Reflections, issues and directions, *The Town Planning Review*, 82 (3), pp. 231-261.

Ward, V. S. (2012) Soviet Communism and the British Planning Movement: Rational Learning or Utopian Imagining? *Planning Perspectives*, 27 (4), pp. 499-524.

Ward, S. V. (2016) Urban planning visits and Anglo-Soviet communication in the 1930s and 1950s, *Russian Journal of Communication*, 8 (3), pp. 288-301.

Warner, S. B. (1978) *Streetcar suburbs: the process of growth in Boston, 1870-1900, Cambridge: Harvard University Press.*

Waschulewski, H., Hasse, K. (1975) Erste Schnellstraßenbahntrasse in Schwerin, *DDR-Verkehr*, 11, pp. 453-456.

Watson, H. (1938) *Ulichnoe Dvizhenie*, trans. Reshetnikov, N. V., Sheremetievskii, M. P., Moskva-Leningrad: Gostranstechizdat.

Wauer, R. (1977) Urbanisierung und Urbanität. Gedanken über die städtische Lebensweise und die Architektur, *Architektur DDR*, 16, pp. 444-445.

Weber, D. (2011) Road against Rail. The Debate on Transport Policy in Belgium, 1920–1940, *Transfers* 1(2), pp. 83–104.

Weigel, W. (1962) *Verkehr in der modernen Stadt*, Berlin: Transpress VEB Verlag für Verkehrswesen.

Werner, H. (1967) *Das Transportation in Eastern Europe: Development and Design in Comecon*, Cologne: Verlag Wissenschaft und Politics.

White, H. P. (1967) The Rapid Transit Revival-A Comparative Review of Overseas Practice, *Urban Studies*, 4, (2), pp. 137-148.

White, P. R. (1974) The Comparative Study of Transport Systems: Swedish Urban Transport Policy and its Application in Britain, *International Journal of Transport Economics*, 1 (1), pp. 78-91.

White, M. P. (1979) Planning of urban transport systems in the Soviet Union: A policy analysis, *Transportation Research Part A: General*, 13 (4), pp. 231-240.

White, P. (1980) Urban Planning in Britain and the Soviet Union: A Comparative Analysis of Two Planning Systems, *The Town Planning Review*, 51 (2), pp. 211-226.

White, S. (1992), *Perestroika and After,* New York: Cambridge University Press.

Wilson, H., Womersley, L. (1966) *Irvine New Town, Final Report on Planning Proposals*, Edinburgh: Her Majesty's Stationary Office.

Wilson, I. B. (1986) The French new towns — Les Villes Nouvelle, *Planning Outlook*, 29 (1), pp. 26-34, DOI: 10.1080/00320718608711762.

Wolný, W. (1955) *Směrný Plán Města Ostravy: Doprava, (1958-1960), Ostrava Municipal Archive* (Archiv města Ostravy), Městský Národní Výbor Ostravy, 154.

Yago, G. (2006) *The Decline of Transit. Urban Transportation in German and US Cities 1900-1970, Cambridge: Cambridge University Press.*

Yakshin, A. (1946) *Planirovanie gorodskikh transportnykh setei*, Moskva: Gosudarstvennoe arkhitekturnoe izdatelstvo.

Yakushenko, O. (2016) Soviet Architecture and the West: The Discovery and Assimilation of Western Narratives and Practices in Soviet Architecture in the late 1950s–1960s, *Laboratorium*, 8 (2), pp. 76-102.

Yaroslavl Regional Archive (1963-1988) *Materialy, otchety, zakliucheniia, spravki po obsledovaniiu planirovki i zastroiki goroda Yaroslavlia*, 5, 5, 254.

Yaroslavl Regional Archive (1969) *Protokol i stenogramma zasedniia po generalnomu planu goroda Yaroslavlia*, Gosstroi RSFSR, P-872, 5, 35.

Yaroslavl Regional Archive (1972) *O plane razvitiia mestnogo khoziaistva oblasti na 1971-75gg. i o planovom razvitii khoziaistva na 1972 god*, P-1358, 1, 265.

Yaroslavl Regional Archive (1976) *Perepiska s ministerstvom Zhilishchno-kommunalnogo khoziaistva RSFSR, i oblastnym upravleniem kommunalnogo khoziaistva za 1976 god*, 1358, 3, 265.

Yaroslavl Regional Archive (1979) *Spravka o sostoianii zastroiki goroda Yaroslavlia za 1979 god*, P – 872, 5, 35.

Young, A. P., Maltby, D., Constantine, T. (1969) Urban Transit Systems: Choice for Investment, *Official Architecture and Planning*, 32 (12), pp. 1454-1460.

Zadorin, N. I. (1931) *Avtotransport i ego mesto v narodnom khoziaistve*, Moskva: Transpechat NKPS.

Zakharov, V. I. (1970) Perspektivy stroitelstva linii skorostnogo tramvaia v Leningrade, in Artinov, A. P. (ed.), *Sostoianie i perspektivy razvitiia skorostnogo passazhirskogo transporta v Leningrade*, Leningrad: LOCHTO, pp. 98-103.

Zakopal, D. (1977) Priorita Rýchlé Tramvaje v Městské Hromadné Dopravě v Ostravě, in Československá vědeckotechnická společnost (ed.), *Perspektivý Moderních Tramvají*, Praha: Československá vědeckotechnická společnost.

Zalčík, T. (1973) Príspevok k formirovaniu struktury mesta, *Architektura a Urbanizmus*, 2, pp. 29-33.

Zarecor, K. E. (2011) *Manufacturing a socialist modernity: The architecture of industrialized housing in Czechoslovakia, 1945–1956*, Pittsburgh: University of Pittsburgh Press.

Zarecor, K. E. (2013) Infrastructural Thinking: Urban Housing in Former Czechoslovakia from the Stalin Era to EU Accession, *Architecture Publications*, 9, pp. 57-78.

Zarecor, K. E. (2018) What Was So Socialist about the Socialist City? Second World Urbanity in Europe, *Journal of Urban History*, 44(1), pp. 95–117.

Závodná, M. (2012) The electrification of tramways in Ostrava in 1900–1901, *Acta Polytechnica, 52 (5), pp. 130-132.*

Závodná, M. (2016) *Koleje a město. Problematika městské kolejové dopravy ve vybraných moravských a slezských městech v letech 1850–1918*, Ostrava: Bohumír Němec – Veduta, Nakladatelství a vydavatelství.

Závodná, M. (2018) From Vienna to Ostrava – from Austria to Czechoslovakia: Urban Rail Transport in the Czech Lands (on the Example of the Ostrava Agglomeration, 1894 –1924, *Mesto a Dejiny, 7(1), pp. 18-39.*

Zbigniew, K.-M. (2014) Trams as Tools of Urban Transformation in French Cities, *Technical Transactions Architecture*, 10/A, p. 65.

Zelezny, R. (2013) *Le tramway et le piéton au cœur des quartiers résidentiels d'aujourd'hui: pouvons-nous en tirer des enseignements du passé? Un contexte de comparaison franco-tchèque*, Colloque International du LABEX Futurs urbains: Enjeux interdisciplinaires émergents pour comprendre, projeter et fabriquer la ville de demain, Marne-la-Vallée, France.

Zelezny, R. (2014) *Tramway-oriented development: what results in what context? Comparative approach between France and the Czech Republic*, Transportation Research Arena (TRA), Paris - La Défense.

ZFIV (1971) *Gestaltung städtische Schnellverkehrsstrassen. Abschußbericht*, Berlin: ZFIV VÚVA.

ZFIV (1973) *Verkehrsliche Anbindung von Wohngebieten. Abschußbericht*, Berlin: ZFIV.

ZFIV (1974) *Richtlinie für die verkehrliche Anbindung und Erschließung von Neubaugebieten*, Berlin: ZFIV.

ZFIV (1975) *Rolle und Aufgaben des Verkehrswesens in der sozialistischen Stadt*, 2 Symposium Stadtverkehr des ZFIV und der KDT, Berlin: ZFIV.

ZFIV (1975) *Methodik der Generalverkehrsplanung – Begutachtung der GVP für Städte der DDR*, Gutachterliche Stellungnahme zum GVP Erfurt vom März 1975, Berlin: ZFIV.

ZFIV (1976a) *Methodik der Generalverkehrsplanung in Klein- und Mittelstädten*, Berlin: ZFIV.

ZFIV (1976b) *Begutachtung der Generalverkehrspläne (GVP) für Städte der DDR*, Berlin: ZFIV.

ZFIV (1976c) *Richtlinie für die Planung und Gestaltung der verbesserten Strassenbahn - Schnellstrassenbahn*, Berlin: ZFIV.

ZFIV (1977) *Generalverkehrsplanung und ihre Wechselbeziehung zum sozialistischen Städtebau*, 3 Symposium Stadtverkehr des ZFIV und der KDT, Berlin: ZFIV.

ZFIV (1981) *Katalog der Orientierungs- und Richtwerte für die Generalverkehrsplanung der Städte,* Berlin: ZFIV.

Zigurds L. Z (1963) Programs and Problems of City Planning in the Soviet Union, *Washington University Law Review*, 1, pp. 19-59.

Zilbertal, A. (1932) *Tramvainoe khoziaistvo*, Moskva-Leningrad: Gosudarstvennoe transportnoe izdatelstvo.

Zilbertal, A. (1937) *Problemy passazhirskogo transporta*, Moskva: Gosudarstvennoe transportnoe izdatelstvo.

Zilov, A. (1934), Pervii Sovetskii trekhosnii trolleibus v podarok XVIII Partsiezdu, *Za rulem*, 2, pp. 12-13.

Zmija, K. (1967) *Reshenie Problemi Gorodskogo Transporta v Ostrave v Budushchie Gody*, International Conference about the Development of Urban and Suburban Transport in the period after the 1970, Praha: ČKD Praha.

Zmija, K. (1985) Doprava a Komunikace v Ostravě, in Bartoš, J., Dohnal, M. (eds.), *Ostrava: Sborník Příspěvků k dějinám a výstavbě města*, Ostrava: Profil.

Zouhar, W. (1968) *Městská hromadná doprava*, Praha: ČKD.

Zubovich, K. (2016) Democracy: The International Union of Architects and the Cold War Politics of Expertise, *Room One Thousand*, 4 (4), pp. 104-116.

Zyuzin, P. V. (2012) *Prostranstvennaia Transformatsiia Setei Gorodskogo Passazhirskogo Transporta Postsocialisticheskikh Stran Tsentralno-Vostochnoi Evropy i byvchego SSSR*, PhD thesis, Moskva, Moscow State University named after M. V. Lomonosov.

Žáčková, M. (2014) *Historie a Činnost Urbanistického Pracoviště Výzkumného Ústavu Výstavby a Architektury v Brně*, doctoral thesis, Brno University of Technology, Brno.

Internet sources:

https://www.metropolismag.com/

https://www.ddr-postkarten-museum.de/

http://theoldmotor.com/

https://flashbak.com/Queues, Fumes, Crowds and Pickpockets – 100 Years of London's Oxford Street.

https://www.pinterest.com/

https://data.worldbank.org/

https://stats.oecd.org/

https://www.statista.com/

https://transphoto.org/

https://transphoto.org/GUP RK Krymtrolebus,

https://www. transphoto.org. Murashov, S.

https://www. transphoto.org/Tereshenko Valeri Sergeevich,

https://www. transphoto.org. Vazhenin, S.

https://fhzz.de/der-rabenstein-strausberger-platz/Friedrichshainer Zeit Zeiger.

https://www.mdr.de/ foto de Wolfgang Schmidt.

https://visualhistory.livejournal.com/1313095.html.

https://www.uitp.org/

http://www.liepajastramvajs.lv/ru/vagoni.

https://techlibrary.ucoz.ru/_ld/0/1_lm68.jpg. Vlad Kupcov,

https://www.wikiwand.com/de/Boeing_LRV

https://www. yargid.ru. Zinaida Shemetova,

http://tvoemisto.tv/exclusive/smilyve_rishennya_yak_shvydkisnyy_tramvay_mozhe_rozvantazhyty_Leópolis_92840.html.

https://www.brno-lisen.cz/letecke-snimky-lisne/t1177

http://sykhiv.media/mif-spalnogo-rayony-abo-sykhiv-vzhe-ne-toy-blog/

Screenshot from the video Blog 360 (Youtube).

VII. ANNEX: SUMMARY TABLE OF POLITICAL , URBAN AND TRANSPORT PLANNING EVENTS

Year	*Global political context and key policies in the European communist countries*	*Urban planning, construction, architecture and housing policy*	*Urban transport, traffic and tramway policy*	*Some key urban transport issues in Western European countries and the USA*
1953	- Death of Stalin. - Election of Khrushchev as First Secretary of the Central Committee of the Communist Party of the USSR. - Uprising in the GDR (Aufstand des 17. Juni). - Balkan Pact (Greece, Turkey and Yugoslavia) to stop Soviet expansionism.		- USSR: Publication by Polyakov of one of the first studies on urban traffic calculation methodology, "Urban Traffic and Street Planning".	
1954	- USSR: amnesty for 5.5 million political detainees.	- Czechoslovak Republic (CR): foundation of the Research Institute of Construction and Architecture (VÚVA).	- USSR: founding of the Institute of Complex Transport Problems.	- USA: creation of the National Transportation Committee to assist cities in urban traffic planning.
1955	- Creation of the Warsaw Pact: collective defence of communist regimes. - The USSR Presidium of the Supreme Council adopted the decree " About the end of the state of war with Germany".	- USSR: Resolution N1871 "On the elimination of excesses in planning and construction". - USSR: Resolution "On measures for further industrialisation, improvement of quality and reduction of construction costs".	- Production of Tatra T2 trams and application in Czechoslovakia operating of T2 in multiple units.	- Xth World Road Congress in Istanbul, and exchange of knowledge on road traffic planning and road infrastructure construction.
1956	- At the XXth meeting of the Communist Party of the USSR, Khrushchev attacked Stalin's policies and initiated the period of de-Stalinisation and the crisis of communism. - Hungarian revolution, suppressed by	- At the XXth Meeting of the Communist Party of the USSR, the goal was set to solve the housing problem within the next 20 years.	- USSR: Publication in the Journal "Arkhitektura SSSR" of the plans of new Western cities as a guideline model for Soviet urban planning.	- Lucio Costa's Brasilia Plan, as a paradigmatic example of modern urban traffic solution (like Chandigarh since 1951). - Publication of the book about traffic calculation methodology "A General Theory of Traffic

	Soviet troops. - Demonstrations in Tbilisi, Georgia. - Uprising in Poznan, Poland.			Movement" by A.M. Voorhees, which was followed by a series of American publications on traffic engineering.
1957	- Khrushchev announced that the USSR had missile superiority over the USA. - Treaties of Rome: European Economic Community (EEC) and European Atomic Energy Community (EAEC).	- USSR: Resolution "On the development of housing construction in the USSR". - Beginning of housing construction in the communist countries based on the concepts of "mikroraions" and "zhiloi raion".	- USSR: announcement of the need for the creation of the USSR Research Institute of Traffic and Urban Transport, which was never realised.	
1958	- Construction starts on the "Druzhba" pipeline to supply oil to the satellite countries of the USSR.	- USSR: International Architectural Congress in Moscow "Construction and reconstruction of cities, 1945-1957". - USSR: Gosstroi Order SSSR N268 "On extending the use of standard projects in construction process". - USSR: new "Rules and regulations of city planning", SN 41-58, where the necessity of planning residential areas with "mikroraions" was announced.	- USSR: urban planning regulations SN 41-58, where ideas were developed on the need for differentiation of streets and roads, and minimisation of road network density to improve pedestrian safety and traffic circulation.	- IFHP Congress in The Hague, dedicated to the urban renewal theme. - Cumbernauld's urban plan, which was an important example for the solution of road infrastructure and urban traffic.
1959	- Start of construction of the integrated power system "Mir" to supply electricity to the satellite countries of the USSR.	- USSR: Start of the study about experimental projects for new towns. - CR: Resolution of the Central Committee of the Czechoslovak Communist Party on mass housing construction.	- CR: foundation of the Higher School of Transport in the Slovak town of Žilina. - CR: construction of the first rapid tramway line in Košice. - GDR: "Regulations on the construction and operation of trams" (BOStrab) with recommendations for the use of a reserved tramway platform.	- "XIth World Road Congress" in Rio de Janeiro. - FRG: publication of the book "Die autogerechte Stadt" by H. B. Reichow, which gave impetus to urban planning for automobiles. - Dissolution of the CIAM.
1960	- Ulbricht's rise to power in the GDR. - Establishment of	- USSR: The All-Union Congress of Urban Planning in Mos		

	the Czechoslovak Socialist Republic (CSR).	cow announced the-new direction in so cialist urban planning.		
1961	- Construction of the Berlin Wall.	- USSR: XXIInd Meeting of the Communist Party, where it was announced a new stage in the development of Soviet urban planning. - Publication and discussion of the ideas of the Moscow Urban Planning Congress in the CSR and the GDR.	- USSR and CSR started to participate in UITP congresses.	- Lehrer proposed at the UITP congress the idea of realisation of general transport plans. - Jane Jacobs published the book "The Death and Life of Great American Cities". - Publication of the urban plan for the new British town of Hook, another paradigmatic example of a new solution for urban traffic.
1962	- Beginning of the economic crisis in the socialist countries. - Cuban missile crisis. - Beginning of discussions on reducing the power of centralised planning in the national economy of communist countries.	- USSR: development of ideas about the urban model with optimal size and structure in urban planning theory. - GDR and CSR: realisation of a series of urban plans oriented towards the idea of limiting urban growth.	- CSR: production of the Tatra T3 model, with the possibility of multi-unit operation, and improved passenger transport capacity	
1963	- Treaty between the USSR, the USA and the UK banning nuclear weapons tests. - In the GDR the "New Economic System of Economic Planning and Management" was adopted.	-CSR: establishment of the Faculty of City and Housing Sociology at the VÚVA Institute. - GDR: study course in spatial and urban planning at the Weimar School of Architecture and Construction.	- GDR, CSR and USSR: intensive publication of books and studies on urban traffic and transport planning, oriented towards the planning of road infrastructure to provide maximum capacity for road traffic circulation.	- Colin Buchanan published the book "Traffic in Towns".
1964	- USSR: Khrushchev dismissed by the Central Committee of the Communist Party of the USSR, and the process of liberalisation of	- USSR: foundation of the Central Research and Design Institute for Urban Planning (TSNIIP Gradostoitelstva).		- FRG: Leibbrand published the seminal work "Stadt und Verkehr", which raised the issue of integration between transport and city.

	social life was terminated. - USSR: Brezhnev elected First Secretary of the Communist Party of the USSR.			- USA: "Urban Mass Transportation Act" to support the development of public mass transport.
1965	- USSR: Decree N729 of the Council of Ministers of the USSR "On improving planning and strengthening economic incentives for industrial production". - Beginning of Kosyguin's economic policy: a self-managed Soviet economy.	- CSR: Jiří Hrůza published the book "Theory of city", where he proposed the development of the "rapid transit city".	- CSR: ČKD Tatra began supplying tramway units to the communist countries. - GDR and CSR: Start of state study programmes on the situation and future planning of urban transport in their cities.	- FRG: Decree on the construction and operation of tramways. - USA: second edition of the "Highway Capacity Manual". - Sweden and France began to implement social housing programmes.
1966	- Brezhnev was elected General Secretary of the Central Committee of the Communist Party of the Soviet Union.	- CSR: VÚVA institute published new standards for planning and construction of housing estates. - USSR: publication of the first volume of the fundamental work "Principles of Soviet Urban Planning". - USSR: new urban planning regulations SNIP II-K.2-62 "Planning and construction of settled areas".	- USSR: "Plan of intensive trolleybus development and limited tramway development, 1966-1975" of the Ministry of Urban Services of the Russian Republic. - USSR: 23rd Meeting of the Communist Party, which set the goal of improving the operation of urban passenger transport. - USSR: production of the experimental model of the LVS-66, 6-axle tramway.	- IFHP International Congress in Tokyo, dedicated to integrated planning and the balance between public and private transport.
1967	- Brezhnev enunciated the idea of building "developed socialism".	- GDR: Resolution of Deutsche Akademie about the need for integration of urban and transport master plans. - CSR: Foundation of the journal "Architektura a Urbanizmus".	- USSR: Resolution N1152 of the Council of Ministers on measures to improve the public services of urban passenger transport. - USSR: "Temporary rules for the plan ning of rapid tramway lines" N279 of the Ministry of Urban Services of the Russian Republic. - USSR: Initiation of planning of experimental rapid tramway lines in large cities.	- Planning of the first British cities clearly oriented towards the enhancement of the role of collective public transport.

			- GDR: the manufacturer Gotha ceased production of trams.	
1968	- "Prague Spring". - Brezhnev initiated the doctrine of limited sovereignty of socialist countries.	- USSR: start of construction of Toliatti new town, oriented towards motorized transport use.	- GDR and CSR: foundation of the transport journals where the problems of urban and public transport were raised: DDR-Verkehr and Doprava.	- FRG: State programme for the development of light rail (Stadtbahn) in the Ruhr area. - United Kingdom: "The Town and Country Planning Act" and the idea of integration between transport and city.
1969	- CSR: Husák, General Secretary of the Communist Party of Czechoslovakia. - CSR: formation of two federative republics, the Czech Socialist Republic and the Slovak Socialist Republic. - FRG: Ostpolitik and the improvement of political and economic relations with Eastern Europe.	- USSR: Resolution of the Council of Ministers of the USSR, N392 "About measures to improve the quality of housing and civil construction", aimed at improving residential variety. - GDR: Establishment of the Faculty of Spatial Planning and Urban Planning at the School of Architecture and Construction in Weimar.	- GDR: "Regulations for the construction and operation of trams" and the planning of the tramway on reserved platform. - USSR: Gosplan SSSR publishes the "Guide on the planning of development schemes of all means of urban passenger transport with 250,000 inhabitants and more".	- UITP London Congress: the importance of integrated transport-city planning was emphasised. - Commissioning of the first pre-metro line in Vienna, Austria.
1970	- Poland: strike wave and new economic programme. - Beginning of consumption and welfare-oriented politics.	- GDR: "Nature Conservation Ordinance" aimed at the preservation of the environment, landscape and evaluation of environmental impact.		- Initiation of international consultancy work for traffic planning in Budapest and joint West-East discussion of urban transport problems.
1971	- Programme on the intensification of trade relations within COMECON. - GDR: Honecker, General Secretary of the Socialist Unity Party of Germany. - The policy of developing heavy industry was continued at meetings of the communist parties of the USSR, GDR and CSR.	- GDR: Deutsche Bauakademie research programme, "Socialist Urbanism 1971-1975", with the aim of improving the efficiency and multidisciplinarity of urban planning. - CSR: Symposium in Prague and series of publications by Terplan (State Institute for Spatial Planning in Prague) on the preservation of the urban environment. - CSR: VÚVA	- USSR: "Technical regulations for the planning and construction of rapid tramway lines" of the Ministry of Urban Services of the Russian Republic and initiation of articulated and four-axle tramway projects. - CSR: "Regulations for the technical operation of urban railways". - GDR: Establishment of the Central Institute for Transport	- Beginning of the gradual change of the urban planning paradigm in Western countries, with the inclusion of environmental, social, participatory and long-term perspectives. - FRG: production of the eight-axle G8 tramway by Duwag, which significantly increased its transport capacity.

		conducted studies on urban agglomerations. - USSR: Shkvarikov published the book *Zhiloi raion i mikroraion*.	Research (ZFIV) and experimental rapid tramway projects in Erfurt and Schwerin.	
1972	- USSR: mass protests in Kaunas. - Signing of the SALT I arms control treaty between the USSR and the USA.	- CSR: creation of the Urban Ecology Department at the Construction and Architecture Research Institute (VÚVA).	- GDR: Resolution of the Council of Ministers "On the development of long-term city planning".	- United Nations Conference on the Human Environment in Stockholm.
1973	- Oil crisis, with the USSR becoming a major supplier and provisionally developing its economic base.	- GDR: Communist Party decision on new housing construction. - CSR: VÚVA became a collective member of the International Federation for Housing and Planning (IFHP).	- CSR: production of the Tatra KT4D articulated tramway model for the GDR. - GDR: 1st Urban Transport Symposium, ZFIV. - USSR: production of the new tram model KTM-5M3.	- The USA, France and the UK intensified their studies on light rail.
1974	Meeting in Moscow between Brezhnev and Nixon.		- GDR: "Guidelines for transport planning in new residential areas". - CSR: "Long-term perspectives for the development of transport in the Czech Socialist Republic until 1990".	
1975	- Helsinki Declaration, aimed at reducing tension between communist and capitalist European countries. - USSR limited the supply and increased the price of oil and other raw materials to COMECON countries.	- USSR: new urban planning standards SNIP II-60-75 "Planning and development of cities, villages and rural settlements".	- GDR: II Urban Transport Symposium, ZFIV. - CSR: Pithardt, Thoř and Vandas published papers dedicated to the integration between collective public transport and urban planning *Urban Public Transport*.	- Discussions on urban transport policy aimed at solving the energy crisis. - UITP Congress "Mutual influence between public transport and city and regional development". - Decision on light rail in American cities at the conference in Philadelphia.
1976	- GDR: Guidelines "The Socialist Way of Life", which sought to strengthen control of social life. - USSR: Communist	- GDR: "Complex guidelines for urban planning and design of new residential areas". - CSR: "Law on	- CSR: "Directive on interim planning and design of lines and equipment for operation of the rapid tramway".	

	Party meeting which announced the need for intensive development of industry.	Spatial Planning and Building" (*Zákon č. 50, částice 9*). - CSR: Government Resolution "On long-term urbanisation and development of CSR settlements".	- CSR: Decision on the planning of the rapid tramway system for Brno and Ostrava. - GDR: "Guidelines for planning and design of improved tramway - rapid tramway" and "Evaluation of general urban transport plans in GDR cities". - USSR: "Electric urban transport. Tram and trolleybus lines".	
1977	- Beginning of economic crisis in communist countries. - USSR: new constitution. - CSR: Havel and the opposition movement to raise awareness of problems in society.		CSR: International Conference in Prague "Rapid Tram Perspectives". - GDR: 3rd Urban Transport Symposium, ZFIV. - GDR: Rapid tramway became the main solution in general transport plans for cities with more than 100.000 inhabitants.	- UITP Congress in Montreal, where the social role of public transport was emphasised. - Beginning of the standardisation of tramway rolling stock. - IFHP International Congress and the problem of urban environment and transport.
1978		- USSR: publication of the work "Spravochnik proektirovshika", where the new standards of urban planning were formulated.		- Budapest meeting dedicated to the theme "Human development of urban transport".
1979	- Signing of the second SALT II Treaty between the USSR and the USA on arms control. - USSR: economic reform "About improving planning and strengthening the impact of the economic mechanism to strengthen the efficiency of production and the work quality", as an attempt to improve the country's economic situation.	- CSR: VÚVA published the seminal work *Zásady a Pravidla Územního Plánování*. - GDR: Bauakademie der DDR published the fundamental work *Städtebau: Grundsätze, Methoden, Beispiele, Richtwerte*.		- UITP Congress on "Light Rail. The Future Transport System".
1980	- USSR: Soviet armies in Afghanistan. - Western govern		- USSR: mass production of the articulated tramway model	

	ments boycott the Moscow Olympic Games. - Gdansk Agreement between the Polish government and "Solidarność".		KT4SU. - USSR: production of the LVS-80 6-axle tramway experimental model.	
1981	- Martial law in Poland again restricted civil rights and daily life.	- IUA Congress in Warsaw "Architecture, Man, Environment".	- USSR: the resolution of the Council of Ministers of the USSR N1138 "About measures of further development of urban passenger transport", the first attempts to improve the operation and priority of tramway.	
1982	- Death of Brezhnev - Andropov, General Secretary of the Communist Party of the USSR. - The beginning of the political crisis and the intensification of the economic crisis.	- USSR: Russian translation of Lynch's 1960 book *The Image of the City*..		- First light rail in Genoa.

VIII. LIST OF FIGURES