



OPPORTUNITIES AND PROSPECTS OF THE MASS PUBLIC TRANSPORT

Ladislav NOVÁK, Jana LOPUŠANOVÁ

Ladislav.Novak@fsi.uniza.sk, jana.lopusanova@fpv.uniza.sk

Assoc. Prof. Ladislav Novák, eng., PhD., Jana Lopusanová, Faculty of Special Engineering, University of Žilina in Žilina, Faculty of Science, University of Žilina in Žilina

SLOVAK REPUBLIC

Abstract: *This paper deals with aspects and relations of the development of the mass public transport and with the discrepancies and conflicts which arouse together with its development. It sets goals, tasks and demands on the development of infrastructure and system of mass public transport.*

Key words: *mass public transport,*

INTRODUCTION

In the process of the human development human settlements and building sites have been gradually built. People's imagination about the way of housing and moving house within and among these settlements and sites has also developed. The development of transport facilitated the human's mobility and led to changes in one's own attitudes towards living. Gradually different systems of public transport connected with the size of building sites and settlements and the industry development have been created. Dependence on public transport means has been reduced by the possession of one's own automobile. The car has been able to reduce distances in a considerably shorter time. This led to future town enlargements and changes in existing systems of public transport.

1. POSSIBILITIES OF DEVELOPMENT OF THE MASS PUBLIC TRANSPORT

Along with today's increase in car traffic it is vital to search for **possibilities of development of the mass public transport**, its engineering facilities, technology and organization so that positively influenced division of traffic labor is promoted in favor of mass public transport. It is on behalf of environmental issues, the capacity of roads, the society's economy, energy saving interest, etc.

Organization and development of the mass public transport should be understood and solved **in a complex way**. The development of regions and towns and human needs themselves require a systematic approach towards solving passenger transport issues with future prospects. Systematic approach towards solving these issues presumes that traffic problems must be solved within their internal and external circumstances. The organization of public transport is being adjusted to the size of town and regions in which one or more transport carriers provide passenger transportation. It is vital that the development of these systems is necessarily kept in balance with **the inhabitant's needs**, their lifestyle, and the environment and must also be in favor of coordination and harmonization of the whole traffic system.

Technical development of the mass public transport brings with itself some innovations in the field of transport means, traffic roads and traffic facilities. This leads to changes in organization of traffic and traffic technology. While conceptual solving of a new or innovative transport means it is necessary to watch to what extend his technical parameters are going to be used and utilized and compared to other vehicles of a similar kind it is vital to observe its utility value. That is why it is important to solve traffic

roads, technology and organization of traffic, too. Energy consumption and work afford is directly proportioned to those numerical expressed transport demands. Fulfillment of higher transport demands and costs cutting is a problem of searching for optimum transport operation together with conservation of environment, and a problem of defining the optimum traffic means and adequate transport technology.

Mass public transport must also be prepared to cope with vast transport demands when meeting needs of the inhabitants and at the same time it must be environmental friendly. To meet these requirements it is useful to maintain its **perfect organization** within traffic framework and harmonization of managerial, planning, organizational, freight rates' and investment activities and technical development.

Together with judging the basis of mass passenger traffic it is important to watch two **contrasting phenomena**. On one hand it is the concentration of traffic in the central parts of towns, on the other hand it is growing influence of towns piercing into wider surroundings and causing intensive and dynamic processes in the whole populated area. Population number rises, but the rise is significant only in the outskirts of towns and suburbs. Along with the latest urban development trends and under conditions of higher population density towns of middle size and their outskirts have a prior position. In this case passenger transport from the outskirts and internal traffic usually create a coordinated traffic system.

There have been new relations built in the passenger transport. This is due to changes in **distribution of resources and journeys' destinations**, mainly when commuting from places of residence to workplace. In the centers of towns there is a signification decrease in number of inhabitants. New facilities, services, businesses, tourists' and cultural facilities have been built there. That is why the number of working opportunities in the downtowns has risen. Number of inhabitants or population density rises hand in hand with the growing distance between their places of residence and centre of towns. This rise has been recorded up to the location of urban settlements with high-rise buildings. Population density decreases further along with the growing distance towards the town's outskirts with houses. This leads to

increase in number of roads, in their length and their concentration.

Number of car owners increases along with the growing distance from their homes to the town centre. This is because of the rising level of car traffic and as well because of the fact that in the town centers there is a decreasing number of inhabitants which is why the majority of them are in the post productive age. In the town centers there is a shortage of garages and parking facilities, but there are other barriers for the car holders as well.

Along with the latest urban development trends and under conditions of rising population density, towns of middle size (up to 50.000 inhabitants) and their outskirts have won a special position. In this case passenger transport from the outskirts and internal traffic usually create one traffic system. There is a problem connected with suburban transport which is the distribution of bus stops in local bus and railway transport. When solving this problem in smaller towns the main criterion is the pedestrian accessibility of the town center. In larger towns the main criterion is an essential link to local and mass public transport.

2. GOALS AND TASK OF MASS PUBLIC TRANSPORT

Passenger transport is a necessary consequence of spatial division of activities as well as consequence of acquiring, utilizing and creation of urban environment. With the help of passenger transport communication relations of vital importance are being realized. These relations arouse under influence of factors such as housing, work, shopping, education, spending leisure time, culture, physical exercise etc.

The main objective of public transport is to convey **maximum** number of passengers within a certain area while exerting **minimal** work afford on a **required** quality level. When meeting the objective the public mass transport should fulfill following partial goals:

In the field of transportation:

- to assure region resident traffic in coordination with changes in population moving house,
- to carry out minimum transport and traffic efforts,

- to provide optimal form of organization and managing of transportation, traffic operating management including laying down rules of procedures and traffic orders,
- to conduct optimal public transport lines,
- to provide the passengers with early and complete information,
- to assure time and spatial coordination inside and outside the transport system.
- to reach maximal labor productivity,
- to reach quality required on moving passengers when securing the required or standardized transporting and operating characteristics such as safety, speed, regularity, reliability, punctuality of traffic, passengers' comfort, etc.,

In the field of engineering and production:

- to guarantee operation reliability of the technical basis, including traffic roads, traffic machinery and means of transport,
- to guarantee the maintenance and repairs of other facilities needed for performing traffic activities of a transport company, such as premises and facilities designed for [alterations and renewals](#) of its technical basis, administrative and other buildings, bus stops, their equipments, bus stations, etc.,

In the field of business and economy:

- to spend minimum costs of operation, above all labor force, energy, fuel, material, raw materials,
- to expend minimum investments costs when meeting the goals set in public transportation,
- to assure minimum interdependence of basic elements of production and traffic,

In the social field:

- to guarantee social accessibility to transport with reasonable pricing and freight rates conditions,
- to make a positive influence on people concerned by providing regular and reliable transport services,
- to prepare its employees for their job and enhance their qualifications required for executing their work performance in the field of public transportation,
- to ensure complex social care for carriers' employees,

Outside the economic and social field:

- to protect the environment,

- to carry out special functions in case of the threat of the region and the state.

3. PUBLIC MASS TRANSPORT AS A PART OF THE WHOLE TRANSPORT FRAMEWORK

In terms of rising transportation requirements and claims on the towns and regional development **coordination of all activities of mass public transport** has gained ground. It is not possible to develop the mass public transportation individually but only as a part of a **homogenous transport system** which involves all kinds of passengers transportation.

The newest proposal of the traffic system, the choice of a suitable transport means, application of a corresponding technology are interconnected with the populated area and urban concepts. This arrangement sets the traffic roads, defines sources and destinations of moving, influences transportation activity rates, division of labor and time for moving together with unsteadiness of traffic flow intensity. The area of the traffic operated land together with the speed of transportation is in mutual coherence with the requirements set on transportation time saving.

Security of correct operation of the whole traffic system must be in harmony with the town or regional development. Constant increase in settlements concentration, formation of further town agglomerations, individual automobile industry development will set even higher demands on transportation and its infrastructure.

Along the traffic arteries new industrial and housing areas are being built. Their grow is enhanced by the development of industry and services which leads towards the fact there are more and more people commuting to towns mainly to work there. At the same time the facilities providing services are moving closer to customers – towards the settlements and housing estates areas. This fact puts further pressure on the town's transport system. Town's growing into agglomerations and new housing estates areas require creation of a new comprehensive and effective system of transportation in which the major role in passenger transportation the public mass transport should play.

Nowadays the rapid grow of towns, development of inhabitants' activities and increase in traffic intensity itself are being put in contrast with the existing structure of the

communication net. Transport relations among single town parts, the downtown, housing estates in the region are getting worse. For their better spatial organization it is necessary to create organic link among social - economic and functional town structures, among allocation of sources and journey's destinations and the net of the mass public transport lines.

When creating the traffic system of towns following basic aims should be taken into consideration:

- **Coordination and integration of all kinds of traffic**, where there are the reserves in quality of travel, in the productivity grow and in the time consumption,
- **Modernization of today existing transport systems and building of new ones**, with

their help to create better conditions for passenger transportation and improvement of the environment.

4. DISCREPANCY IN REQUIREMENTS SET ON PUBLIC TRANSPORT

There are passengers, general public and carriers who all participate in the public transportation. They set various requirements on public transport which usually differ much. These can be those of transport, sociologic, consumption, environmental and other requirements. Their evaluation is there in the Table Nr. 1 below.

Table Nr.1 Requirements set on mass public transport and their evaluation

	Passenger	General Public	Carrier
Transport requirements			
Speed	maximal	maximal	maximal
Reliability	maximal	maximal	maximal
Punctuality	maximal	maximal	maximal
Transport capacity	maximal	necessary	necessary
Availability	maximal	maximal	maximal
Spatial accessibility	maximal	maximal	necessary
Sociologic requirements			
Travel expenses	minimal	necessary	maximal
Social accessibility	maximal	maximal	minimal
Traffic safety	maximal	maximal	maximal
Convenience of moving/traveling	maximal	necessary	necessary
Hygiene	maximal	maximal	necessary
Consumption requirements			
Energy	necessary	minimal	minimal
Raw materials, material	necessary	minimal	minimal
Labor force	necessary	minimal	minimal
Spatial demand on transportation	minimal	minimal	necessary
Environmental requirements			
Noise	minimal	minimal	necessary
Air-pollution	minimal	minimal	minimal
Vibrations, shocks, shakes	minimal	minimal	necessary
Dustiness	minimal	minimal	minimal
Solid waste	necessary	minimal	necessary
Aesthetics	maximal	maximal	necessary

Meeting the requirements set by the cooperation of passengers, public and carriers in the public transport is strongly influenced by following aspects:

- The basis for building and development of town structures must be the net of communications which respects the spatial arrangement of the towns and regional fundamental functions.
- It is necessary to differentiate the net of communications among urban expressways, service trucking routes, highways, major roads, motorways, primary routes, and local communication net.
- The system of public transport should provide and guarantee the frequency of transportation, commercial speed, comfort while traveling, minimal number of transfers, short distances to bus stops, and short waste of time in the regular transportation.
- The whole system of transportation must be safe.
- In the central parts of towns it is necessary to organize moving on foot (pedestrian accessibility) in cooperation with public mass transport.
- It is of vital importance to keep the system of urban transport environmental friendly.
- Nets of communications can be built according to those existing as well as future needs with preference of urban transport in

the main destinations and also it is necessary to keep spatial reserves for the enlargement of road systems.

LITERATURE

[1] CISKO, Š. - GNAP, J. - SUROVEC, P.: Vybrané problémy prevádzky a financovania MHD v SR. Akademia Ekonomiczna, Katowice, 1999 (manuscript to be published).

[2] PITHARDT, K.J. - THOŘ, V. - VANDAS, J.: Městská hromadná doprava. ČSVTS, Praha, 1975.

[3] SUROVEC, P. - CISKO, Š.: Tarifný systém MHD, Horizonty dopravy č.3, 1994, VÚD Žilina, s.7-9.

[4] SUROVEC, P.: Technológia hromadnej osobnej dopravy, EDIS, Žilinská univerzita v Žiline, 1.vyd. 157 strán, 1998, ISBN 80-7100-494-4.

[5] SUROVEC, P.: Tvorba systému mestskej hromadnej dopravy. EDIS ŽU Žilina, 1.vyd. Žilina, 1999, ISBN 80-7100-586-X

[6] SUROVEC, P.: Mestská hromadná doprava. EDIS ŽU Žilina, 1.vyd. Žilina, 2007, 235 strán. (Script manuscript, deadline for submitting May 2007).

The paper has been created with the support of APVV Agency, Project number SK-BUL-01506 and KEGA Agency Project number 3/4055/06

ВЪЗМОЖНОСТИ И ПЕРСПЕКТИВИ НА МАСОВИЯ ГРАДСКИ ТРАНСПОРТ

Ладислав Новак, Яна Лопушанова

Ladislav.Novak@fsi.uniza.sk, jana.lopusanova@fpv.uniza.sk

*Доц. д-р инж. Ладислав Новак, Факултет по специално инженерство,
Университет в Жилина, 1st May Street Nr. 32, 010 26 Жилина, Словакия
магистър Яна Лопушанова, Факултет за природни науки, Университет в Жилина,
15 Hurbanova Street, 010 26 Жилина,*

СЛОВАКИЯ

Резюме: Докладът представя някои актуални аспекти в развитието на масовия градски транспорт, както и несъответствията и конфликтите, които възникват във връзка с това. Поставят се целите, задачите и потребностите на инфраструктурата на системата на масовите градски превози.

Ключови думи: масов градски транспорт.