Transportation problems of contemporary cities and opportunities to solve the problems through innovative management

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ABSTRACT

The article presents problems related to organisation of goods and passenger transport in cities and the methods of solving the problems. Transportation problems in city agglomerations result from dynamic development of economy and the very cities, which is translated into increased demand for transportation services. Owing to infrastructural limitations, specifically in city centres, congestion is a frequent phenomenon. The situation is critical and requires application of unconventional and innovative solutions for transport organisation and management. The article discusses the application of modern logistic solutions based on integration of many elements of the transportation process, including the use of telemetry, IT and planning tools as well as efficient management of goods, passengers and services flow in the cities.

Keywords: city transport, applied telemetry, congestion, innovative management

1. INTRODUCTION

Transport organisation in city agglomerations is one of the important factors affecting improvement of the flow of people, particularly with regard to ensuring availability and organisation of the city transport infrastructure elements [12].
The article is mainly devoted to the impact of proper organisation of the city transport based on the feelings the dwellers of a medium-sized city with regard to their living in that environment. The focus of the article are the factors affecting the extent of using the existing transport infrastructure in the city by its residents but also the expectations and needs of the residents in that regard, as translated into creation of conditions for optimisation and implementation of adequate infrastructure for transportation systems development in their city.

2. TRANSPORT PROBLEMS AND METHODS OF THEIR SOLVING

The fast and dynamic development of cities observed recently and the growing number of residents using transport facilities result in increased demand for moving goods and various loads, and this translates into increased logistic flows within the limited area of the respective city agglomerations or within the very city. The activities undertaken so far with regard to optimisation were rather uncoordinated and chaotic, whereas the attempts of proper organisation and management of the same proved to be particularly difficult for the entities that faced the challenge [7]. In that context, determination of information needs and use of IT systems in organising goods transport in the cities, as well as proper organisation of connection and interfacing of the systems and other city transport elements seems to be one of the major factors to enable solving the growing logistic problems of the cities and overcoming the increasing chaos. That will significantly contribute to bringing the city transport situation to order in accordance with sustainable development principles.

In relation to progressively fast development of urban areas and the growing needs and expectations for ensuring high living standards of the people who permanently or temporarily reside in the cities (inhabitants, entrepreneurs, visitors) make the subject of correct operation of goods transport in the city – understood as commercial collective or individual goods transport organised within the city, both as regards private and public transport, as well as the needs of households (such as the transport and deliveries of goods and other articles within the quickly developing web trade) – is of special importance.

Therefore, implementing solutions that streamline and optimise transport and distribution of any goods and loads within a city is a very important issue [12]. The key role in improving the situation should be played by municipal authorities who are to implement adequate activities within an active goods transport system organisation policy based on the ‘golden mean’ principle, understood as a consensus in respecting the needs reported by various interested parties.

Bearing in mind the role and mission of public transport organisation by municipalities, it must be made precise that the term ‘city transport of goods’ refers to an entity organising the same, i.e. the city instead of to an entity performing the activities or object of such activities, namely the urban organism.

The functioning of a city transport system should comprise solutions respecting the needs reported by all of the interested parties regardless of whether they are private users, namely residents or guests of the city, or institutional, i.e. businesses, enterprises, companies, production plant, commercial organisations or any institutions. In accordance with the concept of city logistics such activities should be implemented such as to optimise the organisation of the flow of people, goods and information and minimise the negative impact of transport on
the surroundings and natural environment. In order to achieve the harmony in organising transport, the logistic transport management in the cities must be based on two principles.

First of all it is necessary to correctly define the problems related to the proper operation of the city transport system, and then – based on the analysis – to make a selection of proper solutions as regards infrastructure and organisation. Secondly, for the achievement of the assumed objectives it is necessary to determine and then provide adequate instruments and tools for the performance of the tasks [8]. These must be tools to enable controlling, monitoring and verification of transport processes in cities. As such, from the operational and technical point of view, they will be a binding element of various platforms of operation with regard to transport organisation. In this context a proper or even essential tool enabling logistic city transport management seem to be transport telematics solutions.

A characteristic feature of city transport is overlapping various types of transport and significant differentiation of needs among various users. This derives from the fact that cities occupying a limited area comprise a multitude of various parties who are the users of city transport, both individual and collective and are a place of concentration of the most important forms of business and social activity, as well as the overlapping forms of daily functioning of the city residents.

A correctly functioning transport system should comprise the conglomerate of dependencies and needs, and with its efficiency enabling an effective performance of passengers and loads transport. Unfortunately, along with the growing demand for transport, congestion problems occur in the cities, consisting in too high transport concentration in a specific area, which exceeds the capacity of the existing infrastructure. This phenomenon is accompanied by unfavourable impact on the environment and confrontation of the needs for various types of transport users, and the fulfilment of the respective needs at the same time within the same limited infrastructure. There appears, therefore, an essential necessity to find system solutions for the transport structure management in the city such as to ensure effective performance of transport tasks combined with simultaneous limitation of the negative impact of the transport activity.

This situation is typical for the rules of logistics organisation, where the utmost objective is to provide the possibly highest level of service with optimal use of the available resources. When combining the two elements, the definition of city logistics must be reminded [8]. City logistics is a logical time and spatial assignment of the flow of various types of transport and intensities of vehicle traffic within a public network, including individual passenger transport, incoming and outgoing goods transport, transit traffic, and the means of collective bus and tram (or in some cases also trolleybus) collective transport, but also formulation of tasks aimed at optimisation of the city system functioning with regard to planning, control and supervision of all economic, environmental, technical and social processes, which are significantly conditioned by traffic and occur within that system [3]. A way for improving people and load transport within cities seems to be implementation of city logistics tools. Application of the existing city logistics tools will enable optimisation of movement by reduction of transport congestion [1].

The definition binding logistic elements with transport management emphasises the role of planning, controlling, optimisation and verification of transport. One of the aforesaid tools playing a special role are transport telematics solutions. This is understood to be a merger of IT, communication and control systems into one organism [5]. Telematic systems are characterised with high degree of flexibility and configuration capacity. Therefore, they may
be applied in organisation of various types of transport in cities, considering the variety of aspects, such as vehicles, infrastructure, organisation principles and transport management. A very important feature of telematics is the possibility of functional combining of the above elements of the transport process. Examples of the introduced telematic solutions confirm the advantages, such as reduction of traffic jams, reduction of negative impact on natural environment, improvement of transport comfort and possibility to extend the offer for the entities using transport process, plus improvement of their economic results. The beneficiary of introducing such solutions are not only the direct participants of the transport process but also the cities which will watch reduced degradation of transport infrastructure and better use of the same.

City logistics definition comprises a broad variety of ideas. Among other things, this refers to purposeful organisation and integration of the flows of goods, materials, people and information within a city agglomeration. The definition comprises also transport accessibility of the city, supply of commercial outlets, supply of water and energy, waste and sewage disposal, construction and maintenance of telecommunications networks and care for natural environment [11].

It must be emphasised that one of the major tasks of modern city logistics is providing adequate organisation of specific and regular transport flows within a city, which have not been coordinated and have been scattered so far. Specifically this refers to simultaneous elimination of errors in steering the flows, elimination or significant reduction of empty transport, limitation of stocks, adjustment to the growing requirements of the customers and ensuring environmental friendliness of the processes. Optimal transport organisation should comprise coordination of incoming and outgoing transport within the very cities [3].

One of the most important tasks of city logistics is coordination of transport flow and merger into one controllable whole of all business entities and institutions using transport and operating within the city, but also management of a network of events in a manner ensuring the required level of life quality and management in the city, with minimum expenditure and in consideration of natural environment requirements [2].

The scope of logistic activities covers also correct organisation of various municipal services provided to business entities and the residents, bearing in mind the maintenance of stable balance between the city space and the transport processes therein. This may be achieved by proper planning, organisation and management [3]. Integration processes exceed the simple chain structures [4]. New cooperation systems originate which pose new challenges to logistics, both as regards flow management but also as regards the flow of people and loads in the city.

3. CONCLUSIONS

Logistic management of a city transport system requires an analysis of all sub-systems as well as planning and implementation of actions focusing on coordination or change of the selected parameters in accordance with the previously assumed strategy. In order to gain and gather information regarding transport characteristics but also for efficient controlling of the processes in accordance with the assumed rules, adequate tools are needed, namely transport telematics systems [9].
The tools, when properly applied, will enable creating a more balanced city transport system, which means a balance between the needs of the residents and the business entities in the city and the level of use of the infrastructure. A very positive aspect of such solutions is their high flexibility and the possibility of gradual extension thereof and creation of more elaborated system adjusted to the needs in city transport systems management appearing along with the development of the cities [10].

A key issue needed for the improvement of the existing situation with regard to efficient management of city transport and improvement of its effectiveness is the necessity of implementing new innovative solutions. In this context it must be emphasised that for the proper operation of telematics solutions and efficiency of the introduced innovative systems for city transport management important is, first of all, organisation of proper flow of data and information, and gathering the same in connection with the possibility of fast access to the dynamically growing and updated resources. Although flow of information, gathering of information, access thereto and the possibility to use it on a current basis have been quite well researched and applied in other sectors of economy, in the area of city transport of goods the gathering of data forming basis for creation of information resources is still a major problem. Unfortunately, the fact contributes to insufficient integration of transport processes and requires determination in continuation of activities aimed at improvement of transport organisation based on the tools provided by modern city transport logistics [6].

References


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