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Milja Simeunović, PhD¹
E-mail: mlekovic@uns.ac.rs

Zoran Papić, PhD¹
E-mail: njele@uns.ac.rs

Milan Simeunović, PhD¹
E-mail: milansim@uns.ac.rs

Nenad Saulić, PhD¹
E-mail: n.saulic@uns.ac.rs

¹ University of Novi Sad, Faculty of Technical Sciences, Trg Dositeja Obradovića 6, 21000
Novi Sad, Serbia

THE CONCEPT OF FORMING INTERMODAL TERMINALS AS AN ESSENTIAL PART OF SUSTAINABLE MOBILITY

Key Words

Intermodality
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Abstract

Passenger intermodality is regulated in various European political documents and it is recognized as a matter of national importance in the policies of individual countries. Intermodality is an integral part of sustainable mobility and its analysis and improvement is vital for congested urban environments. The weakest link in the intermodal passenger transport chain is, most often, the intermodal terminal. Inadequate planning of these terminals leads to a reduction in the level of service, and thus to a reduction in the number of users of the intermodal terminal and their transition to other modes of mobility (most often to private passenger cars). Within this paper, certain factors have been singled out that need to be taken into account when forming intermodal passenger terminals.

1. INTRODUCTION

The conventional approach to building passenger terminals, which has long been present in passenger transport, is increasingly giving way to intermodal terminals. Intermodal passenger transport involves the use of two or more modes of transport during the same journey. Any interchange of passengers, i.e. change of the mode of transport, is the most challenging operation in terminals. The process of changing

the mode of transport is the weakest link in the transport system, so the role of intermodal terminals is extremely important. Passengers, in addition to the economic aspect that is implied, during the planning of their trip, consider the conditions of comfort and travel time. That is way comfort and practicality during changing the mode of transport have become imperative. The goal of the concept of intermodal passenger transport is to make these interchanges as fluid and efficient as possible. The application of this concept will contribute to easier selection travel routes, easy access, a higher level of service, reliability of services and increasing the efficiency of complete passenger transport system.

The formation and construction of intermodal passenger terminals is influenced by numerous factors that need to be taken into account when planning. Within this paper, the basic guidelines that should be taken into account when planning intermodal terminals will be presented.

2. LEGISLATIVE FRAMEWORK

In the past two decades, intermodality has become a very important goal of transport policy in the European Union. Passenger intermodality is included in several European policy documents and more or less in national or regional policies. The concept of passenger intermodality was first mentioned in the „Green Paper on the Citizen's Network“, in the 1995.

The commission, which discussed intermodality within this document, took the position that the European Union must support integrated transport planning, in order to prevent parallel investment in passenger transport. This would prevent unnecessary spending of both financial and physical resources, which could be diverted to other sectors. The commission even offered to coordinate transport services with countries that are not members of the European Union, in order to increase the attractiveness of this way of traveling.

During 2001, the European Union issued a "White Paper", which presented common transport policy of the European Union for the first decade of the XXI century. Within the "White Paper", the main goals of passenger transport were set, which included the development of safe, secure, socially acceptable and environmentally satisfactory transport services. This document identifies the concepts of "integrated tickets", "baggage handling" and "travel continuity", as key priority issues for intermodal passenger transport. Subsequent revisions of the „White Paper“, in 2006, 2009 and 2011, also included passenger intermodality and its integration into the future vision of sustainable transport. In 2006, 4 key points in the further development of intermodality have been defined: increasing mobility, taking care of environment and energy security, technological innovations in the service of intermodal systems related to efficiency and sustainability and international connectivity with countries outside the European Union. In the 2009 White Paper, the European Commission emphasized the need to apply new technologies and integration different modes of transport into a single system, in a more integrated internal market. In 2011, the European Commission highlighted as a priority door-to-door mobility, sharing information about schedule and booking tickets via the Internet, smart and integrated

tickets, etc. In this way, efficiency would be achieved, especially in the field of service quality, which includes defining measures necessary for further integration of different modes of passenger transport and development of framework conditions for promoting the use of intelligent systems for intermodal transport system functionality.

3. INFLUENTIAL FACTORS FOR THE CONSTRUCTION OF INTERMODAL TERMINALS

Most travels are always intermodal. People interchange different modes of transport, practically on all the trips they make. Intermodal terminals simplify the travel process, which is usually certainly intermodal. However, it is not always easy to organize an intermodal terminal. There are various factors that significantly influence their planning and construction. Public budgets of cities and the state in general are limited to finance public transport. Even when long-term positive financial and many other aspects are taken into account, detailed research and planning is necessary. Figure 1 shows some of the more important factors that need to be considered before forming an intermodal terminal. The listed factors are covered in five steps.

First of all, it is necessary to know the legislation, both at the national and European level, all depending on transport lines you want to organize. The member states of the European Union have similar laws but the specifics of each region, as well as its legislative framework, must be taken into account. Therefore, all legislative acts in this area are highlighted, which are necessary to guarantee cooperation and integration of transport services. It is very important to know the relations with countries that are not members of the European Union, because it is necessary to include existing agreements if certain lines cross their territory.

The main participants involved in intermodal passenger transport are certainly passengers and carriers of different modes of transport. Consequently, the main actors can include airports, bus terminals, railway terminals, passenger ports and etc. All of the above makes a unique system during intermodality transport planning, depending on the availability and development of certain modes of transport in the observed area. Secondary participants appearing in the passenger intermodality system are travel agencies, city authorities and society as a whole, as well as many other intermediary agencies. Each of the participants in intermodal passenger transport has certain positive expectations and requirements in relation to the system and which they believe will be realized.

Quality of service, travel time and transportation costs are generally the most important for passengers. At the same time, there are different categories of passengers, because e.g. travelers who make business trips are the most sensitive to travel time, while some other categories of passengers prioritize travel prices. It is important for passengers to be well informed about the possibilities provided by intermodal transport, both before entering the system and in the terminals, when changing from one mode to another. If all the advantages are well used - lower transport costs compared to conventional transport, shorter travel time, which means the integration of schedules of different modes, tariff integration, which means that

one ticket valid for all modes, etc. then passengers will be motivated for intermodal travels and the simultaneous use of intermodal terminals.

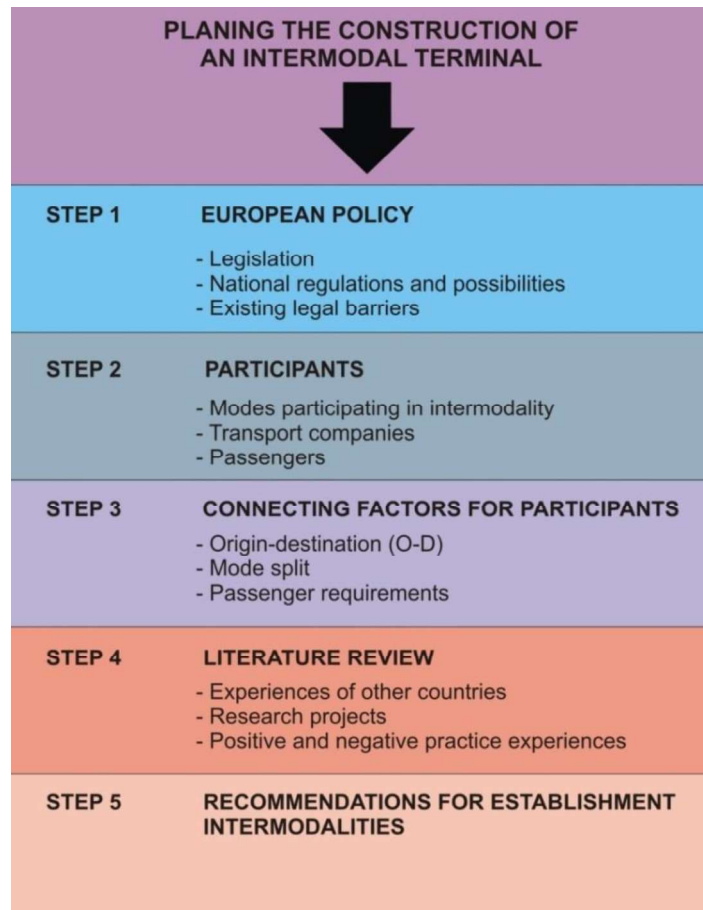


Figure 1. Planning steps for construction of intermodal terminals

Each region is specific in the number of modes that can be included in intermodal transport. In some areas there are physical restrictions. There are no navigable rivers to develop port transport, nor e.g. there are potentials for the construction of the airport, due to the impossibility of filling the transport capacities. Thus, both, different modes of transport used in a given area and which can be included in the intermodality system and size of the city are important during the establishment of modality. In smaller places there is no need for intermodal terminals because they have, for example, bus transport, taxi transport, transport by private passenger cars and bicycle transport. For these reasons, it is very important to make a comprehensive analysis that will determine the justification for the construction of intermodal terminals.

The inclusion of certain modes in intermodal passenger transport would bring many benefits to the participants. By entering the global transport network, carriers are motivated to work on improving their infrastructure in order to increase their market share. Generally speaking, each mode of transport can find its place in intermodality. Planning the construction of a passenger terminal and the choice of modes of transport that will be included in the system are inevitably accompanied by certain research. Researches gives data relevant to the establishment of the system. It is necessary to analyze the population of a particular area. Surveys are used to determine the needs of the population for the use of transport in general. In this way, the share of existing modes of transport in the mobility of the population is considered. The origin-destination trips, the frequency of trips, the readiness to accept the intermodal system, the expectations and requirements are examined. Passengers are the most important for the successful functioning of the system, so it is necessary to devote the most attention to passengers as participants in intermodality. During the construction of an intermodal terminal, the geographical position and mutual distance of already existing terminals should be analyzed. If two terminals of different modes of transport are quite far from each other, additional analyzes will be needed. This can require more funding. When a terminal is built from the ground up, its future impact on the existing public transport network as well as on the environment should be determined. It is also necessary to take into account the ecological aspect, the existing infrastructure, the function of the surrounding facilities, etc. If two terminals of different modes of transport are in the immediate vicinity the conversion of one of them into an intermodal terminal is performed. Finally, the economic gain in the future should be considered, after terminal's inclusion in the public transport system.

Certainly, there are many good examples of passenger intermodal terminals in the world that function successfully and whose experiences can be valuable. As intermodality is becoming increasingly important, both in Europe and around the world, many institutions are also funding projects related to passenger intermodality. All projects result in certain conclusions and recommendations, which are based on researches and results of these studies. It can be an additional support in the formation and construction of passenger intermodal terminals.

4. CONCLUSION

Although the European Union has recognized intermodality in passenger transport as a system that would improve and facilitate travels, and at the same time bring numerous benefits to carriers, various challenges and problems make their efficient functioning difficult. Barriers appear in various fields, such as the policies of individual regions and countries in general, planning and organizing terminals and the entire system, coordination and cooperation, legal issues, financing, technical issues and many other aspects that need to be considered. One of the problems may even be language, since intermodality is conceived at the interstate level. Therefore, it often takes a long time to take the first steps towards intermodality, which would be widely accepted by transport users. This is the reason why in many less developed areas, instead of integrated passenger transport in urban areas,

there is mutual competition and competition of different modes of transport, which have led to a segmented transport system. In order to overcome this problem, it is necessary to create a unique strategy for the establishment of intermodal transport and, accordingly, intermodal terminals, as important links in this system.

The mutual exchange of experiences of individual countries should contribute to greater support for transport networks of European cities and urban areas and increase the intermodality of different modes of transport. Creating an efficient transport network is necessary to form space for maximum use and to promote public transport in order to reduce travel by passenger cars.

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