

THE ROLE OF RAILWAY IN THE EUROPEAN TRANSPORT POLICY

ULOGA ŽELEZNICE U EVROPSKOJ SAOBRAĆAJNOJ POLITICI



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SUMMARY

A modern transport system must be sustainable from an economic, social and environmental viewpoint. A framework for development of European transport system is defined through the common transportation policy, which is based on regulated competition, multi-modal transportation, the reduction of congestion points in traffic systems, environmental protection, and energy efficiency. This paper analyzes the basis and guidelines for the development of the railway in accordance with the common transportation policy by 2050.

Key words: *European transport system, common transportation policy, modes of transportation, multi-modal transportation, railway.*

REZIME

Savremeni transportni sistem mora biti održiva forma sa ekonomskog, socijalnog i ekološkog stanovišta. Okvir za razvoj evropskog transportnog sistema je definisan saobraćajnom politikom Evropske Unije, koja je zasnovana na regulisanoj konkurenciji, multi-modalnom transportu, redukovanju uskih grla u saobraćajnim sistemima, zaštiti životne sredine i energetske efikasnosti. Ovaj rad analizira osnove i smernice za razvoj železnice u skladu sa saobraćajnom politikom Evropske Unije do 2050. godine.

Ključne reči: *Evropski transportni sistem, saobraćajna politika Evropske Unije, vidovi transporta, multi-modalni transport, železnica.*

1. INTRODUCTION

Despite the obvious environmental advantages there can be noted a lack of competitiveness of rail transport. An indication of the decline in rail transport is that many kilometers of railway lines have been closed each year in Europe, while at the same time the motorway network was increasing. Of the thousands of kilometres of lines which have been closed to traffic, or even dismantled, there are branches and lines which today would have been extremely useful for coping with saturation on parts of the rail network.

Global deterioration of the existing railway infrastructure, congestion on the main road and rail routes, in towns, and at airports, unequal growth in the different modes of transport, harmful effects on the environment and public health and heavy toll of road accidents are the reason for development of the common transport policy in the European Union.

At the beginning of the 21st century, the European Union defined a common transportation policy in [12]

and [7]. This policy is based on regulated competition and connecting various modes of transportation, the reduction of congestion points in traffic systems and multi-modal transportation.

With an increasing and more obvious pollution problem, growing ecological awareness and implementation of specific laws to protect the environment, advantages of rail systems became transparent. The rail system, as a system with high capacity, the least air and water pollution, solvable noise and vibration emission problem and the least space usage, might be competitive with other modes of transportation.

Railways of Serbia are a part of the European railway network. Two European traffic corridors pass through Serbia: the Danube Corridor VII and the road-railway Corridor X (Figure 1).

The European Union has enacted various legislative measures aimed at achieving the opening up, integration and harmonization of national railways to form a European railway network. Harmonization of the national railway legislation with the “*acquis communautaire*” on safety and interoperability is of a special importance for integration of the Serbian railway systems. Therefore, the

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Figure 1. The section of Corridor X and Danube Corridor VII that pass through Serbia
 Slika 1. Deo Koridora X i VII koji prolaze kroz Srbiju

development of transport in Serbia is planned within the framework of European policy.

This paper deals with the recommendations of European transport policy in the field of railway transport. The aim is to present a European framework for planning of rail transport.

2. THE DEVELOPMENT OF A SINGLE TRAFFIC AREA

A precondition for the implementation of a unified European transport policy is to establish an integrated traffic area and a legal framework for the implementation of European legal and technical regulations.

The Trans-European Networks (TEN) were created by the European Union by Articles 154-156 of the Treaty of Rome (the treaty establishing the European Economic Community, 1957), with the stated goals of the creation of an internal market and the reinforcement of economic and social cohesion. Three

classes of network were defined by the treaty: Trans-European transport networks (TEN-T), Trans-European Energy Network (TEN-E or TEN-Energy) and Trans-European telecommunications network (eTEN). The construction of Trans-European Networks was also seen as an important element for economic growth and the creation of employment.

Also, the TEN-T networks are part of a wider system of Trans-European Networks (TENs). Basic requirements for a big EU market, with freedom of movement within it for goods, persons and services, are modern and efficient infrastructure, without stopping at national borders. Therefore, the Trans-European transport network (TEN-T) plays a crucial role in the free movement of passengers and goods in the European Union. It includes all modes of transport. By 2020, TEN-T will include 89,500 km of roads and 94,000 km of railways (including around 20,000 km of high-speed rail lines suitable for speeds of at least 200 km/h), the inland waterway system will amount to 11,250 km (including 210 inland ports, whilst there are a further 294 seaports) and some 366 airports [9]. Figure 2 shows the railway network development plan to 2020.

The Pan-European transport (PAN-T) network complements the European traffic area. The nine Pan-European transport corridors were defined at the second Pan-European transport Conference in Crete in 1994. Besides, the tenth corridor was proposed and defined at the third conference in Helsinki in 1997, after the end of hostilities between the states of the former Yugoslavia. Also, these ten corridors include road, rail and waterway routes. Figure 3 shows all ten corridors of PAN-T network.

Unfortunately, current rail transport in Europe is characterised by its diversity. For example, differences



Figure 2. Trans-European transport network [11]
 Slika 2. Trans-evropska saobraćajna mreža [11]



Figure 3. Ten corridors of Pan-European transport network
Slika 3. Deset koridora Pan-evropske saobraćajne mreže

between track gauges, electrification systems and signalling systems generate barriers to railway systems. Performance levels, safety, quality of service and cost depend upon such compatibility and interconnection, as does, in particular, the interoperability of the European rail system. Harmonized characteristics of the infrastructure and rolling stock, as well as the efficient interconnection of information and communication systems of different railway administrations and operators should provide an undisturbed and efficient traffic on the European railway. Therefore, the creation of an integrated European railway system requires interoperability or technical compatibility of infrastructure, rolling stock, signalling and other rail systems, as well as less complex procedures for approving rolling stock for use across the European rail network and wider. The interoperability is a state of unity or connectivity, and functional harmonization of mutually conditioned parts of the rail system. Consequently, in January 2007 the European Commission outlined a policy for closer integration of the EU transport system with that of neighbouring countries, including measures to promote interoperability. In this way, the European transport network integrate countries that are not EU members. The objectives of this

policy are connecting to neighbouring markets and opening up national freight and passenger markets to cross-border competition.

3. COMMON TRANSPORT POLICY AS AN OPPORTUNITY FOR RAIL TRANSPORT

The objectives of the European Union transport policies include the creation of the European multi-modal transportation network and shift of freight transport to rail and waterborne transport. Transfer from road to rail transport is a declared goal of both the European Union and governments of many European countries. Governments support low rail rates through operating subsidies in order to reach this goal. The transfer is mainly motivated by increased ecological awareness, but also by increasing fuel price [17]. The race for sustainable transport became a global phenomenon.

The European Union define a common transport policy in its documents entitled EU White Paper. This policy provides a new opportunity for the development of rail transport.

3.1. Common transport policy

A global approach to the construction of a Community framework for sustainable mobility was established in the document White Paper 1992. This document highlights the need to create efficient transportation which is based on the properly functioning internal market, the development of trans-European transport network, and the possibilities offered by the best available technologies. Citizens and enterprises should have access to modes of mobility corresponding as closely as possible in quality and performance to their needs and expectations. Access to these facilities should be at a reasonable cost consistent with their long-term maintenance and development. At the same time transport services must be safe and must contribute to the protection of the environment. The realization of these objectives implies that all transport users should pay the full costs (internal and external) of the transport services that they consume. Internalization of external costs is a major element of a transport policy integrating the protection of the environment [6]. The document [6] gave the basis for transport market opening.

In 2001, European Commission has published “European Transport Policy for 2010: Time to decide” [7]. This transport policy is based on regulated competition between modes. This means that the growth in road and air traffic must be brought under control and rail and other environmentally friendly modes must be given the means to become competitive alternatives.

Almost two centuries after the first train ran, the railways are still modes of transport with major potential.

Unfortunately, the main characteristic of present railways is a mixture of ancient and modern infrastructure. Also, a level of related services is lagging behind the requirements of modern transport.

In 2001, the International Union of Railways (UIR), the Community of European Railways (CER), the International Union of Public Transport (IUPT) and the Union of European Railway Industries (UNIFE), the rail stakeholders have agreed to achieve the following objectives by 2020: for rail to increase its market share of passenger traffic from 6% to 10% and share of goods traffic from 8% to 15%, a trebling of manpower productivity on the railways, a 50% gain in energy efficiency, a 50% reduction in emissions of pollutants, and an increase in infrastructure capacity commensurate with traffic targets.

The main obstacles to the realization of stated objectives are the lack of infrastructure suitable for modern transport and of interoperability between networks (geographical fragmentation of the networks) and systems, the constant search for innovative manufacturing technologies, the non-transparency of costs, and the patchy productivity and shaky reliability of the service, which is failing to meet customers' legitimate expectations.

The foundation stone for an integrating rail transport into the internal market has been laid by the EU Directive 91/440 [1]. This Directive sets out a framework and requirements for railways in the EU to allow open access operations on railway lines by companies other than those that own the rail infrastructure.

The safety statistics show that rail has always been far safer than road. The ratio of deaths in traffic accidents on the railways and road transport is 1:100, and the ratio of injured people is 1:3500. Consequently, interoperability must guarantee a level of safety at least equal or higher than that achieved today in the national context [7,13]. In that sense, Directives [2-5] list safety amongst the essential requirements for operation of the trans-European railway system. In addition, that is why an independent body (that investigates any accidents or incidents on the network and makes appropriate recommendations to reduce the risks) is introduced.

European transport policy for the period up to 2050 was promoted in [12]. This text is continuation and development of the policy that was established in [11]. Once again White Paper [12] promotes the single European transport area and a competitive and resource efficient transport system as well as reduction of greenhouse gas (GHG) emissions from transport. White Paper [12] optimises each mode, integrates modes for a seamless transport and promotes modal shift. This European document lists ten goals for a competitive and resource efficient transport system needed by 2050. The first two objectives are related to developing and deploying new and sustainable fuels and propulsion systems:

- Halve the use of 'conventionally-fuelled' cars in urban transport by 2030; phase them out in cities by 2050; achieve essentially CO₂-free city logistics in major urban centers by 2030.

- Low-carbon sustainable fuels in aviation to reach 40% by 2050; also by 2050 reduce EU CO₂ emissions from maritime bunker fuels by 40% (if feasible 50%).

The following four objectives are related to rail transport and include optimising the performance of multimodal logistic chains, including making greater use of more energy-efficient modes:

- 30% of road freight over 300 km should shift to other modes such as rail or waterborne transport by 2030, and more than 50% by 2050, facilitated by efficient and green freight corridors. To meet this goal will also require appropriate infrastructure to be developed.

- By 2050, complete a European high-speed rail network. Triple the length of the existing high-speed rail network by 2030 and maintain a dense railway network in all Member States. By 2050 the majority of medium-distance passenger transport should go by rail.

- A fully functional and EU-wide multimodal TEN-T 'core network' by 2030, with a high quality and capacity network by 2050 and a corresponding set of information services.

- By 2050, connect all core network airports to the rail network, preferably high-speed; ensure that all core seaports are sufficiently connected to the rail freight and, where possible, inland waterway system.

The last four objectives include increasing the efficiency of transport and of infrastructure use with information systems and market-based incentives:

- Deployment of the modernised air traffic management infrastructure (SESAR12) in Europe by 2020 and completion of the European Common Aviation Area. Deployment of equivalent land and waterborne transport management systems (ERTMS – The European Rail Traffic Management System is a project supported by the European Union and its aim is to implement a uniform system of signaling, to provide interoperability of the railways, which is the free movement of trains on the national railway networks without having to stop at the border and exchange locomotives or drivers). Deployment of the European Global Navigation Satellite System (Galileo).

- By 2020, establish the framework for a European multimodal transport information, management and payment system.

- By 2050, move close to zero fatalities in road transport. In line with this goal, the EU aims at halving road casualties by 2020. Make sure that the EU is a world leader in safety and security of transport in all modes of transport.

- Move towards full application of "user pays" and "polluter pays" principles and private sector engagement to eliminate distortions, including harmful subsidies, generate revenues and ensure financing for future transport investments.

3.2. Rail transport within the scope of European policy

Modern European railways operate under conditions of regulated competition and with connections to other modes of transportation (Figure 4). The objective

is to eliminate all barriers between transportation modes and national rail systems, to facilitate the process of integration and thus to create a single European transportation system. Harmonization of the legal and technical regulations in the field of railways is one of the preconditions for creating a single European transportation space. Figure 5 shows an example of the process of harmonization of the accessibility standards in the Republic of Serbia with EU standards for railway transport.

For a successful economic functioning in the field of railway passenger transportation, it is necessary to consider the requirements of the users. Placing users in the focus of transportation policy enables the realization of transport in accordance with human needs. It is a contemporary approach in the design of a railway infrastructure and organization of services, which equally encompass-

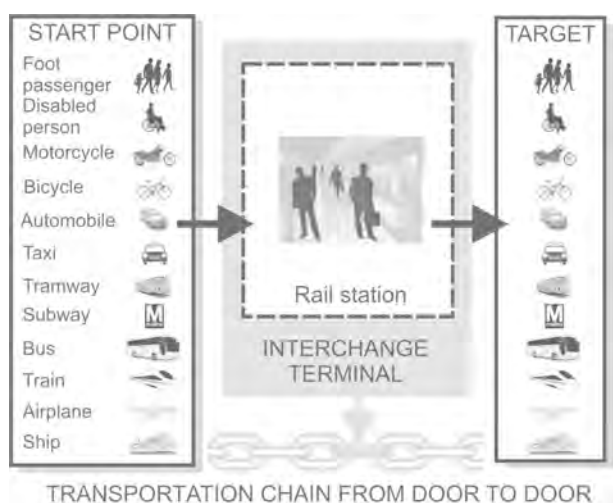


Figure 4. Connections of the railway station to other modes of transportation [16]

Slika 4. Povezivanje železničke stanice sa drugim vidovima saobraćaja [16]



Figure 5 Harmonization of the accessibility standards of the Republic of Serbia [16]

Slika 5. Harmonizacija standarda pristupačnosti u Republici Srbiji [16]

es all categories of passengers: children, adults and the elderly, including people with visual, hearing, stature, mobility or intellectual impairment [8,10]. At the same, the application of such technical solutions for the equal participation of people with reduced mobility, the blind and the visually impaired, people with hearing impairment and the deaf should simplify and make the participation in railway transport easier for all the categories of passengers, especially those with heavy or bulky luggage, people with children, foreigners and others. However, the age structure of the population should correspond to the structure of passengers. Figure 6 shows the age structure of the population in Serbia (according to data from the statistical office of the Republic of Serbia) and expected structure of rail passengers. The transportation needs of people with reduced mobility are directed to different modes of transportation. In that respect, an appropriate infrastructure and new services provided by the railway should be defined, in order to be competitive within the transportation market. It should be born in mind that offered infrastructure and services shape the mobility of the population. For example, Figure 7 shows adapted rail infrastructure for access for the disabled in wheelchairs. In general, it is necessary for all passengers to provide adequate infrastructure and related services and to ensure a connection on the other modes of transport in rail station.

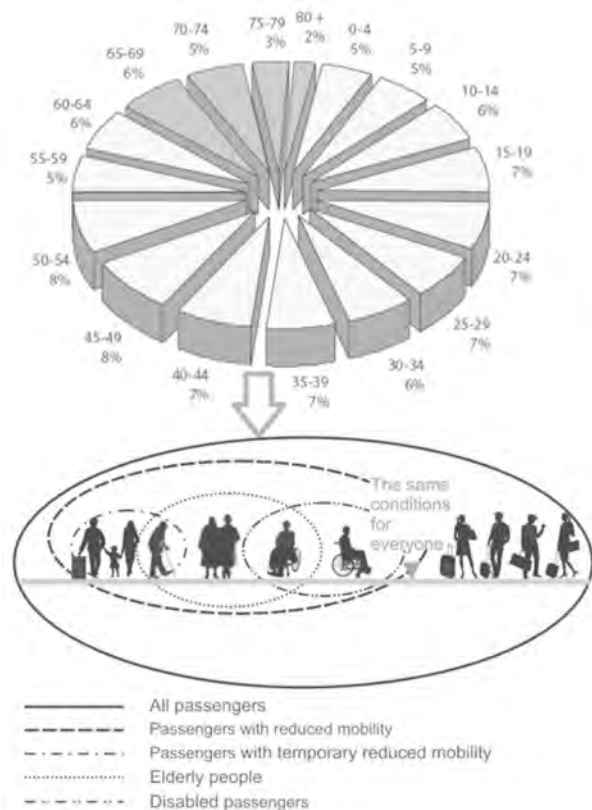


Figure 6. Age structure of the population in Serbia and structure of passengers [16]

Slika 6. Starosna struktura stanovništva u Srbiji i struktura putnika [16]

In addition, development and application of telematic (interconnection of seat reservation systems, real-time information systems) contribute to the competitiveness of the rail sector.

Further, necessary infrastructure measures for efficient passenger transportation are separation of the passenger and freight subsystem in the major railway junctions and solution for the spatial position of the passenger railway subsystems in relation to the urban environment and other traffic infrastructure. Also, passenger pass-through stations type must be located in the intersection of passenger flows in the important transportation junctions and included in a multi-modal traffic interchange. It is especially important to connect the main railway passenger terminals with airports. Nevertheless, railway stations must be integrated into the urban matrix and the architecture of the town. Stations must provide good comfort in terms of orientation, the presence of plenty of daylight and barrier-free access to all station contents for passengers with reduced mobility.

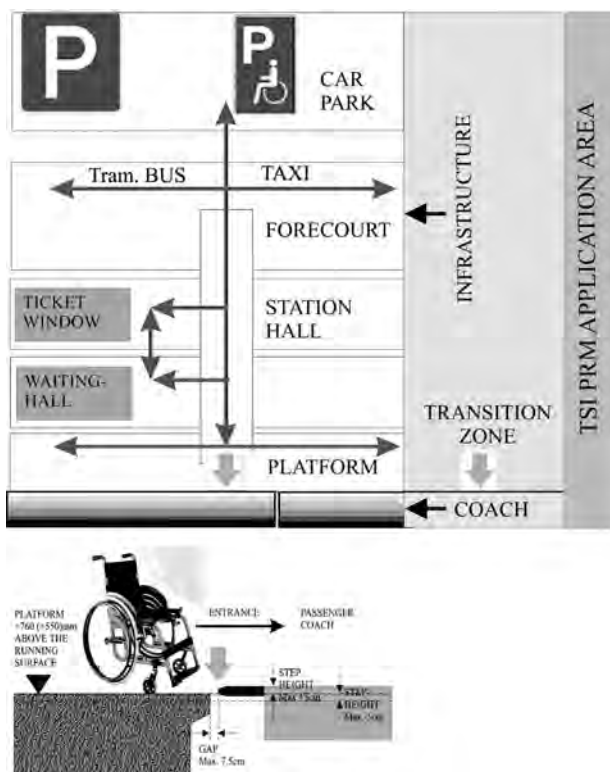


Figure 7. Rail infrastructure for access for the disabled in wheelchairs [16]

Slika 7. Železnička infrastruktura za pristup putnika u invalidskim kolicima [16]

On the other hand, transport policy objective of the necessary modal shift to rail will lead to the tripling of rail freight and increasing the noise level (rolling noise in wheel-rail interaction receives the biggest importance) by 5 dB (A) by 2020 (Figure 8).

Between a freight car and a modern double-decker cars of an intercity train there is a difference of almost 20 dB (A). This is the same difference as between a taste-

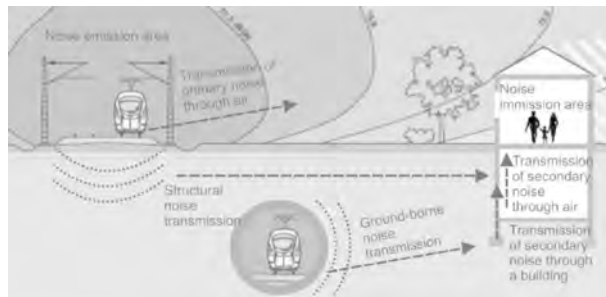


Figure 8. The principle of railway noise transmission to the surrounding objects

Slika 8. Princip prenošenja buke od železničkog saobraćaja na okolne objekte

ful chamber music and a wild rock concert. Increased freight rail traffic implies an increase of traffic load and axle load, progressive track geometry deterioration and increased pollution of the environment. It demands an appropriate infrastructure capacity, an adequate organization of rail transport (for example, transport of goods by night), a coordinate maintenance of vehicles and infrastructure, and solution of increased pollution of the environment. The increasing splitting of the responsibilities of the Car owner, Operator, Maintenance and Infrastructure complicates dealing with listed problems.

The creation of the European multi-modal transportation network and shift of freight transport to rail requires substantial financial investments. In the current complicated economic situation, national budgets are insufficient to fund such projects and European countries are looking for new financing instruments.

4. CONCLUSION

Mobility is vital to the economy and quality of life around the world. Therefore, the traffic has global importance and for its effectiveness a strong international cooperation is required. In light of the new challenges for modern society it is necessary to plan a sustainable transport development. Basis for sustainable development of the European transport system are international traffic area, environmental protection and energy efficiency.

Further, a modern railway infrastructure must provide equal conditions for all passengers: children, adults and the elderly. It must provide safe and simple use regardless of a potential visual, hearing, stature, mobility or intellectual impairment [14-15].

The countries that were signatories of the Protocol adopted in Kyoto on December 12th, 1997 committed to reduce the emission of harmful gases. Achieving the target of the reduction of emission of harmful gases requires the reduction of the influence of transport on the environment and re-establishing the balance between different modes of transport. Thus the relative competitiveness of railway transport compared to other modes of transport becomes quite significant (European Commission, 2011).

European traffic policy expects a tripling of freight transport on rail by 2020, which will affect on reduction

of air pollution and increase of road traffic safety (European Commission, 2011). By the assessments, consequences of this policy will be increase of noise from railway traffic by 5 dB(A).

Control of traffic noise has very significant part in the traffic policy of the EU. An increase of noise will significantly reduce the quality of life of citizens. Enhanced noise firstly causes uneasiness, then irritability, tendency towards depression, insomnia, digestive problems, even cardio-vascular disease and deafness. That's why utilizing methodical measures for noise reduction is expected from the railway.

Above mentioned principles are included in common transportation policy. Community framework for sustainable, efficient and ecologically acceptable mobility needed by 2050 was established in the document White Paper: Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system. This European document [12] lists ten goals for a competitive and resource efficient transport system. Railway receives a significant place and role in multimodal transportation chains due to transport potential, energy efficiency, engaged space, safety, and obvious environmental advantages.

Railways of Serbia are a part of the European railway network and their development must be in line with the European transport policy. Good position of Serbian railways in the European rail network is a necessary but insufficient precondition for the successful functioning of rail transport and meeting the requirements of interoperability. For that reason, the Railway Directorate has been formed in accordance with the Railway Act in 2005. One of the tasks for the Directorate is drafting technical regulations and standards in railway transport, as well as suggesting the measures to harmonize and increase the level of interoperability and modernization of the railway. Unfortunately, the process of harmonization of the legal and technical regulations is conducted slowly. Harmonization of regulations is a process that must include education of professionals for railway infrastructure and rolling stock in the area of actual application of regulations on railway. This is a necessary condition for the realization of the idea of interoperability of railway systems across Europe and beyond. The Serbian Railways needs a strategic development plan, project implementation and investors to help the network upgrade. Otherwise, Serbia will stay outside the European transport flows.

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