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INTEGRATION OF THE RAILWAY LINE IN CORRIDOR Vb IN THE TRAFFIC SYSTEM OF CROATIA AND EUROPE

ABSTRACT

Significant and generally well-known advantages of railways compared to other transport branches, considered in the framework of the traffic development of Croatia and the wider environment, put an emphasis on the significance of high-quality railway connections in the Pan-European Vb corridor. In order to raise the quality of the traffic services on this railway route to the level that is required by the contemporary European criteria, it needs to be modernized. This would at the same time contribute to the integration into the overall European traffic system.

The paper presents the possibilities of improving the mentioned railway connecting of the Adriatic coast with other parts of Croatia and Europe. Special significance belongs to the Rijeka-Zagreb-Botovo (Hungary) railway line. Significant improvement of the railway traffic in this area would be achieved by constructing a new railway line from Rijeka to Trieste, which is the logical extension of the Pan-European Vb corridor. The construction of a railway line in the Adriatic-Ionian corridor along the Adriatic coast from Trieste to Dubrovnik and further towards the border would contribute to better connecting of all the regions, cities and ports which it would pass through and it would have a positive impact on the overall economic development of the Republic of Croatia. Regarding the interests and requirements of the international traffic, the Adriatic railway line would present the shortest way of connecting the North-west Europe with the South of Europe and the Near East. The level of service quality expected on the new line would contribute to greater attraction of cargo and passengers to the tourist, port and other capacities in Croatia.

KEY WORDS

Pan-European Vb corridor, Croatia, railway integration, Adriatic railways

1. INTRODUCTION

A network of high-speed railway lines is being developed and formed in Europe, consisting of railway lines of the European countries which form a free market. On this market Croatia is becoming a factor and participant in the market relations and thus it will create interdependence of market categories and influence them. This will result in the changes on the international transportation market that will refer to the passenger and cargo flows. This particularly refers to determining the networks of the Croatian high-speed railway lines in order to connect her economy with the European economy. Since the economic significance of a traffic route results from its gravitation environment, the emphasis is on the corridors through which these railway lines need to pass.

The construction of high-speed European railway lines is the precondition of every other cooperation. The European integration without modern organized traffic system has no success, since without transport market the single European market would not function. Therefore, a modern traffic system is the condition for the integration into Europe. It enables and improves communication of cargo and passenger flows in the European region. For Croatia, the transversal corridors connecting the Adriatic and the Danube basin and the longitudinal Adriatic corridor are becoming especially significant.

The significance of a traffic route in a corridor is considered regarding its narrow, wider and widest gravitation area. Narrower regions are districts passed by the traffic routes. Since it is a high-speed railway line, the wider gravitation area is the state territory. In the widest sense, the transport flows that will gravitate to the Pan-European corridor Vb will be those of Central and Eastern Europe, Austria, Hungary, the Czech Republic, Slovakia, as well as countries outside this area that will be oriented to the Croatian ports in the world exchange of goods and services.

Considering the network of Mediterranean railway lines the emphasis is on the railway lines along the sea coast. Since such railway lines supplement also the tourist offer, Croatia needs a high-speed Adriatic railway line from Trieste via Rijeka to Zadar, Šibenik, Split and Dubrovnik (the Adriatic-Ionian initiative). The construction of high-speed railway lines in the Pan-European Vb corridor and the Adriatic coast would supplement the railway line network of Croatia.

After the construction of the Vukovar-Šamac canal in Croatia, together with the river traffic in Sisak (Zagreb), a connection would be enabled between the sea and river navigation. In such qualitatively new conditions, the combined path in the Adriatic-Danube basin corridor would be the counterpart to the north-west combination from Rotterdam, along the Rein-Main-Danube canal and river traffic to the central part of Europe.

2. CHARACTERISTICS OF PAN-EUROPEAN CORRIDOR Vb

The concept of the Pan-European traffic corridors and the Pan-European traffic areas has been developed in order to help the countries, EU accession candidates, to establish the bases of the future infrastructure that will stimulate trade among the states and thus expand the cargo flows, enable easier throughput of traffic means and eventually improve the social relationships among peoples.

The transition countries through which the corridor passes are faced by the requirements for modernization of the traffic infrastructure. Such requirements demand greater exchange of goods, as consequence of the market openness and the requirement to harmonize the legislation with the legislation of the European Union.

Branch B of the fifth Pan-European corridor starts in Rijeka (Croatia) and continues via Zagreb (Croatia) to Budapest (Hungary) (Figure 1) [1]. In this corridor, the ports (Rijeka, Koper and Trieste) and the surface terminals, as the main intermodal nodes, occupy the most important place. These points might in the future represent the main origin areas for the distribution of goods towards south-eastern Europe.

3. IMPACT AND SIGNIFICANCE OF RAILWAY LINES IN THE WIDER GRAVITATION AREA

Considering the railway routes in the EU environment it is clear that there has to be a high-quality railway connection with the Near East, the Adriatic and its member Greece. In this context corridor Vb receives its full significance.

Diverting of traffic flows of Europe is the strategic interest of all the European countries regarding the load on the traffic routes going to the North-sea ports. The majority of the West-European countries has started the revitalization and modernization of railways that should take over the biggest volumes of cargo for overseas countries and from them.

The insufficient construction level of road and railway infrastructure in Central Europe makes it difficult to reroute the traffic flows towards the Adriatic, which is in the interest of Croatia, Italy and Slovenia.

Within numerous European organizations and associations the projects are being developed and the road and railway routes modernized and constructed. The cooperation in the field of traffic is oriented mostly through the network of traffic corridors that pass over the territory of Central Europe. Certain corridors have parallel branches or the corridors themselves are interconnected. Since these corridors pass through different countries of the region, these have become mutually competitive.

Since the activities in certain corridors have not been harmonized (or not sufficiently) in the national development programs of traffic infrastructure of the countries through which they pass, this requires harmonization of the national development programs of traffic infrastructure and the concentration of the means at selected priority routes.

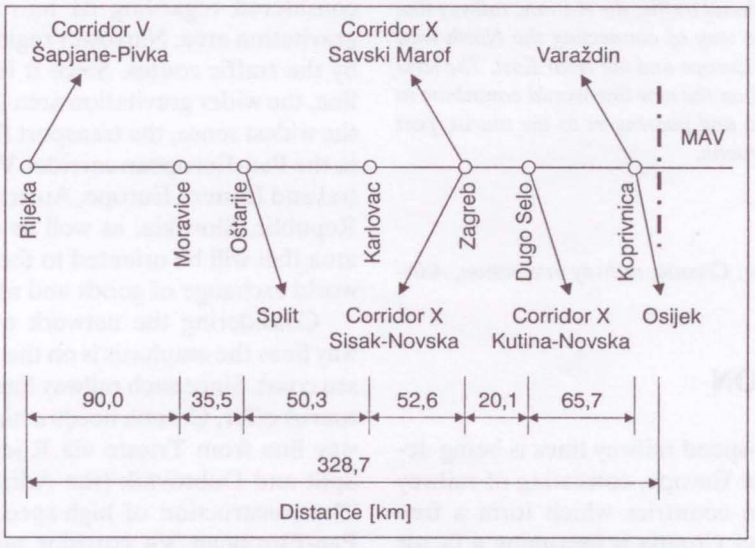

Figure 1 – Schematic presentation of Corridor V branch B in Croatia

4. ADRIATIC-IONIAN RAILWAY LINE

The Pan-European regions have been defined at the 1997 Helsinki Conference on Transport, with the intention of enabling the countries encompassed by this region to work on a joint development plan of the traffic infrastructure. Thus, the area of the Adriatic and the Ionian Sea has been defined. The Adriatic-Ionian area comprises the following countries: Italy, Slovenia, Croatia, Bosnia and Herzegovina, Serbia and Montenegro, Albania and Greece.

Within the Pact of Stability it is possible to open a new Adriatic-Ionian corridor along the Adriatic coast. In the same traffic corridor it is possible to construct a new railway line that would pass along the Adriatic coast. This so-called "Adriatic-Ionian line" would connect Trieste via Koper, Rijeka, Split (Šibenik and Zadar) with Dubrovnik and would continue further via Albania to Greece (Figure 2) [1]. This railway line would provide a very favourable railway connection of Central and West Europe with the southern part of Europe.

The railway connection can be divided into two sections:

- Rijeka-state border (Koper-Trieste),
- Rijeka-Split-Dubrovnik-state border.

4.1. Rijeka-state border (Koper – Trieste) railway line

The construction of a railway line from Rijeka to Trieste represents a logical extension of the Pan-European Vb corridor. The connection of Rijeka towards Istria and Trieste has not been precisely defined yet. The railway line has been studied until now in several variants. The suggested variants are through the tunnel "Učka" and the tunnel "Ćićarija".

The study of the possible variants, in the new conditions, focuses on the orientation to select the variant through the tunnel "Učka" in the length of 12,030 m (Figure 3). [2].

The variant through "Ćićarija" is directed towards the north of Istria (Jurdani, Lupoglav), whereas the main railway users (Raša, Pula, Pazin) are located in the South of Istria.

The route through the "Učka" variant in comparison to the "Ćićarija" variant is more favourable since it shortens the railway connection from Rijeka to Is-

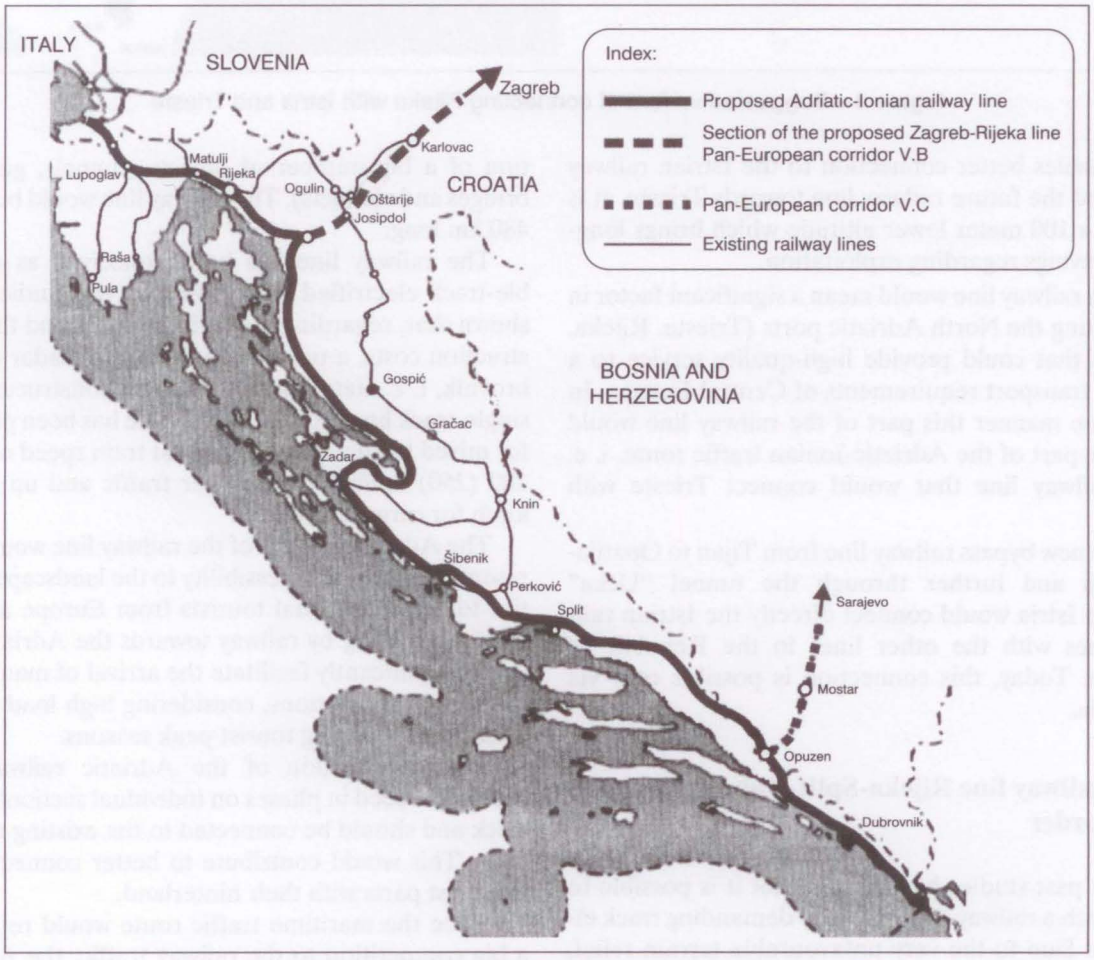

Figure 2 – Suggested Adriatic-Ionian railway line

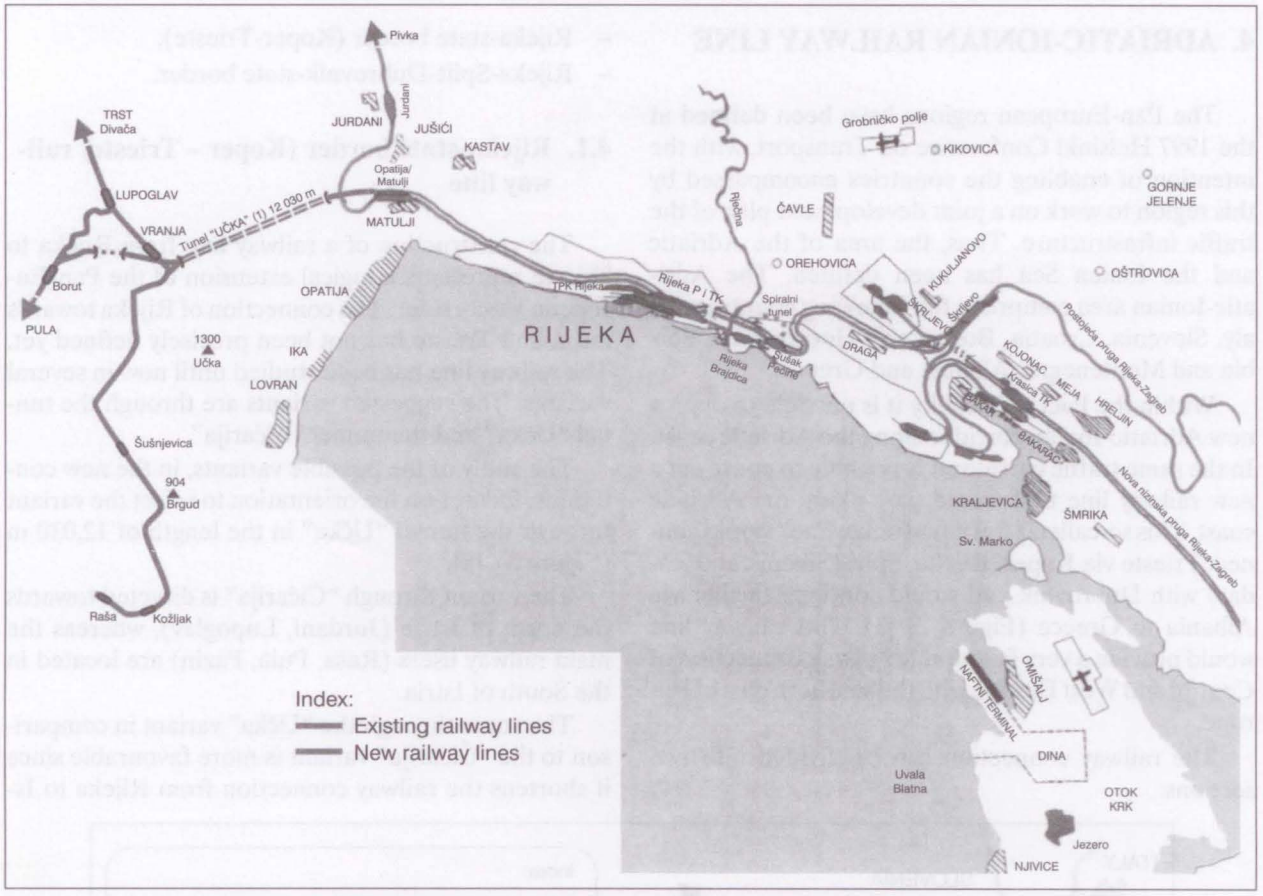

Figure 3 – Suggested variant of connecting Rijeka with Istria and Trieste

tria, enables better connection to the Istrian railway lines and the future railway line towards Trieste. It is also at a 100 meter lower altitude which brings long--term savings regarding exploitation.

This railway line would mean a significant factor in connecting the North Adriatic ports (Trieste, Rijeka, Koper) that could provide high-quality service to a part of transport requirements of Central Europe. In the same manner this part of the railway line would become part of the Adriatic-Ionian traffic route, i. e. new railway line that would connect Trieste with Solun.

The new bypass railway line from Tijan to Opatija--Matulji and further through the tunnel "Učka" towards Istria would connect directly the Istrian railway lines with the other lines in the Republic of Croatia. Today, this connection is possible only via Slovenia.

4.2. Railway line Rijeka-Split-Dubrovnik-state border

The past studies have shown that it is possible to trace such a railway line with very demanding track elements. Due to the very unfavourable terrain relief, the construction of such a line would require construction of a big number of objects (tunnels, galleries, bridges and viaducts). The railway line would be about 480 km long.

The railway line has been conceived as a double-track electrified line. However, the studies have shown that, regarding the traffic volume and the construction costs, a part of the line from Zadar to Dubrovnik, i. e. state border would be constructed as a single-track line [3]. The railway line has been planned for mixed traffic, with the highest train speed of up to 200 (250) km/h for passenger traffic and up to 140 km/h for cargo traffic.

The Adriatic section of the railway line would represent one form of accessibility to the landscape beauties to many potential tourists from Europe and beyond. Travelling by railway towards the Adriatic Sea would significantly facilitate the arrival of many tourists to the destinations, considering high load on the traffic routes during tourist peak seasons.

The construction of the Adriatic railway line should proceed in phases on individual sections of the track and should be connected to the existing railway lines. This would contribute to better connecting of the coast parts with their hinterland.

Since the maritime traffic route would represent a big competition to the railway traffic, the Adriatic

line should accommodate mainly the transport of high-quality goods on the relation Central and West Europe towards the South of Europe. It would also be used to transport food products and high-quality raw materials from the South towards the West and the North of Europe. These are the types of goods that can be subjected to high-speed transportation and that can afford higher transportation costs.

By realizing this project, the railway passenger transportation would become competitive to road traffic (in spite of the construction of the new motorway) on distances greater than 100 km, and to air traffic at distances of 400 to 500 km, as is the case in West Europe.

The construction of the railway line in the Adriatic-Ionian corridor along the Adriatic coast from Trieste to Dubrovnik and further via Serbia and Montenegro, Albania to Greece, represents justified orientation of the Republic of Croatia. The railway line would contribute to better connections of all the regions, cities and ports which it would pass through, and it would have a positive effect on the overall economic development of the Republic of Croatia. Regarding the interests and the requirements of the international traffic, the Adriatic railway would provide the shortest connection between the North-western Europe and the South of Europe and the Near East. The level of service quality that is expected on this new line would contribute to higher attraction of cargo and passengers to the tourist, port and other potentials in Europe

5. RAILWAY NETWORKS AND INTEREST ROUTES OF COUNTRIES AROUND THE CORRIDOR

The transition countries accommodating Pan-European corridor V, in the early 90s of the last century started to encounter requirements for the modernization of the traffic infrastructure. Such requirements are demanded by greater goods exchange as consequence of market openness and the requirement to harmonize the legislation with EU. These were precisely the new circumstances in which the newly formed countries found themselves. Analyzing their positions each of them brought its own strategic plans of developing the traffic system.

The North-Adriatic ports (Trieste, Koper and Rijeka) located in the same gravitational region, with different possibilities of development in the three countries, have become competitive (Figure 4) [1]. Since the transit transport of Croatia and Slovenia via North-Adriatic ports Rijeka and Koper forms the backbone of the goods transport of the two countries, the Slovenian interests on the Adriatic traffic route are directly competitive to the Croatian ports.

According to the national program of traffic infrastructure development, in the Republic of Slovenia, the basis of development is on the route from the port of Koper to the Hungarian border. According to this program the railway line has been constructed in the length of 43.5 km. The length in Slovenia is 24.5 km and in Hungary 19 km (Figure 5). [4].

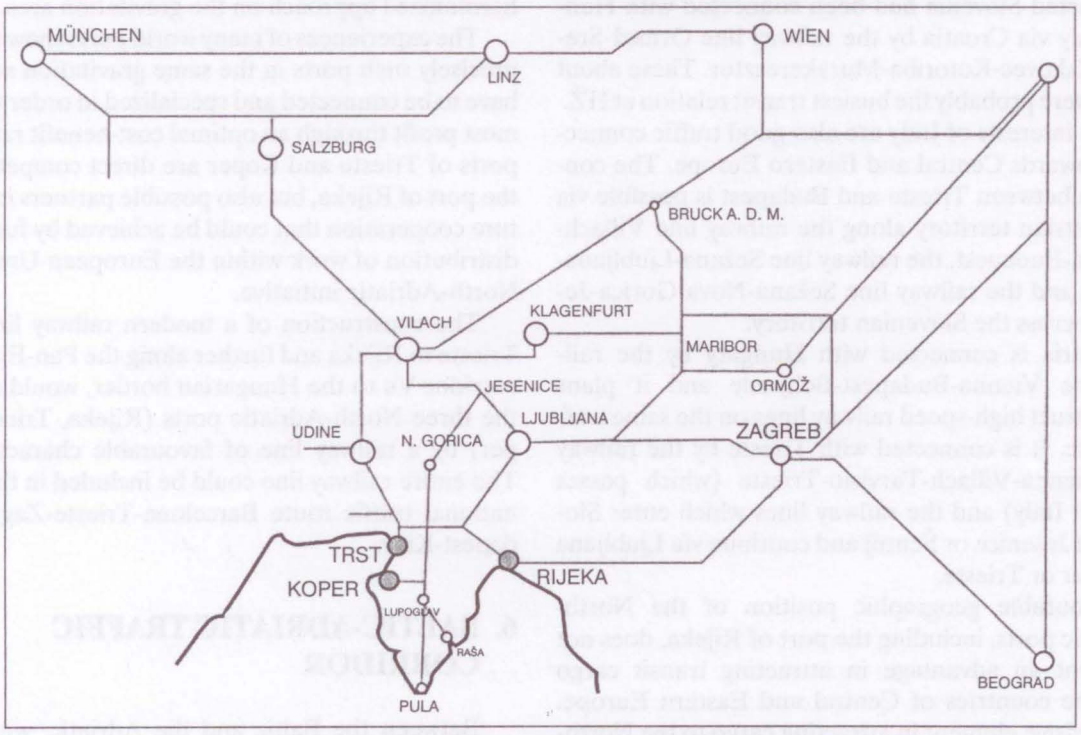

Figure 4 – Railway network Adriatic – Central Europe

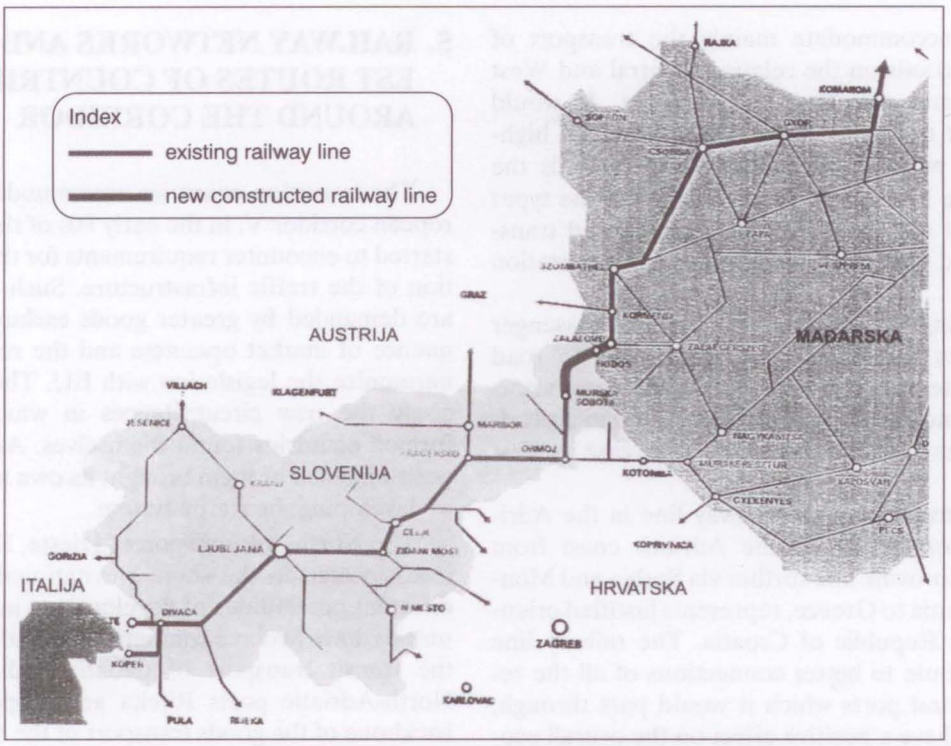

Figure 5 – New railway connection between Slovenia and Hungary

The railway line has been constructed in Pan-European corridor V which passes through Slovenia, from Trieste, Koper, via Ljubljana, Budapest and Bratislava to Lvov.

By the construction of this railway line the port of Koper has entered a more direct competition with the ports of Croatia and Italy. Until this railway line was constructed Slovenia had been connected with Hungary only via Croatia by the railway line Ormož-Središće-Čakovec-Kotoriba-Murakeresztur. These about 45 km were probably the busiest transit relation at HŽ.

The interests of Italy are also good traffic connections towards Central and Eastern Europe. The connection between Trieste and Budapest is possible via the Austrian territory along the railway line Villach-Vienna-Budapest, the railway line Sežana-Ljubljana-Šentilj and the railway line Sežana-Nova Gorica-Jesenice across the Slovenian territory.

Austria is connected with Hungary by the railway line Vienna-Budapest-Belgrade and it plans to construct high-speed railway lines on the same traffic route. It is connected with Trieste by the railway line Vienna-Villach-Tarvisio-Trieste (which passes through Italy) and the railway lines which enter Slovenia at Jesenice or Šentilj and continue via Ljubljana to Koper or Trieste.

Favourable geographic position of the North-Adriatic ports, including the port of Rijeka, does not represent an advantage in attracting transit cargo from the countries of Central and Eastern Europe. The decisive element in attracting cargo to the North-Adriatic ports include the quality of services and prices on the entire transport route. This means modern equipment of the ports, good traffic connection with the hinterland, by road or railway and connection of the port with the network of world maritime lines. In order to render value to the Adriatic traffic corridor, the North-Adriatic ports have to implement a harmonized approach on the gravitation area.

The experiences of many world ports show that it is precisely such ports in the same gravitation area that have to be connected and specialized in order to make most profit through an optimal cost-benefit ratio. The ports of Trieste and Koper are direct competition to the port of Rijeka, but also possible partners in the future cooperation that could be achieved by functional distribution of work within the European Union, i. e. North-Adriatic initiative.

The construction of a modern railway line from Trieste to Rijeka and further along the Pan-European corridor Vb to the Hungarian border, would connect the three North-Adriatic ports (Rijeka, Trieste, Koper) by a railway line of favourable characteristics. The entire railway line could be included in the international traffic route Barcelona-Trieste-Zagreb-Budapest-Kiev.

6. BALTIC-ADRIATIC TRAFFIC CORRIDOR

Between the Baltic and the Adriatic, with more than 100 million inhabitants and with a significant eco-

nomic and market potentials, the traffic possibilities have not been used sufficiently. The connection of the two seas by modern traffic modules would be only logical from the aspect of taking advantage of the geo-traffic location.

In order to establish an efficient traffic-infrastructure system and gradually reach the traffic standard of Western Europe, a new multimodal network of Pan-European traffic corridors has been determined at the Conferences on Transport (Crete, 1994 and Helsinki 1997). The implementation of this network and its extension makes it possible to establish a very efficient traffic connection of the Baltic and the Adriatic [5].

On the basis of the interest shown and the already started cooperation in traffic planning of certain regions, the Baltic-Adriatic initiative has been started with the intention of establishing a better connection of the Baltic region with the northern and central part of the Adriatic-Ionian region, i. e. improvement of the planned guidelines of the European traffic development. The initiative encompasses seventeen countries that are marked by different levels of economic development and democratisation of the society.

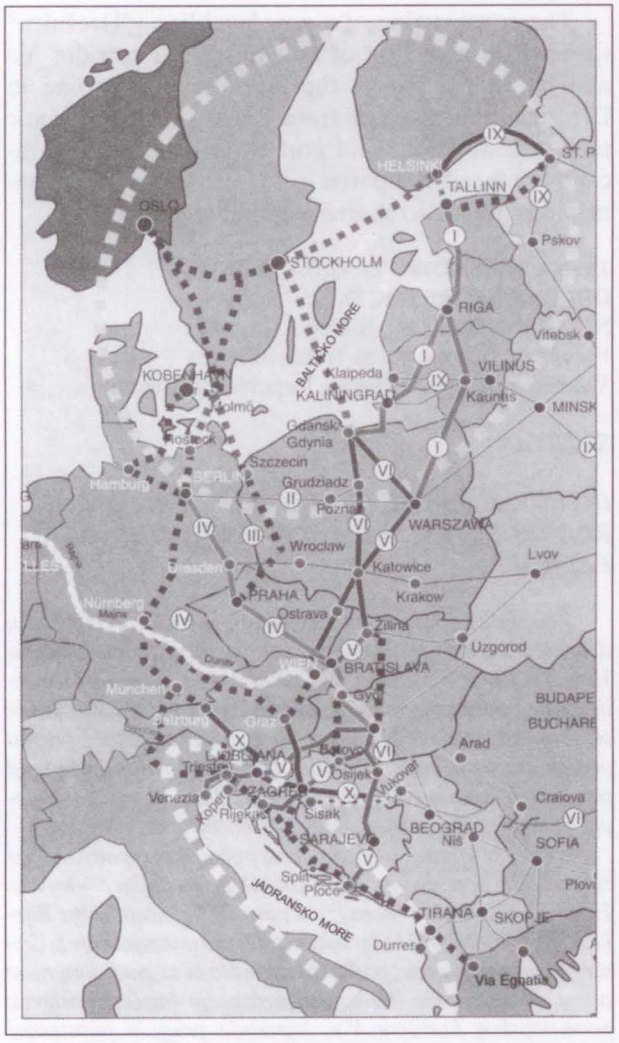

Figure 6 – Proposal of traffic surface connections in the region of the Baltic - Adriatic

Based on the evaluation of the infrastructure construction level and the plans of priority needs for repair and extension of the existing national traffic networks, the modelling of plans of the traffic development of interest for the wider region should focus on stimulating the railway traffic, combined and multimodal traffic (rail-ship) and water traffic.

Apart from the favoured investments into railway infrastructure and port cargo-container terminals, with traffic policies at national levels these modes can be additionally stimulated by various mechanisms, ranging from subsidies and measures of benefits for railways, to increased fossil fuel taxes and introduction or raising of road tolls.

The characteristics of the existing railway lines are obsolete technical and technological parameters and roundabout connections. Significant differences can be observed in the quality of railway infrastructure and the level of transport service between the countries of Central-eastern Europe and the countries of the European Union.

In order to form the network of the main railway lines and lines of combined transport, as well as to balance the technical parameters of the European traffic network, the AGC and AGTC agreements have been adopted.

Since there is no direct connection by a corridor between the Baltic and the Adriatic sea, it could be established through several corridors (I-VI-IV/V and VI-IV/V) (Figure 6) [5].

In optimizing the model of traffic connection between the Baltic and the Adriatic, it would be necessary to establish the interconnections between the existing corridors. On the one hand, there is the need for a better and more direct connecting of the Baltic and the Adriatic and the regions between them, whereas on the other hand, the primary traffic network has been already defined at the Pan-European Conferences on Transport. Therefore, conceptually, the Baltic initiative is based on the expansion of the Pan-European corridor network (Crete / Helsinki corridors) i. e. its extension on the following routes:

- Rostock-Berlin-Nürnberg-Salzburg, as connection of end points of corridors II, III, IV and X;
- Vienna-Graz, interconnection of corridors IV and Xa;
- Berlin-Prague-Vienna, interconnection of corridors IV and VII;
- Bratislava/Vienna-Gyor-Gyekenyes-Zagreb/Rijeka, interconnection of corridor VI and branch Vb;
- Munich-Trieste, recommended connection of corridors X and V which provides direct connection of the South of Germany with the Adriatic Sea;

- Rijeka-Koper-Trieste-Palmanova-Viellach, interconnection between branches Vb and Va and the main corridor V and X;
- Zagreb/Bosiljevo-Split, branch Vb indicated in the final document from Helsinki;
- Split-Ploče-Dubrovnik, extension of branch of Vb corridor and part of the Adriatic –Ionian corridor planned for this region in the Pact on Stability;
- Rostock-Szczecin-Gdanjsk, as a connection of corridor I, IV.

Interconnections of Pan-European corridors may be realized by railway or by road segments, which have already been suggested in the global networks (TER, TEM), and have priority considered from the aspect of the Baltic-Adriatic Initiative. Such traffic connections applying the concept of combined and multimodal transport would enable optimal utilization of natural resources and maximum compliance with environmental requirements. For transportation with destinations in the regions of the Indian Ocean passing through the Suez Canal, traffic connections according to this initiative are extremely favourable.

According to this initiative of improving the traffic connections, mainly based on the option of using the geographically shortest and most favourable surface connections between the Adriatic and the Baltic Seas, Pan-European corridor Vb would have an even greater significance, and the Port of Rijeka would experience its full recognition.

7. CONCLUSION

The development of the railway traffic in Europe is oriented to the construction of high-speed railway lines with free market access, rational cargo and passenger transportation and providing competitiveness to other transport modes. On this market, Croatia is becoming a factor and a participant in the market relations and will accordingly create its traffic development.

On the international transport market there will be a change which will refer to the passenger and cargo flows. This refers especially to determining of a high-speed railway network in Croatia in order to connect its economy with the European economy. Since the economic significance of a traffic route depends on its gravitation environment, the corridors through which the railway lines are to pass are of extreme importance.

Since Croatia is a sea-oriented country and the Port of Rijeka represents the maritime connection for cargo transport of Central and Eastern Europe, a high-quality railway connection of Rijeka and its hinterland is very important. The significance of this route has been increased by the integration of Croatia into the Pan-European network on corridor V. Corridor V, Branch B (Rijeka-Zagreb-Budapest) determines Croatia as a maritime country.

The rerouting of the traffic routes in Europe is of strategic interest for all the European countries regarding the load on the traffic routes directed to the North-Adriatic ports. The majority of West-European countries has started the revitalization and modernization of the railways which should take over most of the cargo being delivered to and from the overseas countries.

As part of the Pact on Stability it is possible to open a new Adriatic-Ionian corridor along the Adriatic coast. In this same traffic corridor a new railway line can be constructed, and it would stretch along the Adriatic coast. This railway line would provide a very favourable railway connection of Central and Western Europe with the southern part of Europe. The realization of this project would make passenger transport by rail competitive to road traffic at distances greater than 100 km, and to air traffic at distances of 400 to 500 km.

The construction of a new level line ("Drežnica" variant) on a section of Pan-European corridor Vb and by connecting to the Adriatic railway line in Drežnica, the distance from Zagreb to the Adriatic tourist destinations and port cities would be significantly reduced compared to the existing railway connections, thus also shortening the travelling times.

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SAŽETAK

INTEGRACIJA ŽELJEZNIČKOG PRAVCA NA KORIDORU Vb U PROMETNI SUSTAV HRVATSKE I EUROPE

Značajne i opće poznate prednosti željeznice u odnosu na druge grane prometa, promatrane u okviru prometnog razvoja Hrvatske i šireg okruženja, naglašavaju značaj kvalitetnog željezničkog povezivanja na paneuropskom koridoru V.b. Da bi se kvaliteta prometnih usluga na tom željezničkom pravcu podigla na nivo koji zahtijevaju suvremeni europski kriteriji potrebno je njegovo osuvremenjivanje. Time bi se ujedno doprinijelo integriranju u sveukupni prometni sustav Europe.

U radu se ukazuje na mogućnost poboljšanja spomenutoga željezničkog povezivanja Jadranske obale s ostalim dijelovima Hrvatske i Europe. Pritom je od naročite važnosti pruga Rijeka-Zagreb-Botovo (Mađarska). Značajno unaprjeđenje željezničkog prometa u tom području ostvarilo bi se gradnjom nove pruge od Rijeke do Trsta, što predstavlja logičan nastavak paneuropskog koridora V.b. Izgradnja pruge u jadransko-jonskom koridoru uz jadransku obalu od Trsta do Dubrovnika i dalje prema granici doprinijelo bi se boljem povezivanju

svih područja, gradova i luka kroz koje bi prolazila te pozitivno utjecala na svekoliki gospodarski razvitak Republike Hrvatske. S obzirom na interese i potrebe međunarodnog prometa, jadranskom željeznicom bi se najkraćim putem povezala Sjeverozapadna Europa s jugom Europe i Bliskim istokom. Razina kvalitete usluge koja se predviđa za novu prugu pridonijela bi većem privlačenju tereta i putnika na turističke, lučke i ostale kapacitete u Hrvatskoj.

KLJUČNE RIJEČI

paneuropski koridor V.b, Hrvatska, integracija željezničkog pravca, jadranska željeznica

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