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CARGO TRANSPORTATION ADRIATIC - DANUBE REGION WITH REFERENCE TO CROATIAN HARBOURS AND PORTS

ABSTRACT

The paper considers the role of the Croatian sea harbours, the Croatian ports, river navigation and waterways depending on the transport routes between the Adriatic and the Danube region.

The strategic and economic position best describes the role of the economic bridge spanning the North and the South, whether speaking of the Adriatic corridor, which has harbours with all kinds of technologies, or of the combined transport Adriatic - Danube-region corridor, and our river ports.

Considering the difficulties currently present due to the war destruction, which have disturbed the technological processes at our harbours and ports, as well as the Adriatic - Danube-region commodity trade, we have to continue investing all our efforts in order to prevent our harbours and ports of being limiting factors of cargo flows between the Adriatic and the Danube-region.

Taking into account the transportation flows towards the Central European countries, our duty is to create modern and competitive traffic and thus emphasise our role on the European and world market.

KEY WORDS

cargo transportation, harbour of Rijeka, Adriatic-Danube-region, Croatian harbours and ports

1. INTRODUCTION

The traffic system of the Republic of Croatia is a part of the European and world traffic system. The geographic traffic location of Croatia, as a maritime, Mediterranean and Danube-region country, offers significant comparative advantages in developing traffic not only for its own requirements but also for the needs of other countries. Within these characteristics the role of the Adriatic harbours and ports on our rivers is obvious.

The strategic and economic location best characterises the role of economic bridge spanning the North and the South, both when speaking about

the Adriatic corridor, where among other things there are harbours of all technologies, and about the corridor of combined transport Adriatic - Danube-region, as well as our river ports. By rail, road, river and combined transport this relation links Ploče, Split, Šibenik, Zadar, Rijeka, Pula and other Croatian harbours, via ports of Sisak, Osijek, Vukovar and Šamac with the Danube region. Although the severe aggression war partly or temporarily blocked some of the harbours and ports, as well as some roads, the main artery towards the Danube-region via Rijeka harbour is functioning normally. However, the fact is that this war resulted in expansion of some of the Croatian transportation capacities, and this refers to the harbour of Ploče with the part of rail network as well as the Istrian railway lines, which had been exploited by other republics in the former country. All this has particular significance for the Croatian transport technological whole, and thus also more generally for the economy. Considering all the difficulties that occurred and disturbed the technological processes of our harbours and ports, we must continue to invest our efforts and make the last preparations so that our harbours and ports would not represent the limiting factor of the Adriatic - Danube-region cargo flows. The ports and river transport in the Republic of Croatia offer great possibilities to serve the economy in the domestic and international transportation of goods.

The Danube links the Republic of Croatia with Germany, Austria, the Czech Republic, Slovakia, Hungary, Rumania, Bulgaria, Moldavia (and other Russian republics), and regarding traffic, in a wider sense, i.e. in the combined river-sea transportation, it includes practically the countries of the Near, Middle, and Far East, as well as the European and Mediterranean countries.

Considering the transportation flows towards the Central European countries - our task is to create modern and competitive traffic so as to emphasise our significance on the European and world market.

2. ADRIATIC HARBOURS DEPENDING ON THE ADRIATIC - DANUBE-REGION TRANSPORTATION FLOWS

Analysing the rationality of cargo flows, respecting the modern transportation technologies, it may be concluded that almost any type of goods has its transportation means and its technology of cargo handling and transportation. The rationality of the cargo flows has not been sufficiently respected over the last two decades in our region, and significant emphasis has been put by the central planning economy on the expansion of road traffic and the lagging behind of the rail traffic. This led to structural changes on the traffic services market, so that a fall in the share of rail in the overall transport of cargo and passengers has been recorded. On the other hand, a sudden increase in road traffic was not accompanied by appropriate construction and modernisation of the road network, which had very negative effects on traffic safety and on the high share of transportation costs in the total value of the product.

Big technological reserves are contained in the cargo speed. This means that in relation to the modern world we have very low speeds of cargo moving from the production centre to the consumption centre. The basic reason is that traffic must be an integral whole, that the Adriatic harbours and the river ports have to be an integral part of our transportation system, and not that the ships sail to Koper, Trieste or Venice, and if, in the best solution, they unload their cargo in the

port of Rijeka, then it is transported by rail, across the country of Slovenia towards the Central European countries (geo-trafficly a less suitable route). That the whole Adriatic - Danube-region transport has to be an integral whole is also obvious in practice, because of uneconomical usage of transportation capacities. All these are the actual difficulties of the transportation system integral whole. Therefore, a lack of measures for regulating the more rational transportation is felt, since the goods have to use the transport mode which requires least work and least of the government means. The time has come for the traffic exploitation of all modes to enter the free market. The Adriatic harbours, particularly the harbour of Rijeka (Table 1) have invested huge efforts in integrating into the European and world integral wholes, through all the aspects, and particularly through the aspect of integral transport. The technology and organisation of modern transportation technologies in Europe and the world have found wide application, particularly in the industrially developed countries. Considering the Adriatic - Danube-region transport chain and vice versa, our harbours provide technological access to the world seas, but the difficulties occur in the integrity towards the Central European countries. Unfortunately, the harbour of Rijeka and some other harbours are forced to search for access in the transportation chain towards Europe and the world and other routes, since we are not always able to insure the integrity of the transportation system (Table 2).

Table 1 – Overall turnover and public handling of the Rijeka harbour in the period between 1980 and 1992

Year	Overall turnover	Public handling	Index 1980=100		Chain index		Share of public handling in overall turnover
			Overall turnover	Public handling	Overall turnover	Public handling	
1980	15,197	7,373	100.00	100.00	–	–	48.52
1981	20,328	7,629	133.8	103.5	133.8	103.5	37.53
1982	18,588	6,246	122.3	84.7	91.4	81.9	33.60
1983	18,483	6,557	121.6	88.9	99.4	105.0	35.48
1984	18,675	6,842	122.9	92.9	101.0	95.8	36.64
1985	18,225	7,128	119.9	96.7	97.6	104.2	39.11
1986	19,565	6,734	128.7	91.3	107.4	94.5	34.42
1987	19,408	6,280	127.7	85.2	99.2	93.3	32.36
1988	19,923	6,237	131.1	84.6	102.6	99.3	31.31
1989	18,885	6,450	124.3	87.5	94.8	103.4	34.15
1990	20,131	5,796	132.5	78.6	106.6	89.9	28.79
1991	18,138	4,535	119.3	61.5	90.1	78.2	25.00
1992	9,600	4,547	63.2	61.7	52.9	100.3	47.40

Source: Statistics of the Luka Rijeka

Table 2 – Handling of cargo in the Croatian sea ports

	1990	1991	1992	1993	1994
Handled (thou. tons)	13,366	8,835	6,540	5,452	4,340
Manipulated (thou. tons)	20,996	13,456	10,091	10,171	8,461
Chain indexes					
Handled	-	66.1	74.0	83.4	79.6
Manipulated	-	64.1	75.0	100.8	83.2
Annual changes (%)					
Handled	-	-33.9	-26.0	-16.6	-20.4
Manipulated	-	-35.9	-29.0	0.8	-16.8
Indexes (1990=100)					
Handled	100	66.1	48.9	40.8	32.5
Manipulated	100	64.1	48.1	48.4	40.3

Source: Government Bureau of Statistics

Central European and European countries require fast, high-quality and inexpensive service. From the geo-traffic aspect, Croatia can provide it. Geo-trafficly, this means that it has to find also the economic interest. So, what is missing is the integral whole, i.e. the speed and quality of service, major and secondary terminals in Zagreb, Varaždin, Koprivnica, Osijek, Sisak, Vukovar and other adequate goods - transportation centres located on the artery of cargo flows, of high-quality and fast agency and shipping services as well as a strong link between the harbours, ports, rail, road carriers, shipping and forwarding agencies, customs and other factors which are directly or indirectly involved in the Adriatic - Danube-region transportation system. Certainly, the Act on Harbours and Ports and the Act on Railway play an important role, since omissions in these Acts may reflect negatively on the transportation flows. One of the extremely significant factors in any transportation system as well as in the integral transportation whole, is the forwarding agent. If we do not respect science in our own circumstances, then let us look at the developed world and we may learn a lot. Concretely, "Schenker" in Germany plays a significant role in the German and European major cargo flows. "Intereuropa" Koper has for decades now been the major Slovenian forwarding agent, and still today performs significant activities in the Balkan and the Central European countries.

Although new transportation technology is getting increasingly well established in our country, and although today we can see containers in practically every company, and opening of regular Ro-Ro lines, still we cannot be satisfied with the current condition of the development of new technology in Croatia, since we are significantly lagging behind the development in the Central European countries. Hence, greater em-

phasis should be put on the harbours and ports as the basic link between the Adriatic and the Danube-region.

3. CROATIAN HARBOURS, RIVER NAVIGATION AND WATERWAYS

Along with the development of modern transportation technologies in general, and on the Adriatic - Danube-region relation in particular, special attention should be paid to the modernisation and development of the existing and construction of new ports, especially on the river Sava. Based on the potential cargo substrate, it is assessed that there are prerequisites for the initial development of the ports in Zagreb, Jasenovac, Šamac and Županja - of course, when the river transport gets normalised in the post-war period. These ports (along with the existing ones in Vukovar, Osijek, Slavonski Brod and Sisak) could result in a more significant increase in the transportation substrate in the river traffic.

Before this war, the Croatian river fleet consisted of: 33 tugboats with 137 cargo vessels and tankers of 113,618 tonnes deadweight. The volume of traffic (including unloading in domestic traffic and total international traffic) amounted to 4,3 million tonnes of cargo - and out of this about 800,000 tonnes were covered by international traffic.

The Croatian river-shiping organisations include "Dunavski Lloyd" and "Hidroput" from Sisak, "Belišće-promet" and "Dravska plovidba" from Donji Miholjac. The inventory regarding facilities is as follows: tugboats 25, push boats 8, motor cargo vessels 1, tanks and combi-freighters 43, lighters 55, barges 2, other barges 36. (Source of data: Promet i veze 1988 - Dokumentacija 707, Zagreb).

Regarding the exploitation level of the cargo floating fleet per all the types of vessels (tugboats, push boats, motor freighters and motor tanks, tanks and combi-freighters, lighters, push-tanks and other barges) they amount to more than 50% of mileage utilisation on the average, which economically justified its operation until this war.

The Croatian river fleet participated in the export of coal, coke, petroleum and petroleum products, ore, products of iron and steel metallurgy, wood, sand, gravel and road gravel, brick, tiles, concrete and others, artificial fertilisers, grains, other food products, seeds, oil and grease, raw leather and pulp, chemical products, metal products, piece goods and packages, and various other goods.

Regarding entering the country, it participated in the import of: coal, coke, iron ore, old iron, ferrous metal ore and concentrates, products of iron and steel industry, treated and non-treated wood, and other products.

In the combined transit transport, our fleet participated primarily in the transportation of iron ore and old iron, and then much less in other goods.

The river Sava is navigable up to Sisak in the length of 376 km through the territory of the Republic of Croatia (or from the mouth into the Danube, in the length of 588 km). The total length of the river Sava through Croatia amounts to 413 km. The difference of 37 km from Sisak to Zagreb is a special topic of how this section should be made navigable and the city of Zagreb connected to the European network of waterways, i.e. turned into a European port.

There are a number of ports and loading terminals on the river Sava, but none of the modern basin type ports. The major ports include Sisak, Jasenovac, Slavonski Brod, and Slavonski Šamac.

The Sava riverbed has not been regulated for navigation in shallow waters, so that regarding its duration and size (which is relatively small), the greatest hindrance for navigation are the depth and width, i.e. the shallows which form one fifth of the total navigable length of the river Sava. The greatest number of these shallows is located in the Sisak - Jasenovac section, then downstream from the tributary of the river Bosna. Due to the poor condition of navigability, the navigation on the river Sava is discontinued about 40 days annually on the average, and various restrictions and reduction of cargo take sometimes even up to 100 days annually.

The river Drava is navigable for minor navigable vessels up to Donji Miholjac i.e. up to 153 km from the mouth. Regarding its international status, it has been registered in the length of 22 km, i.e. from the mouth to Osijek (since 1975). Thus the port of Osijek obtained the status of the permanent river border crossing for cargo and passenger traffic. The river Drava re-

gime is characterised by a pronounced Alps hydrological regime with maximum flow in the first months of summer and the minimum in January. Most part of the Drava riverbed is cut into its own, easily movable deposit, so that the waterway condition and the navigation conditions on the Drava depend greatly on the hydrological circumstances. All the performed works regarding maintenance of the waterway, as well as geodetic works elaborating the general situation that are under way, represent the first phase that will, in the following years, enable more intensive and efficient interventions in maintaining the river Drava.

The river Drava rises in the Italian region of Tyrol and is 749 km long. It passes through our country in the length of 435 km. Its basic characteristic is that it has the highest water level in summer (because the maximum water level is in May and the minimum in January).

The river Danube is an international waterway which passes through our country. The Danube is 2,950 km long, and regarding navigability it is divided into three sections.

- 1) upper Danube (Regensburg - Gonyu)
- 2) central Danube (Gonyu - Moldova)
- 3) lower Danube (Moldova - Sulina).

4. ORGANISATIONAL AND TECHNOLOGICAL CO-ORDINATION OF THE ADRIATIC HARBOURS AND PORTS WITH TRANSPORT BRANCHES IN THE ADRIATIC - DANUBE-REGION TRANSPORTATION SYSTEM

The transportation group - Pentagonal initiative, group for the combined transport project - Verona, 19 March 1991, concluded: "Regarding future development of international cargo transport, due to greater volume of international trade expected in the future, and particularly with the Eastern European countries, the role of combined transport is increasing because of power and ecological advantages and brings savings in fuel consumption, in expenses regarding road infrastructure maintenance, reduction of the burden carried by the main road traffic, less pollution regarding exhaust gases as well as reduction of noise. Apart from this, due to its various technical aspects, combined transport is generally considered as one of the most efficient instruments for balancing and rationalising of the land transportation system."

Therefore, all this indicates that the Adriatic harbours and river ports inevitably have to become an integral whole of transportation systems of all types and directions, and the Adriatic - Danube-region direction in particular.

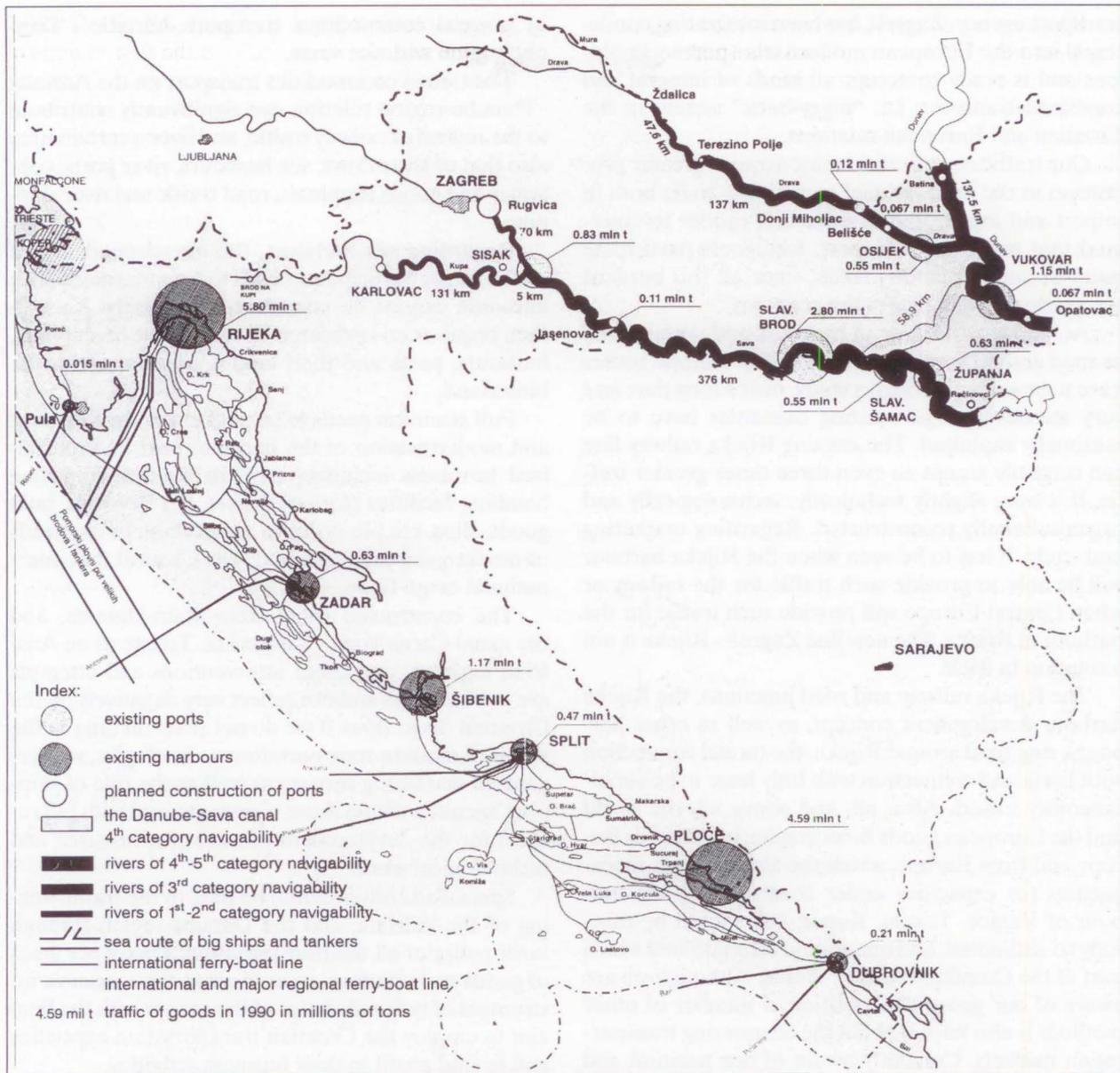


Figure 1 - The Croatian ports and harbours and their traffic volume

The system of combined transportation requires especially:

- modern equipped harbours and ports,
- terminals for loading, unloading and storing of loading units (containers, semi-trailers and motor passenger cars, as well as semi-trailers with traction trains),
- utilisation of railway lines of sufficient capacity (number of days/trains in both directions) and dimensions (maximum dimension of the complex car and loading unit),
- availability of special or specialised railway pool for the transport of loading units,
- service organisation which can meet the interests of the users of various production and trade activities.

Comparing the Croatian capacities with the European and Central European countries, we must urgently apply our efforts (that are economically justified), to co-ordinate our capacities with the neighbouring and Central European countries, and then with the European as well, and to undertake measures where the minimum technological and organisation activities can intensify the traffic and accept the offered goods. For the moment, we have the infrastructure for a combined transport in Zagreb and Rijeka, as well as with cranes and fork-lift trucks for handling of goods. Apart from these, we have terminals in Rijeka and Zagreb. In the rolling stock at the railway we also have wagons for the combined transport and also platform-wagons for container transport, but their number is not sufficient. The "AGIT" company, integral

transport agency, Zagreb, has been integrating consistently into the European modern transport technologies and is ready to accept all kinds of integral and combined transport, i.e. "piggy-back" system in the Croatian and European relations.

Our traffic organisation must acquire greater proportion in the international commodity trade both in import and export and in transit. It cannot be tolerated that regarding transport, foreigners participate more in our commodity trade, since all this burdens the product and damages the economy.

At any rate, the issue of harbours and ports as well as road and railway Adriatic - Central Europe routes have to be solved through a study, over a long time and very attentively. The existing capacities have to be maximally exploited. The existing Rijeka railway line can certainly accept an even three times greater traffic, if it were slightly technically, technologically and organisationally reconstructed. Regarding marketing and study, it has to be seen when the Rijeka harbour will be able to provide such traffic for the railway or when Central Europe will provide such traffic for the harbour of Rijeka. The new line Zagreb - Rijeka is not a solution in itself.

The Rijeka railway and road junctions, the Rijeka harbour development concept, as well as other harbours, ring road around Rijeka, the tunnel connection with Istria and connection with Italy have to be simultaneously solved. After all, and above all, the world and the European goods flows gravitating towards Europe and from Europe across the already built-up capacities (or capacities under construction) the harbour of Venice, Trieste, Koper, etc. should be carefully co-ordinated, and one should estimate well which part of the Croatian "cookie" this is. Although we are aware of our geo-traffic position, a number of other methods is also known about the conquering transportation markets. Currently aware of our position and our difficulties, not present in case of our neighbours, the route of goods Trieste, Koper towards Austria, Hungary and Ukraine is increasingly coming to life. But if the last twenty years of operation of the Rijeka harbour are analysed and compared to the harbours of Koper and Trieste - the diagrams will tell everything. However, this was once upon a time, but acknowledging all the methods of modern transportation technologies, informatics, economy, marketing and with fully acknowledging other scientific methods as well, this has to be different and of greater importance for the Croatian industry.

5. CONCLUSION

The geo-traffic position of Croatia, especially the Rijeka - Zagreb - Danube-region corridor provides the most suitable transport connection for the needs

of integral commodities transport Adriatic - Danube-region and vice versa.

The transit commodities transport on the Adriatic - Danube-region relation can significantly contribute to the revival of railway traffic, and over a certain time also that of river flows, sea harbours, river ports, container and goods terminals, road traffic and river shipping.

Regarding sea harbours, the interdependence of all the traffic participants needs to be intensified, since harbours cannot be considered separately. This, in fact, requires co-ordinated development of shipping, harbours, ports and their land connections with the hinterland.

Full attention needs to be paid to the development and modernisation of the harbour, port and specialised terminals including modern fixed and moving handling facilities (for containers, Ro-Ro ships, bulk goods, silos, etc.) in order to adjust them to the needs of modern shipping (sea and river), transit and international cargo flows.

The constructed canal Rein-Main-Danube, and the canal Črna voda - Constanta, Trieste as an Austrian harbour, and other interventions and attempts are not harmless and can reflect very negatively on the Croatian cargo flows if we do not react on time to the needs of modern transportation technologies, well organised marketing service, as well as the role of shipping agencies within these transports, and with full respect for the development of scientific, research and technological work.

Special attention should be paid to the traffic linking of the Adriatic and the Danube-region through tariff policy of all the transportation aspects per types of goods and relations, so as to act as the economic instrument of rational choice of the carrier with the final aim to employ the Croatian transportation capacities and to find profit in their business activities.

Maximum attention needs to be paid to training and specialisation of personnel, since lack of qualified staff in any course reflects negatively on the work of modern technology, and by not training the existing staff, they acquire a preference of classical transport and as such prefer not to accept the new operation concepts.

SAŽETAK

ROBNI PROMET JADRAN-PODUNAVLJE S OSVRTOM NA LUKE I PRISTANIŠTA HRVATSKE

Prometni sustav naše Republike je dio europskog i svjetskog prometnog sustava. Geoprometni položaj naše zemlje pruža značajne komparativne prednosti da kao pomorska, sredozemna i podunavska zemlja razvija promet ne samo za vlastite potrebe već i za potrebe drugih zemalja. U sklopu navedenih značajki očita je uloga robnog prometa Jadran - Podunavlje, te luka i pristaništa Hrvatske.

Strategijsko-ekonomski položaj najbolje označava ulogu ekonomskog mosta sjever-jug, bilo da je riječ o jadranskom koridoru, koji između ostalog raspolaže s lukama svih tehnologija ili pak s koridorom kombiniranog transporta Jadran-Podunavlje, te pristaništima na hrvatskim rijekama.

Uvažavajući poteškoće koje su trenutno nastupile zbog ratnih razaranja, te poremetile tehnološke procese naših luka i pristaništa, kao i robni promet Jadran – Podunavlje mi i dalje moramo ulagati napore kako naše luke i pristaništa ne bi bili ograničavajući čimbenik robnih tokova Jadran - Podunavlje.

Sagledavajući transportne tokove prema srednjoeuropskim zemljama dužnost nam je stvaranje suvremenog i konkurentnog prometa kako bi više došli do izražaja na europskom i svjetskom tržištu

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