

# EVALUATION OF THE CROATIAN TRANSPORT SYSTEM

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## Abstract

Research in this paper is targeted to the valorisation of the national transport system status, which can allow detecting the geo-strategic position within the initiatives of the regional transport networks and contribute to the methodological concept of the Croatian transport development within the process of European integrations. Analysis of specific transport system segments assures dissemination of data and sources of relevant standards and the applicable models of regulation, organization and management in the transport sector according to the transport acquis. In terms of integrity, the analysis of transport infrastructure network within a wider regional context determinates the development priorities. Regarding the interoperability principle the emphasis is on the development potential of intermodal transport options with the aim of optimizing the usage of natural resources. From the aspect of sustainability, further transport development is marked by coordinated approach to modeling the economic growth, ecological balance and social development. transport development is the strategic orientation of enlarged European Union.

## Keywords

Transport system evaluation, transport strategy, transport policy, transport development, transport governing and management

## INTRODUCTION

Regarding her geographic complexity – climatic and configuration diversity, which is directly reflected also on her geo-traffic characteristics, Croatia is a unique and specific part of the European region. Croatia is a Central European, and Pannonian and Danube Basin, as well as Adriatic – Mediterranean country, bordering on the South-eastern Europe.

Due to her geo-traffic position, Croatia is a country of multi-directional contacts, out of which during the 20<sup>th</sup> century special emphasis was on the route from Western and Central Europe towards the Black Sea region and the European South-east as well as the route from the parts of Central Europe, Pannonian and Baltic area and parts of Eastern Europe towards the Adriatic coastal area i.e. the Mediterranean area.

The importance of the geographic position of the Croatian region is confirmed by its historical participation in the crucially important events, in the wider European frame. This is also confirmed by the geo-political influences during the near past, variable in relation to certain political constellations, and with necessary adaptations confirmed also in the new government and political circumstances and modern relation of the political patterns that have been created and that continue to develop.

The geo-political component of evaluating the position of Croatia is therefore important for a better assessment of the status and the trends of regional transport development. This supplements and additionally emphasises the consistency and durability of the geo-traffic significance of the Croatian state territory.

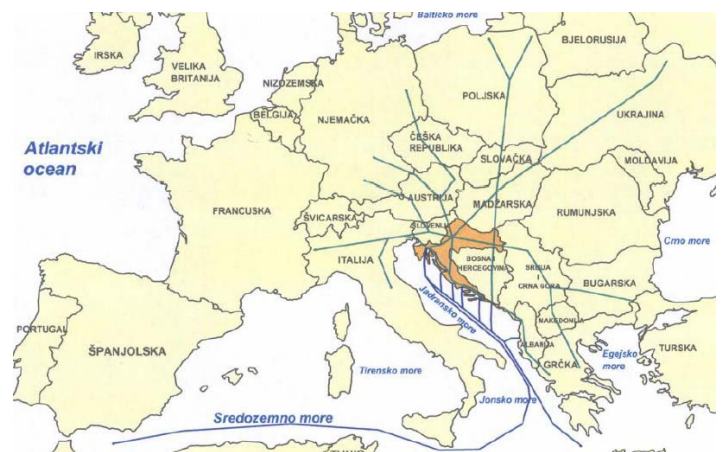


Figure 1. Valorisation of the geographic site of Croatia through the network of transport corridors

Source: Puž, G.: Scientific advances related to the construction of motorways, Croatian Motorways Ltd.

The transport development in the function of international communication is articulated by the primary interest in connecting Croatia with her European surroundings, with special emphasis on those transport connections that correspond to the political and economic orientation of Croatia. In this sense the focus is on the land transport connections towards Central Europe and across it to Western

Europe, and towards the Pannonian part of the Central European area and across it to Northern and Eastern Europe.

The routes of international transport connections of Croatia with her European surroundings are at the same time, considering in a wider sense, the transit connections to continental communication routes West – East, i.e. North-east – South-west, with the former connection being exclusively land connection, and the latter directed to sea transport with the possibilities and benefits for integrating the Croatian river waterways into international traffic flows. When speaking of international traffic flows on the Croatian area, the importance of the tourist traffic should be especially evaluated. Apart from the interest of attracting the transit flows to the Croatian sea resorts and transit traffic through the Sava corridor, it represents a significant directive in the development projection of the transport infrastructure. An important question is the transport connection, i.e. transiting via Bosnia and Herzegovina, which together with Croatia in some parts and with certain routes represents a geo-traffic whole. These are in fact integral traffic routes whose sections belong to two states.



Figure 2. Transport and development axes in Croatia  
 Source: Transport Operational Programme 2007-2009, Instrument for Pre-accession Assistance, Ministry of the Sea, Tourism, Transport and Development, Zagreb, 2007

Defining of strategic frames for the realization of the objectives of the transport development is based on the evaluation of the level of development of the transport sector, its functioning in realizing the objectives of the economic development, as well as its harmonization in the context of the development strategies in the regional surrounding.

Conceiving the strategic directives in the transport development of Croatia is determined by the objective of integration into the European transport system. Therefore, it is important to detect the specific characteristics of the development programs and the transport policies at national and regional levels, as well as trends of the market opening and the dynamics of traffic flows.

In modelling a coherent transport policy special importance belongs to a systemic approach to development – consideration of all the influencing factors, detection of development specifics of the environment, harmonization of the national transport system from the infrastructural, technical, technological and institutional and administrative aspect, and recognizing of special requirements in the planning of an integrated transport network.

The starting documentation basis for the assessment of the transport sector condition in Croatia is the Transport Development Strategy of the Republic of Croatia which was accepted by the Croatian National Parliament in 1999.

Parallel with preparing the draft of the existing transport strategy important documents were adopted, such as the Strategy of physical planning of the Republic of Croatia (1997) and the Strategy of Energy Power Development of the Republic of Croatia (1998). The Program of Physical Planning of the Republic of Croatia (1999) analyzes in more detail the strategic guidelines of the physical planning of Croatia.

The transport strategy foresees investments into transport of 5 percent of GDP. Summed up this would result in investments into the transport infrastructure of US\$19.9 billion in the period from 1998 to 2010. A frame structure of total investments per single transport branches has been planned: road transport 40 percent, rail 25 percent, sea and river 20 percent, air 5 percent and integral transport 10 percent. The investments program was very optimistic, and especially unrealistic were the expectations of the allocations from the budget for transport of 5 percent of GDP, out of which 2 percent were planned for new investments, and for the remaining investments 3 percent.

From the more recent strategic documents that mark also the transport development in the context of the Croatian integration into the European Union, the National Strategy for ISPA [1] program in the transport sector from 2005, Strategic Frame for Development 2006-2013 from 2006 and the Operational Program for Transport as part of IPA [2] - pre-accession program from 2007 have special importance.

#### ANALYSIS OF INSTITUTIONAL AND LEGAL FRAME

The transport sector in Croatia has an important role in the economic development with a share of about 8 percent of GDP, employing the same percentage of the labour – about 80,000 employees. Its significance has been additionally articulated by the fact that transport connection is a precondition of regional and tourist development of a country,

as well as of a better geo-strategic positioning in the European integration processes.

In Croatia, however, there is no unambiguously defined integral transport development policy. Although formally in force since 1999, the Transport Development Strategy of the Republic of Croatia is not a consistent development document, but rather an infrastructure-oriented document per single transport branches.

Although conceptually closer to the principles of strategic planning of the transport development in the European Union, the offprint "Transport" as part of the 2001 strategic document "Croatia in 21<sup>st</sup> century" has not been formally adopted so that again no precise definition of the aims and measures has been achieved that would be necessary for the transport sector development. The reason of such strategic planning insufficiency lays primarily in the lack of administrative competence and organizational structure in the government administration bodies whose scope includes transport.

Although transport, together with maritime industry and telecommunications is primarily within the scope of the Ministry of the Sea, Transport and Infrastructure, some aspects of transport regulations – construction of the transport infrastructure, mainly high-serviceability roads, transport safety, issues regarding authority in river transport, have not been systemically included in the scope of the respective Ministry but rather under the jurisdiction of other government administration bodies. Moreover, there is quite a uniformity in the scientific approach to all the activities – since economic and market criteria are neglected over a longer period of time compared to the political approach to determining the transport development priorities.

In principle, the actual concept of the transport development is concentrated per single branches of transport and focused to a greater extent on the transport infrastructure rather than on the organizational and administrative competence of the transport sector.

The respective Ministry and its subordinate institutions are in charge of designing and implementing the transport policy, but actually, in the previous practice the main function of the ministry was reduced to designing, proposing and implementing the national strategies of single transport branches, creating conditions for the development of infrastructure, coordination of activities for the area of transport and participation in designing the transport safety policy as well as reduction of harmful impact of transport on the natural environment.

The accession program of Croatia into the European Union planned in the World Bank Country Assistant Strategy for the Republic of Croatia [3], as part of the reforms for the area of transport refer to the establishment of the basic transport regional network in South-eastern Europe and strengthening of the administrative capability in road and rail sector.

For sustainable growth, this Strategy, among other measures, specifies the measures of rationalization and

enhancement of the efficiency of public consumption, which in the transport sector understand:

- Reduction of mass of incomes and subsidies in public sector. The share of the mass of incomes of public sector in GDP remains high, at 11 percent of GDP compared to the average of 7.2 percent of GDP in the countries of Central and Eastern Europe i.e. 10 percent in EU15 countries. The subsidies in the sector of enterprises [4], including those for railways and shipyards, reached more than 3.3 percent of GDP (2003), compared to the average in EU15 of approximately 0.8 percent of GDP. Faster privatization and implementation of the policy of strengthening the market competition is expected to result in lesser reliance of the enterprises sector on the state subsidies. For instance, annual fiscal load of the railways sector has reached about 1.3 percent of GDP, double as much as in Bulgaria and Italy (0.6 percent) or Rumania (0.7 percent). The restructuring of the sector by closing down non-profitable railway lines, adoption of the plan of optimal investments in order to comply with the standards of the European Union, reduction of the excessive costs for staff, increase in the operative efficiency with the support of the private sector, and privatization of non-core activity the fiscal load of the railways should be reduced.

- Ambitious program of transport investments for roads and highways has brought the public consumption to the level of 2.5 percentage credits of GDP more than in comparative countries. Public expenditures for transport amount to 5 percent of GDP in Croatia, compared to 1.5 percent in the United Kingdom and France. Still, the share of transport amounts to only 8 percent of GDP, which is just a little bit more than the average in EU of 6.5 percent. The unit price for investment into the system of highways is high due to excessively high standards, and "squeezes out" the expenditures for the very needed maintenance and reconstruction of the existing road network. For the fiscal sustainability in the road sector, it will be important for the Government to insure sufficient support from the budget for the critical road maintenance, and to consider the options for inclusion of the private sector into the construction and maintenance of roads and highways.

In the context of integration, the necessary regulative harmonization of the transport sector refers directly to the aspects of infrastructure development of the transport network and the adoption of a complex of regulations in the domain of the transport policy. The implementation of the transport *acquis* in the national regulations is the precondition of full membership of Croatia in the European Union.

Currently, for the area of transport the phases of the analytical screening have been completed [5] and reports of the European Commission [6] have been published. The negotiations are underway about the referenced Chapters 14 and 21 of "*acquis communautaire*".

Apart from the Strategy of the Transport Development of the Republic of Croatia (Official Gazette No. 139/99), for the projects of transport infrastructure construction, independent

of the type of transport and the transport branch, the legal frame for environmental protection, market competition and public purchase is implemented.

Relevant here are the Strategy and Program of Physical Planning of the Republic of Croatia (Official Gazette No. 50/99), Act on Environmental Protection (Official Gazette No. 82/94, 128/99) and Act on Construction.

The normative frame for the road network development in Croatia is provided by the Act on Public Roads. This act determines the plan documents for the development of the road network – Strategy of Public Roads Development brought by the Croatian Parliament, and bound four-year programs of construction and maintenance brought by the Government of the Republic of Croatia and the annual implementation plans brought by the subjects that manage public roads.

The basic regulations for the field of road transport stipulate the relevant contents – admission to the profession and access to the market regulated by the Road Transport Act (Official Gazette No. 178/04, 48/05, 151/05)., The social, technical and safety conditions are regulated by the Road Traffic Safety Act (Official Gazette No. 105/04).

Croatia accepted by notification on succession the Custom Convention on International Carriage of Goods under the cover of TIR carnet (1991), the European Agreement Concerning the Work of Crews of Vehicles Engaged in International Road Transport (AETR, 1995), Convention on International Transport of Goods by Road (CMR, 1992), Convention on International Transport of Dangerous Goods (ADR, 1993), Convention on Agreement on International Road Transport of Passengers and Baggage (CVR), and the INTERBUS Agreement on Occasional Passenger Transport Services by Bus and Coach (MoU, 2001).

The Railway Act (Official Gazette No. 123/03, 194/03, 30/04) was brought in 2003, and its implementation was prolonged until the beginning of 2006. The act represents the basic national regulations for the area of railway transport, which determines the state ownership over the railway infrastructure, which has the status of public assets in general use. Following the principles of separation of the transport activities of infrastructure management, the Croatian Railways Division Act (Official Gazette No. 153/05) was brought, which plans the establishment of four companies: - for management, - for maintenance and construction of railway infrastructure, - for transport of passengers, - for transport of cargo, and – for traction of trains. The establishment of a fifth company is planned – holding, as the owner of these four separated companies.

The Railway Act regulates the relevant contents – access to the market and infrastructure, and standardization of bookkeeping and statistics.

Technical conditions and the area of safety and operability of the railway transport have been regulated by the Railway Safety Act (Official Gazette No. 77/92, 26/93, 100/04).

The area of combined transport in Croatia has not been regulated by special basic regulations, but rather partly referred to by the Railway Act.

The relevant contents of the access to the market and admission to profession, technical and safety conditions for the area of river transport in Croatia are regulated by the following basic regulations – Inland Navigation Act (Official Gazette No. 19/98, 151/03), the Inland Ports, Act (Official Gazette No. 142/98, 65/02) and Act on the Croatian Register of Shipping (Official Gazette No. 81/96).

The Inland Navigation Act regulates the obligation of bringing a five-year plan for the development of waterways, and the Inland Ports Act regulates the obligation of bringing the five-year development plan of ports. Infrastructure projects are proposed in the sequence of five-year plans accepted by the Croatian Parliament and the Government of the Republic of Croatia, and the annual programs determine the priorities.

Croatia signed and ratified the European Agreement on the Major Inland Waterways of International Level (AGN), which include the waterways of the rivers of Sava, Drava, Danube and the future Danube-Sava Canal into the network of European waterways, and the ports in Osijek, Vukovar, Slavonski Brod and Sisak into the network of ports open to international traffic.

The basic regulations that cover the area of sea transport in Croatia are the Maritime Demesne and Seaports Act (Official Gazette No. 158/03), according to which the entire infrastructure and suprastructure of seaports has the status of general assets over which real ownership cannot be acquired, Maritime Code (Official Gazette No. 181/04) as the basic document which contains the provisions on the implementation of international contracts and the Act on Security of Merchant Ships and of the Ports open to International Traffic (Official Gazette No. 48/04).

Air Traffic Act (Official Gazette No. 132/98, 178/04) is the basic regulation for the area of air transport in Croatia, mainly the relevant contents of technical provisions, safety and security of air transport and environmental protection. Apart from this act, in the context of integration processes, by signing of the Agreement on European Common Aviation Area (ECAA) Croatia has maximally harmonized the standards of access to market and external aviation policy of the community.

Air Traffic Management is additionally regulated by the Act on Founding of the Croatian Air Navigation Services (Official Gazette No. 19/98).

According to the Air Traffic Act, the National Aviation Security Program was adopted in 2003.

The Airports Act (Official Gazette No. 19/98) is a special act which regulates the ownership status of seven international airports in Croatia.

The protection of the passengers' rights is regulated by the Act on Obligatory and Legal Relations in Air Transport (Official Gazette No. 132/98).

ANALYSIS OF TRANSPORT INFRASTRUCTURE

Transport infrastructure in Croatia consists of a network of roads and highways in the total length of 29,016 kilometres, railway network in the total length of 2720 kilometres, inland waterways network in the total length of 804 kilometres with four ports – Sisak, Slavonski Brod, Vukovar and Osijek, and two lakes – Visovac and Kozjak within the national parks which provide tourist navigation, sea transport system with six main seaports – Rijeka, Zadar, Šibenik, Split, Ploče and Dubrovnik, and the air transport system with seven airports – Zagreb, Split, Dubrovnik, Zadar, Pula, Rijeka and Osijek and two minor aerodromes – Brač and Lošinj.

The backbone of the transport network of Croatia consists of the sections of Pan-European corridors:

- Vb – Rijeka-Zadar-Varaždin-Budapest,
- Vc – Ploče-Sarajevo-Osijek-Budapest,
- X – Salzburg-Villach-Ljubljana-Zagreb-Belgrade-Skopje-Solun,
- Xa – Graz-Maribor-Zagreb,
- VII – Danube river system with the Sava waterway,
- Adriatic-Ionian area PETRA.



Figure 3. Pan-European corridors in Croatia

In 2006 the traffic performance in domestic transport of goods amounted to 5,977 million ton kilometres, with railways accounting for 11.5 percent and roads 88.5 percent.

International transport of goods amounted to 7,503 million tone-kilometres, with the share of railway of 35 percent and roads 65 percent.

An extremely low traffic effect, only 116.4 million ton-kilometres, was realized in inland waterway goods transport, in which domestic transport participated with 33.2 percent. [7]

The Croatian Railways perform a significantly smaller part of the pre-war operation, and the quality of the service at the existing network is not satisfactory, except on one section of Corridor X. In 2005 there were 15.83 million tonnes of cargo and 39.84 million of passengers transported, which represents about 40 percent and 91 percent, respectively of the realized transport in the pre-war year.

Table 1. Length and density of railway networks

Railway lines	Length		Density	
	km	%	km/1000 km <sup>2</sup>	km/mln citizens
Total	2,720	100	48	612
Single-track	2465.7	90.7	44	555
Double-track	254.3	9.3	4.5	57
Electrified	977.6	35.9	17.3	220

Source: according to data of Croatian Railways

With low speeds on a large section of the railway network, conditioned by obsolete track geometry, there are numerous speed limits due to inadequate maintenance or obsolete signalling and safety and telecommunication instruments.

Table 2. Status of permitted speeds on railway network

Permitted speed	Share in the network (%)
more than 100 km/h	12.2
60-100 km/h	42.6
lower than 60 km/h	38.9
out of transport	6.3

Source: Ibidem

According to general indicators of the development level the Croatian Railways lag behind the average of the EU countries and the countries of Central and Eastern Europe. This lagging behind is especially marked regarding electrification of the network and the length of double-track railway lines. There is significant lagging behind regarding exploitation characteristics. Only on 13 percent of the railway network speeds of over 100km/h can be reached, and 43 percent of the railway lines network allows speeds of only up to 60km/h. With the exception of the section of the railway line between Novska and Vinkovci, which is double-track, electrified, and allows speeds of up to 160km/h, all other lines have obsolete technical and technological parameters, dating back to as far as the 19<sup>th</sup> century, i.e. time of their construction.

In 2005 in Croatia in the structure of the transported cargo road traffic accounted for 52 percent, and in the structure of transported passengers 55 percent.

The density of the road network of high serviceability in Croatia is multiply greater (almost six times) in comparison to other transition countries, whereas in comparison to the countries of the European Union (EU15) it is at approximately the same level.

However, the qualitative characteristics of the Croatian road network are not satisfactory, mainly due to insufficient investment into maintenance, which consequently affects also the safety aspects of road transport.

Table 3. Length and density of road network

Road length (km)			Density (km/1000km <sup>2</sup> )
State roads	6,812		27,951
County roads	10,604		
Local roads	10,535		
Highways	846	1,065	18.8
Semi-highways	219		

Source: according to data of Ministry of Sea, Tourism, Transport and Development, 2007

The standards of designing and construction of high-serviceability roads refer exclusively to construction technical elements and do not include in sufficient measure the ITS applications of flow management, which, especially regarding the specific characteristics of the transport demand in Croatia – periodic traffic fluctuations, are the necessary precondition of assuring the quality and safety of operation.

Table 4. Average annual daily and summer traffic on highways (2005)

Average traffic (veh/day)	Corridor Vb	Corridor X	SEETO Route 1 (Karlovac-Split)
AADT	9,900	15,700	8,000
ASDT	16,900	17,100	20,500

Source: according to data of Ministry of Sea, Tourism, Transport and Development

The total length of the existing (804.1 km) and planned (61.5 km) waterways in Croatia amounts to 865.6 kilometres, out of which 600.7 kilometres are included in the network of European waterways of international significance. Inland waterways include also the lakes of Visovac and Kozjak as part of the national parks Krka and Plitvica Lakes, which provide tourist navigation.

The density of inland waterway network is 14 km/1000 km<sup>2</sup>, which is not negligible in comparison with other European countries. The internal lack of connections of two most important basins of the Sava and Danube rivers does not allow major affirmation of the transport function and greatly reduces their transport and economic attraction. The isolation of the Sava River waterway and of the respective ports is the

consequence of low level of navigation safety in the lower part of the basin.

Out of a total of 539.2 kilometres of the existing waterways included in the network of European waterways, only 286.9 kilometres satisfy the conditions of classification for international navigation – 4<sup>th</sup> category of navigability. The longest navigable section is on the river Sava, which in Croatia on its largest section does not satisfy the conditions of international navigation.

Croatian river ports open for international traffic are Vukovar, Osijek, Slavonski Brod and Sisak. The infrastructure of the ports is not sufficient for a better provision of port services. All the four ports have suffered substantial damage that has not been completely repaired yet. The transport on the river Sava is limited to cabotage transport of crude oil between Sisak and Slavonski Brod and at annual level amounts to approximately 200,000 tonnes.

The international transport along the river Danube is marked by the growing trend so that the ports of Vukovar and Osijek, in spite of the lack of substantial investments into the port infrastructure mark a growth, especially in international transport. The total cargo transport realized on inland waterways amounted in 2005 to about 1.5 million tonnes.

In the network of river transport of Croatia no international standards of organizing waterways have been established which makes the integration of this transport module into intermodal logistic chains impossible. The specific characteristic of the Croatian waterways is that these are mostly border rivers so that the projects of their regulation has to be coordinated with the neighbouring countries. This refers especially to the project of regulating the Sava waterway.

The indentation of the Adriatic Sea into the European mainland and its sea characteristics make the Adriatic ports attractive to transit cargo from the area of Central and South-eastern Europe.

Croatia has six seaports open to public transport of national importance – Rijeka, Zadar, Šibenik, Split, Ploče and Dubrovnik, 40 county and about 280 local ports. There are 24 marinas registered and 26 industrial and shipyard ports of national importance.

The biggest Croatian ports Rijeka and Ploče are the endpoints of two branches of the Pan-European Corridor V – the Port of Rijeka on Vb, and the Port of Ploče on Corridor Vc.

Transport connections of the Port of Rijeka with the hinterland – Slovenia, Austria and Hungary, and the Port of Ploče with Bosnia and Herzegovina, Serbia, Montenegro and Hungary open up the possibilities of attracting international traffic flows. This refers particularly to the connecting roads and high-quality interfaces of the Pan-European corridors in the region and the sections of TEN-T network. In this sense, and following the objectives of the joint transport policy of the European Union the most interesting option is the development of intermodal chain which combines the environmentally friendly forms of inland water, rail, and sea

transport. The geo-traffic position and natural resources insure for Croatia extreme comparative advantages in connecting the Pan-European corridors with the new 21<sup>st</sup> priority project of the TEN-T network – sea highway.

The existing capacities of the container terminal in the Port of Rijeka represent a limiting factor of increasing the transport of container, Ro-Ro and general cargo. The start of work of the ironworks in Bosnia and Herzegovina has stipulated a continuous growth in the demand for import of bulk cargo via the Port of Ploče, whose capacities are underdeveloped. The reconstruction of the industry in the hinterland sets the requirements for an increase in the container transport for which the Port of Ploče has no terminal.

The continuous growing trend of the tourist traffic is reflected on the increase in the traffic demand in international passenger traffic and adequate evaluation of the sea transport function, mainly in servicing the demand for cruise voyages and connections between the Italian and Croatian coasts.

Cargo transport in six main seaports in Croatia in 2005 amounted to 18.8 million tonnes or approximately 72 percent of total cargo transport in the Croatian ports. Total passenger traffic in the Croatian seaports in the same year amounted to more than 22 million passengers, led by the port of Split with the realized transport of 3.2 million passengers.

The main aerodrome network in Croatia consists of seven airports of category 4E with runways that can accommodate conventional aircraft almost without restrictions. Two are located in continental part of Croatia – Zagreb and Osijek, and five are located along the coast – Pula, Rijeka, Zadar, Split and Dubrovnik.

At airports and at two airfields – Brač and Mali Lošinj, there is scheduled public transport and occasional public transport in domestic and international traffic. Seventeen airports are registered for handling aircraft of general purpose and occasional air-taxi, five airfields, three heliports for personal needs and four emergency heliports.

The international status of regional importance has been confirmed by airports Zagreb, Split and Dubrovnik being included in the basic regional network of South-eastern Europe.

In 2005 a total transport of almost 4 million passengers was realized, out of which 90 percent was concentrated at three airports – Zagreb, Split and Dubrovnik.

A more moderate trend of traffic growth is present also at other airports that have over a relatively long period operated at the verge of profitability due to traffic loss and transport isolation. Opening of the market, growth of tourist traffic and arrival of a number of low-cost air carriers have contributed to the revival of these, for scheduled domestic transport insufficiently attractive aerodromes.

## ANALYSIS OF MANAGEMENT SYSTEM

Although at the state level the readiness for the processes of economic transition has been declared, at the administration and organization level the preconditions for the structural reforms towards commercial management have not been fully insured.

From the aspect of road infrastructure management, the classification of roads into state, county and local roads expresses not only transport and other functions of roads, but also a model of state structure. The intensity of the resulting conflict of interest is immanent to individual structure models. The conflict of interest, as well as the subjective setting or implementation of classification criteria, for instance, affect to a certain measure the entire classification of roads. The problems that result from such classification increase more with the degree of reduction in the means allocated to road maintenance. This is precisely one of the already more permanent characteristics of the Croatian road system.

The organization of the road management sector in general follows the model of road classification and state structure, and this is not a Croatian specific characteristic. The Croatian specific characteristic, however, in professional and political sense, is the too sudden and insufficiently thought through introduction of concession in the field of road infrastructure. This similarly refers to unprepared implementation of common investments of public and private sector in the construction of new roads. In case of, for example Istrian Y, the public has shown not only sensitivity but also a strong reaction, which should be taken into consideration in the future projects.

The sources and the amount of means that are paid by the motorized vehicle owners and road users are not important just from the aspect of road infrastructure management but also from the position of entire internal policy. Policy of fuel pricing and the future direct charging of transport infrastructure usage will gain in importance.

The models of structuring commercial units with the aim of rational road infrastructure management are closely related also to the methodology of determining costs and prices of infrastructure usage.

Table 5. Classification of the network of highways in Croatia per management companies (2006)

Company (origin name)	Highways (km)	Semi-highways (km)	Total (km)
HAC d.o.o.	729	0	729
ARZ d.d.	76	70	146
Bina Istra	0	149	149
AZM d.d.	41	0	41
Total	846	219	1065

The absence of an organization for guiding heavy cargo vehicles at the state level, as well as of transport of dangerous

cargo, has deformed the cargo traffic flows. The carriers have tried to avoid toll charging, that were anyway too low compared to the costs caused by cargo transport.

The interest of the state regarding this issue is expressed by the need to reduce the budget expenditures and increase the revenues. It is therefore necessary to establish a system and methodology of precise delegation of expenditure/revenues value for all groups of roads, i.e. at state, county and local level.

The means for construction and maintenance of highways are planned in the plan periods. For the period from 2006 to 2008 total investments of about 19.2 billion kunas were planned, with maintenance and construction ratio being 1:4.

For the period after 2008 the plan document that would specify the planned means for investment into construction, maintenance and management of highways has not been adopted. In the context of integration processes, strategic planning of the transport development and interests of international financial institutions, the failure to determine the priorities in investments, dynamics of construction and deadlines for the realization of investments into highways, may be identified in a negative sense.

The budget of the Croatian Roads for the period from 2006 to 2008 was planned in the amount of about 9.9 billion kuna with the maintenance – construction ratio of 1:1.3.

The county and local roads in Croatia are managed by County Administration for Roads owned by twenty counties and authorized administrative body in the City of Zagreb. The budget of the County administration for roads for the period from 2006 to 2008 has been planned in the amount of about 5 billion kunas. The funding system is based on the sources – annual fees from vehicle registration and the respective part of the revenues from the fees for roads in the price of fuel.

The Railway Act has regulated that the railway infrastructure owner, i.e. the Republic of Croatia determines the legal person to manage infrastructure. The access to railway infrastructure is approved by the infrastructure manager, and a respective contract is signed with the rail carrier.

The Croatian Railways are in the process of restructuring according to the new act which means separation into several companies with specific activities. In order to realize the separation the Croatian Railways Division Act was brought. Four companies with limited liability for management, maintenance and construction of railway infrastructure, for passenger transport, for cargo transport and for train traction are owned by the holding.

The privatization process of river ports was completed by separating the functions of port management from port commercial activities. Port management, organization of port infrastructure and insuring the access to ports by users are the responsibility of port authorities – public institutions for the management and development of ports. Port commercial activities are performed by port operators based on concession agreements. The charging of port fees for the usage of coast represents revenues of the port authority and is

used for maintenance of port facilities. The fees are paid by all ships under the same conditions.

Out of two ship operators registered for public transport, whose capacities are used mainly on the Danube and the Drava, the major Danube Lloyd Sisak is a privatized company with a share of private capital of more than 70 percent.

According to the Inland Navigation Act, the waterways are under the care of the Agency for Inland Waterways with the main tasks being: construction and technical maintenance of inland waterways. Water facilities for navigation are owned by the state and are financed from the state budget.

All the subjects on the air transport market in Croatia – flag carrier, service provider in air navigation, airports, are independent companies and there is no mutual transfer of financial means, nor any agreement on public passenger services. Although mainly owned by the state, the flag carrier Croatia Airlines is an commercial subject that bases its operation on the principles of entrepreneurship.

Airports in Croatia are the companies. However, the investments into expansion of capacities and modernization are covered partly from the state budget. Owing to business results the three most important airports in Zagreb, Split and Dubrovnik have ambitious development plans, especially the construction of a new terminal in Zagreb. Other airports do not mark such good financial results and their financing still depends to a large extent on the budget means of the state and local governments.

Croatia Control (Croatian Air Navigation Services) operates as an independent company with limited liability, owned by the state and funded by charging the air traffic control services and aircraft guidance in Croatian airspace.

The Maritime Demesne and Seaports Act separates the function of infrastructure management from the port activities. Ports for public transport are managed by the port authority, which has the status of a public institution, and its basic tasks are the construction and maintenance of the port and allocation of concessions to perform port activities. The construction of port infrastructure is funded from the port fees, concession fees and the state and county budget. The special purpose ports – shipyard ports, industrial ports, ports of nautical tourism, are managed by the concessionaires, and the concession is granted based on the public tender, depending on the importance and size of the port by the Parliament, Government or County.

The port activities – cargo and passenger handling, storage, mooring and unmooring of ships, port tugging etc., are published by legal and physical entities that have concession based on the public tender.

In Croatia the main operator of combined transport is the Croatian Railways with own transport capacity and terminal infrastructure. Their managing is delegated to Agency for Integral Transport AGIT Ltd and CROCOMBI Ltd as combined transport company, and other companies and forwarding agencies.

As container transport organizer AGIT operates exclusively within Croatia (inland service). Other container



transports by rail are in the regime of Crocombi and Intercontainer in transit towards neighbouring countries.

Following the increasingly marked requirements of the carrier for the establishment of new technologies, mainly on the Croatian section of the Pan-European corridor X, in the current phase of introducing Ro-La technology, according to geographical position and highway closeness in order to redirect the transit truck flows from Serbia and Bosnia and Herzegovina, the railway station in Spačva proved as the most favourable location.

### CONCLUSION

Transport evaluation is the basis for defining the strategic goals and the precondition of determining the transport policy. Within the assumptions of regional development and integration processes, and following the historic development context, the transport system of Croatia can be assessed as a significant potential of geo-strategic positioning, both from the aspect of contribution to the spatial integration and from the aspect of the contribution to economic integration of the country.

The network of international transport routes in Croatia is related to omni-directional transit flows, and natural resources for modelling intermodal logistic chains in the context of European policy of sustainable transport development are the priorities of the development option.

In the process of integration of Croatia into the European Union it is necessary to harmonize the legislation of the transport sector at two levels: vertically – by establishing the frame of transition to the free market system with controlled influence on the management models and transport infrastructure management (structural reforms), and horizontally – by harmonizing the national transport sector with references of the European Union, mainly regarding the institutional and legal organization of the regulator, and the technical, technological and safety standards of exploitation.

The establishment of legal frames for intensifying of progressive development of intermodal transport – primarily rail and water transport, and the sustainable development of public, mainly urban transport, dictates the concentration and strengthening of the regulatory function of the transport sector and administrative capacity, program development approach with precise definition of dynamics and financial instruments i.e. investment policy.

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