

INVESTMENT IN TRANSPORT INFRASTRUCTURE IN THE REPUBLIC OF CROATIA

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ABSTRACT

A specific configuration of Croatia with total area of 87,661 km² (56,594 km² of land) indicates vital importance of transport infrastructure for its development. However, due to exceptional geographical position, transit transport has very important significance in terms of connecting Central Europe with the countries of Southeast Europe. The Pan-European transport corridors which pass through Croatia (Vb, Vc, VII and X) emphasise the above mentioned statement. The basic network of transport infrastructure in Croatia consists of: roads (29,038km), railways (2722km), seaports of national interest, inland waterways, airports and terminals for combined transport.

The paper analyses the overall transport infrastructure in Croatia with special emphasis on investment in road and railway network and comparison of models of their funding as well. An investment in building a new transport infrastructure is one of the prerequisites of continued sustainable development. In the past fifteen years, very intensive investments in road infrastructure, particularly motorways, have been carried out. The cycle of investing in Croatian motorways is in its final stage with more than 1000km of the new network. The investment cycle in railway infrastructure is still expected, and it is essential due to infrastructure inadequacy. The main problem is on the Pan-European corridors, where infrastructure must comply with the European standards. It is expected that the investment cycle in railways will last at least 15 years. Building of the motorways is mainly financed from the state budget and concessions. The construction and reconstruction of the railway network which is part of the Pan-European corridors have the funding option through pre-accession EU funds. In Croatia the IPA fund is active, but there are also previous experiences with the ISPA fund as a source of funding the reconstruction of the railway network. At the end of the paper suggestions for more intensive, efficient and transparent investment solutions are proposed.

Keywords: transport infrastructure, investments in road and railway network

1. INTRODUCTION

Investment in the construction of a new traffic infrastructure is one of the prerequisites for a continuous sustainable development. Long-term plans have to be in compliance with the objectives of the traffic policy, economic development, social politics and environmental protection. The Republic of Croatia bases the development of the traffic system on the *Traffic Development Strategy of the Republic of Croatia*.

Because of its exclusive geographic position, the Croatian territory has a very important transit significance regarding connections of Central Europe with the countries of the European Southeast indicated also by the Pan-European traffic corridors that pass through Croatia (X, Vb, Vc and VII).

However, the traffic infrastructure in the Republic of Croatia is at different development levels. Thus, a high level of development has been achieved in the highway network, whereas at the same time the level of quality among state, county and local roads is unsatisfactory. The length of the railway lines in Croatia also exceeds the European average (there are 62km of railway lines per 100,000 inhabitants in Croatia, whereas the average in EU-25 is 45 kilometres). However, only 9% of railway lines are double-track lines, and 36% are electrified.

One of the reasons of such misbalanced condition of the traffic infrastructure lies also in the fact that in the last dozen years there have been intense investments almost exclusively into the network of highways and no investments in other traffic infrastructure. Therefore, the development of traffic infrastructure should be directed to an increase in mutual integration and connection of the overall traffic system in order to achieve synergy effects on the development and competitiveness of the economy as well as uniformity of development, quality and safety of the traffic infrastructure.

2. TRAFFIC INFRASTRUCTURE IN THE REPUBLIC OF CROATIA

The basic traffic infrastructure network in the Republic of Croatia consists of the public roads, railways, seaports, internal waterways, airports, and transport terminals for combined transport.

a) Public roads

There have been 29,546.9km of roads classified as public roads in Croatia, and they include (Figures 1, 2) [1]:

- highways (1,562.6km – there are 1,102.4km constructed as full-profile highways, 141.2km of highways not yet constructed as full profile, 319km planned for construction);
- state roads (6,819.7km);

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- county roads (10,867.4km);
- local roads (10,279.2km).



Figure 1 - Public roads in Croatia

■ highways ■ state roads ■ county roads ■ local roads

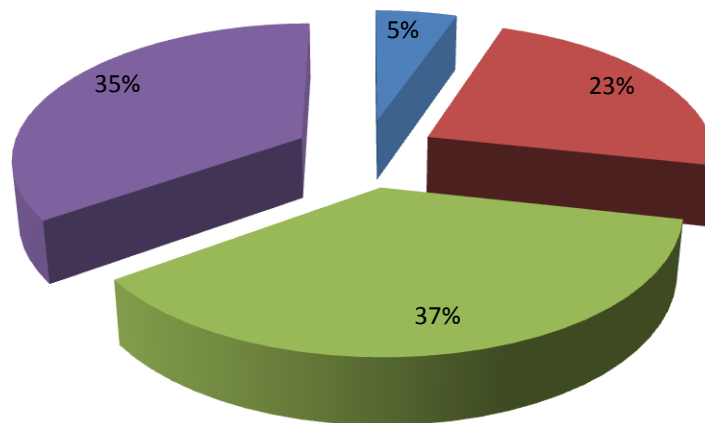


Figure 2 - Share of single categories of public roads

Public roads management has been entrusted to the institutions depending on the public road category (Table 1)[2].

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Table I - Public roads management

Public roads category	Highways	State roads	County roads	Local roads
Institution	- Croatian Motorways Ltd. - concession companies: Motorway Rijeka – Zagreb PLC, Motorway Zagreb – Macelj Ltd and BINA ISTRA PLC	Croatian Roads Ltd	County Road Administration and City of Zagreb	

b) Railway network

In order to determine the method of managing the railway infrastructure and planning of its development, the railway lines in the Republic of Croatia have been classified into three main categories (Figure 3) [3]:

1. railway lines of significance for international traffic (M)
 - a) main (corridor) – located on Pan-European corridors or their branches;
 - b) connecting – connecting the railway lines of Pan-European corridors and their branches;
 - c) connection – connecting international sea and river ports in the Republic of Croatia with railway lines on Pan-European corridors and their branches.
2. railway lines significant for regional traffic (R);
3. railway lines significant for local traffic (L).

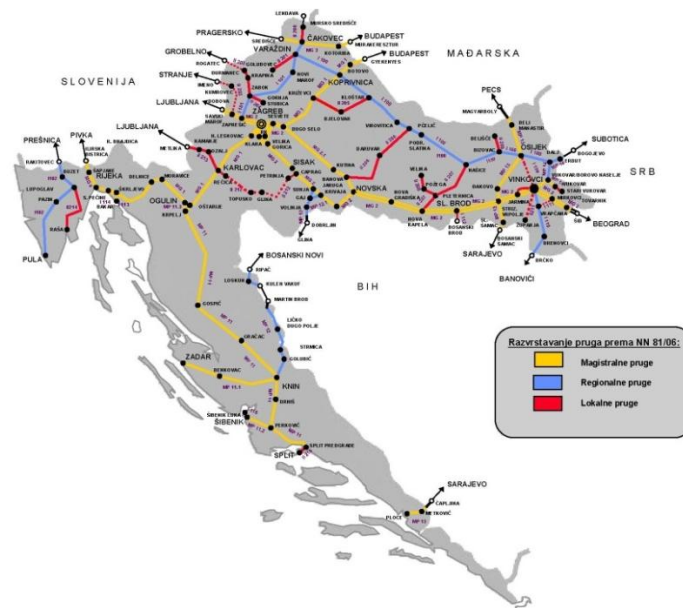


Figure 3 - Network of railway lines in the Republic of Croatia

A part of railway network is at the same time part of the network of Pan-European traffic corridors that pass through the territory of the Republic of Croatia, and these are [4]:

- **Corridor X** - state border – Zagreb – Novska – Slavonski Brod – Vinkovci – Tovarnik – state border,
- **Corridor Xa** - Graz – Maribor – Zagreb,
- **Corridor Vb** - (Budapest) - state border – Zagreb – Rijeka,
- **Corridor Vc** - state border- Beli Manastir – Osijek –Vrpolje – state border – (Sarajevo) – state border – Ploče.

The total length of all the railway lines in the Republic of Croatia is 2,722.41km, and out of these 2,468.54km (90.7%) are single-track and 253.87km (9.3%) are double-track lines. There are 980.07km (36.0%) electrified railway lines, and out of these 824.37km (84.1%) are with AC 25kV/50Hz and 137.70km (15.9%) DC 3kV system.

c) Seaports

According to the existing categorisation, there is a total of six seaports of state interest: Rijeka, Ploče, Šibenik, Zadar, Split and Dubrovnik. The ports of Rijeka, Ploče and Šibenik are primarily cargo, and the ports of Zadar, Split and Dubrovnik are primarily passenger ports.

d) Inland waterways

The inland waterways in the Republic of Croatia in the total length of 804.1km encompass the following rivers:

- the **Danube** - waterway in the length of **137.5km**;
- the **Sava** - waterway in the length of **447.7km**;
- the **Drava** - waterway in the length of **198.6 km**;
- the **Kupa** - waterway in the length of **5.9km**;
- the **Una** - waterway in the length of **11km**.

The Danube waterway system is part of the Pan-European traffic Corridor VII. The ports on inland waterways are: Osijek, Sisak, Slavonski Brod and Vukovar

e) Airports

Airports: Zagreb, Dubrovnik, Split, Zadar, Pula, Rijeka and Osijek, and two aerodromes: Mali Lošinj and Brač.

f) Transport terminals for combined transport

The transport terminals for combined transport are located within the infrastructure of the Croatian railways, and these are: Vrapče (Zagreb), Brajdica (Rijeka) and Spačva in the vicinity of the intersections of Pan-European Corridor X and Corridor Vc.

3. INVESTMENTS IN ROAD AND RAILWAY INFRASTRUCTURE

Although the Strategy of Traffic Development of the Republic of Croatia defines the frame structure of total investments balanced per individual branches of the traffic system (Figure 4), the main part of investments into the traffic structure in the last dozen years was directed almost exclusively into road traffic network i.e. construction of highways [5]. In the period from 2005 to 2008 the investments into the construction of highways were as much as 37% greater than the predicted ones (Table 2). Therefore, high development of highway network has been achieved, whereas the network of state, county and local roads needs to be developed further.

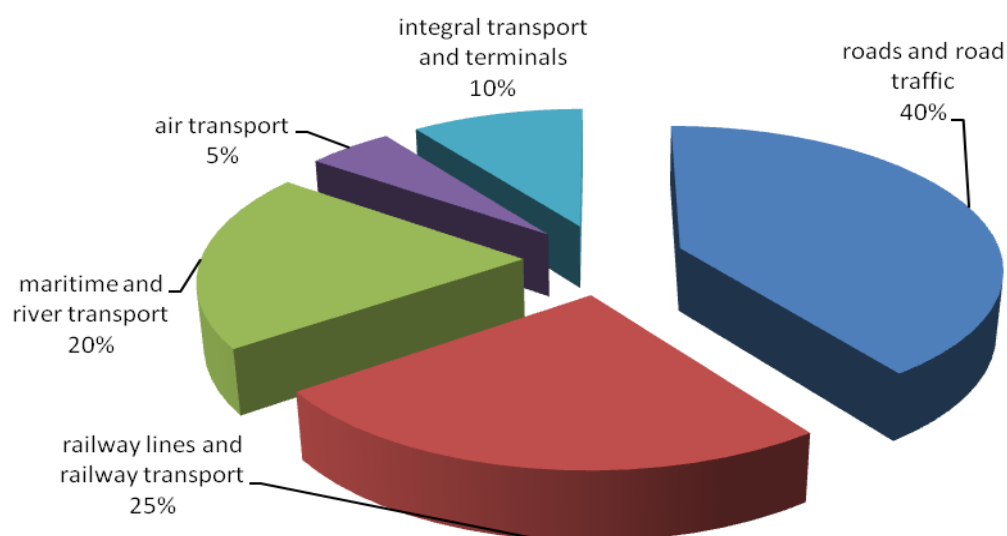


Figure 4 - Predicted structure of investments in traffic infrastructure

Table II - Realisation of the Program of public roads construction and maintenance for the period from 2005 to 2008

Public roads categories	Investments + maintenance in 10 ³ kn		
	Program 2005 - 2008	Realisation of the program 2005 - 2008	Deviation from the program / index
HIGHWAYS	19,238,189	26,361,662	1.37
STATE ROADS	9,643,000	10,059,939	1.04
COUNTY AND LOCAL ROADS	4,962,000	4,288,685	0.86
Total:	33,843,189	40,710,286	

The level of investments in the railway network in the last ten years was insufficient regarding the obsolescence and worn-out condition of railway infrastructure and referred mainly to programs of modernisation and renewal of the worn-out railway infrastructure (capital railway lines overhauls, modernisation of signalling and security and telecommunication devices), and maintenance (Table 3). The total amount of financial means, which was invested in the

past into the railway infrastructure, is substantially lower than the share in GDP planned for these needs, according to the Strategy of the traffic development in Croatia [6].

Table III - Investments in railways in five-year period

Investments in railways	VALUES OF INVESTMENTS (in 10 ³ kn)				
	2002	2003	2004	2005	2006
MODERNISATION PROGRAMS	269,900	789,500	960,900	694,204	889,984
CONSTRUCTION OF RAILWAY LINES	0	0	0	0	0
MAINTENANCE	165,563	213,625	247,588	160,597	158,794
OVERALL	435,463	1,003,125	1,208,488	854,801	1,048,778

The major investments in the railway infrastructure have been planned and defined by the National Program of Railway Infrastructure for the period from 2008 to 2012.

4. PLAN OF FUTURE INVESTMENTS IN TRAFFIC INFRASTRUCTURE

Since the investments in the past period were dominant in road traffic, this cycle is now being completed, whereas the investment cycle in the railways is yet to follow. Bearing this in mind, the basic care at the state level should be the modernisation and additional construction first of all of the railway lines which are of significance for the international traffic that would be the backbone of the overall railway system of the Republic of Croatia. The purpose of investment in other railway lines is the maintenance of their adequate traffic and technical level in compliance with the traffic service level requirements [7].

Table IV - Structure and dynamics of investments into railway infrastructure in the period from 2008 to 2012 in 10³ kn (Source: National program of railway infrastructure for the period from 2008 to 2012)

FIELD OF INVESTMENT	2008	2009	2010	2011	2012	total (2008-2012)
1. Maintenance of railway infrastructure and management of railway infrastructure and traffic	1,095,600	1,080,900	1,080,900	1,080,900	1,080,900	5,419,200
2. Reconstruction and modernisation of railway infrastructure	1,576,200	1,620,000	1,424,500	1,692,100	1,391,500	7,708,300
3. Upgrade of the existing and construction of new railway infrastructure	185,000	504,000	675,500	1,303,900	2,258,500	4,926,900
OVERALL	2,856,800	3,204,900	3,180,900	4,080,900	4,730,900	18,054,400

The investments into road infrastructure have also been planned in the period from 2009 to 2012, but at a much smaller volume than in the previous five-year period (Table 5); however, still in a greater amount compared to the investments in railway infrastructure. In the four-year period 2009 – 2012 all the activities related to the construction and maintenance of public roads have been limited by the financing possibilities, which due to global financial crisis and recession are less favourable than in the previous four-year period. The priority in the realisation will lie on the completion of certain activities started in the previous program period, solving of the most critical sections and objects with special emphasis on the solving of the road infrastructure in suburban and urban areas, as well as good connections between the islands and the mainland [2].

Table V - Investments into road infrastructure according to the Program of construction, maintenance, and management of highways for the period from 2009 to 2012 in 10³ kn

Description of investment	Legal entities for public road management				Total 2009-2012
	Croatian Motorways Ltd.	Croatian Roads Ltd.	County Road Administration	Concession companies	
Construction of public roads	5,885,111	4,589,570	769,985	3,386,030	14,630,696
Public roads maintenance and management	4,127,360	2,498,414	3,986,149	2,127,133	12,739,056
Total	10,012,471	7,087,984	4,756,134	5,513,163	27,369,752

5. SOURCES OF FINANCING INFRASTRUCTURAL PROJECTS

The financing of public roads construction and maintenance has been defined by the Act on Public Roads according to which the road infrastructure is financed from fuel taxes, toll charged when directly using motorways, road tax charged at vehicle registration, realized revenues and other sources (that do not exceed 5% of the basic sources) and finally the long-term credits (Table 6).

Table VI - The sources of the means per public road categories

	Public road category			
	Highways (not under concession)	Highways (under concession)	State roads	County and local roads
Sources of the means	- fee from the fuel, - toll charged for the usage of motorways - other fees related to the usage of highways	- toll charged for the usage of motorways under concession - financing sources defined by contracts on concession	- road fee from fuel - other fees related to the usage of state roads	- annual fee for roads charged at registration of motor vehicles - other fees related to the usage of county and local roads

The financing sources for the realisation of the National program of railway infrastructure have been planned with the following structure: 15.99 billion kuna (88.1%) from the state budget, 1.06 billion kuna (5.8%) from the pre-accession EU funds and 1.0 billion kuna (5.5%) from other sources (Table 7) [6].

Table VII - Financing sources to realize the National Program of Railway Infrastructure

SOURCES PER STRUCTURE	2008	2009	2010	2011	2012	TOTAL (2008 – 2012)
STATE BUDGET	2,644,100	2,854,900	2,730,900	3,580,900	4,180,900	15,991,700
Maintenance of railway infrastructure, and management of railway infrastructure and traffic	1,095,600	1,080,900	1,080,900	1,080,900	1,080,900	5,419,200
Reconstruction, modernisation and construction of railway infrastructure	1,548,500	1,774,000	1,650,000	2,500,000	3,100,000	10,572,500
EU FUNDS	110,000	200,000	250,000	250,000	250,000	1,060,000
OTHER SOURCES (inventories etc.)	102,700	150,000	200,000	250,000	300,000	1,002,700
OVERALL	2,856,800	3,204,900	3,180,900	4,080,900	4,730,900	18,054,400

The planned investment dynamics has been harmonised with the insurance dynamics from the predicted financing sources, and ranges from 2.85 billion in 2008 and 3.2 billion in 2009 to the amount of about 4.73 billion kuna in 2012 (Figure 5).

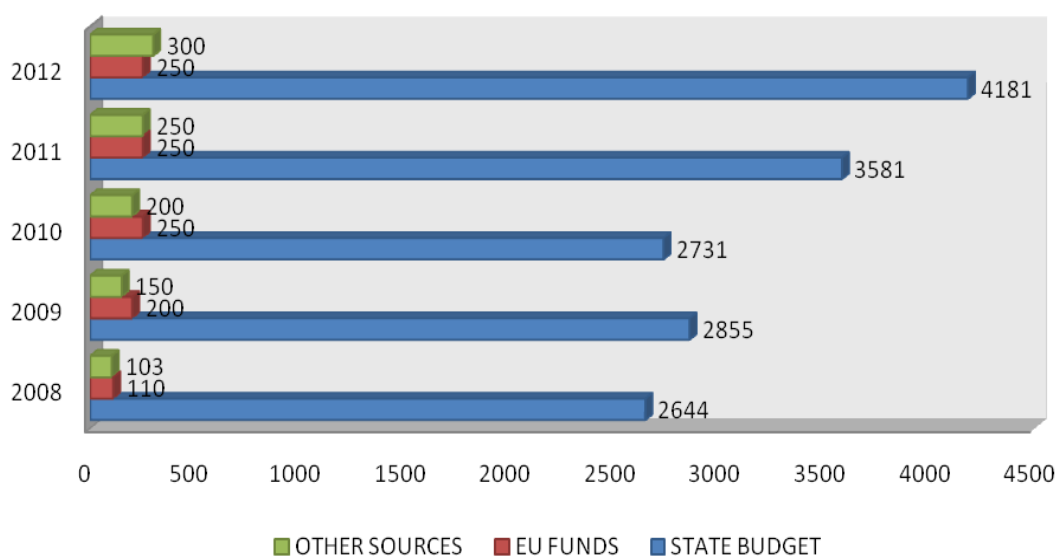


Figure 5 - Financing sources and planning dynamics in the period from 2008 to 2012

In the period from 2008 to 2012, the state budget will be the main source of financing the National Program, and also means have been planned from the pre-accession European Union funds (ISPA and IPA) with a share of 6% which is an extremely low share regarding the availability of the financial means [8].

6. CONCLUSION

Investments, almost exclusively in the highway network have resulted in unbalanced development of the overall traffic infrastructure and extreme deviation in the level of development as well as the level of providing the traffic services. Therefore, future investments in traffic infrastructure should be designed in such a way that will result in reducing the differences in the quality and safety among various segments of road infrastructure but also among single traffic branches.

Also, all the investments in traffic infrastructure up to now have used state budget as the main source of financing. It is obvious that the pre-accession funds in the function of sources of financing the railway infrastructure are represented by only 6% which is extremely low regarding the availability of EU means that are allocated to the Republic of Croatia and the traffic sector. Therefore, there is a necessity of implementing the more sophisticated financing models of investment infrastructure projects that will primarily focus on the means from the pre-accession funds (later the structure funds and cohesion funds), but also major participation of the private sector (public-private partnership).

Thus, the basic origins in further development of infrastructure will be: strengthening of market mechanisms in the construction and usage of infrastructure, modern system of infrastructure management, based on information technology, and sustainable development of financing its construction and maintenance.

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