ČEDOMIR IVAKOVIĆ, D.Sc,
Fakultet prometnih znanosti
IVAN LEGAC, D.Sc.
Ministarstvo pomorstva, prometa i veza
IVAN MAVRIN, D.Sc.
Fakultet prometnih znanosti
Vukelićeva 4, Zagreb
Republika Hrvatska

Traffic Planning
Scientific Paper
U.D.C. 656.1/.7(474+497)
Accepted: Mar. 2, 1999
Approved: Apr. 19, 1999

TRAFFIC LINKING OF THE BALTIC AND THE CENTRAL EUROPEAN COUNTRIES WITH THE ADRIATIC

ABSTRACT

The paper analyses new projects of the European traffic network as well as the extension of corridors defined in 1997 in Helsinki. For connecting of the Baltic and Central European countries with the Adriatic, the projects TEM 1 and 2, Via Baltica and TINA are of great importance. The programme of the TINA project includes road and railway corridors and relies on the 7th Danube corridor. The interrelations between traffic branches in the EU are presented, with the greatest share of road traffic, followed by railway and river traffic. The comparison indicates similar relations between single transportation branches in the period from 1979 to 1991 in the Republic of Croatia.

KEY WORDS

TEM project, road traffic, railway traffic, river traffic, Via Baltica, TINA project

INTRODUCTION

Expanding the existing and determining new traffic corridors is of great significance for the whole Europe and the country through which these pass through. Defining of projects such as TEM1 and TEM2 in road traffic and TER project in railway traffic have provided great incentives to countries in transition which encompass major sections of these corridors, to get involved in construction, expansion and reconstruction. The central European project, TEN, has initiated a number of subprojects related to various regional integrations such as the central European initiative CEFTA, linking of the Alpine and the Adriatic regions ALPE-ADRIA, and others. These initiatives have resulted in the need to connect the Baltic and the Adriatic, i.e. the Mediterranean in order to take off the load from the European traffic system, alleviate negative ecological aspects due to the high traffic volume, and stimulate intensive development of the east European countries. A great turning point was made at the Conference of European Ministers (CEMT) held in June 1997 in Helsinki, where the basic network of corridors in Europe was determined, including road, railway, river and air traffic. These are supplemented by defining the sea corridors based on a number of international agreements. On these assumptions, two new projects such as VIA BALTICA and TINA have been developed. For the railway traffic, TERN project and AGC and AGTC agreements are important, as well as the defining of the Danube initiative for connecting the Danube and the central European countries with the Adriatic.

1. TEM (TRANS-EUROPEAN NORTH--SOUTH MOTORWAY PROJECT)

TEM Project is the international system of motorways in the region between the Baltic and the Mediterranean, and in the traffic and technical sense it is the best planned and one of the best developed regional projects in Europe. Founded some 30 years ago, the Project includes today 13 full member countries and two observer countries.

On the west side, the TEM Project leans on and is an extension of the TEN/TERN system of the European Union (Trans European Road Network) and road section of the TINA project (Transport Infrastructure Needs Assessment). In the north, it is connected to the Project VIA BALTICA between Poland and Finland, and in the east and south-east it extends to the road network of the Front Asia and the Near East.

At first, the network consisted of the basic route from Gdansk to Istanbul, and with branches to Udine, Rijeka, Athens and Bucharest amounted to approxi-

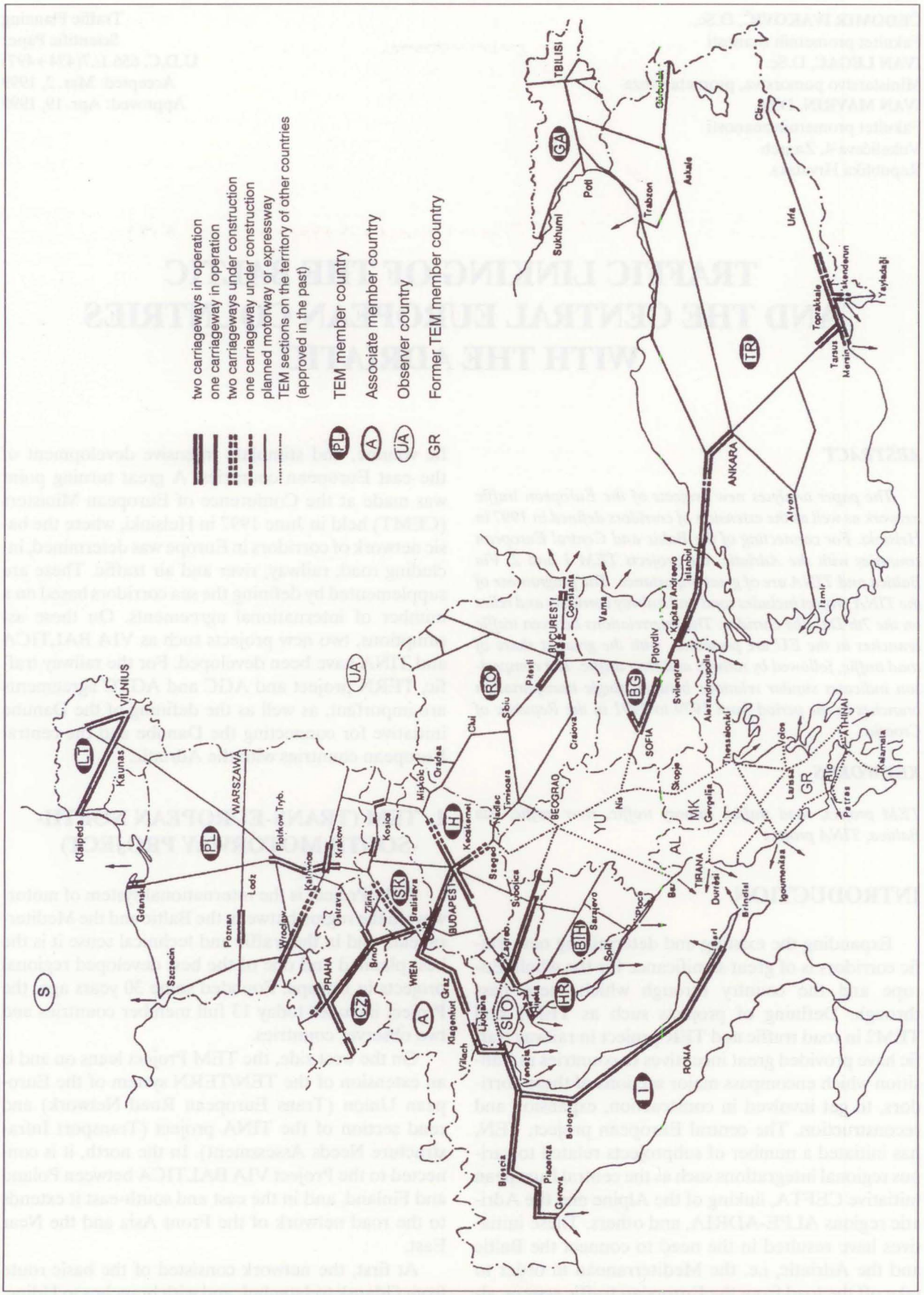


Figure 1. Trans-European North-South Motorway (TEM) Network

mately 10,400 km of roads. Subsequently, the branches from Segedin to Osijek and Ploče, as well as from Solun to Igoumenitse in Greece were added, and recently, especially following the political and economic changes in 1989, the network covers about 22,000 roads, out of which almost 7,000 km of modern motorways.

TEM Project coincides with the first attempts of the countries in the region to articulate their own national traffic policies and standards. The development of the Project has provided the possibility of harmonisation regarding regulations, guidelines and connections, as well as a well-planned approach to environmental protection and systemic monitoring of the traffic load on the network. Certain services within and outside the Project co-ordinate and assist in the process of implementing new models of financing construction and privatisation of certain aspects of road maintenance.

Many activities and initiatives have been made possible by the related UN-ECE bodies or have been initiated by OECD bodies. There is a specific co-operation with PHARE program in the sphere of multimodal transport as well as within the frame of traffic optimisation, environmental protection, etc.

The professionals involved in the TEM Project have actively participated in the implementation of the key documents for the 3rd Pan-European Conference on Transport held in 1997 in Helsinki, especially regarding updating of the traffic corridors and identification of priorities. It is noted that TEM network coincides significantly and is supplemented by certain sections of the traffic corridors.

In summer 1998, an agreement on co-operation was made between the UN-ECE/TEM Project and the WTB-TINA project, with concrete engagement regarding usage of certain parts of traffic data banks for the needs of the TINA project.

The co-operation with the Project VIA BALTICA may also be mentioned as another good example. It is extended in the zone of the Baltic countries and from Poland to Finland represents the logical and compatible system with the TEM Project.

2. VIA BALTICA

Via Baltica is a road traffic corridor connecting Finland and the near Baltic countries in the north with Poland and central Europe in the south. The system of future motorways is connected by the main route: Hel-

Figure 2 - Via Baltica

sinki/Tallin - Riga - Kaunas - Warsaw, in the length of about 1,000 km and servicing a potential of 40-50 million inhabitants.

The basic aim of the project is to ease the development of economy and the investments in the region, and apart from the development of the road system it includes the modernisation of telecommunications and railway, as well as the development of ferry lines and terminals. The development of this traffic system is expected also to join similar systems of Sweden, West Russia/St. Petersburg and Poland, i.e. TEM Project.

Along with other direct advantages, it is assumed that the modern road system and state borders will reduce the travelling times by half. A carefully selected route and the construction solutions are in maximum harmony with the environment and the found infrastructure.

Study analyses from the beginning of the 90s indicate a high level of social justification for the construction and a high level of economy of the project. The growth of the motorisation level and of travelling is very high, and the forecasts predicted a possibility of 500,000 t/annually, already during the first period of new construction. Via Baltica has obtained very high grades of profitability from the international financial institutions, and has become the priority project in all the countries of the region.

3. TINA (TRANSPORT INFRASTRUCTURE NEEDS ASSESSMENT)

The direct reason for founding this project were the conclusions made at the Meeting of the Ministers from the central and eastern Europe and the representatives of the European Council held on 28 September, 1995, with the aim of improving the vital traffic infrastructure in the countries - candidates for joining the European Union.

Declarative explanation starts from the evident need to gradually improve the level of traffic quality in the region of the former "iron curtain" until finally reaching the level of TEN-Tr network (Trans European Transport Network).

The whole project was, for reasons of operational functioning, divided into three geographically oriented sub-groups with the countries in the following regions:

- Baltic: Denmark, Finland, Germany, Sweden, Estonia, Latvia, Lithuania, Poland (Germany presiding);
- Central Europe: Austria, Germany, Czech Republic, Hungary, Poland, Slovakia, Slovenia (Austria presiding);
- South and Central Europe: Austria, Greece, Italy, Bulgaria, Hungary, Rumania, Slovenia (Greece presiding).

The TINA Project directorate was founded in Vienna in June 1996 as the operative body of the PHARE program, i.e. multinational transport program. Vienna was chosen as the strategic contact of the interest zones, and the directorate's tasks are, among others, the following:

- collecting data and comparison as the basis for assessment of the necessary infrastructure;
- professional support to the main group and subgroups during the traffic process;
- transforming the results of the group into coherent suggestions for the future of the TEN- Transport program;
- co-ordination between the sub-groups and developing of the proper traffic database with the GIS system;
- maintaining the service function in the process of developing the TEN-Tr program for the expanded European Union.

In June 1998, a concrete business agreement was concluded between TINA and TEM projects about sharing a part of the data bank and about the future co-operation.

4. RIVER TRAFFIC

The traffic corridor east of the Alps connects north and central Europe by road, rail and river transport whose backbone is formed by the river-canal system Rhine-Main-Danube. From the North Sea ports of Rotterdam and Hamburg this system connects central Europe, i.e. the Pannonian Plain with the south-east Europe (the Black Sea) and the Near East. Several side branches of this corridor pass through the Pannonian Croatia towards the Adriatic. The most important is the one connecting the region between Zagreb, Karlovac and Sisak with Rijeka. Important is also the branch connecting east Croatia via Tuzla, Zenica and Sarajevo in the Republic of Bosnia and Herzegovina with south Croatia i.e. the port of Ploče.

Another important corridor is the one connecting south of the Alps the central and eastern parts of the European continent over the Pannonian Plain and the Trieste and Kvarner Bays with the Po Plain, i.e. the Genova bay and the French, Spanish and Portugal Mediterranean coast. This corridor includes the road and rail transport as well as the waterways of the rivers Sava, Drava and Danube.

New incentive to the development of the river traffic is provided by the European contract on the main inland waterways of international significance, AGN, UN/ECE/ITC. By this contract, the waterways of the

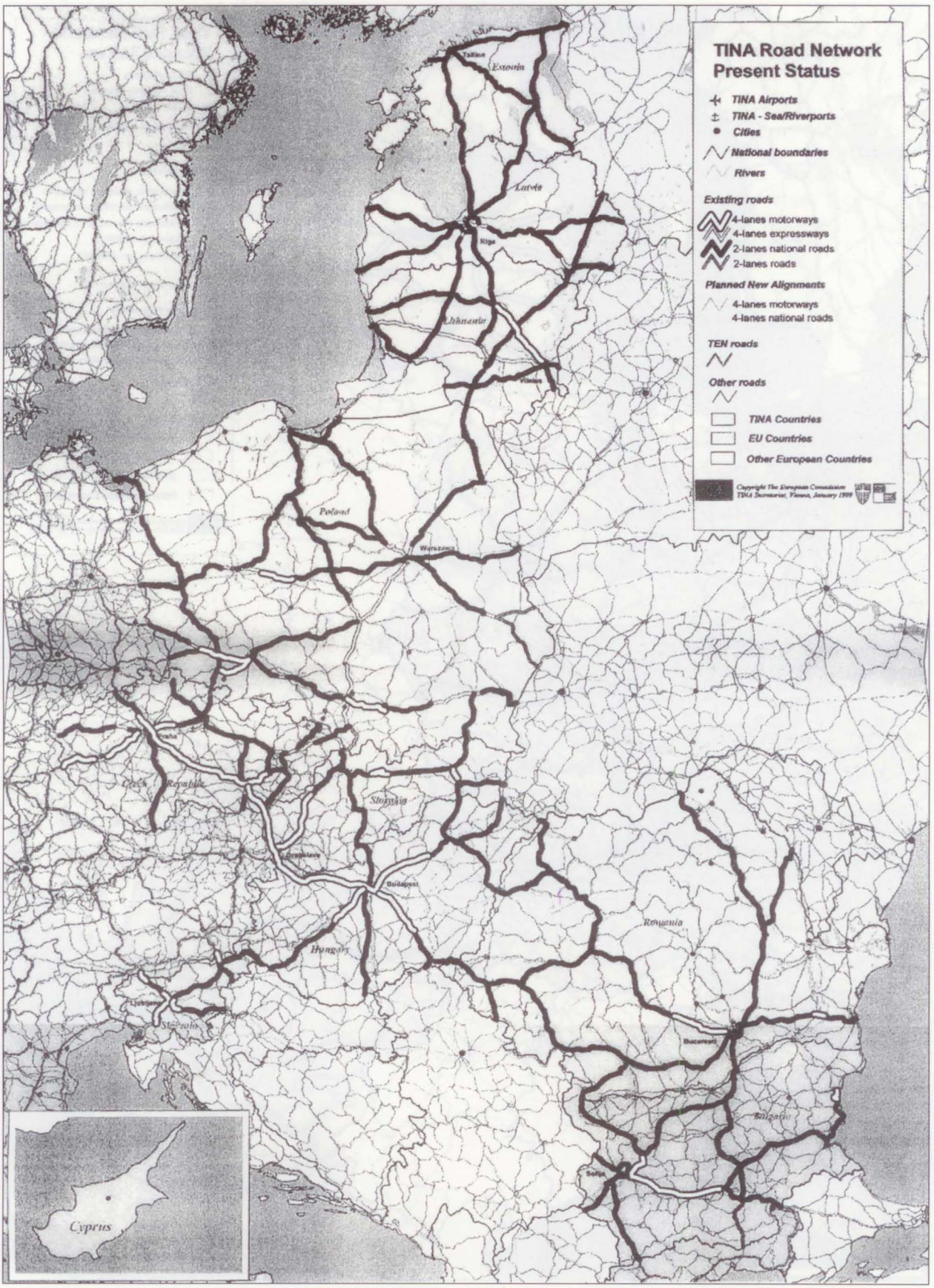

TINA Road Network
Present Status
TINA Airports
TINA - Sea/Riverports
Cities
National boundaries
Rivers
Existing roads
4-lanes motorways
4-lanes expressways
2-lanes national roads
2-lanes roads
Planned New Alignments
4-lanes motorways
4-lanes national roads
TEN roads
Other roads
TINA Countries
EU Countries
Other European Countries
Estonia
Latvia
Lithuania
Poland
Czech Republic
Slovakia
Hungary
Romania
Bulgaria
Cyprus

Figure 3

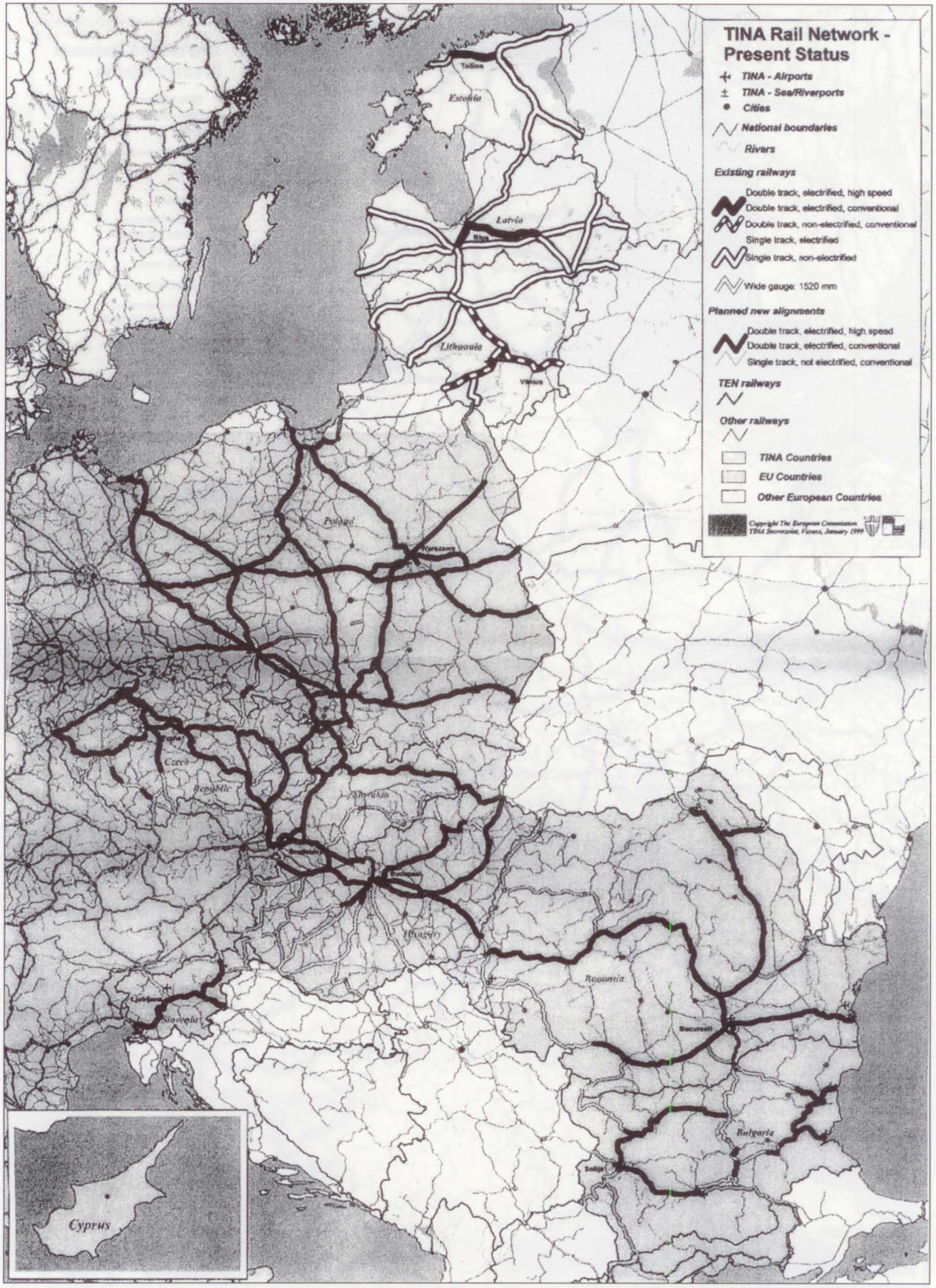

TINA Rail Network - Present Status
TINA - Airports
TINA - Sea/Riverports
Cities
National boundaries
Rivers
Existing railways
Double track, electrified, high speed
Double track, electrified, conventional
Double track, non-electrified, conventional
Single track, electrified
Single track, non-electrified
Wide gauge: 1520 mm
Planned new alignments
Double track, electrified, high speed
Double track, electrified, conventional
Single track, not electrified, conventional
TEN railways
Other railways
TINA Countries
EU Countries
Other European Countries
Estonia
Latvia
Lithuania
Poland
Warszawa
Czech Republic
Romania
Bucuresti
Bulgaria
Cyprus

Figure 4

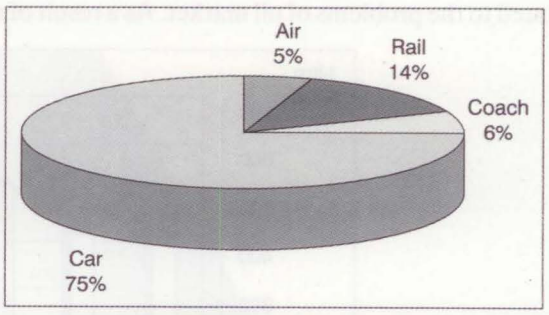
Figure 5 - Adriatic-Danubian Initiative Countries Main Integration Corridors

rivers Sava to Sisak, the Drava to Osijek, and the future Danube-Sava are included in the E network of waterways of the 7th Danube corridor.

5. LEVEL OF TRAFFIC DEVELOPMENT AND NEW TENDENCIES

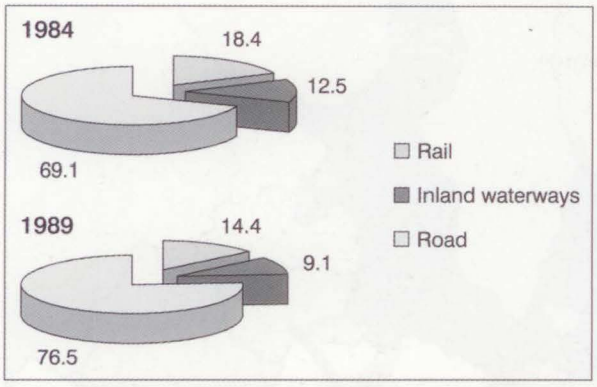
Regarding comparison of the data and traffic development in the aspect of the Republic of Croatia, the period from 1990 to 1998 does not offer the real image due to the aggression and the war in her territory as well as in Bosnia and Herzegovina. Therefore, we shall compare the data and trends for the period between 1984 and 1990.

According to the IRF data for the period between 1984 and 1989, the traffic along the main road routes in the EU is increasing on the average by 4% annually, which indicates how attractive the road transport is. If we compare the data for the year 1989 in the EU member countries, it may be noted that in passenger transport, the passenger road transport participates with 75%, railway with 14%, air traffic with 5%, and bus transport, as part of the road traffic, with 6%.



Graph 1 - Share of Different Transport Modes for Mid- and Long-Distance Passenger Journeys

In cargo transport, the road traffic is far ahead of the railway and river transport, and the tendency of growth in road traffic at the expense of railway and river transport is continuing.



Graph 2 - Community goods Transport trends 1984-1989, broken down by mode of transport

The transport of goods by road traffic within the EU member countries and between the member countries also indicates a tendency of high growth.

Such tendencies cause a number of problems related to overload of the road network, congestion in the cities and the increasingly negative influence of traffic on the environment regardless of the introduction of new vehicle engine designs, usage of unleaded petrol, etc. The latest studies in the EU[1] indicate that by 2010 an increase in the number of cars is expected by 35%, when there will be over 500 vehicles per 1,000 passengers. By the year 2015, the traffic within the community might increase by 110-140%, and in the countries of central and eastern Europe even more, and on some roads by 600-800%.

By 2010, the transport of goods in the EU may increase by more than 90%, and the international traffic by 87-156% regarding the introduction of free market after 1993.

5.1. The state of the art and expectations in the Republic of Croatia

Up to 1990, the passenger and cargo traffic had a constant tendency of growth with minor oscillations related to the problems of oil market. As a result of aggression and war in Croatia, there was a fall in the internal traffic, transit and tourist traffic, as well as a discontinuation of cargo transportation routes. Over the last two years there has been a gradual increase in the transit and tourist traffic.

Over the period between 1980 and 1990, the overall traffic in all the transport branches has oscillated, and the biggest growth was noted in the period between 1986 and 1990.

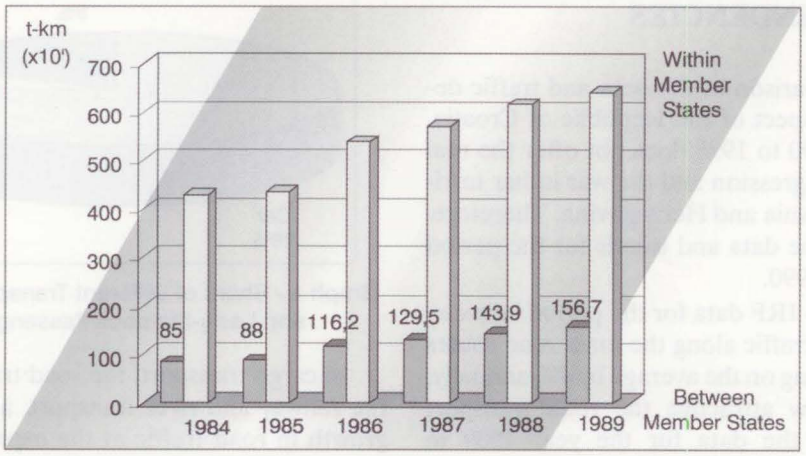
The highest transport efficiency was realised in the sea traffic, then railway, road and river transport, and oscillations may be noted in all the branches, depending on the market conditions.

6. CONCLUSION

The suggested projects and their realisation are of extreme importance for connecting the Baltic and the central European countries with the Adriatic for several reasons. Regarding the excessive traffic load on the west European corridors, northern ports, it is necessary to re-direct the traffic to the new corridors which at the same time need to stimulate the development of the countries in central Europe, the Baltic countries, i.e. the countries in transition. The ecological aspects play also a very significant role.

By accepting the traffic corridors in 1997 in Helsinki, the region of the Republic of Croatia and Bosnia and Herzegovina has been valorised, thus insuring a faster realisation of the TEM/TER and TINA projects. A big disadvantage is the fact that the Republic of Croatia and Bosnia and Herzegovina are not included in the PHARE program, which would insure an even faster realisation of the TINA project as a whole.

The region of the Republic of Croatia is closely connected to the 10th corridor which connects western Europe with the south-eastern Europe and the Near Ease, as well as to the 5th corridor, which is closely connected with the TEM, TER, TINA and Via Baltica



Graph 3 - Growth in Community carriage of goods by road 1984-1989

Table 1 - Cargo Transport in the Republic of Croatia from 1980 to 1990 **(mill. tkm)**

Type of transport	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Ton km (RH)	44,559	43,066	40,581	41,503	45,172	44,922	48,141	53,730	62,898	58,928	60,700
international	36,887	35,172	32,557	32,701	36,826	36,690	39,978	45,788	55,346	51,462	54,390
railway - total	7,561	7,630	7,918	8,723	8,698	8,674	8,098	7,698	7,211	7,419	6,535
international	2,516	2,508	2,598	2,839	2,997	2,980	2,579	2,380	2,377	2,537	2,592
road - total	2,630	2,715	2,755	2,687	2,710	2,723	2,897	2,935	3,006	2,965	2,852
international	124	168	219	245	276	291	356	418	427	507	611
sea - total	34,367	32,720	29,907	30,092	33,763	33,524	37,145	43,096	52,681	48,543	51,312
international	34,247	32,496	29,740	29,617	33,553	33,419	37,043	42,990	52,542	48,418	51,187
river - total	0,827	0,724	0.668	0.611	0.652	0.556	0.635	0.738	0.462	0.557	0.527
international	0.081	0.079	0.086	0.118	0.229	0.201	0.231	0.144	0.119	0.253	0.315

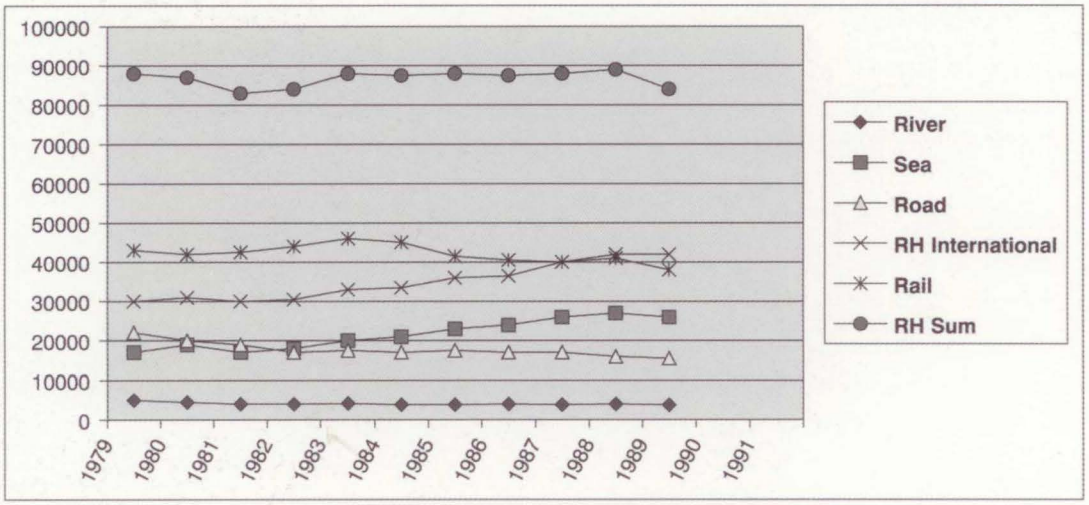


Figure 6 - Cargo transport in Croatia, 1980-1990

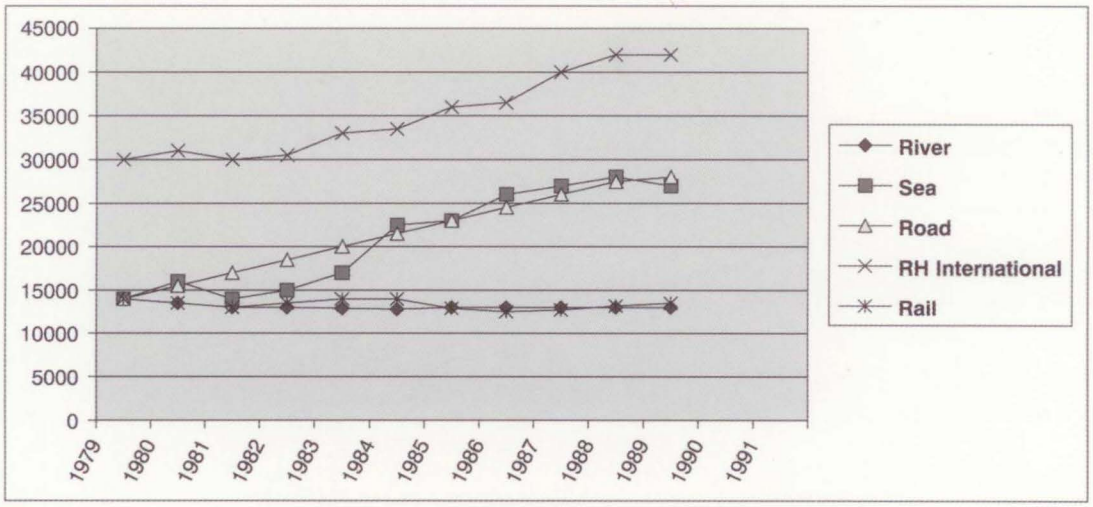


Figure 7 - Cargo transport in Croatia, 1980-1990

projects. The construction of the Danube-Sava canal (Vukovar-Šamac) in the 7th Danube corridor, shortening the waterway by 472 km, is also included in the project of connecting the Baltic and the central Europe with the Adriatic. By reconstructing the river Sava up to Zagreb and by building a river port in Rugvica, the 5th corridor branch B will be supplemented.

REFERENCES

1. See for example the study carried out for the Commision by Transroute (EC Motorway Guidelines, Horizon 2010 – Issis/Heusch Boesefeldt/AT Kearney).

LITERATURE

[1] **J. Božičević, J. Golubić, Č. Ivaković** et al.: *Prijedlog strategije prometnog razvitka Republike Hrvatske*, IPV, Ministarstvo pomorstva, prometa i veza RH, 1998

[2] AGTC, *Pregled postojećih AGTC normi i parametara UN*, New York, 1993.

[3] *Brijuni paper for combined transport in the central European region, 3rd Conference of ministers of transport of central European countries*, Croatia, Brijuni, 1994.

[4] **Č. Ivaković**: *Model for Determining the River Harbour Capacity*, Promet-Traffic, Zagreb, Vol. 6, No. 4-5, p. 77-84.

[5] *Third Pan-European Conference of Transport Ministers*, CEMT, Helsinki, spring of 1997.

[6] *Which changes for Transport in the next Century?* Proceedings of XIVth International Symposium on Theory and Practice in Transport Economics, CEMT – Innsbruck, 1997

[7] Commission of the European Communities, Directorate General for Transport, *Tram-European Network Towards a Master Plan for the Road Network and Road Traffic*, IRF, Motorway Working Group Report, Geneva, 1992.