

THE ROAD NETWORK IN THE BALKAN REGION AND THE POSSIBILITY OF THE DEVELOPMENT OF MULTIMODAL TRANSPORT¹

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Abstract

In this paper I addressed the position of Kosovo's road network and the harmonization of this network in connection with the Balkan road network and the possibility of organizing multimodal transport. Taking into consideration that Kosovo is a "hub" in the center of the Balkan area I have analyzed the importance of Multi-Modal development through the use of models of road, rail and sea transport.

Organization of logistics centers in the Balkan region with the main objective the use of multimodal transport and the role that Kosovo has for the development of this transport, as transport hub from where will be achieved shorter routes of transport, safer and faster services with lower costs. This paper also will consider the evaluation of the priorities of the national transport policy and treatment of important initiatives for the development of roads and transport corridors in the Balkans.

Keywords – *Multimodal Transport; Transport Corridors in Balkans; Networks*

¹ Original scientific paper

INTRODUCTION

The transport is an integral part of economic and social activities and is regarded as the key to economic development for development of a country in particular and development of the whole world in general, hence there is a need for development of a transport with rapid and quality services, and more efficient through integrated multimodal transport systems. Therefore, from my perspective the organization of transport is viewed in a new vision of Balkan and European integrated network, in order to minimize the shortcomings and disadvantages of multimodal transport.

Developed global economy, enhanced ICT (Information and Communications Technology) and improved communication network have contributed to major changes in transport.

Similarly as in EU developed countries and other European countries (of Central and Eastern Europe) and in Balkans, the rapid economic development imposes introduction and development of transport to a higher degree. The developed and modern transport has advantages of speed, availability, accessibility, reliability, security, sustainability, transparency and focusing on the last, which is the user. The developed transport leads to more effective use of the existing infrastructure with reduced environmental adverse impacts.

Balkans has an important geostrategic position, which represents an important intersection linking European countries with Asia, Africa, etc. The suitable geographical position provides an advantage of transiting of the goods transportation from many European and World countries through the “Balkans Bridge”.

PAN-EUROPEAN TRANSPORT CORRIDORS

Pan-European Transport Corridors and transport zones have been conceptualized and decided in the meeting of European Ministers of Transport:

1. Prague in 1991,
2. Crete on 14-16.03 1994, and
3. Helsinki in 1997.

Pan-European Corridors (shown in table 1) variously encompasses road, rail and waterway routes.

Table 1. Pan-European Transport Corridors

No. of Corridor	Designation of Corridor	Corridor Route
I	(North-South)	Helsinki - Tallinn - Riga – Kaunas and Klaipeda - Warsaw and Gdansk Branch A (Via/Rail Hanseatica) - St. Petersburg to Riga to Kaliningrad to Gdansk to Lübeck Branch B (Via Baltica/E 67) - Helsinki to Warsaw
II	(East-West)	Berlin - Poznan – Warsaw- Brest - Minsk - Smolensk - Moscow -Nizhny Novgorod
III		Brussels - Aachen - Cologne - Dresden - Wrocław - Katowice - Kraków - Lviv – Kiev 1. Branch A - Berlin - Wrocław
IV		Dresden/Nuremberg - Prague - Vienna - Bratislava - Gyor - Budapest - Arad -Bucharest - Constan'a /Craiova - Sofia -Thessaloniki / Plovdiv - Istanbul.
V	(East-West)	Venice - Trieste/Koper -Ljubljana - Maribor - Budapest - Uzhhorod -Lviv - Kiev. 1,600 km (994 mi) long. Branch A - Bratislava - Žilina - Košice –Uzhhorod Branch B - Rijeka - Zagreb – Budapest Branch C - Ploce - Sarajevo - Osijek –Budapest
VI	(North-South)	Gdansk - Katowice - Žilina, with a western branch Katowice-Brno.
VII	(The Danube River)	(Northwest-Southwest) -2,300 km (1,429 mi) long.
VIII		Durrës - Tirana - Skopje - Sofia - Plovdiv - Burgas - Varna. 1,500 km (932 mi) long.
IX		Helsinki - Vyborg - St. Petersburg - Pskov - Gomel - Kiev - Ljubashevka - Chisinau - Bucharest -Dimitrovgrad - Alexandroupolis.3,400 km (2,113 mi) long. Major sub-alignment: St. Petersburg -Moscow - Kiev. Branch A - Klaipeda - Vilnius - Minsk –Gomel Branch B - Kaliningrad - Vilnius - Minsk –Gomel Branch C - Ljubashevka -

		Rozdilna –Odessa
X		Salzburg - Ljubljana - Zagreb - Beograd – Niš-Skopje - Veles - Thessaloniki. Branch A: Graz - Maribor – Zagreb Branch B: Budapest - Novi Sad – Beograd Branch C: Niš - Sofia - Plovdiv -Dimitrovgrad - Istanbul via Corridor IV Branch D: Veles - Prilep - Bitola - Florina – Igoumenitsa Burimi: SEETO

Out of 10 abovementioned corridors, six corridors pass via Balkans, namely: Corridor IV (Rumania-Bulgaria), Corridor V (Croatia-Bosnia and Herzegovina), Corridor VII (Serbia, Rumania, and Bulgaria), Corridor VIII (Albania, Macedonia and Bulgaria) Corridor IX (Rumania-Bulgaria), and Corridor X (Croatia-Serbia-Bulgaria-Macedonia).

SOUTH EAST EUROPE CORE REGIONAL NETWORK

DEVELOPMENT – SEETO (South East Europe Transport Observatory).

SEETO is regional transport organization established by the Memorandum of Understanding for the development of the Core Regional Transport Network (MoU) signed on June 11th 2014 by the Governments of Albania, Bosnia and Herzegovina, Croatia, the Former Yugoslav Republic of Macedonia, Montenegro and Serbia and United Nations Mission in Kosovo on behalf of Kosovo.

The core road and railway network consists of corridors and roads. The Corridors are defined and are Pan-European. Corridors are as follows: V, VII, VIII, IX, X, which provide international links with European Union. Routes, of which seven are road network and six railways, complete the core network aimed at linking capitals within the region and neighbouring countries. The goal is free movement of people, goods and services, thus giving the regional economy development opportunities. The total length of the Core road network is around six thousand kilometres, consisting of three thousand kilometres of corridors and over three thousand five hundred other roads.



Fig.1. Regions on T-v Diagram

The software Trans Cad is used to carry out the road and transport corridors analysis in Balkans, and main roads in Kosovo (route 6 and 7), which provides the option of analysing O/D (ORIGIN-DESTINATION).

Taking into account the topic of research: ROUTES AND TRANSPORT CORRIDORS in Balkans, as an opportunity of Multimodal transport development, the studying field is analysed as a space laying between Pan-European Corridors (TEN-T) South East Europe Core Regional Network Development (SEETO), define the travelling distances for vehicle, rail and sea transportation in Balkans, also the flux of goods and passengers with different types of transport is analysed based on the travel distribution model (Matrix O-D). For this purpose Trans Cad uses Gravitational Model according to mathematic algorithms as below:

$$T_{ij} = k \times \frac{G_i^a \times A_j^a}{C_{ij}^b} \quad (1)$$

Where:

i & j - Origin and Destination Zone

T_{ij} – Traffic passenger flow (road transport) between zones i and j

G_i - The number of trips generated by zone i

A_j - The number of trips attracted by zone j

Cij - Barriers to travel between zones i and j (in function of travelling time between zones i and j)

Equivalent flow in cars per hour for one lane is determined using the following equation:

$$V_p = \frac{V}{PHF \times N \times f_{HV} \times f_p} \quad (2)$$

Where:

V_p – 15-minute passenger-car equivalent flow rate

V - hourly volume

PHF - peak hour factor

f_{HV} - heavy vehicle adjustment factor

f_p – driver population factor (drivers)

Values for the driver population factor, f_p , range from 0.85 - 1.0.

The density of vehicles:

$$D = \frac{v_p}{S} \quad (3)$$

Where:

D – density,

v_p – flow, and

S – average speed of a passenger vehicle.

In the OD analysis of traffic of goods and passengers, not only the Western Balkans zone into the SEET is included, but also other important zones out of it which are generator of traffic and/or impact centroid-joints in this network: Chisinau (Moldavia), Lviv (Ukraine), Kiev (Ukraine), Odesa (Ukraine), Istanbul (Turkey), which are also important joints of Pan-European corridors. **Centroid-joints** which are away from the impact area for road network of Kosovo are not included in the system. In figures 2 and 3, are given the maps of study zoning done with Trans Cad.



Fig.2. Map of study zoning – European States done with **Trans Cad**

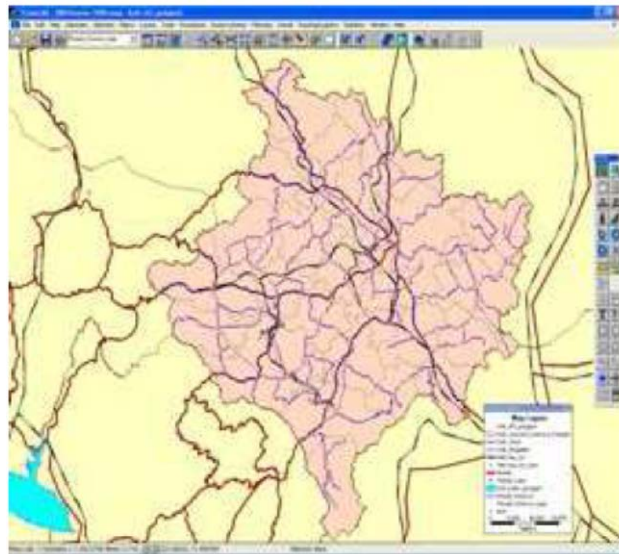


Fig. 3. Kosovo's road and corridor network, done with **Trans Cad**

The data are the inputs of program structured by the matrix formats of tabular data in the form of Excel: xls, xlsx, which serve as basis for conversion into transferable formats in Trans Cad: dbd, bin, mtx, dbf and tab.

Through Trans Cad software program, the calculated sizes of traffic flow and respective distances between different areas and (Fig. 2 and 3), seaports of Constanta, of Varna and Burgas in the Black Sea, and ports of Durrës, Bar-Montenegro and Igoumenitsa (Greece) in Adriatic sea, derive, which results that Kosovo presents the shortest road distance:

- From the seaport of Constanta (Rumania) to Durrës (through Corridor VI and VII) for 150 km shorter compared with the trip to the seaport of Bar (Montenegro), 97 km shorter than to Igoumenitsa seaport, 36 km shorter compared to the route VIII through Skopje.

- From the seaport of Varna to Durrës (through Corridor VI and VII) with 178 km shorter than to the seaport of Bar (Montenegro), 61 km shorter than through route VIII through Skopje, and 122 km shorter than to Igoumenitsa seaport.

- From the seaport of Burgas to Durrës (through Corridor VI and VII) 157 km shorter than to the seaport of Bar (Montenegro), 40 km shorter than through Route VIII through Skopje, 100 km shorter than to Igoumenitsa seaport.

Road distances from Black Sea ports to Balkans ports, that of Adriatic and Ion are presented on table 2.

Table 2. Distances between centroids and seaports in Balkan

No	Line	Type	Distance km
1	Constanta - Nish - Prishtinë - Durrës	Road	1215
2	Constanta-Nish - Prishtinë - Bar	Road	1365
3	Constanta - Sofia - Thessaloniki -	Road	1312
4	Constanta - Sofia - Skopje - Durrës	Road	1251
1	Varna - Sofia - Nish - Prishtinë - Durrës	Road	960
2	Varna-Sofia-Nish-Prishtine-Bar	Road	1138
3	Varna - Sofia - Skopje - Durrës	Road	1021
4	Varna - Sofia - Thessaloniki - Igoumenitsa	Road	1082
1	Burgas - Sofia - Nish - Prishtinë - Durrës	Road	910
2	Burgas-Sofia-Nish-Prishtinë-	Road	1067
3	Burgas - Sofia - Skopje - Durrës	Road	950
4	Burgas - Sofia - Thessaloniki -	Road	1011
1	Durrës - Bari (Italy)	Maritim	220
2	Bar (Montenegro) - Bari (Italy)	Maritim	247
3	Igoumenitsa - Bari (Italy)	Maritim	380

ROADS AND CORRIDORS OF KOSOVO AND ALBANIA TRANSPORT IN TERMS OF BALKAN TRANSPORT CORRIDORS

Kosovo geographical position is an important factor for the connection between states, corridors, connections between Adriatic Sea and Black Sea. Kosovo through Routes 6 and 7 is connected to the important transport corridors and lines in the Balkans and beyond in Central and Eastern Europe, as well as with the Black Sea regional countries, it connects Pan European states and corridors with seaports and centres in the Balkan region (Table 2).

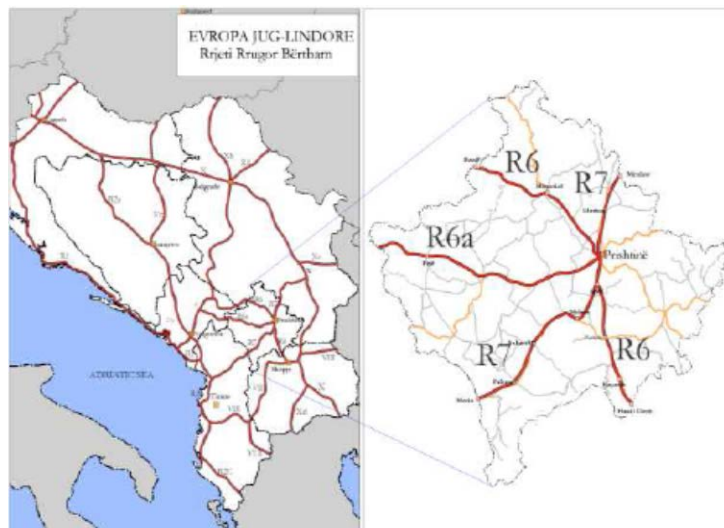


Fig. 4. Kosovo's and regional primary road directions network (Source: Kosovo's multimodal strategy)

Multimodal sustainability

Kosovo in the Balkan Peninsula has a central position, because it is approximately the same from Thessaloniki in the south and Belgrade in north, Sofia in east and Shengjin in west, on the Adriatic coast. Distance from Ferizaj to Thessaloniki is (300 km) same as Mitrovica is from Belgrade (320 km), or the distance from Prishtina to Sofia (260 km) same as to Shengjin in Albania (250 km).

The motorway Durrës-Kukës-Prizren-Prishtinë-Merdare has an essential importance for including Kosovo to international road corridors. That is the sole long-term solution and is the shortest road to incorporate Kosovo into the European roads network.

The aim is to promote a truly multimodal approach in the projects discussed as a result of assessment of all investment in infrastructure, in the light of the alternatives offered by other modes of transport or other roads, and in relation to the intermodal complementarity in order to combine the specific advantages at any way. The criteria of multimodal consistency enables the evaluation of infrastructure projects in terms of efficiency of transport chain and quality interfaces between modes, or between the burden of traffic over long and short distances, with the final purpose to create a truly scheme of pan-European multimodal transport.

Balkan meridional axis which runs through the valley of Morava and Vardar gets closer to Kosovo at Bujanovc area at approximately 10 km, while the meridional secondary axis, which through the valley of the Ibër, Fushë Kosovë, Kaçanik gorge exits in Skopje is connected to the primary axis.

Trans-Balkans road advantage is that it provides much shorter connection, compared to existing alternative routes, with the Mediterranean coast in an almost completely flat route. This route would provide the transport primarily of goods to the European and Mediterranean countries with a much lower cost and in a shorter period of time than presently. This road would connect Romania, would go through central Serbia where it would intertwine with the motorway to Bulgaria. The road will enter Kosovo in Merdare border point. From Kosovo it would go through northern Albania at Morinë border crossing point (Vërmicë). From this point it would be connected to the ports of Durrës or Shëngjin in Albania.

The construction of this Trans-Balkan route is of great importance to the Balkan states, as well as those of Europe. More economically developed countries with the larger populations such as Rumania, Bulgaria and Serbia will have greater advantages. Kosovo's interest for the motorway is of great importance. Through this route, Kosovo will get closer to European, African and Asian states.

Trans-Balkan motorway provides shortest distance to many gravitating countries compared with existing roads, especially with the port of Thessaloniki. Transport through the port of Thessaloniki is indirect, and by Shengjini (or Durrës) is directly with the shores of the Mediterranean countries. For Serbia, the path towards the Albanian coast is closest, namely:

the destination Nis - Prishtinë - Shëngjin is 340 km, while the destination Nis - Skopje -Thessaloniki is 450 km, or 110 km closer than Vardar motorway. It should also be noted that transportation through the port of Thessaloniki is very indirect, whereas from Shëngjin is direct with the Italian coast, France, Croatia, Spain, the Suez Canal, Magrep states, etc.

CONCLUSION

Development of multimodal transport in the Western Balkan countries would accelerate the integration of regional countries into the European road and railway network. With regard to such matters, in the past few years several specific initiatives were presented at various meetings of senior officials of the European Union (EU) with the leaders of Western Balkan countries. Cooperation of Western Balkans countries with the EU in this field will undoubtedly facilitate the movement of people and goods within the region and beyond, and will increase cooperation and help overcome transport difficulties which are present in the region.

Existing road and railway corridors network in the European Union have enabled the development of a fast and also safe transport in countries which are connected to these corridors, whereas on the other hand, countries that are not connected to these corridors continue to face great difficulties in transport. These difficulties were present particularly in the 90's, as a result of the wars in the former Yugoslavia, where noticeable destructions of road and railway infrastructure occurred.

After the review and analysis on this matter, namely the development of a multimodal transport in countries of the region due to EU infrastructure investment projects, I consider as follows:

- Development of multimodal transport system in the countries of the region would enable a faster, more efficient and cheaper transport, thus also increasing trade exchanges between countries in the region.
- Development of infrastructure projects, with particular emphasis in connecting to regional road and rail network to the Pan European corridors would encourage the development of multimodal transport.
- Cooperation between countries of the region on finding solutions based on the construction of joint terminals (two or more countries), the application of a multimodal system would help reduce transport costs and increase transport speed and safety.
- Construction of the road network and re-operationalization of the railway network in Kosovo but also in the region would enable

connection to existing corridors, thus helping in faster integration of the region into Europe.

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