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7–9 May 2012, Dubrovnik, Croatia

## Road and Rail Infrastructure II

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University of Zagreb  
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## SPECIFICITIES OF PROJECT FOR RAILWAY LINE ON CORRIDOR VIII

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### Abstract

The project regarding construction of the new railway line, part of the TEN Corridor VIII through the area of R. of Macedonia, is in the advanced stage of study and design preparation. The railway line on Corridor VIII starts in Durres (Albania – port in the Adriatic Sea), going by Tirana, Skopje, Sofia, Plovdiv, Burgas and the other endpoint is in Varna (Bulgaria – port on the Black Sea). There are two missing sections for construction of new railway link in R. of Macedonia: the first is on the East (link with the railway network in Bulgaria), and the second is on the West (link with the railway network in Albania). The part on the East has been started with construction in 1994 with proper governmental financial resources, but this manner of investment is abandoned in 2000. The usage of European financial institution is a new approach to find stable financial funds for complete construction of this part of railway line. The starting point for project concerning the part on the West is preparation of general study and tracing of feasible railway line variants and preparation of feasibility study. The feasibility study for the West part is finished and for the East part is going currently. The next step of this project is to complete the Detailed Design and to prepare the tender documentations. The study until now shows some specificities of this railway line and its importance for national and international transport. The construction of missing segments on the railway line is envisaged to start in 2013.

*Keywords: railway line, corridor VIII, corridor X, design, pre-feasibility study*

### 1 Introduction

The Republics of Albania, Macedonia and Bulgaria in 1992 agreed on a transport Corridor Durres–Tirana–Gostivar–Skopje–Kumanovo–Gueshevo–Sofia–Burgas in a Memorandum of Understanding (South Balkan Development Initiative, Bechtel Report on East–West Transport Corridor Feasibility Study, 1997). This is the forerunner of Corridor VIII, the southernmost among the West–East Pan–European Corridors, linking the Adriatic/Ionian to the Black Sea Pan–European Transport Areas. The main alignment of Corridor VIII runs from the southern Italian ports of Bari and Brindisi, the Albanian ports of Durres and Vlora, the cities of Tirana, Skopje, Sofia, Plovdiv, to the Bulgarian ports of Burgas and Varna (Black Sea), thus connecting the Italian Adriatic Transport Corridor, the Adriatic branch of Motorway of the Sea and the Mediterranean Transport Area to the Black Sea Pan–European Transport Area.

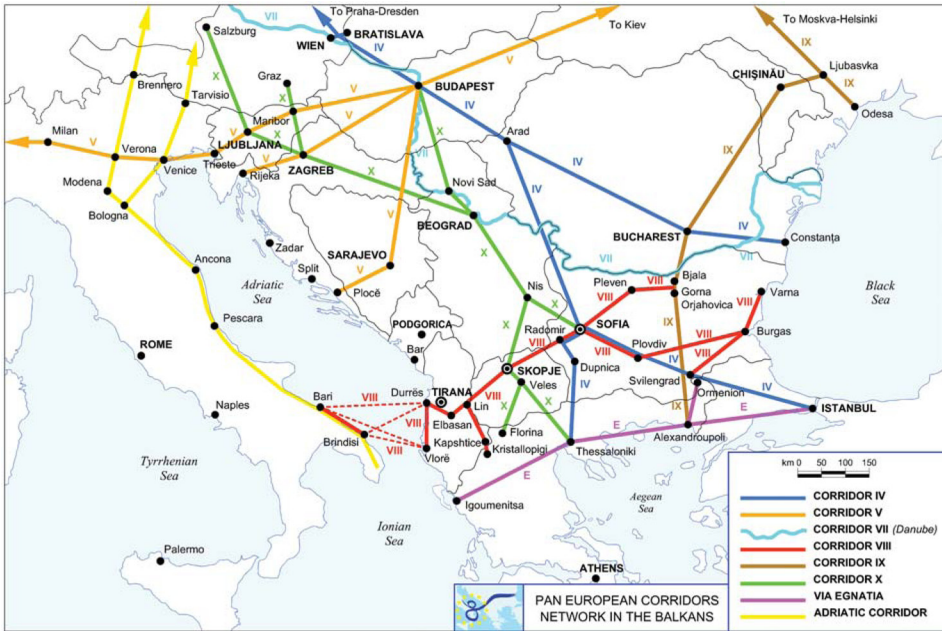


Figure 1 Pan-European Transport Corridors in the Soud Europe

## 2 Rail Corridor VIII description

The Corridor starts from the ports of Bari and Brindisi in Italy, and through the port of Durrës and Vlorë in Albania reaches the capital Tirana. The rail connection continues on towards the boundary between Albania and Republic of Macedonia. After crossing the border the main route continues northward, passing through the city of Tetovo and ultimately reaching the capital city of Skopje; from there the route continues moving East, running along the main line, which crosses all of northern part of Republic of Macedonia, up to the zone bordering on Bulgaria until it reaches the port of Burgas on the Black Sea.

Rail Corridor VIII forms a network with Rail Corridors X, IV and IX. The interconnection nodes are in Skopje, with Corridor X; in Sofia, with Corridor IV; and in Gorna Oriahovica, with Corridor IX. The entire line, including missing links, is 586 km long, of which 139 km are in Albania, 309 are in Republic of Macedonia and 138 km are in Bulgaria. The line is composed by a single track segment, suitable for diesel traction trains.

The entire line from Durrës to Sofia has been divided in 17 sections, identifying 3 main categories: the existing railways on which no immediate intervention has been envisaged, the sections already built which require rehabilitation or upgrading and, finally, the sections where the rail line is completely missing or is currently under construction.





Figure 2 Rail Corridor VIII main alignment and connections with other corridors

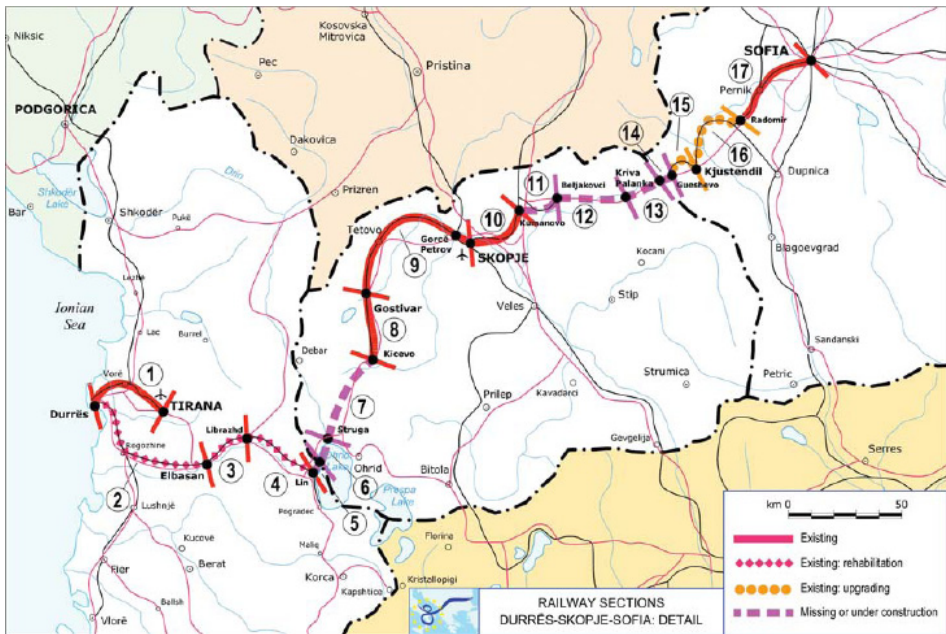


Figure 3 Details of Rail Sections Durres–Skopje–Sofia

### 3 Part of Corridor VIII through the territory on Republic of Macedonian

#### 3.1 Section Lin – Macedonia border (Section n.5)

This section, 2–3 km long, is one of the missing links along the rail Corridor VIII alignment.



Figure 4 Albania – Macedonia cross border rail missing link

#### 3.2 Macedonia rail sections (from Section n. 6 to Section n. 13)

Eight rail sections have been identified: Albanian border–Struga–Kicevo (Sections n. 6–7 missing link), Kicevo–Kumanovo (Sections n. 8–9–10, existing with minor upgrading between Kicevo and station Gorce Petrov), Kumanovo–Beljakovci–Kriva Palanka (Sections n. 11–12, under construction) and Kriva Palanka–Bulgarian border (Section n.13, missing).



### 3.3 Albanian border–Struga–Kicevo (Sections n.6 and n.7)

These sections, which are 66 km long, are missing. Section n.6, from the Albanian border to Struga, is 12 km long, while section n.7, Struga–Kicevo, is 54 km long.

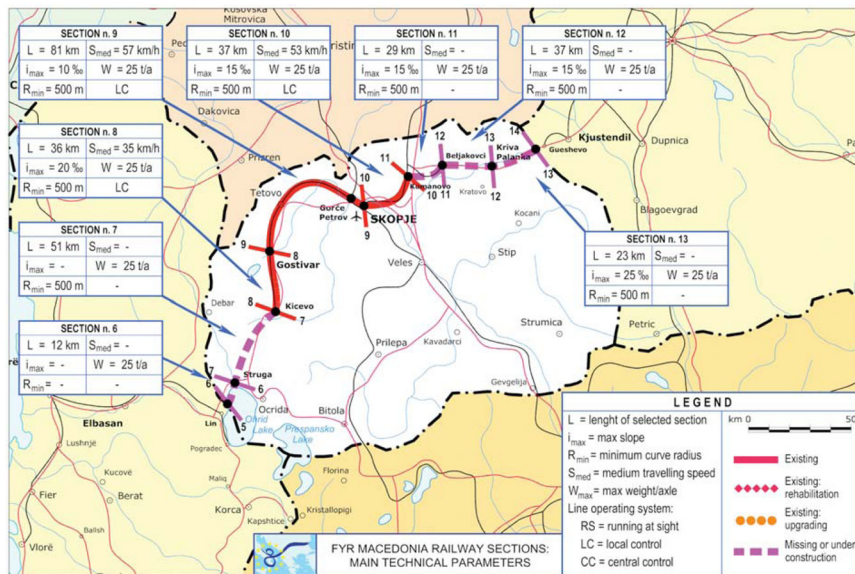


Figure 5 Macedonia Rail Sections: Albanian border–Skopje–Bulgarian border



Figure 6 Kicevo Station: terminal of the existing railway line towards Albania

### 3.4 Kicevo–Gostivar–Gorce Petrov–Skopje–Kumanovo (Sections n. 8–9–10)

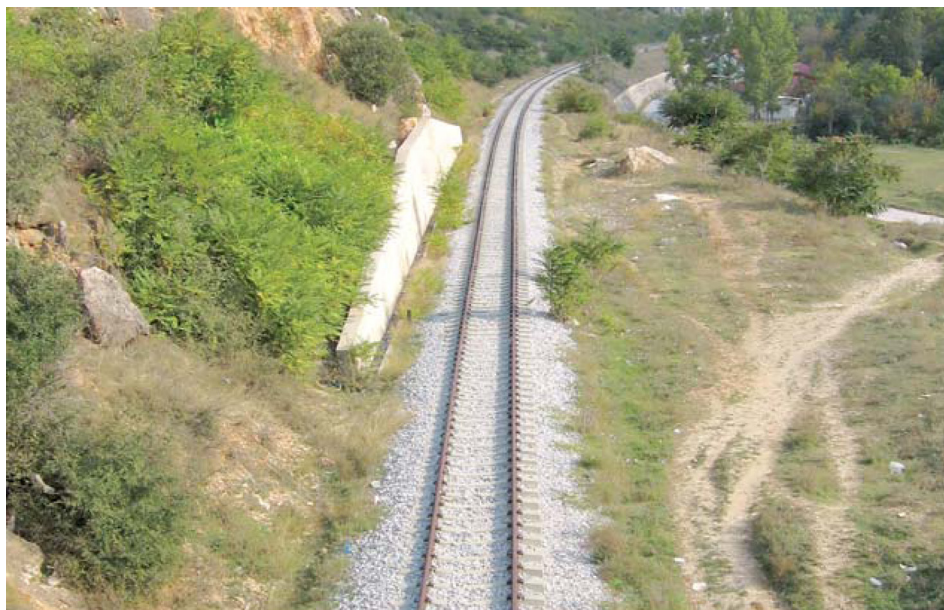
This alignment is the existing, 154 km long, central part of rail Corridor VIII in Macedonia. West of Skopje, there are the Kicevo–Gostivar (36 Km) and the Gostivar–Skopje (81 km) sections; East of the capital city there is the Skopje–Kumanovo section (37 km). The operating speed is around 60 km/h and only the section Skopje–Kumanovo is electrified, the others are suitable for diesel engines only. The signaling–interlocking system and the telecommunication equipment are twenty years old but still in good shape.

Louis Berger, in its study 'Investment Options in the Transport Sector component 5: Rail Link to Albania', investigated the 103 km West of Skopje (the section Kicevo–Gorce Petrov) for upgrading the line Kicevo–Skopje in order to achieve a sustainable speed of 100 km/h.

### 3.5 Section Kumanovo–Beljakovci (Section n.11)

This line is under construction. Design parameters are the following:

- Speed: 100 km/h
- Min curve radius: 500 m
- Max axle load: 250 KN
- Max gradient 15 ‰
- Bridges: 8, total length 224 m
- Rail station: 1



**Figure 7** Rehabilitated section Kumanovo – Beljakovci

This section, which is 29 km long, is completed for about 35 %, in terms of financial resources already spent, i.e. 13 million € over a total sum of 37 million € required to reach Kleceve. From this village a 6 km rail track, including a new bridge, must be constructed to reach Beljakovci. The additional investment are needed to complete this section, including signaling and electrification as well as an intermediate rail station.

### 3.6 Section Beljakovci – km 66 (Kriva Palanka) (Section n.12)

This 37 km long section is also under construction. Basic technical parameters are the following:

- Speed: 100 km/h
- Min curve radius: 500 m
- Max axle load: 250 KN
- Max gradient 15 ‰
- Bridges: 33, total length 3,985 m
- Rail stations: 3
- Overpasses: 8, total length 273 m
- Tunnels: 15, total length 3,437 m
- Embankments: 12,295 m
- Cuttings: 16,509 m



**Figure 8** Viaduct in construction on the section n.12 Beljakovci–Kriva Palanka

The section Beljakovci–km 66 ends 7 km before reaching the town of Kriva Palanka. This section is completed for about 58 %, in terms of financial resources already spent: 90 million € over 155 million € of total resources required. The last constructed bridge is about 7 km before Kriva Palanka. The additional investment are needed to complete the single electrified line including signaling and telecommunications. Works have stopped two years ago because of lack of funding. Construction materials are nearly entirely produced in Republic of Macedonia.

### 3.7 Section from Km 66 (Kriva Palanka) to Bulgarian border (Section n. 13)

This section, 23 km long and running through mountains, is missing. The Detailed Design for the alignment and also Preliminary design for structures (bridges and tunnels) is finished. From the available technical documents the following parameters can be derived:

- Speed: 100 km/h
- Min curve radius: 500 m
- Max axle load: 250 KN
- Max gradient 25 ‰
- Bridges: 41, total length 4,544 m
- Rail stations: 2
- Tunnels: 25, total length 8,593 m
- Embankments: 3,056 m
- Cuttings: 6,659 m

The investment costs amount to some of 105 million € for a single electrified line. The main part of the required sum will cover the needed civil works (including the tunnel to reach the Bulgarian border), adding to about 95 million €.

## 4 Conclusions

The missing sections of railway line on Corridor VIII, through the territory of Republic of Macedonia, are in the final stage of preparation of design documentation. The start of the works is envisaged to be in 2013. The financing of this project will be realized from European banks and funds.

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