



CETRA²⁰¹⁴

3rd International Conference on Road and Rail Infrastructure
28–30 April 2014, Split, Croatia

Road and Rail Infrastructure III

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REHABILITATION OF RAILWAY LINES ŠAMAC – SARAJEVO AND SARAJEVO – ČAPLJINA

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Abstract

When warring parties signed the “General Framework Agreement for Peace in Bosnia and Herzegovina” back in 1995, numerous railway bridges were destroyed, railway tracks mined, station buildings demolished and most of the rolling stock and locomotives destroyed or severely damaged. “The Study on the Transport Master Plan in Bosnia and Herzegovina” (JICA for World Bank, 2000) estimated (aggregated) value of direct damages to the railway sector in the country at 1,000 million US\$. Within the “Emergency Transport Reconstruction Program”, major railway capacities were reconstructed / rehabilitated, enabling the re-establishment of railway operations in Bosnia and Herzegovina. In the next stage, International Financial Institutions strongly supported not only institutional capacity building but also the drafting of relevant Studies with the primary objective of defining priority projects for the railway sector. Two railway lines connecting Bosnia and Herzegovina’s capital, Sarajevo with the Croatian port of Ploče in the south and the Hungarian Capital Budapest in the north are included in the “5th Pan-European Transport Corridor” (branch c) and “SEETO Comprehensive Network” as well. This paper focuses on railway lines in the 5th Pan-European Transport Corridor (Šamac-Sarajevo and Sarajevo-Čapljina) rehabilitation projects from 2005 onwards. Being active participants in some of the projects, the authors had the opportunity to be involved in discussions with representatives of the Beneficiaries and the Banks, to conduct field surveys and comprehensive desk research as well and some of their findings are represented herein.

Keywords: railways rehabilitation projects, Corridor Vc, analysis

1 Introduction

Bosnia and Herzegovina (hereinafter: BiH) is a middle-income country, with small-size economy where approximately two thirds of the GDP has been created in the service sector, 25 percent in industry, and less than 10 percent in agriculture, hunting, fishing and forestry. It is located in South-East Europe or more precisely in South-West Balkans (see Figure 1) where the Dinaric Alps “cover” most of the land. Therefore, river valleys and mountain passes have been the most used transport routes since the time of old Romans.

Such a specific configuration of landforms and a relatively good geostrategic position have been the most influential factors in the development of transport systems in BiH. Moreover, the historical development of railways in particular was strongly influenced by the political and economic environment for mining and extraction of different ores (iron, coal, minerals) and other natural resources (e.g. wood, salt etc.) of BiH.

The railways have played different roles in the country’s development during different historic periods. Still, the two most significant periods occurred during the Austro-Hungarian reign (expansion of the narrow gauge railway network) and when BiH was one of the six Social Republics within the Socialist Federative Republic of Yugoslavia. Anyway, the first subheading of

this Introduction provides more basic facts on the historical development of railways in BiH. The railways today remain a significant economic asset of BiH's economy and railway transport is still essential for operation of big industrial systems (e.g. power plants, steel factory, aluminium factory etc.). In addition, the railway system is connected to the Port of Ploče in Croatia in the south and the European railway network in the north, providing perspective for all export oriented companies in the country. The second subheading gives a brief review of BiH railways institutional setup.

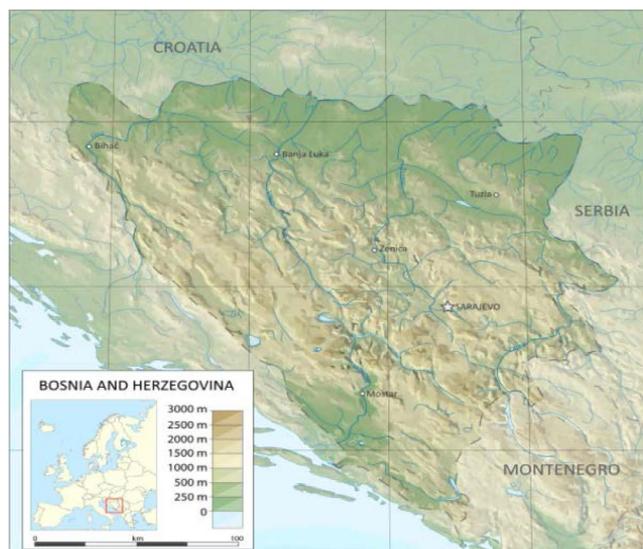


Figure 1 Map of Bosnia and Herzegovina

EU accession was declared as a strategic priority for BiH hence the two sides signed the Stabilization and Association Agreement (SAA) – Interim Agreement, on 16th June 2008. Unfortunately, for BiH politicians' acceptance of this priority was (to use "legal terms") clearly just declaratory as SAA has never been affirmed. That is why this Introduction ends with a summary of common activities of the two sides (BiH and EU), having more or less the railways in its focus.

1.1 A Brief History of Railways in Bosnia and Herzegovina

The first railway line in BiH was constructed in the XIX century, during the Ottoman Empire reign. Construction started in 1869 and was completed in December 1872, when a 101.6 km long standard gauge railway line between Dobrljin and Banja Luka was put in operation. It should have been a section of (the never completed) 2 500 km long railway line Istanbul – Wien. From 1878 to 1918, BiH was a part of the Austro-Hungarian Empire. During the first two years of this period, railway line Dobrljin-Banja Luka was rehabilitated and in 1882 (via Sisak) it was linked with the rest of the Austro-Hungarian railway network. Moreover, Austro-Hungarian Empire constructed 1611 km of narrow gauge lines (760 mm) all over the country (see Figure 2). Between two World Wars, BiH was part of the Kingdom of Yugoslavia, and from 1918 to 1941 another 65 km of standard gauge lines (from Bihac to Bosanski Novi) were constructed as well as another 90 km of narrow gauge lines (from Trebinje to Bileća and from Ustiprača to Foča). From 1945 to 1992 BiH was one of the six federal units in SFRY and the BiH railways network was managed by "ŽTP Sarajevo" (one of ex Yugoslavia's Railways Community units). During that period, more than 850 km of standard gauge railway lines (including the 87 km long

double track section Dobož-Zenica) were constructed, some of the narrow gauge lines were upgraded to standard gauge (e.g. Sarajevo-Dobož), but the best part of narrow gauge lines network was closed.

It was the time of contemporary railway technologies introduction (e.g. automatic block signalling, remote control of electric power consumption and so on) when 72% of the standard gauge railways network in BiH was electrified (25 kV AC, 50 Hz) as well. Consequently, in 1985, “ŽTP Sarajevo” recorded the best railway performance ever (19.1 million of passengers and 32.1 million tons of goods transported). Unfortunately, that was the end of a golden era for railways in BiH.



Figure 2 Map of Railway Network in BiH (1918)

In March 1992, BiH declared independence from SFRY. This act was followed by the beginning of wartime activities in the country, which lasted until November 1995, when warring parties signed the “General Framework Agreement for Peace in Bosnia and Herzegovina” (DPA). During the wartime, most of the important railway bridges were destroyed, numerous railway tracks were mined, buildings demolished, and major parts of rolling stocks were destroyed or severely damaged. Essential facilities and equipment (signalling, telecommunications, electric power supply etc.) were heavily damaged as well.

During the post-war period, within the “Emergency Transport Reconstruction Program”, (financial support was provided by International Financial Institutions, the European Union, and other bilateral donors), major railway capacities were partly rehabilitated, just enough to re-establish railway operations in the country. In 2001, the Study on the Transport Master Plan in Bosnia and Herzegovina estimated the aggregated value of direct damages to the railway sector at 1,000 million US\$.

Today, the BiH railway network is poorly developed as there are just over two km of railway line per 100 km² (See Figure 4). On the other hand, all industrial systems are linked to the railways and most of BiH’s population lives in areas which railway lines traverse. Nevertheless, the only sure thing is that there is a huge perspective for development of railways in the country. However, this paper shall put focus on the improvement of key railway infrastructure in the country. Since 2000 when the “Phare Multi-Country Transport Programme” gave overall priority to railway lines in branch c of the 5th Pan-European Transport Corridor (hereinafter: Corridor 5-c), as numerous studies (e.g. TIRS, REBIS and so on) confirmed its importance not only for BiH’s economy but also for the regional transport system development.

1.2 Institutional Framework

According to the DPA, the Inter-Entity Boundary Line divides BiH into two Entities: Federation of Bosnia and Herzegovina (FBiH) and Republika Srpska (RS). In addition, in 1999, Brčko District of BiH was established as a single administrative unit of local self-government existing under the sovereignty of BiH (and owned by two Entities).

The complex organizational structure of the country resulted with even more complex institutional establishment of railways: The owners of railway infrastructure in BiH are both entity governments as well as the government of Brčko District (each on its territory). Therefore, the railways in BiH are the “subject of interest” for three different ministries: At state level, there is the Ministry of Communications and Transport (MoCT) and in addition both Entities have Ministries of Transport.

Furthermore, there are two railway undertakings established by the Entities, which are at the same time infrastructure managers and railway operators: Railways of Federation of BiH (ZFBH) and Railways of Republic of Srpska (ZRS). Both companies are members of the “Union Internationale de Chemins de Fer” (UIC). Consequently, operations are regulated in legal terms by the State and Entity Laws, but also by the specific railway regulations which elaborate in detail each component of the railway transport system.

Finally, pursuant to Annex 9 of the DPA, the Entities founded a joint public corporation as an inter-entity umbrella organization for all stakeholders. A Management Board (one general manager and two deputies) and a Board of Directors (representatives from both Entities as well as from both railway undertakings) were established in line with the Agreement on establishment of the Bosnia and Herzegovina Railways Public Corporation (hereinafter: BHRPC).

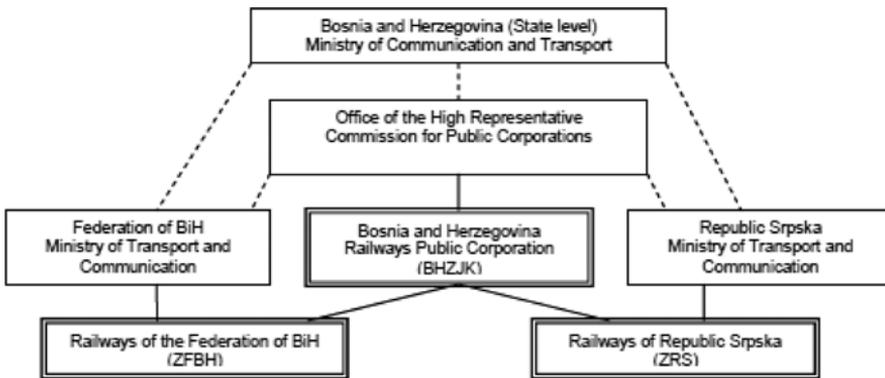


Figure 3 Basic structure of railway sector in BiH (DB International, 2008)

According to the Agreement on establishment, BHRPC mission is to ensure institutional cooperation (on inter-Entity level) and to act as an overall supervisory and regulatory organization by (i) allocating train paths for inter-Entity and international traffic (ii) setting railway infrastructure investment and rehabilitation priorities (iii) examine the ways and means to improve the level of service on the two main lines, (iv) harmonizing technical systems such as signalling, safety and telecommunication, (v) harmonizing of fee structures and levels, (vi) settling of accounts between the railway undertakings, and (vii) harmonizing regulations and standards to EU and international organizations requirements.

Furthermore, the Agreement confirmed the responsibility of the State for international and inter-entity transport and consolidates the role of the BHRPC as an agent for international financial assistance and for communication with international organizations and the EU. Finally, the Agreement stipulates that BHRPC can act as common agent for all matters which will contribute to the development of the railway sector in BiH. However, both the representative

and the active role (in international activities) are subject to the approval of the Entities' governments or the railway undertakings.

The state Railways Act stipulates the establishment of the Railways Regulatory Board (hereinafter: RRB) in BiH as part of BiH MoCT financed from the state budget. RRB activities are related to: (i) technical standards specification, (ii) railway sector monitoring and (iii) licensing of safety certificates, inspection and railway accidents statistics. RRB is still not fully operational, because a lot of functions have been delegated without adequate personnel and financial support.

1.3 BiH and EU in context of Railway infrastructure rehabilitation

The Declaration on Special Relations of BiH and EU was adopted in 1998. In 2006, the BiH Directorate for EU integration drafted "EU Integration Strategy", where "Parliamentary Assembly adopted Conclusions which, inter alia, present the presence of a full political consensus that EU membership is the highest possible priority for BiH."

This act was followed by drafting of the "Transport Sector Policy and Strategy for BiH" (supported by EBRD and WB) to the MoCT. Both documents were completed in 2007 and adopted by the Council of Ministers (hereinafter: CoM) back in 2008. Unfortunately, the process of its acceptance in the Parliament took more than five years and recently the documents were returned to the CoM for its additional adjustment.

An integral part of the signed SAA is the "Protocol on Land Transport", which should ensure that land transport between and through the territories of BiH and EU is developed in a coordinate manner. The Protocol includes a section titled "Rail and Combined Transport" stipulating the adoption of coordinated measures by BiH and EU for the development and promotion of rail and combined transport. In addition, this section of the Protocol also refers to the readiness of EU to support the infrastructure development in BiH through its financial institutions and lending instruments.

On June 11th, 2004 BiH was one of the countries to sign Memorandum of Understanding for the development of the Core Regional Transport Network (SEETO Comprehensive Network). This act established South East Europe Transport Observatory (SEETO) as regional transport organization. One of the main SEETO objectives is to enhance local capacity for the implementation of investment programmes.

In the meantime BHRPC has implemented "Regional project Railways in BiH I" (63.5 million € loans from EBRD & EIB and donations from Government of Canada and Government of Japan) and "Regional project Railways in BiH II" (173 million € from EBRD & EIB loans, grant EU and from BiH budget). "Regional project Railways in BiH III" announcement is expected soon. Moreover, EU continuously provides technical assistance to railway authorities in BiH (e.g. through IPA I Action Programmes).

One of the most important projects of railway sector institutional building in BiH, so far was the harmonisation of regulations on maintenance of railway infrastructure and rolling stock with the EU Directives (2001/16/EC on interoperability and 2004/49/EC on safety) and Technical Specifications for Interoperability (TSI). "Updated and harmonised railway regulations concerning the railway infrastructure shall provide the regulatory basis for BHRPC for implementation of design, upgrade and construction activities concerning the railway infrastructure in BiH."

On the other hand, Infrastructure Projects' Facility of The Western Balkans Investment Framework (WBIF) has already provided technical assistance for two railway infrastructure rehabilitation projects in BiH (TA2-BIH-TRA-02 and WB5-TRA-BIH-14). WBIF is a joint initiative of the EU, International Financial Institutions, bilateral donors and the governments of the Western Balkans countries. The range of technical assistance includes feasibility studies, as well as economic and financial analyses, environmental and social impact assessments, and design drawings.



Figure 4 Railway lines in Corridor 5-c and BiH Core Transport Network

2 Railway lines Šamac-Sarajevo and Sarajevo-Čapljina

Back in 2004 The World Bank in “Bosnia and Herzegovina Infrastructure and Energy Strategy” assessed that 70% of the railway network in BiH is in need of major rehabilitation. A year later, EBRD recognized improvement of the railway infrastructure as a key priority in the country. Due to poor condition of railway infrastructure and lack of signalling and telecommunications systems maximal train speeds in BiH are limited to 70 km/h for passenger trains and 50 km/h for freight trains.

Railway lines in Corridor 5-c are D4 category (fiche UIC-700) conventional rail system for mixed traffic (yet dominantly used for freight transport) providing standard gauge – GB (fiche UIC-506). Both railway lines are included in “SEETO Comprehensive Network”, so at some point it will also be included in the Trans-European Transport Network as well. However, considering the present condition of infrastructure it seems that some urgent measures should have been applied a long time ago.

2.1 Railway line (km 21+748) – Šamac – Sarajevo (km 257+097)

Construction of railway line Šamac-Sarajevo in the valley of the Bosna River (maximal gradient is 8%) was completed in 1947. The railway line was significantly upgraded from 1968 to 1971 (railway line electrification, installation of automatic block signalling and electric power supply remote control etc.). Construction of the second track from Dobo to Jelina (87 km) was completed in 1978 and applied design parameters should have enabled train running speed from 70 to 100 km/h. The railway line is constructed in densely inhabited areas. Railway stations Sarajevo and Zenica are located in city centres and there are many settlements along most of the alignment. Consequently, one of the big issues is safety (e.g. between Sarajevo and Zenica there are 39 level crossings).

2.2 Railway line Sarajevo – Čapljina – (km 170+390)

Railway line Sarajevo-Čapljina-Ploče was designed and constructed over mountain pass “Ivan sedlo” (narrow track tunnel “Ivan” was reconstructed to provide standard track gauge) and through the valley of the Neretva river. The electrified (25 kV AC, 50 Hz) single track railway line was put in operation in December 1966. The mountain railway line section Bradina-Konjic

was designed and constructed with marginal technical standards ($i_{\max}=25\%$ and $R_{\min}=250$ m). The applied design standards allow maximum train speeds between 70 km/h (the mountain section) and 100 km/h (southern from Mostar). The design included a lot of railway structures so 98 tunnels as well as 70 bridges, viaducts and overpasses were constructed.

2.3 Railway lines in Corridor 5-c Rehabilitation Projects

2.3.1 “Railways I” Project

“A General Overhaul of the Single Track Railway Line Sarajevo-Čapljina, (30 km long) Section Bradina-Konjic-(Čelebići)” was completed in 2005. Project also included reconstruction of border stations Čapljina and Šamac and railway station Doboј, as well as rehabilitation of stations interlocking and level crossings.

2.3.2 “Railways II” Projects

Construction works on Track overhaul of 100 km long section Čelebići – Čapljina were completed in 2011. Signalling system rehabilitation works started in July 2010 but hasn’t been fully completed yet.

Track overhaul of the railways on Corridor Vc section Sarajevo-Bradina including tunnel “Ivan” rehabilitation is on pending (design for 41,5 km long section was completed in 2008 and General Procurement notice was issued on 21st November 2013). Invitation to tenders shall be issued soon.

“Reconstruction of track and signalling works on railway Šamac – Doboј” is on pending as well (design for 62,5 km long section was completed in 2008, but Feasibility Study is still missing). Invitation to tenders for modernization signalling-telecommunication system along Railway lines Banja Luka- Doboј and Sevarlije-Doboј-Samac was issued on 31st January 2014.

2.3.3 WBIF Projects

Technical Assistance for “Track Overhaul of Railway Section Podlugovi-Sarajevo on Corridor Vc” (Feasibility Study and Design for overhaul of 25 km long single track section) was successfully completed in 2013.

Technical Assistance for “Track Overhaul of the Railway Sections Doboј-Maglaj and Jelina-Zenica on Corridor Vc” (Feasibility Study and Design for overhaul of 23,3 km long double track section and 8,8 km long single track section) was successfully completed in 2014.

3 Lessons learned?

One of the main reasons why the railways in BiH are struggling to improve poor performances lies in lacking strategic planning. EU transport policy concepts (e.g. sustainable mobility) and projects (e.g. shift2rail) should be top priorities on the agenda of BiH politicians. The Governments are aware that financial stability of infrastructure manager(s) is a pre-requisite for implementation of priority railway projects, so restructuring of ZFBH and ZRS can be expected rather soon.

Railway lines in Corridor 5-c are not only one of the most important transport systems in the country but also in a wider regional context (e.g. essential for operation of Croatian port of Ploče). Therefore, introduction of track maintenance planning based on Life Cycle Costing and Asset Management System is a must!!!

It seems that the harmonization of railway standards and regulations and transposition of EU legislation is the only bright spot of the railway sector in the country (confirmed with the highest mark in new EBRD Strategy). Still, RRB and BHRPC are not fully operational and there are a lot of railway regulations still pending.

Rehabilitation of railway lines in Corridor 5-c (including signalling, telecommunications and electric power supply facilities and equipment) remain at the top of priorities. However, reha-

bilitation of landslides and decontamination of mine fields prior to railway line rehabilitation works is paramount.

In addition, even on sections where railway line rehabilitation works were recently completed there is a lot of railway structures (tunnels, bridges, viaducts, masts etc.) in a poor condition, therefore a railway asset management system should be introduced as soon as possible.

Modernization of signalling (including level crossings) and telecommunications of Railway Lines in Corridor 5-c is a big issue and it seems the time has come to treat it accordingly. In other words, the consolidated technologies and systems will be applied as described in TSI.

4 Conclusions

The rehabilitation of railway lines in Corridor 5-c is progressing, but the feeling that prevails is that the pace has been too slow. It took ten years to complete (single) track overhaul works between Bradina (km 41+084,54) and the Southern Border with the Republic of Croatia (km 170+390), which is roughly just a third of the total single track length. As there is also an 87 km long double track section, with this pace it would take at least another 20 years to complete the overhaul.

Restructuring of railway companies in the country and full staffing of BHRPC and RRB are prerequisites for cost-effective railway infrastructure maintenance and development of feasible projects as well. Moreover, the BiH governments and railway authorities should make harder efforts to accept the European sustainable mobility concept and draft strategic papers promoting comparative advantages of railway transport in the Comprehensive Transport Network. Transposed European Norms together with new regulations stipulate the introduction of modern technologies preparing the system for future integration into the Trans-European Transport Network. Finally, as the International Financial Institutions are willing to continue playing their role using reliable resources and tools for funding core transport infrastructure development in the country, the main question is not if but when BiH will have a modern conventional railway system.

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