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IDENTIFICATION OF BOTTLENECKS IN INFRASTRUCTURE AND SERVICE (CROATIA)

Work paper

Version 2.0
10.2020

BOTTLENECK NO. 1: Old infrastructure

BOTTLENECK ALLOCATION

(Select the type of bottleneck with X)

transport infrastructure	<input checked="" type="checkbox"/>
rolling stock / machinery	<input type="checkbox"/>
services / operations	<input type="checkbox"/>
legislation / administration	<input type="checkbox"/>

PROBLEM DESCRIPTION

Republic of Croatia have the total length of 2617 km of the railway tracks. It gives a good ratio of kilometers of railways per the number of inhabitants (1556 people per kilometer) and puts the Republic of Croatia on a par with the developed European countries. However, the problem is that Croatian railway tracks have been mostly built during the 19th and 20th century and not invested in much since then. Data suggested that in next 5 to 8 years it is possible to maintain only 45,6% of total length of Croatian railways, and remaining 54,4% will need to carry out investment works or major repairs as part of the maintenance.

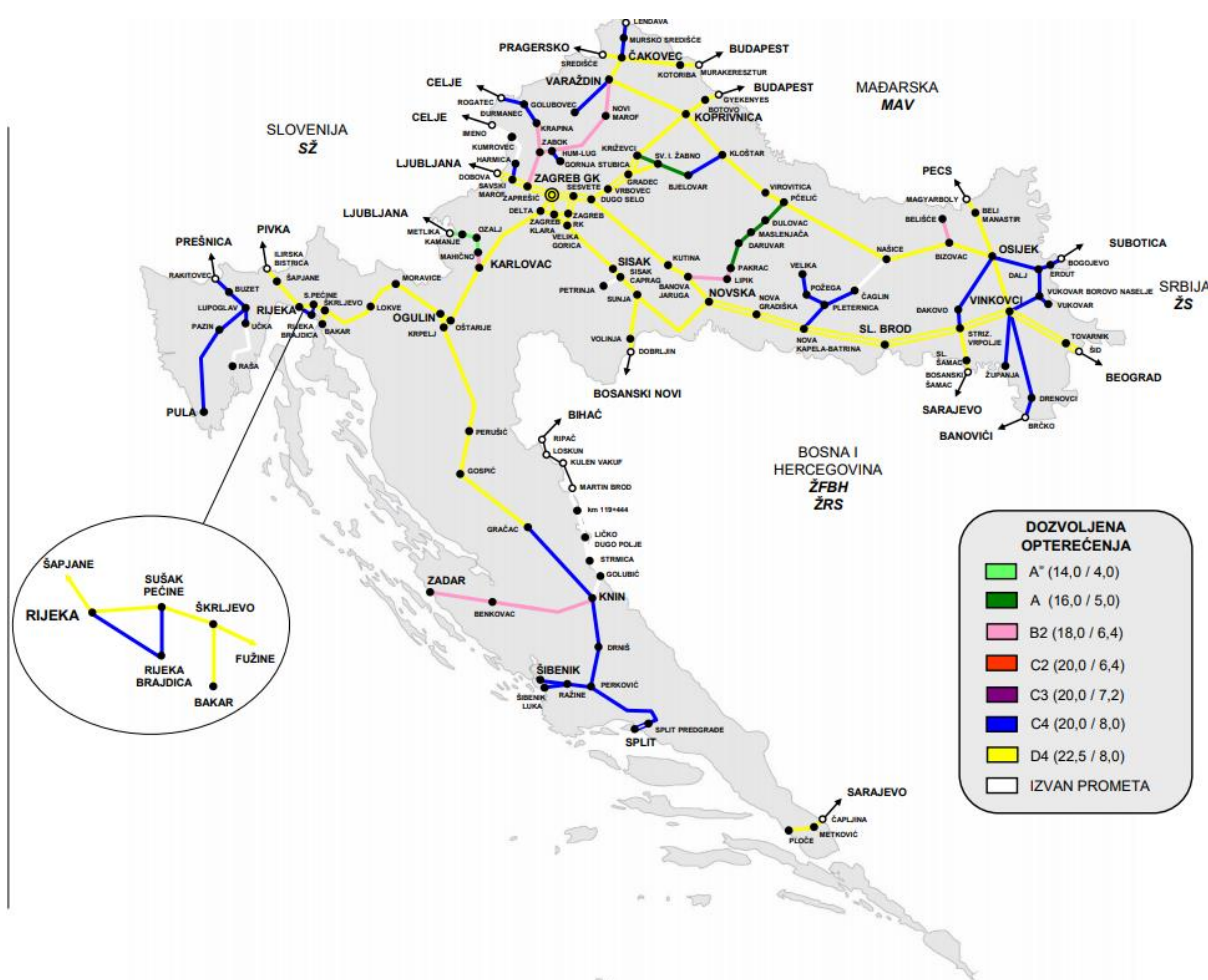
89,5% is the single-track line and 10,5% is double track line (only 274 km). 37,4% is electrified (980 km). The total length of the catenary on electrified lines is 1,827 km. During the war in the 1990s, 633 km of the contact network were damaged, of which 62 km are still out of operation and awaiting repair. Insufficient investments in the past period have caused a deterioration in the technical condition of the system as a whole, so some plants have been brought to a critical state. The renewal of the system prescribed every eight to ten years has not been carried out due to lack of funds in the

past 35 years. Due to all this, it is necessary to thoroughly revitalize the entire system in order to preserve the functionality and safety of traffic.

Beside poor condition of the railways, there are 109 tunnels and 544 bridges that can seriously hamper the allowed speed and load of the trains. Overall, on the Croatian railway network, driving is relatively slow. On 65% the speed is between 40 - 100 km/h and there is no part where the speed is over 160 km/h, and the speed up to 160km/h is allowed at only 12.2%. It means that only at 18.0 percent of the total length is the maximum permitted speed of trains on the line equal to the designed speed.

Maximum allowed train length at stations is mostly between 500 and 700 meters (50%). About 36% of stations cannot accept length greater than 500 m, and only about 13% can accept train length greater than 700 meters.

Croatian have several mountain ranges and there are several places with high gradient on lines (17-26%). However, permissible loads in tons per axle and tons per length meter are not bad, as can be seen from the picture below:



Source: Izvješće o mreži, 2020., HŽ Infrastruktura

In the context of infrastructural interoperability, more than 80% of the lines of the Croatian railway network are designed for an axle load of 20 tons per axle (up to a maximum of 22.5 tons per axle). The free profile of the GC is met by 54.6% of the total length of the railway network, and at 2.7% of the total length the free profile is limited to the GA.

The state of infrastructure is not good, but renewed sections of the network are underused given the available capacity. In general, in the structure of all modes of transport, road transport prevails over rail, despite the existing option of parallel railway corridors and market liberalization. The source of



the problem is the inconsistency of the projects of maintenance, reconstruction of the track and organization of traffic with the existing and / or planned freight transport.

BOTTLENECK CONSEQUENCES

(Select the level of consequences with X)

low	<input type="checkbox"/>
medium	<input type="checkbox"/>
high	<input checked="" type="checkbox"/>

PROBLEM-SOLVING APPROACH

It is necessary to establish an appropriate structure and organization of maintenance in order to enable a railway service that would be efficient and effective, but also sustainable. The concept must be derived from purposeful and concrete analyzes of the situation in HŽ Infrastruktura d.o.o., HŽ Cargo d.o.o. and HŽ Putnički prijevoz d.o.o., taking into account technical and financial conditions, as well as user needs, as arising from Directive 2008/57 / EC on the interoperability of the rail system within the Community, taking into account EU Directives and Regulations, and laws and regulations. The infrastructure need renewal, but it must be done taking into consideration the financial sustainability.

RESPONSIBILITY

Ministry of the Sea, Transport and Infrastructure of the Republic of Croatia

HŽ Infrastruktura d.o.o - is established by the Republic of Croatia with sole membership. They are responsible for the management, maintenance and building of railway infrastructure.

HŽ Cargo d.o.o. - for the provision of railway services

HŽ Putnički prijevoz d.o.o. - Public transport of passengers

TIME FRAME

(Select the time, needed to eliminate bottleneck with X)

Immediately	<input type="checkbox"/>
Short-term	<input type="checkbox"/>
Mid-term	<input checked="" type="checkbox"/>
Long-term	<input checked="" type="checkbox"/>

EXPECTED BENEFIT

(Select the benefit with X)

Low	<input type="checkbox"/>
Medium	<input type="checkbox"/>



High	X
Vast	

AN EXAMPLE OF BEST PRACTICE

If you have any information's and if they are relevant, please add an example of best practice for elimination of the relevant bottleneck.

BOTTLENECK NO. 2: Old rolling stock

BOTTLENECK ALLOCATION

(Select the type of bottleneck with X)

transport infrastructure	
rolling stock / machinery	X
services / operations	
legislation / administration	

PROBLEM DESCRIPTION

The vehicle fleet of HŽPP and HŽ Cargo is on average older than 30 years. HŽ Cargo's fleet consists of closed, open, plateau and special wagons, some of which are suitable for combined traffic and diesel and electric locomotives. A large number of locomotives need to be replaced given an estimate that 70 percent of locomotives will reach the end of their service life in the next ten years. The operational characteristics of the old vehicle fleet negatively affect the infrastructure in the form of faster deterioration of the upper structure of the track, and also poor and inadequate maintenance of the track affects the lower structure of towing and towed vehicles. The characteristics of the old vehicle fleet are such that they cannot meet the needs and criteria of modern freight and passenger transport.

BOTTLENECK CONSEQUENCES

(Select the level of consequences with X)

low	
medium	
high	X

PROBLEM-SOLVING APPROACH

In order to increase the competitiveness of rail passenger and freight transport in relation to other modes of transport, it is necessary to modernize the rolling stock in accordance with the planned investments in the improvement of railway infrastructure. The first step would be the implementation of a comprehensive analysis of the existing organizational and operational structure and the structure of maintenance of railway transport in relation to existing and future transport requirements, and then the development of an operational plan and maintenance plan. Once the actual needs have been identified, further studies should define the specific technical requirements of the rolling stock.

RESPONSIBILITY

Ministry of the Sea, Transport and Infrastructure of the Republic of Croatia

HŽ Infrastruktura d.o.o - is established by the Republic of Croatia with sole membership. They are responsible for the management, maintenance and building of railway infrastructure.

HŽ Cargo d.o.o. - for the provision of railway services

HŽ Putnički prijevoz d.o.o. - Public transport of passengers

TIME FRAME

(Select the time, needed to eliminate bottleneck with X)

Immediately	<input type="checkbox"/>
Short-term	<input type="checkbox"/>
Mid-term	<input checked="" type="checkbox"/>
Long-term	<input type="checkbox"/>

EXPECTED BENEFIT

(Select the benefit with X)

Low	<input type="checkbox"/>
Medium	<input type="checkbox"/>
High	<input checked="" type="checkbox"/>
Vast	<input type="checkbox"/>

AN EXAMPLE OF BEST PRACTICE

The modernization of the rolling stock and the inclusion of the railway system in the public transport system in the Zagreb area is a rare example of a successful revival of passenger transport in the country.

BOTTLENECK NO. 3:

BOTTLENECK ALLOCATION

(Select the type of bottleneck with X)

transport infrastructure	<input type="checkbox"/>
rolling stock / machinery	<input type="checkbox"/>
services / operations	<input type="checkbox"/>
legislation / administration	<input checked="" type="checkbox"/>

PROBLEM DESCRIPTION

The main administrative bottleneck in railway transportation is the change of locomotives in the border area, especially at the border with Bosnia and Herzegovina, but at the other borders too. It is especially noticeable in the area of Dalmatia, where trains from port of Ploče travel only few kilometers with Croatian locomotive till border where they then need to change locomotive. Although Bosnia&Herzegovina and Croatia have same rail tracks, the locomotives are changed due to administrative issues.

BOTTLENECK CONSEQUENCES

(Select the level of consequences with X)

low	<input type="checkbox"/>
medium	<input checked="" type="checkbox"/>
high	<input type="checkbox"/>

PROBLEM-SOLVING APPROACH

- The legislation that would help with this problem, maybe agreement between countries. There are already some attempts to make it possible. There was the passenger train that travelled from Hamburg to Rijeka without the change of locomotives.

RESPONSIBILITY

- Ministry of the Sea, Transport and Infrastructure and its equivalent in other countries; railway companies of each involved countries

TIME FRAME

(Select the time, needed to eliminate bottleneck with X)

Immediately	
Short-term	X
Mid-term	
Long-term	

EXPECTED BENEFIT

(Select the benefit with X)

Low	
Medium	
High	x
Vast	

AN EXAMPLE OF BEST PRACTICE

Already mentioned passenger train that travel from Hamburg to Rijeka without the change of locomotives. It used motto: "4 countries, 1 locomotive". It was seasonal line and railway companies from Germany, Austria, Slovenia and Croatia participated to make it possible.