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IDENTIFICATION OF BOTTLENECKS IN RAIL INFRASTRUCTURE AND SERVICE – STYRIA

Report

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REIF Identification of Bottlenecks in Rail Infrastructure & Service - Styria

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1. Introduction

A bottleneck is a limit in transport system. The inefficiencies brought about by the bottleneck often create delays and higher transport costs.

An analysis of bottlenecks have to comprise all types of bottlenecks:

- transport infrastructure,
- rolling stock,
- services & operations and
- legislation & administration

According to this classification the enumeration of relevant bottlenecks in the region of Styria are listed in the separate entire matrix of bottlenecks of all REIF-regions.

2. Detection and Analysis of Bottlenecks in Styria

Due to extensive harmonisation of the transport infrastructure and mostly good opportunities for shipping companies, freight forwarders and rail operators, the biggest bottlenecks in Styrian rail freight transport are missing connections and lack of capacity in the main rail network. By closing the gaps and eliminating capacity bottlenecks on the main rail network, freight transport on the subordinate network will also benefit.

These most relevant bottlenecks in which limit the rail freight transport in the region of Styria are listed below.

2.1. Missing Link - Bosruck Tunnel

BOTTLENECK ALLOCATION

(Select the type of bottleneck with X)

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

PROBLEM DESCRIPTION

The Styrian Central Area with Graz as well as the regions Leoben-Bruck/Mur-Kapfenberg and Wels-Linz are the strongest industrial regions in Austria. They have much in common, but one decisive factor is still missing: a high-level rail link that connects these regions with each other and with the regions beyond. The Pyhrn-Schober axis, which connects Styria with Upper Austria and the strong economic sites of central Europe, is the most important rail connection for the export of styrian products.

At present, the rail connection between the Upper Styrian industrial region and the central region of Upper Austria is largely only available via single-track lines and the mountain route to the Bosruck tunnel, which is relatively steep for railways.

The existing railway line in the area of the border between Styria and Upper Austria - the southern ramp to the Bosruck tunnel - is only passable for freight trains up to a maximum weight of 1,000 tons due to the steepness of up to 21‰. This bottleneck severely restricts the capacity of transportable goods in rail traffic.

BOTTLENECK CONSEQUENCES

(Select the level of consequences with X)

low	
medium	
high	X

PROBLEM-SOLVING APPROACH

The upgrading of the Pyhrn-Schober axis and in particular the construction of the new Bosruck tunnel with flat ramps (up to a maximum of 12.5‰) can solve a problem, which has an impact to the whole corridor and are essential. Flatting the ramp with the construction of the new Bosruck tunnel increases the loading capacity of freight trains by 50% and the operation speed up to 100 km/h.

RESPONSIBILITY

ÖBB Infrastructure AG and Austrian Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology

TIME FRAME

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

Immediately	X*
Short-term	
Mid-term	
Long-term	X*

*The need to eliminate this bottleneck is immediately. The realistic time to eliminate it by the construction of the new Bosruck tunnel is about 20 years. So there is the need to start the planning immediately.

EXPECTED BENEFIT

(Select the benefit with X)

Low	
Medium	
High	X
Vast	

AN EXAMPLE OF BEST PRACTICE

The current construction of the Koralm tunnel and the Semmering base tunnel are examples of best practice for increasing the loading capacity and operation speed for freight trains on mountainous railway lines.

2.2. Missing Capacity - Railway Line Bruck/Mur-Graz-Spielfeld-Maribor

BOTTLENECK ALLOCATION

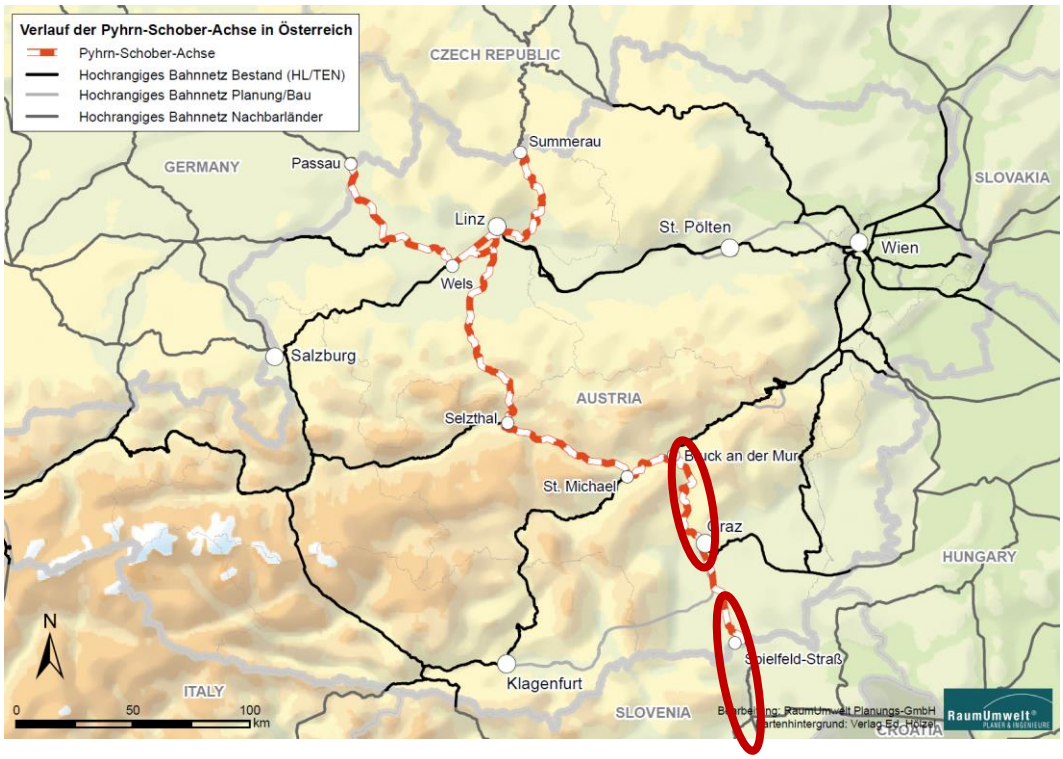
(Select the type of bottleneck with X)

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

PROBLEM DESCRIPTION

With the operational start of the Koralm Railway line, more than 400 trains per day are predicted on the section between Bruck/Mur and Graz. This is a value far above the usual capacity utilisation for a double-track railway line. This is only possible because long-distance trains will run at lower speeds, suburban trains sometimes have to stay longer in stations for overtaking or freight trains have to run mainly at night.

Over the next 20 years, a massive increase in freight traffic is expected from the Adriatic ports of Trieste, Koper and Rijeka to the north. In connection with regional and international passenger transport, the capacity of the almost continuous single-track line between Werndorf (in the south of Graz) and Spielfeld and respectively further to Maribor will therefore also represent a bottleneck in the rail network. An effective shift from road to rail will therefore not be possible.



BOTTLENECK CONSEQUENCES

(Select the level of consequences with X)

low	
medium	
high	X

PROBLEM-SOLVING APPROACH

To achieve the required capacity for commuter trains, passenger trains and freight trains, the construction of additional tracks is necessary. On the line between Bruck/Mur and Graz, this means in part completely new lines away from the existing double-track line. For the area between Werndorf and Spielfeld or Maribor, the addition of a second track is necessary, partly with line improvements.

RESPONSIBILITY

ÖBB Infrastructure AG and Austrian Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology

TIME FRAME

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

Immediately	
Short-term	X*
Mid-term	
Long-term	X*

*The need to eliminate this bottleneck is given by the start of the operation of the Koralmbahn (end of 2025). The realistic time to eliminate it by the construction of additional tracks – partly with new alignments and tunnels - is about 20 years. So there is the need to start the planning immediately.

EXPECTED BENEFIT

(Select the benefit with X)

Low	
Medium	
High	X
Vast	

AN EXAMPLE OF BEST PRACTICE

The expansion of the Western Railway line between Vienna and Salzburg up to four tracks is an example of best practice of how to increase the capacity of heavily used railway lines.

2.3. Missing Capacity – Cargo Center Graz-Werndorf (CCG) Terminal

BOTTLENECK ALLOCATION

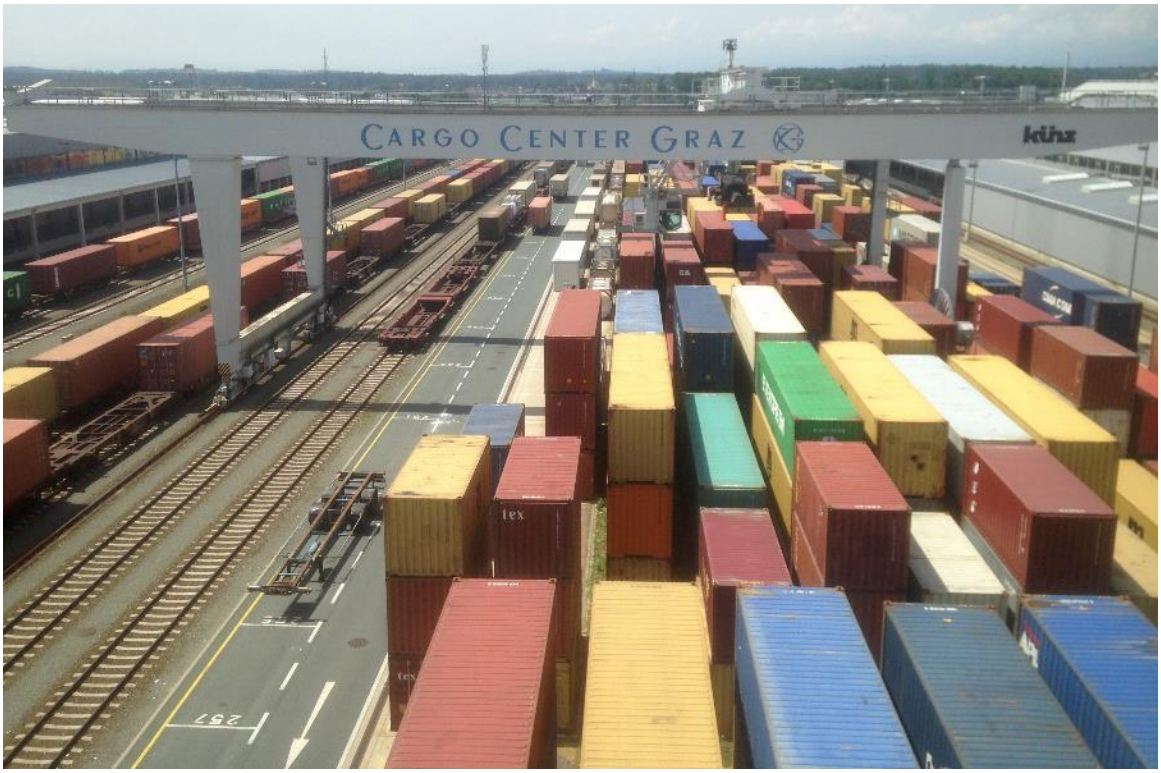
(Select the type of bottleneck with X)

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

PROBLEM DESCRIPTION

The CCG rail-road-terminal is the most up-to-date cargo transport center south of the Alps. Its linchpin is the container terminal for efficient combined transport, operated by Steiermärkische Landesbahnen STLB. Major logistic companies profit from warehouse and office accommodation on an area of more than 320.000 m2. Via a neutral logistics platform, CCG provides every-day access to combined transport routes to Koper, Triest, Neuss and the Northern Ports (Hamburg, Bremerhaven, Rotterdam, Antwerp) for its partners and leaseholders.

CCG has operated successfully on the market since 2003 and is a role model of a Public-Private-Partnership (PPP) in the sector of transport and infrastructure. From 2003 to 2017, the branch invested more than € 290 million. Nowadays the capacity limit of the terminal (230.000 TEU/a) with its 4 tracks at 700 m each, the 2 gantry cranes, mobile cargo handling equipment and storage space is reached. With the operational start of the Koralm Railway line the freight volume will increase. Due to the already existing full capacity utilization, no additional capacities can be taken up. There is an immanent risk of shifting to the road.



BOTTLENECK CONSEQUENCES

(Select the level of consequences with X)

low	
medium	
high	X

PROBLEM-SOLVING APPROACH

An expansion of the terminal is essential to increase the freight loading capacity for rail transport. In a 1st phase the expansion contains the elongation of the existing tracks and the operation of a 3rd gantry crane.

The 2nd phase shall go along with the construction of the Koralm railway. It contains the construction of a new terminal site with 4 additional tracks with 2 gantry cranes, additional storage space and new connections to the high-level rail and road network. These measures increase the capacity of the terminal up to about 500.000 TEU/a.

RESPONSIBILITY

Terminal Operator and State Government of Styria

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

The construction of the CCG terminal in 2003 is an example of best practice for itself.

2.4. Missing Link - Railway Connection Koralmbahn to Steirische Ostbahn

BOTTLENECK ALLOCATION

(Select the type of bottleneck with X)

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

PROBLEM DESCRIPTION

The Steirische Ostbahn is part of the TEN-T basic network. It runs as a single-track railway line with diesel operation from Graz to the national border at Szentgotthárd (HU). The continuation of the railway line - the Hungarian Western Railway line - connects some important railway junctions and economic centres of Hungary as Körmend, Szombathely, Porpác, Celldömölk, Pápa and Györ. In combination with the Koralm Railway, the Styrian East Railway can provide a high-level transport connection between Italy, Austria, Hungary and, subsequently, the EU member states Romania and Bulgaria as well as the Ukraine. On the regional scale important industrial sites in the Graz central region (in particular co-working automotive cluster industries) do not have sufficient railway connections.

However, the section between Koralmbahn and Gleisdorf in particular is still insufficient for an efficient railway line that meets the requirements of a dense and fast commuter train service and for effective freight transport on rail. Continuous freight trains currently have to pass through the Graz city area and have to change their direction in Graz and the existing line is not suitable for heavy goods traffic, either because of the permissible speeds or because of the existing gradients. In the longer term, capacity bottlenecks are also to be expected due to the planned and forecasted traffic.

Teilabschnitte und ihre Nutzen

Abschnitt	wesentlicher Nutzen
Bf Messendorf – Bf Gleisdorf (21,5 km; davon 6 km Tunnel)	• Reduzierung der Neigung auf max. 10‰ auf der gesamten Steirischen Ostbahn • bis zu 50% Fahrzeitverkürzung
Feldkirchen – Raaba (7,6 km)	• direkte Anbindung an die Koralmbahn • Entfall von Verschubtätigkeiten
Anbindung Industriegebiet (1,5 km)	• direkte Verbindung des Industriegebiet Graz Süd mit dem Terminal Werndorf

BOTTLENECK CONSEQUENCES

(Select the level of consequences with X)

low	
medium	X
high	

PROBLEM-SOLVING APPROACH

A new railway line connecting the future Koralm Railway line and the Steirische Ostbahn solves the capacity problems and establish a sufficient railway connection between important co-working automotive cluster industries. It provides a direct and high-quality connection of the largest industrial company in the Graz area (MAGNA) to the international rail network and to suppliers in the region.

RESPONSIBILITY

ÖBB Infrastructure AG and Austrian Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology

TIME FRAME

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

Immediately	X*
Short-term	
Mid-term	
Long-term	X*

*The need to eliminate this bottleneck is given after the start of the operation of the Koralmbahn (end of 2025). The realistic time to eliminate it by the construction of this new railway line is more than 20 years. Consequently, there is the need to start planning immediately in order to obtain the land for the route.

EXPECTED BENEFIT

(Select the benefit with X)

Low	
Medium	
High	X
Vast	

AN EXAMPLE OF BEST PRACTICE

The freight train bypass St. Pölten on the Western Railway line between Vienna and Salzburg is an example of best practice to keep negative impacts of freight transport away from urban areas and increase the capacity of the entire rail network.

Styrian State Government

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