RFC 6 Bottlenecks from the Perspective of Freight Operators

Budapest, 3. 10.2017
SŽ-Tovorni promet

About the Company
### Key Data

#### Transport dynamics

Comparison 2016/2010:
+ 2.0 M tonnes
+ 11.6%

Average yearly growth rate:
1.9%

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>KEY DATA</strong></td>
<td></td>
</tr>
<tr>
<td>Cargo transported</td>
<td>M. Tonnes</td>
</tr>
<tr>
<td>Work performed</td>
<td>M. NTKM</td>
</tr>
<tr>
<td>Operating revenues</td>
<td>M. EUR</td>
</tr>
<tr>
<td><strong>RESOURCES</strong></td>
<td></td>
</tr>
<tr>
<td>Wagons</td>
<td>Nr.</td>
</tr>
<tr>
<td>Locomotives</td>
<td>Nr.</td>
</tr>
<tr>
<td>Diesel</td>
<td>Nr.</td>
</tr>
<tr>
<td>Electrical</td>
<td>Nr.</td>
</tr>
<tr>
<td>Employees</td>
<td>Nr.</td>
</tr>
</tbody>
</table>
A Strong Presence in the Port of Koper

- Port of Koper is an important source of goods for SŽ-Tovorni promet.
- 59% of all goods were transported to and from the port of Koper (2016).

85% of all rail cargo for the port of Koper is transported by SŽ-Tovorni promet.

Share of transports to and from the port of Koper in the total SŽ-Tovorni promet volumes:

- 2016: 59%
- 2015: 59%
- 2014: 57%
- 2013: 57%
- 2012: 60%
- 2011: 58%
- 2010: 55%

Note: The values are percentages and represent the share of transports to and from the port of Koper in the total SŽ-Tovorni promet volumes for the years 2010 to 2016.
At the Crossroads of European Corridors

Length of lines:
- Total: 1,207 km
- Double-track: 330 km
- Single-track: 877 km
- Electrified: 610 km
- Corridor RFC 6: 365 km
- Corridor RFC 5: 324 km
- Corridor X: 395 km

Number of:
- Rail freight Stations: 105
- Rail passenger Stations: 115
Strong International Presence

**KEY MARKETS 2016**

- **volume and % of total SŽ-TP volume**
  - Austria: 7.2 M t (37.5 %)
  - Italy: 2.5 M t (13 %)
  - Hungary: 2.4 M t (12.5 %)
  - Slovakia: 2.2 M t (11.5 %)
  - Croatia: 0.9 M t (4.7 %)
  - Germany: 0.9 M t (4.7 %)
  - Czech Rep.: 0.9 M t (4.7 %)

**INTERNATIONAL PRESENCE**

- Activities with own traction:
  - Slovenia
  - Austria
  - Croatia

- Entering foreign markets (in progress):
  - Serbia
  - Italy

- Cooperation with strategic partners
Our Range of Products in Conventional and Combined Transports

The network of trains

**CONVENTIONAL transports**
- Comprehensive products for individual customers
- A wide network of partners
- Organisation of transports Europe-wide
- Own traction in Austria
- Own traction in Croatia

The network of trains

**COMBINED transports**
- Hungary – Budapest
- Germany – Munich, Duisburg
- Slovakia – Bratislava, Žilina, Dunajska Streda
- Austria – Salzburg
- Czech Rep. – Dobra, Vratimov
- Slovenia – Ljubljana, Celje, Maribor

Tailor-made products for strategic customers and markets
- Zahony – Ukraine
- Breza – Czech Republic (with own traction)
- Istria Railer – Austria (with own traction), Germany
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RFC 6 - Mediterranean Corridor at a Glance
RFC 6 - Mediterranean Corridor at a Glance

The corridor’s structure from November 2016:

6 Countries: Spain, France, Italy, Slovenia, Croatia and Hungary;

7 Infrastructure Managers and 1 Allocation Body: ADIF, TP FERRO, SNCF RESEAU, RFI, SŽ-INFRA, HŽI, MAV and VPE;

New route:
- from Ljubljana to Zagreb;
- from Budapest via Zagreb to Rijeka;

Line distance: over more than 7,000 km Algeciras (ES) - Záhony (HU);

Diversionary routes: 550 km;

10 + Adriatic and Mediterranean Sea ports;

5 + Main European Sea Ports

2 Transhipment terminals UIC vs. non-UIC track gauges;

100 + terminals.
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RFC 6 - Mediterranean Corridor in Slovenia
In Slovenia the corridor RFC 6 includes the following sections:

- Villa Opicina (Border)-Sežana-Divača
  - Koper-Divača-Ljubljana
    - Ljubljana- Zidani most-Pragersko-Hodoš
    - Zidani Most-Dobova

<table>
<thead>
<tr>
<th>Location</th>
<th>Cargo volume I-XII/2016</th>
<th>Cargo volume I-VIII/17</th>
<th>Cargo Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hodoš</td>
<td>4.18 M. t</td>
<td>2.6 M. t + 4.1 %</td>
<td>containers, cereals, iron and steel, vehicles, empty private wagons</td>
</tr>
<tr>
<td>Dobova</td>
<td>1.82 M. t</td>
<td>1.0 M. t + 14.6 %</td>
<td>cereals, empty private wagons</td>
</tr>
<tr>
<td>Koper</td>
<td>11.4 M. t</td>
<td>8.24 M. t + 11%</td>
<td>container, ores, coal, oil and derivatives</td>
</tr>
</tbody>
</table>
# Major Bottlenecks on RFC 6 in Slovenia

<table>
<thead>
<tr>
<th>Type of bottleneck</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Number of tracks**      | **One-track lines**  
  • Divača-Koper (characteristics of a mountain line)  
  • Hodoš-Pragersko                                                                 |
| **Speed**                 | **Low maximum speeds**  
  (Villa Opicina-Sežana 100km/h, Sezana- Ljubljana 75km/h, Ljubljana-Zidani Most 80 km/h, Zidani Most-Pragersko 75-90km/h, Pragersko- Hodoš 100km/h) |
| **Axle loads**            | **Low axle loads, train weight limits** –  
  C3 axle load (Load per unit length 7,2 t/m and axle load 20,0 t) on some sections of the lines Zidani Most – Pragersko and Pragersko – Murska Sobota |
| **Utilization**           | **Very high occupancy of certain sections:**  
  • Cepišče Prešnica – Divača: utilized capacity of trains in 24 hours is 72 trains; occupancy rate is 93%.  
  • Ormož – Ljutomer: utilized capacity of trains in 24 hours is 34 trains; occupancy rate is 88%. |
| **Train length**          | **Low maximum train lengths on certain sections (TEN-T standard: 740 m)**  
  • Sežana border – Ljubljana; Zidani Most – Pragersko; Pragersko – Ormož – Hodoš border - 600 m.  
  • Divača – Koper 505 m.  
  • Ljubljana – Zidani Most 570 m. |
| **Nodes**                 | **Ljubljana node:**  
  all cargo train run through the city centre, shunting needed. |
| **Signalling System**     | **Signalling System ETCS level 1**  
  • Not yet deployed, the infrastructure part is already functional. |
Operative Problems in Rail Transports

- Many closures in other countries mean many trains arrive late to Hodoš.
- Only three tracks at the station Hodoš can be used for cargo trains.
- Shunting of all locomotives for both directions due to the voltage difference between the Hungarian and Slovenian networks.
- The backlog of trains at Hodoš can quickly lead to congestion of the one-track line Pragersko-Hodoš and onward to Zidani Most, as well as in Hungary.
- An almost zero tolerance of the Italian carriers to delays in the handover of trains at the Villa Opicina border station. A missed time window for the handover can mean a few day’s waiting time.
- Car trains can be up to 589 m long (without locomotive) and cannot be transported whole to Koper.
- Many closures in Slovenia – on average 3 major closures on the main routes Hodoš-Sežana and Hodoš-Koper.
- The closures are not coordinated to be performed at the same time to minimize the negative impact.
- Each delay directly influences the delay with the time windows for loading / unloading in the port of Koper. This causes the costs of cancelled workforce, waiting ships, problems with shunting and delivery of wagons, delay of the train in the opposite direction and higher RIV costs.
## Examples of the Influence of Bottlenecks on RFC 6

<table>
<thead>
<tr>
<th>Route</th>
<th>Cargo Type</th>
<th>Transit time: TIMETABLE</th>
<th>Delay</th>
<th>Location of bottleneck</th>
<th>Reasons for deviation / consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hungary (Hodoš)–Italy (Sežana)</strong></td>
<td>Cereals</td>
<td>Hungarian + Slovenian part 24 h</td>
<td>10h 54m</td>
<td>Ukk – Hodoš Hodoš station Kresnice – Laze</td>
<td>▪ delay in arrival from Hungary due to closures&lt;br&gt;▪ occupied track capacities at Hodoš&lt;br&gt;▪ limited paths from Villa Opicina to destination&lt;br&gt;▪ missed path from Villa Opicina (on average 3 days’ waiting)</td>
</tr>
<tr>
<td><strong>Hungary (Hodoš)–Koper</strong></td>
<td>Cars</td>
<td>Hungarian + Slovenian part 20 h</td>
<td>6h 12m</td>
<td>Zalaszentiván - Hodoš Hodoš station</td>
<td>▪ delay in arrival from Hungary due to closures&lt;br&gt;▪ occupied track capacities at Hodoš&lt;br&gt;▪ missed unloading window in Port of Koper&lt;br&gt;▪ lost wagon turnaround</td>
</tr>
<tr>
<td><strong>Hungary (Gyekenyes/ Dobova)–Italy</strong></td>
<td>Cereals</td>
<td>Hungarian + Croatian + Slovenian part 18 h</td>
<td>7h 02m</td>
<td>Kaposvar - Gyekenyes</td>
<td>▪ delay in arrival from Hungary due to closures and occupied capacities in Gyekenyes&lt;br&gt;▪ missed path from Villa Opicina (on average 3 days’ waiting)&lt;br&gt;▪ lost wagon turnaround</td>
</tr>
</tbody>
</table>
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The Measures of SŽ-Tovorni promet for Better Services
The Solutions of SŽ-TP for Better Services

Longer trains
- For the transport of longer car trains, we set up a hub at Celje. There the excess wagons are removed and sent to Koper with the next train, and empty wagons are added on the return trip. In case of construction works at Celje, we also use Ljubljana Zalog as a hub.

Heavy trains
- We accept heavy trains from Hungary via Dobova. We transport trains of cereals with the gross weight up to 2,100 tonnes.
- For traction between Ljubljana and Sežana we use two locomotives. We accept heavy trains from Hungary via Hodoš.
- We transport container trains and trains of iron and steel with the gross weight of up to 1,700 tonnes.

Transport optimisation
- We also accept many unplanned trains and transport them close to the borders, to help reduce the congestion on railway lines on the neighbouring networks, in spite of our larger costs (hubs in Jesenice and Sežana).

Information
- We provide our customers up-to-date information about any major obstacles in transport runs – round the clock.

Coordination
- We are constantly coordinating with our partner railway carriers to achieve the best possible transport flow.
- In the case of major problems in cargo transport flows, SŽ Group suspends passenger trains on the busiest sections and reschedules infrastructure maintenance works.
SŽ-Tovorni promet

Ongoing and Planned Infrastructure Projects
Major Ongoing Infrastructure Projects

Upgrade of the line Zidani Most – Celje (26.2 km, investment value EUR 282.4 M.):
Planned end of the project: 2022

Upgrade of the line Poljčane – Slovenska Bistrica (7.6 km, investment value EUR 27.7 M.):
Planned end of the project: 2022

Upgrade of the Pragersko node (investment value EUR 194.87 M.):
Planned end of the project: 2022

The goal of the projects:
- ensure the line category D4 (load 22.5 t/axle and 80 kN/m) instead of the existing category C3 (load 20 t/axle and 72 kN/m),
- ensure GC profile,
- compliance with the technical specifications for the interoperability of the TEN-T conventional rail system
- optimisation of the technology of railway transports
- increase of the capacity
- increase of rail transport safety,
- shorter transport times,
- increase of the utilization of freight trains,
- better service of the carriers
Construction of the “pull track” on the Koper – Divača line (investment value EUR 25.5 M.):

- construction of a 1.2 km long track between at the freight station Koper and the power station Dekani,
- measures for a better power supply with the new mobile power station.

The goal of the works:

- increase of rail transport safety,
- shorter transport times,
- better service of the carriers,
- provision of reliable, competitive and environment-friendly cargo transports
- increase of the capacity from 82 to 85 trains/day
- increase of the capacity from 14.3 M. to 15.2 M. net tonnes/year.

Planned end of the project: 2022

Further ongoing major infrastructure projects:

- Deployment of the GSM-R system by the end of 2017
- Deployment of ETCS level 1 on the section Židani Most-Dobova by 2020
The Second Track Divača – Koper

**Increase of capacity**

- Nr. of trains / day (modernisation) + 20 %
- Nr. of trains / day (both tracks) + 160 %

**Planned end of project: 2025**

**Type of line:**
- one-track

**Length:**
- 27.1 km

**Top speed:**
- up to 160 km/h

**Profile:**
- GC

**The largest longitudinal inclination:**
- 17 prom.

**Maximum load:**
- 225 KN/axle, 80 KN/m (cat. D4)

**Rails:**
- 60 E1

**Upper structure:**
- predominately track on a rigid basis

**Electrification:**
- Direct current 3 kV

**Traffic management system:**
- ERTMS (GSM-R/ETCS level 2)

**Profile:**
- GC

**Throughput capacity**

<table>
<thead>
<tr>
<th>Type of Line</th>
<th>Modernised Existing Line*</th>
<th>New One-Track Line</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nr. of Trains / Day</td>
<td>85 trains/day</td>
<td>102 trains/day</td>
</tr>
<tr>
<td>M. net t/year</td>
<td>15.2 M. net t/year</td>
<td>17.7 M. net t/year</td>
</tr>
</tbody>
</table>

* Including the second track between the power station Dekani and Koper

**Transport capacity**

<table>
<thead>
<tr>
<th>Type of Line</th>
<th>Modernised Existing Line*</th>
<th>New One-Track Line</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nr. of Trains / Day</td>
<td>222 trains/day</td>
<td>120 trains/day</td>
</tr>
<tr>
<td>M. net t/year</td>
<td>43.4 M. net t/year</td>
<td>25.7 M. net t/year</td>
</tr>
</tbody>
</table>

* Including the second track between the power station Dekani and Koper
Conclusion
Conclusion

- Infrastructure obstacles on the corridor RFC 6 are causing high costs and lower efficiency for carriers, as well as for customers.
- The obstacles are causing problems in providing the necessary resources (locomotives and wagons, human resources).
- Missed time windows for handover mean dissatisfaction of end customers, transport organizers and rail carriers.
- Long-term focus on investments in the corridor infrastructure is needed to reach the TEN-T network standards.
- Better coordination of infrastructure managers is needed to harmonize the timeframe of maintenance and construction works on the various rail networks as much as possible.
- The coordination among rail carriers should be further improved.
- All carriers should accept unplanned train as much as possible, to enable the best possible flow of goods. This is especially important in exceptional situations (e.g. closures of border crossings).
Thank you for your attention!