Railway infrastructure in the Czech Republic as a part EU railway system

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Thanks to its geographical location in the centre of Europe the Czech Republic is inherently predestined for transit transportation in all major directions...
• As of 1. 1. 2003
• following the Transformation Act No 77/2002 Coll.
• two organizations were established:
  ▪ **Czech Railways**, joint-stock company (CD) – the national carrier
  ▪ **Railway Infrastructure Administration**, state organization (SZDC)

• SZDC has taken over the management of state assets mainly represented by the **railway infrastructure**
• It fulfils the role of **rail owner**, providing operation, operability, modernization and development of the railway infrastructure
• It allocates **path capacity**, ensuring **equal access** to all carriers
• As of **1.7.2008** it also became the operator of the national and regional rail owned by the Czech Republic, ensuring **rail maintenance**
• Since **1. 9. 2011** it has been ensuring **operation control** (formerly provided by Czech Railways)
## Czech rail network characteristics

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
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<tbody>
<tr>
<td>Total length of lines</td>
<td>9 470 km</td>
</tr>
<tr>
<td>Total length of electrified lines</td>
<td>3 208 km</td>
</tr>
<tr>
<td>Length of single-track lines</td>
<td>7 557 km</td>
</tr>
<tr>
<td>Length of double and multiple-track lines</td>
<td>1 913 km</td>
</tr>
<tr>
<td>Total length of tracks</td>
<td>15 552 km</td>
</tr>
<tr>
<td>Rail network density</td>
<td>122 m/km²</td>
</tr>
<tr>
<td>Railway crossings</td>
<td>8 096</td>
</tr>
</tbody>
</table>

### Interoperable parameters of transit corridors

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
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<tbody>
<tr>
<td>Gauge</td>
<td>1 435 mm</td>
</tr>
<tr>
<td>Structural gauge</td>
<td>GC</td>
</tr>
<tr>
<td>Loading gauge (Track carrying capacity)</td>
<td>UIC-D4</td>
</tr>
<tr>
<td>Contact line systems</td>
<td>AC/DC</td>
</tr>
</tbody>
</table>
Management of assets defined in § 20 of Act No 77/2002 Coll., namely:

- providing **operation** of the railway infrastructure and its operability
- providing **maintenance and repair** of the railway infrastructure
- providing the **development and modernization** of the railway infrastructure
- preparation of documents related to **public service obligations**
- **supervision** of the railway infrastructure utilization, of rail operation and operability
Real situation of czech railways

Historical debt:

- Technical track parameters from 19 century
- No satisfactory maintenance – decrease of technical parameters
- Sceptics view to speed increasing and technology development:
  - **1930:** Great Britain, France, Germany: 160 kmph in steam and diesel × Czechoslovakia: standard 100 kmph, only express „Slovenská strela“ 130 kph
  - New and upgraded lines designed for 80 – 120 kmph, partly todays trend too
  - Delay of electrification
  - **1990:** EU-12: standard 200 kmph on key conventional lines + building of high speed lines × CZ: corridor modernisation up to 160 kmph
Corridor modernisation:
• European standard, but...
• Modernisation in existing routes—no important speed increasing (very convenient for future for freight and regional transport
• Very long time of modernisation
• Modernisation of the rest of the lines—postponed

!!! Still on the same route !!!
Railway is not backbone of public transport system:

- No time competitiveness:
  - Only 9% opposite to car
  - Only 48% opposite to bus
- Very similarly situation in international transport
- No attractive offer of international long distance trains
No enough capacity on the main lines:

- Problem in big cities areas – commuter, long distance and freight transport on the same tracks
- results:
  - Delays of commuter trains
  - No maximum possible speed of long distance trains
  - No convenient paths for freight trains
- Problems with "open-access“ trains:
  - More requests for fast paths
  - Negative influence on commuter and freight trains
Infrastructure development priorities

1. Done of the corridors and junctions modernisation
2. New fast line for long distance trains
3. Capacity and speed increasing for freight transport
4. Fulfilled interoperability requirements
5. Rail connection to Prague airport
6. Capacity increasing for commuter trains
7. Rest lines parameters development
8. Electrification of the lines
9. Technology development
10. Use of local lines
1. Completion of the corridors and junctions modernization

- EU cofinancing
- Future development planned: ETCS, capacity increasing
2. New fast line for long distance trains

**Reasons**

- Increase of CZ railway infrastructure competitiveness opposite to:
  - **Inside CZ** (opposite to the other kinds of transport)
  - **outside** (opposite to the other railways infrastructure)

- Mobility increasing
  - National – between regional centres
  - International (investment more attractively, tourisms,...)
2. New fast line for long distance trains

- New TEN-T politic: railway network with speed more than 200 kmph
- Necessary for railways as the most important system in public transport + capacity increasing in freight transport
- New concept – rapid service
- Very complex solution
- Including operational concept
- „RS“: new PR mark
- First section – engineering works will start up to
- Pilot project: 200 km/h Brno – Břeclav
2. New fast line for long distance trains

- **Current situation:**
  - **Opportunity study:** complex CBA including regional, environmental and global economic aspects
  - **Territorial study:** Praha – Benešov – Brno - Vranovice
  - **Responsibility:** SZDC Strategy department

- **Basic principles:**
  - Open for HS trains class 1 (including Railjet, ICX, engine +coaches Bmz, Amz type)
  - Freight transport on bases HS train class 1
3. Capacity and speed increasing for freight

- Freight corridors Regulation 913/2010/EU
- TEN-T proposal – separation lines in the main direction for freight or passengers
- Possible of use existing modernised lines
- New capacity – **long distance trains on own track**
- Main priority line Kolín – Ústí nad Labem – Děčín + Hranice na Moravě – Horní Lideč modernisation
- Enough capacity for freight trains development
- Open access – critical situation for freight trains on line Prague – Ostrava (3 long distance trains p.h.)
3. Capacity and speed increasing for freight

- Change from road to rail— the most important potential in combine transport
- Cooperation with road transport is necessary
- New infrastructure is necessary (terminals)
- Speed and timetable guaranty
- In the future high speed cargo possible
4. Fulfilled interoperability requirements

- Common technical EU standards for vehicles and infrastructure – technical specification for interoperability (TSI)
- Their application makes condition for transit more attractive
- ETCS (European train control system):
  - Decin – Breclav up to 2015
  - Praha – České Budějovice up to 2018
  - Děčín – Nymburk – Kolín up to 2020
  - Ostrava – Břeclav – important for transit
- It is necessary fulfil infrastructure parameters – train length, loading gauge, axle load
ERTMS implementation possibilities

- Scenario A: Coexistence national system and ERTMS for long term period
- Scenario B: Coexistence temporary limited
- Scenario C: ERTMS instead of national system without exception
ERTMS Migration strategy

Our ERTMS expectation:

- **Speed increasing** – stations, speed more than 160 kmph
- **Capacity increasing**: L2 implementation on corridor lines
- **Safety increasing**: speed supervision
- Competitiveness of CZ railways (Railjet project)

Main principles of the implementation:

- EU cofinancing
- First: transit lines
- Target: ERTMS without national system
- Transition periods necessary (old vehicles)
- EU obligation (Corridor E, Praha – České Budějovice)
5. Rail connection to Prague airport

• Important White book target - multimodality
• Prague airport is important in our region, but without rail passenger connection
• A lot of expansive requests from Prague citizens
• Economic aspects are important (CBA)
• Common with suburban railway to Kladno
• Final solution has to include long distance train connection
6. Capacity increasing for commuter trains

- Development of suburban railway
- Common line with freight, long distance and interregional trains
- Segregation is necessary
- Suburban parts of RS – new occasion for regional rapid service
- Very good benefits from integrated transport systems
7. Other lines parameters development

- Good connection between RS lines and the other lines
- Possibility for speed increasing:
  - New vehicles
  - New interlocking system
- Homogenisation of speed profile (level crossing, ...)

![Image of trains on tracks]
8. Electrification of the lines

- Electric energy – energy for future
- More effective, speed increasing
- Priorities:
  1. Freight lines
  2. Suburban lines
  3. Logical network
- For future – only one power system 25 kV 25 Hz
  - New RS line with 25 kV system
  - TSI preference
  - Start with discussion
9. Technology development

- ETCS, GSM-R
- Future TSI – requests for all of network
- Long distance control:
  - Priority: main corridor lines
  - Target: all of network
- Junction – automatic management
- Telematics application - TSI TAP and TAF
10. Use of local lines

- EU-White book requests high density of network
- It is necessary analyse potential of the lines
- Politic question too
- Good potential – speed increasing is necessary
- Touristic potential, regular public transport system for commuting to jobs, offices, schools,…
- Connection to RS – opportunity for these lines
Conclusions

• Segregation
• Railway system – integration with inside and outside is necessary
• Speed increasing – necessary condition for future
Thank you for attention

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