



# Preliminary Planning Study

## New Railway Line Dresden - Prague

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### Task 1.1    Laws & Regulations

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## **Task 1**

### **Adjustment of the national (german/tschech) Guidelines and Standards in correlation of the european Technical Specifications for Railwayinfrastruktur**

#### **Subtask 1.1 Railway Regulations**

##### 1.1. Introduction

###### **1.1.1 The framework of laws and Regulations**

The rail traffic in the EU is currently operated under national, bilateral or international agreements. Therefore each railway project that crosses the border lines of two EU member states needs to be designed under the rule of international and national laws and technical regulations.

The task of this work package was to identify the actual binding laws and technical regulations that have to be considered for the planning of a new railway line between Germany and the Czech Republic.

Above all it was concluded that the EU regulations on the technical specifications for interoperability (TSI) which are related to the design and operation of a railway system within the EU are the most important regulations that have to be fulfilled at first.

Therefore each planning team set up a table for the new railway line (mixed traffic,  $v > 200$  km/h) of national laws and national technical regulations and compared these tables for differences in the laws and technical regulations between the states and in comparison to the TSI regulations. The German list includes also the regulations of the Eisenbahnbundesamt and the Guidelines of the Deutsche Bahn and the safety regulations for accident prevention.

It was found, that the laws and provisions on the German side are fitting very well into the TSI regulations, whereas the laws and provisions on the side of the Czech Republic need to be adjusted since there are simply no regulation for railway traffic in the Czech Republic for a train speed higher than 160 km/h.

The following chapters condense these findings to allow a brief overview of the main results.

Chapter 1 List of railway relevant laws and regulations in the EU

Chapter 2 List of relevant railway laws and regulations in Germany

In order to be able to design a railway line that has a specified speed of 200 km/h and above it was decided that the new railway line Dresden – Prag shall be designed following a list of parameters which has been defined by the guideline 413 of Deutsche Bahn.

See Attachment 1 General List of Planning Parameter for Railway Standard M 230

The design parameters have been discussed by the Czech and German side with participation of Deutsche Bahn and SŽDC and it has been decided that the list of **Technical Design Parameter (Status May 5th 2015)** shall be the basic for the technical planning at this preliminary design stage.

### 1.1.2 Technical Design Parameter (Status May 5<sup>th</sup> 2015)

TEN Category	HGV
Traffic Category	Passenger Traffic (P) / Goods Traffic (G) > Class M 230
Traffic Study BMVBI 2025	P 16/16 - G 64/70      trains / direction / day
Combined Traffic Category	P 80 / 410
Maximum Speed	P 200/230 km/h / G 120 km/h
Maximum permissible Slope	12.5 ‰
Load Classification	D4      22.5 t /axle    8.0 t/m + SW
In Future (Option)	E5      25.0 t/axle    8.4 t/m
Track	slab track in tunnels on bridges / ballast on side tracks
Track Distance	4.50 m open section / > 24.70 m twin tunnel section
Track Gauge	GC Profile according to EBA / TSI
Track Bypass	if possible at each Tunnel Portal (downhill), useable Length 750 + x m
Track Switches	at Track Bypass $v_e = 100$ km/h
Train-Communication	GSM-R
Signaling	ETC-S Level 2
Electronic Train Control	ESTW
Hot Wheel / Hot Brake Detecting Devices	Yes
Overhead Lines D	Re 200 mod. / Re 250 (15 kV – 16.7 Hz)
Overhead Lines CZ	System to be defined (25 kV – 50 Hz)
Transition Point D / CZ	to be defined

Cross Border Tunnel	26.530 m length
Tunnel Equipment	Tunnel Tube Cross Connections at distance < 500 m Fire Rescue Station at tunnel crest Video Control Temperature Control Heat and Smoke Detection Rescue Devices Fire Extinguishing Pipes Water supply 96 m <sup>3</sup> at Portals and Rescue Exit Ventilation at tunnel crest at Börnersdorf Rescue Places 1.500 m <sup>2</sup> at Portals Rescue Exit and Place 1500 m <sup>2</sup> at Börnersdorf Slab Track for Rescue and Fire Protection Vehicles

### 1.1.3 Chapter 1 Application of relevant EU Regulations

Existing Technical Specifications for Interoperability (TSI) have been adapted by the members of the EU through the Trans European Railway Interoperability Ordinance TEIV as substantive law.

Therefore new TSI specifications do not need to be enacted by national governments.

In Germany the relevant TSI specifications are listed as “Acknowledged Technical Rules” in the EBA Listing ELTB (List of Technical Regulations).

The EU regulations (TSI) have to be applied as a legal ordinance. Exemptions on the application of the TSI can be made only through approval by the EBA.

During different planning stages of a railway project the EC Conformity (on TSI) has to be checked e.g. by the Deutsche Bahn and being approved by the EBA.

The first planning stage in Germany e.g. for a traffic infrastructure is before the Integrated Building Permission Process (Planfeststellung) during the Preliminary Design.

The second planning stage is the Final Design (before construction) through approval by appointed examiners (technical expert's e. g. announced by Deutsche Bahn and acknowledged by EBA) through a written report.

The third planning stage will take place before initial operation on the basis of measurements and completion protocol (person responsible for operation, e.g. announced by Deutsche Bahn and approved by EBA).

The conformity process will finish in a final EC-Certificate after approval of fulfilment of all relevant TSI provisions.

The whole process is documented in an EC-Audit Report (EG-Prüfheft).

The parameters that have to be fulfilled for different TSI Subsystem are listed exemplarily for this planning stage in the tables below.

<p><b>Trans European Railway Interoperability Ordinance</b>          (Transeuropäische Eisenbahn Interoperabilitätsverordnung)</p>	<p><b>TEIV</b></p>
<p><b>Interoperability of Railway Systems in the EU</b></p>	<p><b>Guideline 2008/57/EG</b></p>
<p><b>TSI subsystem „Infrastructure“</b>          Route class IV-M (GC-25-200-750)</p> <p>zul. <math>s &lt; 12,5 ‰</math>          zul. <math>s &lt; 20 ‰</math> (average over 3 km longitudinal profile)          zul. <math>s &lt; 35 ‰</math> (average over 0,5 km longitudinal profile without stops)</p> <p><math>r_w &lt; 600 \text{ m} / r_k &lt; 300 \text{ m}</math></p> <p>zul. <math>u_0 = 160 \text{ mm}</math></p> <p>zul. <math>u_f = 130 \text{ mm G} / \text{zul. } u_f = 150 \text{ mm P}</math></p> <p>LM 71 / LM SW/0 with <math>\alpha = 1,1</math></p> <p>acc. DIN EN 1991</p> <p>Health, safety and environmental protection          Maximum pressure fluctuation in the tunnel</p>	<p><b>TSI-INF-2014-1299</b></p> <p>Longitudinal inclination 4.2.4.3</p> <p>Trough / crest radius</p> <p>Superelevation 4.2.5.2</p> <p>Superelevation deficiency 4.2.5.4.1</p> <p>Vertical loads 4.2.8.1.1</p> <p>Other loads 4.2.8.1.2 ff</p> <p>4.2.11          4.2.11.1</p>
<p><b>TSI subsystem „Energy“</b></p> <p>Clearance for current collectors          Electric shock protection</p>	<p><b>TSI-ENE-2014-1301</b></p>
<p><b>TSI subsystem „Control-Command and Signalling“</b></p> <p>Track-side CCS Systems, On-board CCS Systems</p>	<p><b>TSI-CCS-2012-88 / 2012-696</b></p>
<p><b>TSI sub-area „Safety in Railway Tunnels“</b></p> <p>Tunnels over 20 km long require a special safety inspection which can lead to additional specifications not mentioned in this TSI. This is to ensure that interoperable trains travel through areas with an acceptable level of fire safety.</p> <p><b>Fire resistance requirements for construction materials</b></p> <p><b>Fire detection in technical rooms</b></p>	<p><b>TSI-SRT-2014-1303</b></p> <p>EBA-Guideline</p> <p>4.2.1.2</p> <p>4.2.1.4</p>

<b>Evacuation facilities</b>	4.2.1.5
- safe area	4.2.1.5.1
for parallel single-track tunnels	
- emergency exits into the open air (1000 m)	4.2.1.5.2
not essential if cross passages at intervals < 500 m	
lead into the neighbouring tunnel tube	
Clear width > 1,50 m, clear height > 2,25 m,	
Door opening clear width > 1,40 m, clear height > 2,00 m	
Lighting and escape signs	
<b>Emergency lighting</b>	4.2.1.5.4
1 lx for 90 minutes on pedestrian escape route	
<b>Escape route signs</b>	4.2.1.5.5
Intervals < 50m	
<b>Pedestrian escape routes</b>	4.2.1.6
Width > 80 cm, height > 2,25 m	
<b>Fire Fighting Points</b>	4.2.1.7
<b>Access for rescue services (fire fighting points)</b>	4.2.1.7.b (1)
at Portal / emergency exit < 1000 m	
in Tunnel	4.2.1.7.b (2)
Rolling Stock Category A (4.2.3)	max. 5 km (Tunnel)
Rolling Stock Category B (4.2.3)	max. 20 km
<b>Fire Fighting Points:</b>	4.2.1.7.c
(1) Water supply 96 m <sup>3</sup> (800 l/sec during 2 hours)	
(2) Train position information	
(3) Accessible for emergency response vehicles	
(4) Traction Energy Switch Off	
<b>Outside Tunnels:</b>	4.2.1.7.d
Rescue area outside the tunnel A = 500 m <sup>2</sup>	
<b>Inside Tunnels:</b>	4.2.1.7.e
(1) Safe area and evacuation route	
(2) Sufficient standing surface	
(3) Access to the affected train for emergency response services (vehicles)	
(4) control of smoke in particular at the self-evacuation facilities	
<b>Emergency communication GSM-R</b>	4.2.1.8
<b>Subsystem Energy</b>	4.2.2
Overhead Catenary section max. 5 km	4.2.2.1
Earthing equipment at tunnel entrances	4.2.2.2

Electricity supply for rescue services	4.2.2.3
Requirements for electrical cables in the tunnel	4.2.2.4
Reliability of electrical installations	4.2.2.5
<b>Subsystem Rolling Stock</b>	4.2.3
(1) Category A passenger rolling stock	
(2) Category B passenger rolling stock	
<b>Measures to prevent fire</b>	4.2.3.1
Hot axle box detection LOC&PAS TSI	4.2.3.1.3
<b>Measures to detect an control fire</b>	4.2.3.2
Fire detection systems LOC&PAS TSI	4.2.3.2.3
<b>Requirements to related emergencies</b>	4.2.3.3
Smoke control systems LOC&PAS TSI	4.2.3.3.2
<b>TSI subsystem “for rolling stock noise”</b>	<b>TSI-NOI-2014-1304</b>
Limiting values for rolling stock vehicles	
<b>TSI subsystem „Telematic Systems Freight Trains“</b>	<b>TSI-TAF-2014-1305</b>
Information system (train path, running, schedule, disruption)	
<b>TSI subsystem „Telematic Systems Passenger Trains“</b>	<b>TSI-TAP-2011-217</b>
Information system (train path, running, schedule, disruption)	
<b>TSI subsystem „Operation“</b>	<b>TSI-OPE-2012-797 / 2013-710</b>
Operation and traffic management	
<b>TSI subsystem „Persons with reduced mobility“</b>	<b>TSI-PRM-2014/1300</b>
Enhancement of accessibility	



## 1.1.4 Chapter 2 German List of railway laws and railway regulations

### 1.1.4.1 Federal Laws

Federal law on railway improvement (Bundesschienenwegeausbaugesetz)	BSchWaG
Regional planning law (Raumordnungsgesetz)	
Administrative Procedure Act (Verwaltungsverfahrensgesetz) ff.	VwVfG §§ 74
Environmental Impact Assessment Act (Umweltverträglichkeitsprüfungsgesetz)	UVPG
Federal Mining Act (Bundes Berggesetz)	BBergG
Federal Waste Act (Bundesabfallgesetz)	
Federal Pollution Control Act (Bundes-Immissionsschutzgesetz)	BImSchG
Federal Emission Protection Directive (Bundes-Immissions-Schutzverordnung)	16.BImSchV
General Railways Act (Allgemeines Eisenbahngesetz)	AEG § 18 ff.
Railway Crossing Act (Eisenbahn Kreuzungsgesetz)	EBKrG
Waste Management and Recycling Act (Abfall-Kreislauf-Wirtschaftsgesetz)	
Railway Reorganization Act (Eisenbahnneuordnungsgesetz)	ENeuOG

### **Ordinance**

Railway Construction and Operating Regulations (Eisenbahn Bau- und Betriebsordnung) Permissible longitudinal inclination zul. $s < 12,5 \%$	EBO
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### 1.1.4.2 EBA Railway Regulations

<p>Planning permission procedure guidelines          Guidelines for making decisions under planning law on the permissibility of operational facilities for federal railways under § 18 ...</p>	<p>(PF-RL) Edition 01/20          Dated July 2012</p>
<p>Environmental guidelines on planning permission and plan authorization procedures under railway law, also for magnetic levitation trains</p>	<p>Environmental guidelines          Dated</p>
<p>Administrative rules for the procedure used when putting into operation structural subsystems of the trans-European railway system for the area of fixed installations</p>	<p>(VV IST) Edition 12.2011</p>
<p>Administrative rules for construction supervision in civil engineering, superstructure and building construction (IOH)</p>	<p>(VV BAU) Version 4.53          Edition 07.2013</p>
<p>Administrative rules for construction supervision for signalling, telecommunications and electrical facilities</p>	<p>(VV BAU-STE) Ausgabe 4.51          Dated 27.052010</p>
<p>Fire and catastrophe protection requirements for the planning, construction and operation of railways in accordance with the General Railways Act (AEG)</p>	<p>Dated 12/2012</p>
<p>Fire and catastrophe protection requirements for the construction and operation of railway tunnels</p>	<p>Dated 07/2008</p>
<p>List of railway-specific technical construction regulations</p>	<p>ELTB</p>

### 1.1.4.3 Deutsche Bahn Railway Regulations

<p><b>Guideline 123</b>  <b>Emergency Management, Fire Protection</b></p>	<p>Dated 14.06.2012</p>
<p><b>Guideline 800-0110</b>  <b>Network Infrastructure Technology Design: Line Routing</b></p> <p>Limits and parameters for line routing</p> <p>Transition curves and camber ramps</p> <p>Longitudinal inclination and change of inclination          zul. <math>s &lt; 12,5 \text{ ‰}</math>          min. <math>s = 4 \text{ ‰}</math> in tunnels (drainage)</p> <p>Rounding off radius  <math>r = 16.000 \text{ m}</math> for <math>v \leq 200 \text{ km/h}</math> (standard value)  <math>r = 10.000 \text{ m}</math> for <math>v \leq 200 \text{ km/h}</math> (limit of discretion)</p> <p>Intermediate straight section where rounding off  <math>l_g = 50 \text{ m}</math> for <math>v \leq 200 \text{ km/h}</math> (at standard value)  <math>l_g = 110 \text{ m}</math> for <math>v \leq 200 \text{ km/h}</math> (at limit of discretion)</p> <p>Minimum radius of curve at <math>v=200 \text{ km/h}</math> P  <math>r &gt; 1.630 \text{ m}</math> at <math>u_f = 130 \text{ mm}</math> (zul <math>u_f</math>)</p> <p>Minimum radius of curve at <math>v=120 \text{ km/h}</math> G  <math>r &gt; 1.100 \text{ m}</math> at <math>u_f = 130 \text{ mm}</math> (zul <math>u_f</math>)</p>	<p>Dated 15.07.2008</p> <p>Guideline 800.0110A01</p> <p>Item 8</p> <p>Item 10</p>
<p><b>Guideline 800-0120</b>  <b>Network Infrastructure Technology Design: Switches</b>          Switches and crossings</p>	<p>Dated 01.02.1997</p>
<p><b>Guideline 800-0130</b>  <b>Network Infrastructure Technology Design: Line Cross-Section</b></p> <p>Distance between tracks on new lines  <math>a = 4,50 \text{ m}</math></p> <p>Distance between edge of subgrade level and middle of track  <math>b = 3,80 \text{ m}</math></p> <p>Width of subgrade level (at <math>u=0</math>)  <math>B = 12,10 \text{ m}</math></p> <p>Limits of clear space          Clear space profile GC          Standard clear space with overhead contact line  <math>v_e &lt; 200 \text{ km/h}</math></p>	<p>Dated 01.02.1997</p> <p>Table 1 und Item 2</p> <p>Table 1 und Item 3</p> <p>Table 1 und Item 5</p> <p>Item 1          Figure 1          Figure 4</p>

Footpaths at the border and between tracks	Item 4
Transverse inclination of the subgrade level	Item 5
Cable routes	Item 6
Distance between edges of subgrade level and fixed objects	Item 7
Lines of ownership	Item 8
Standard drawings for track cross-sections > 200 v <sub>e</sub> < 300 km/h	Item 9, Appendices 1 and 3
<b>Guideline 804</b> <b>Planning, constructing and maintaining railway bridges</b> <b>(and other civil engineering structures)</b>	Dated 01.01.2013
<b>Guideline 808</b> <b>Cost calculation</b> Cost group catalogue, cost parameters	Dated 01.05.2012
<b>Guideline 809</b> <b>Realizing infrastructure and electronic measures</b>	Dated 01.10.2006
<b>Guideline 819</b> <b>Planning of signalling systems</b>	
<b>Guideline 820</b> <b>Guidelines for superstructures of standard gauge railways</b>	Dated 02.12.1999
<b>Guideline 836</b> <b>Planning, constructing and maintaining earthworks and</b> <b>other geotechnical structures</b>	

<b>Guideline 853 Planning, constructing and maintaining railway tunnels</b>	8 <sup>th</sup> updated version 13.10.2014
<b>853.1001 Basic design principles: general rules</b>	8 <sup>th</sup> updated version 13.10.2014
List of quoted regulations	-
Selection of cross-section single-track / two-track	Item 1
Line routing (Ril 800.0110)	Item 2
Cross-section design	Item 3 und 853.1002/1003
Rules for tunnel portals and special structures	Item 4
Fire and catastrophe protection	Item 5
Safe areas and escape routes	
Handrails	
Elevators in rescue galleries	
Rescue galleries	
Water supply for fire extinguishing	
Structural fire protection	
Structural stability in the event of fire	A01
<b>853.1002 Basic design principles: railway tunnels</b>	
<b>853.1101 Basic geotechnical principles</b>	
<b>853.1201 Requirements for concrete</b>	
<b>853.2001 Structural stability inspections</b>	
<b>853.4001 General principles for tunnel driving, securing and lining</b>	
<b>853.4002 Lining curves</b>	8 <sup>th</sup> updated version 13.10.2014
<b>853.4003 Lining with shotcrete</b>	
<b>853.4004 Lining with in-situ concrete</b>	8 <sup>th</sup> updated version 13.10.2014
<b>853.4005 Lining using segments</b>	8 <sup>th</sup> updated version 13.10.2014
<b>853.4101 Sealing and drainage</b>	8 <sup>th</sup> updated version 13.10.2014
<b>853.4201 Tunnels using the cut-and-cover method</b>	8 <sup>th</sup> updated version 13.10.2014
<b>853.4202 Tunnels using the cut-and-cover method – rectangular frames</b>	8 <sup>th</sup> updated version 13.10.2014
<b>853.5001 Regulations for construction products and built-in elements</b>	8 <sup>th</sup> updated version 13.10.2014

<p><b>853.6001 Construction procedure and documentation</b></p> <p><b>853.8001 Inspections in the SAP IT system</b></p> <p><b>853.8002 Maintenance, repairs and other construction measures</b></p> <p><b>853.9001 Specification drawings for tunnels</b></p>	<p>8<sup>th</sup> updated version 13.10.2014</p>
<p><b>Guideline 859</b>  <b>Guideline for the design of Alarm- and Signaling Systems</b></p>	
<p><b>Guideline 877</b>  <b>Guideline for crossing Gas and Water lines</b></p>	<p>Dated 01.04.2012</p>
<p><b>Guideline 882</b>  <b>Guideline for operation of GSM-R-Net</b></p>	
<p><b>Guideline 892.9401 ...</b>  <b>Guideline for the design Switching Devices and Railway Control</b></p>	
<p><b>Guideline 954</b>  <b>Guideline for the Design of Electrical Power Systems</b></p>	<p>Dated 01.03.2012</p>
<p><b>Guideline 955</b>  <b>Guideline for the Design of Traction Power Supply Switch Systems</b></p>	<p>Dated 01.01.2011</p>
<p><b>Guideline 995</b>  <b>Guideline for the Design of Traction Power Supply Systems</b></p>	<p>Dated 01.10.2009</p>
<p><b>Guideline 99701-03</b>  <b>Guideline for the design of Overhead Line Systems</b></p>	<p>Dated 01.10.2013</p>

<p><b>Guideline 997</b>  <b>Planning and erecting overhead lines</b></p> <p>Clear space profile for new railway lines: overhead lines and catenaries</p> <p>Clear structure heights</p> <p>Space for re-tensioning devices</p> <p>Space for switch disconnectors</p>	<p>Dated 01.07.2001</p> <p>Appendix 1 Figure 3</p> <p>Appendix 1 Table 4</p> <p>Appendix 1 Table 5</p> <p>Appendix 1 Table 6</p>
<p><b>AK-FF</b>  <b>Requirements catalogue for the construction of slab tracks</b></p>	<p>4<sup>th</sup> edition 08.01.2002</p>
<p><b>Fire and catastrophe protection in railway tunnels</b></p> <p>Design of structure</p> <p>Operational requirements</p>	<p>Deutsche Bahn AG        Notfallmanagement        Herr Klaus Kruse        2003 edition</p>

#### 1.1.4.4 Other German Federal Regulations

<p><b>Accident prevention regulations</b>  <b>Electrical facilities and operating equipment</b></p>	<p>GUV-V A3</p>
<p><b>Accident prevention regulations</b>  <b>Working in the area of tracks</b></p> <p>Working in the area of tracks</p>	<p>GUV-V D 33        Dated 1999</p> <p>§2 and Appendix No.3</p>
<p><b>Accident prevention regulations</b>  <b>Railways</b></p> <p><b>Safety space for insured persons</b>        Safety area height &gt; 2,00 m        Width 0,80 m (100 &lt; v<sub>e</sub> &lt; 300 km/h)        Width 0,50 m (in tunnels, by bridge guardrails)</p>	<p>GUV-V D-30.1        Dated 2008</p> <p>§ 5 (2) und Appendix 1</p>

## **1.1.2 Results and Next planning step**

The railway regulations in the Czech Republic are limited to a maximum design speed of 160 km/h. The Czech railway regulations will have to be further developed with respect to the new railway line Dresden - Prague e ( $v_e \geq 230$  km/h) from Ústí nad Labem to Prague in the coming years.

It was assumed for this preliminary design study on both, German and Czech sides that the design parameters for the cross border tunnel will be chosen according to the harmonized German / European regulations. The main part of the cross border tunnel is placed in Germany (15.1 km), the tunnel in the Czech Republic has a length of 11.5 km long.

The design parameters for the cross border tunnel (track layout, cross section and technical equipment) can be defined by the following set of rules (see also Attachment 1):

### **DB-Guideline 413**

**Infrastructure Design, Trackstandard M 230 (413.0301.A03)**

### **DB-Guideline 800-0110 bis 800-0130**

**Network Infrastructure Technology Design:**

**Line Routing / Switches / Line Cross- Section**

in connection with

**TSI-INF-2014-1299**

**Subsystem „Infrastructure“**

### **DB-Guideline 853**

**Planning, constructing and maintaining railway tunnels**

in connection with

**TSI-SRT-2014-1303**

**Subsystem „Safety in Railwaytunnels“**

and the EBA Guideline

**Fire and catastrophe protection requirements for the construction and operation of railway tunnels**

as well as

**DB-Guideline 123**

**Emergency Management, Fire Protection**



Concepts for the Emergency Management, Fire Protection of the cross border tunnel with a length of 26.6 km have to be developed on bilateral local and international legislation levels and the fire protection organisations. The previously mentioned guidelines will be the outline.

Before future planning stages will take place it is desirable that both railway organisations DB Netz and SŽDC will initiate several working groups on the technical working level to harmonize the design parameters and set up technical specifications for the design and operation of the crossborder tunnel, the telecommunication and signalling systems, the concept for safety in the railway tunnel and the transition station between the two different heavy current systems.

### **Working Groups DE/CZ for harmonization of guidelines**

1. Technical Design of the Cross Border Tunnel  
including Construction Methods and Tunnel Equipment
2. Technical Operation Models of the Cross Border Tunnel
3. Safety and Rescue Measures (SRM) of the Cross Border Tunnel  
including Feasibility Studies on SRM and Tunnel Ventilation
4. Telecommunication Systems between Heidenau and Ústí nad Labem
5. Signalling Systems between Heidenau and Ústí nad Labem
6. Heavy Current Systems between Heidenau and Ústí nad Labem
7. Overhead Line Systems between Heidenau and Ústí nad Labem  
including transition zone at the station in Ústí nad Labem
8. Train Operation between Heidenau and Ústí nad Labem

## Attachment 1 General List of Planning Parameter for Railway Standard M 230

<b>Bahnbetrieb</b>	<b>Infrastruktur gestalten</b>
<b>Streckenstandard M 230</b>	<b>413.0301A03</b> <b>Seite 2 von 5</b>

## 2 Planungsparameter

Streckenstandard		
M 230 - Mischbetriebsstrecke 1 - (ABS)		
Basisparameter		
Streckenauslastung [Z/d je Richtung]	Obergrenze	Untergrenze
1 Summe/SPFV/SPNV/SGV	150/50/40/60	60/20/20/20
2 Leitungsgeschwindigkeit	161 - 230 km/h	
3 angebotene Zugklassen	ZP1 - ZP6, ZG1 - ZG5	
4 Optimierungskriterien	Mischverkehr	
Standardelemente		
1 Anzahl der Streckengleise	2	
2 Gleisabstand freie Strecke	4,50 lt. EBO 4,00 bei TSI-Strecken	
3 Überholungsgleisabstand	8 km (entsprechend Bemessungsrechnung)	20 km (entsprechend Bemessungsrechnung)
4 Überholungsgleislängen	750 m (für Gz)	750 m (f. Gz je 2. Gleis ***)
5 Abstand der Überleitverbindungen	8 km (Bahnhofsabstand)	bis 20 km
6 Blockabschnittslängen	1,5 km (entsprechend Bemessungsrechnung)	4,0 km (entsprechend Bemessungsrechnung)
7 v Einf / Ausf.:	100 km/h	80 km/h
8 v Überleit.:	100 km/h	80 km/h
9 v Abzweig:	v - Strecke	
10 Max. Neigung	12,5 ‰ (Bemessungszug)	
11 Lichtraum	EBO bzw. TSI	
12 Streckenklasse	D4 plus SSW	
13 Schutzweichen	erforderlich	
14 Streckenblock	erforderlich	
15 Gleisfreimeldeeinrichtung	erforderlich	
16 PZB/Indusi	erforderlich	
17 LZB	erforderlich	
19 GWB	erforderlich	
19 Zugfunk	erforderlich	
20 HOA, FBOA	erforderlich	
21 Windwarnanlage	entsprechend geltenden Richtlinien	
22 Betriebszentralen Dispositionsebene Stellwerksbedienebene	ist vorzusehen Bedienung der "Unterkentralen"	
23 Einfachbetriebsweise	nein	
24 Bahnsteigzugänge	schienenfrei erforderlich	
25 NeiTech-Einsatz	entsprechend Programm	
26 Bahnübergänge	nicht zulässig	
27 Bahnstrom	siehe Anhang 11	

**Besondere Hinweise**  
**Signaltechnik**  
 Kontinuierliches Zugbeeinflussungssystem gemäß ETC oder LZB, ortsfeste Blockteilung auf der freien Strecke, wenn nicht alle Züge LZB oder ETC-Ausrüstung haben.  
**Bahnhof A:** Großer Bahnhof mit einmündenden Strecken unterschiedlicher Kategorien  
**Bahnhof B:** Bahnhof in der Regel ohne einmündende Strecken mit SGV-Aufgaben  
**Bahnhof C:** Überholungsbahnhof  
 \*\*\*) NL Gz 750 m wenn dadurch keine Sprungkosten entstehen, bei M 230 untere Leistungsgrenze ist jedes 2. Gleis je Richtung mit 750 m ausreichend.  
 Im Zweifelsfall Leistungsfähigkeitsberechnung durchführen.