

Ministry of Transport and Construction of the Slovak Republic
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**National implementation plan for the technical specification of interoperability related
to safety in railway tunnels of the rail system of the European Union**

Legislative Background

In order to achieve a common transport policy for the interoperability of national rail systems, it is necessary to harmonize technical, administrative and safety rules.

In order to ensure the interoperability of the Community's rail system and to enable Union citizens, economic operators or competent authorities to take full advantage of the existence of the single European railway area, EU legislative instruments have been developed, including Directive 2008/57/EC of the European Parliament and of the Council on the interoperability of the rail system within the Community (hereinafter referred to as the “Interoperability Directive”). In order to pursue the objective of interoperability set, the level of technical harmonization should be optimized and the improvement and development of international rail transport services should be facilitated and it should be contributed to the progressive establishment of the internal market for equipment and services for the construction, renewal, modernization and operation of the Union rail system. Directive 2004/49/EC of the European Parliament and of the Council on safety on the Community's railways and amending Council Directive 95/18/EC on the licensing of railway undertakings and Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification (hereinafter referred to as the “Railway Safety Directive”) was adopted to ensure the safety level of the Community's rail system, which made it obligatory to introduce gradually common safety targets (CSTs) and common safety methods (CSMs) in order to guarantee the maintenance of a high level of safety and, where feasible, possible safety improvements. These targets and methods should provide tools for assessing both the safety level and the performance of operators at Community and Member State level. On the basis of the Railway Safety Directive with the Interoperability Directive as an essential tool for technical harmonization, individual subsystems have been introduced, as well as the obligation to develop a technical specification for interoperability (hereinafter referred to as “TSI”) for each subsystem. On the basis of that obligation, Commission Regulation (EU) No. 1303/2014 of 18 November 2014 concerning the technical specification for interoperability relating to safety in railway tunnels of the rail system of the European Union (hereinafter referred to as the “TSI Regulation relating to safety in railway tunnels”) was adopted, which applies to tunnels irrespective of the volume of traffic in them. The TSI Regulation on safety in railway tunnels only sets minimum requirements, compliance with the TSI does not in itself mean a guarantee of safe commissioning or safe operation. All parties involved in safety management shall cooperate with a view to achieving an appropriate level of safety for the given tunnel in accordance with the provisions of this TSI and the Interoperability Directive. The aforementioned Directive of the European Parliament and of the Council 2008/57/EC on the interoperability of the rail system within the Community was rewritten as part of the fourth rail package by Directive (EU) 2016/797 of 11 May 2016 on the interoperability of the rail system within the European Union which took over the same subsystems.

At national level, there was the harmonization performed with the Directives, in particular through the adoption of Act No. 513/2009 Coll. on railways and on amendments to certain acts, as amended. The implementing regulation to the Act is the Decree of the Ministry of Transport, Posts and Telecommunications of the Slovak Republic No. 350/2010 Coll. on the Construction and Technical Regulations of Railways, the subject of which is the modification of the details of the technical-safety test of constructions, construction-technical requirements for the design of railways and their construction and operation, technical parameters of the railways.

Current condition

Railway tunnels are an essential element of railway infrastructure, usually the most technically complicated. Construction or reconstruction of tunnels is very demanding from the investment point of view and they are carried out within the modernization and optimization of the track. The reconstruction of tunnels without a link to the modernization and optimization of tracks is also carried out in cases where they show serious defects (waterproofing - winter conditions, wall defects ...).

The construction of new railway tunnels, in which the requirements of the TSI SRT are fully implemented, takes place on a modernized track section between Púchov and Považská Teplá. At present, two tunnels are under construction where the requirements of the TSI SRT are fully implemented. These are the tunnels Diel (1,081 m) and Miločov (1,861 m), which are part of the modernization of the track section between Púchov and Považská Teplá.

The project of modernization of the 18.7 km railway track between the towns of Púchov and Považská Teplá in Slovakia will allow trains to travel at speeds of up to 160 km/h. The modernization includes a 15% reduction of the railway track to 15.9 km and the construction of two tunnels and three main bridges. The result will be a reduction in travel time between the towns of Púchov and Žilina. The project also included the modernization of two railway stations, namely in Považská Teplá and Považská Bystrica. The project contributes to the construction and modernization of the Trans-European Transport Network (TEN-T) and its corridors, several of which cross the territory of Slovakia.

Works carried out on the section between the towns of Púchov and Považská Bystrica include the construction of a new train stop in Nosice together with two platforms with a length of 250 m (the original train stop will be taken out of service). The new railway bridges will be built across the Nosický Canal (379 m long), the Váh River (288 m) and the Nosická Dam (589 m). In addition, two new tunnels will be built: the Diel tunnel (1,081 m long) and Miločov (1,861 m long), as well as a new pedestrian bridge across the Nosický Canal.

Tunnel Diel

The Diel tunnel passes through the Diel hill massif, which forms the central part of the Váh meander in this section of its flow. The tunnel is designed for rail transport, as a single-tube double-track with the distance between centres of lines of 4,200 m. The clearance profile is of type C with an extension on electrified tracks for a design track speed of 160 km/h, prospectively 200 km/h. The tunnel profile centre line is always vertical. The tunnel tube is divided into sections built by punching and excavating. The excavated sections are built in an open building pit on both portals, which are subsequently filled. The surface of backfills will be recultivated by grassing and appropriate planting of shrubs and woody plants to preserve the character of the natural environment. The punched part of the tunnel will be implemented in accordance with the principles of the New Austrian Tunnelling Method (NRTM) using

mechanical disconnection by means of a tunnel excavator in areas near the portal. Explosive disconnections are used after the tunnel tube has been inserted into a more compact rock mass.

The tunnel lining is designed as a double-skin lining, consisting of primary and secondary lining, arc-shaped. Tunnel safety is achieved by a number of design and technological measures. Based on the requirement of the regulation TSI-INS, TSI-SRT, the Diel tunnel will be equipped with an escape gallery of about 304.150 m in length and a cross connection to the tunnel tube of about 21 m in length. The cross connection profile is identical with that of the escape gallery. The directional line of the gallery is designed as a polygon, parallel to the centre line of the tunnel tube. The gallery is situated on the eastern portal of the Diel tunnel.

Tunnel Milochov

A new Milochov tunnel is designed as a single-tube double-track tunnel to bridge the foot of the Stavná hill, south of the local part of Horný Milochov (town district of Milochov of the town of Považská Bystrica). Its route leads mostly in the extravilan, only the areas of the escape gallery and the eastern portal reach into the urban area of the local part of Horný Milochov. The clear tunnel profile is determined by the combined tunnel clearance profile, double-sided escape routes, safety area and double-sided safety area with a width of 0.5 m. In the design, the C clearance profile with the electrification extension and the UIC GC vehicle outline were considered. The distance between the rails is 4,200 mm. The tunnel also includes fire-fighting equipment (fire mains with outlet stands, fire tank and automatic pressure station), technical equipment of the tunnel and a side escape gallery as an emergency exit from the tunnel tube, with the clearance profile of 2.25 m × 2.25 m. The Milochov tunnel is divided into sections built by punching and sections built in an open building pit, the excavated tunnel east and the excavated tunnel west.

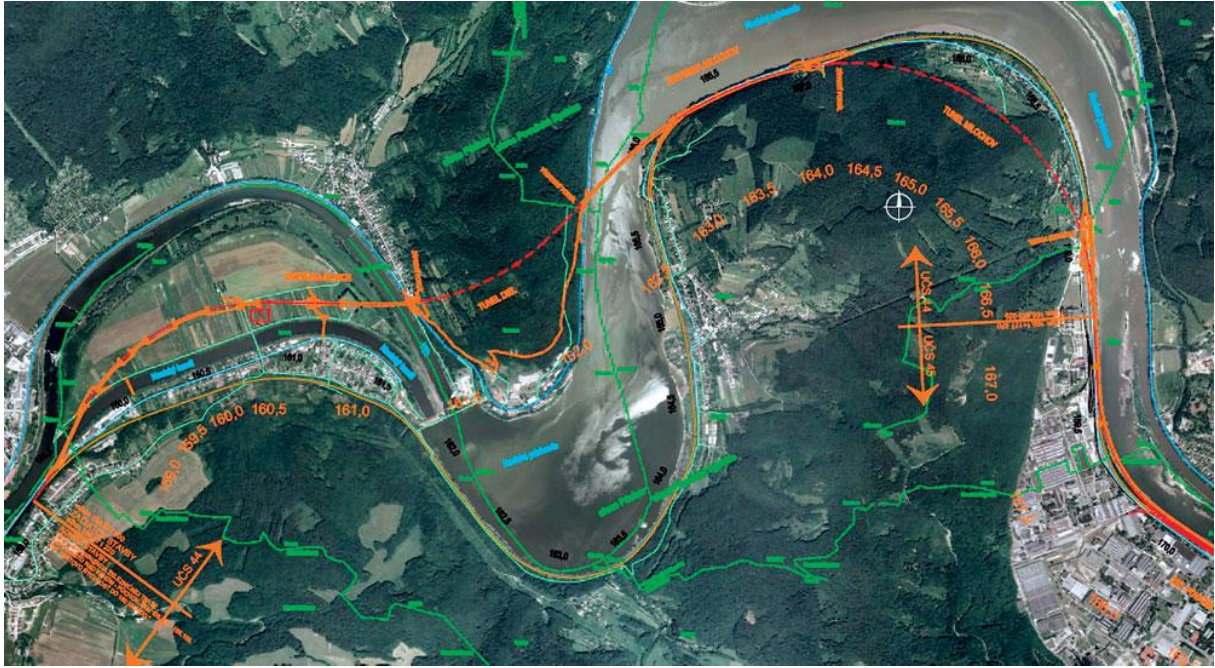


Figure 1: Situation plan of the tunnels Diel and Milochovej

The total investment for the project “ŽSR (Railways of the Slovak Republic), Modernization of the Púchov - Žilina railway track for speeds up to 160 km/h - stage I (Púchov - Považská Teplá section)” amounts to EUR 471,037,403, with the EU Cohesion Fund contributing with the amount of EUR 285,475,667 under the Integrated Infrastructure Operational Programme for the programming period 2014 – 2020. The investment falls under the priority “Railway Infrastructure (TEN-T CORE) and Mobile Renewal”. Completion of tunnel construction and modernization of the Púchov - Žilina track section is planned in 2021.

Conclusion

Interoperability is an essential prerequisite for the functioning of the integrated trans-European conventional rail system. Interoperability means the ability of this system to allow the safe and uninterrupted movement of trains of different carriers that meet the basic parameters established for these selected tracks. To achieve this goal, all regulatory, technical and operational conditions set out in the relevant European Union directives and regulations must be met.

The reasons why interoperability is needed are mainly of a security, economic and commercial nature. The competitiveness of the rail system currently depends on differences between Member States in terms of material, technology, signals, safety rules, braking systems, traction current and speed limits. International trains that cross many states are forced to stop at the border crossing points of neighbouring states in this situation where there are systemic differences.

Interoperability is one of the absolutely essential factors for the revival of rail transport and the consistent balancing of the transport market. Thanks to the interoperability and construction of the rail sector, which is legally and technically integrated and commercially competitive, the objective of reducing road congestion, while reducing pollution and clear environmental benefits, becomes real.

The Slovak Republic intensively deals with the issue of interoperability and emphasizes it in the modernization of rail transport, but also its transposition and implementation into national legislation. The fulfilment of the requirements of the TSI is the basis for enhancing the quality, availability and unification of the European rail system.

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