

“The common operative rules for health and safety during the construction of base tunnel of the Mont Cenis base tunnel between France and Italy”

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ABSTRACT: The railway project between Lyon and Turin was developed to unite and standardise design choices, overcoming the technical differences between the countries in light of the strategic importance of this work for the EU, and adopting the best practices of both countries.

In the early 2000s, when French exploratory tunnels were started, this demand for standardisation created an opportunity to draw up a shared bi-national document between France and Italy, which established the “Common Operating Rules” for protecting the health and safety of workers. This positive collaboration gave rise to the first version of the document, which was updated periodically until the treaty of January 2012, which referred to it as an integral part of the contractual documents.

In 2016, the Rules were updated after some meetings between the labour inspectorates and the project sponsor, under the coordination of the French Ministry of Labour and Italian Labour National Inspectorate. The document was submitted to the Intergovernmental Conference and, in spring 2017, was validated by both countries.

1 THE TURIN-LYON HIGH-CAPACITY RAIL PROJECT

The new line between Turin (Italy) and Lyon (France) will be the central and key part of the East-West “Mediterranean Corridor”, one of three major rail lines passing south of the Alps planned by the European Union (see figure 1).

The bi-national border crossing between Italy and France includes a 57.5 km, 8.70 m diameter single-way twin-tube base tunnel, the longest in the world, which crosses the Alps at an elevation of approximately 600 m, roughly 45 km in France and 12.5 km in Italy (see figure 2).

Design of the base tunnel includes four exploratory adits and tunnels.

Three French exploratory adits were completed between 2007 and 2010: Saint-Martin-La-Porte (2.4 km), La Praz (2.5 km) and Modane (4.0 km).

The Italian exploratory tunnel of La Maddalena (7.1 km) was completed in February 2017 and the French exploratory tunnel of Saint-Martin-La Porte (9 km) has been under construction since 2014, more than 5 km of which have already been excavated.



Figure 1. Mediterranean HCR corridor

The Mont Cenis base tunnel is a complete geological section of the Western Alps, which are crossed from west to east with an overburden of over 2,000 metres.

The excavations will face complex challenges due to the geotechnical and hydrogeological conditions, the nature of the rocks and the conditions of access to the workplaces, which are dozens of kilometres away from the entrances in some sections and under extreme microclimatic conditions.

The thousands of construction workers spread across six main work sites, the need for accommodation in the Alpine valleys and the impact on the local population and the environment are other major issues that will characterise the entire project.

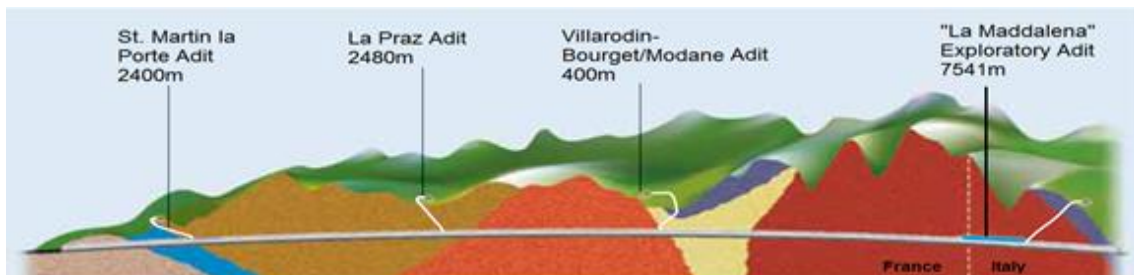


Figure 2. Base tunnel through Alps and adits

2 THE CREATION OF A BI-NATIONAL COMMITTEE AND THE ORIGIN OF THE DOCUMENT

The construction sites for the future Turin-Lyon railway link represent a crucial objective for the inspection services of the Ministries of Labour of both countries, and of the Piedmont Region for Italy (through the Local Health Authority - ASL) of both countries. They have been mobilised for several years to guarantee an effective response to the social and economic concerns that accompany the execution of such an important project.

Cooperation between the departments has proved necessary for the “border crossing section”, located between Susa-Bussoleno in Italy and Saint Jean de Maurienne in France, whose specific characteristics fall well outside ordinary problems. Furthermore, the transnational character of this section has raised a number of questions in terms of both the law applicable to relations and working conditions, and the methods of intervention of those inspection services. As a matter of fact, the contracting companies may be of different nationalities, even from outside the European Union.

For these reasons, the “Direzioni Territoriali del Lavoro” (Territorial Labour Inspectorates) of Turin and Alessandria, the “Servizio Prevenzione Sicurezza Ambienti di Lavoro” (Workplace Safety and Prevention Services) ASL TO3 of the Piedmont Region, the “Direction Régionale des Entreprises, de la Concurrence, de la Consommation, du Travail et de l’Emploi” of the Rhône-Alpes region (DIRECCTE), as well as the “Direzione generale per l’attività ispettiva” (General Directorate for inspective activities) (DGAI)¹ in Rome and the “Direction générale du travail” (General Labour Directorate) (DGT) in Paris have collaborated in responding to such requirements, launching an innovative initiative in which the client (initially LTF, then TELT) and some of the companies present during the French exploratory works in the early 2000s are strongly involved.

The work carried out between 2002 and 2010 has been recognised by the respective governments, by including the resulting document in the bilateral agreements between France and Italy and requiring compliance with it in article 10.2 of the Treaty of January 2012.

The article defines the applicable rules in terms of working and employment conditions of workers and provides for cooperation actions between the inspection bodies of both states. It expressly envisages that the public operator sponsoring the works must attach the final document to the contract and that failure to comply with these rules shall be accompanied by financial penalties.

The Common Operating Rules define the common rules applicable in terms of occupational health and safety during the works and attest to the willingness of both countries to implement uniform and coordinated procedures relating to the prevention and control of professional risks, as well as the working conditions of workers.

The Rules must be applied for the works carried out both in Italy and France. They were drawn up by comparing European, Italian and French regulations and “good practices” observed on the excavation sites, with reference to the adits already carried out.

The work of drafting the document was divided into two phases:

- From 2002 to 2012: following a series of meetings between the inspection services, held alternately in France and Italy (the first of which in Modane in Savoy, in 2002), the first versions were drafted. This work was referred to in the Treaty of January 2012 and was the subject of a bilateral meeting between the French and Italian Ministries of Labour, held in Rome on 11 October 2012;
- From 2016 to 2017: through further meetings between the services and, in the final stage, the participation of TELT, the document was sent to the Technical Safety Commission (CTS) of the Intergovernmental Conference. Following the favourable opinion of the CTS, the last bilingual version was approved by the respective ministries in spring 2017, in time for it to be used in the contracts for implementation of the works.

¹ From January 2017 “National Labour Inspectorate”



Figure 3. The cover of the final version of the “Common Operating Rules” of April 2017

The first phase of the meetings also involved two French organisations, the OPPBTP (Organisme Professionnel de Prévention du Bâtiment et des Travaux Publics) and the CARSAT (Caisse d'Assurance Retraite et de la Santé au Travail) with whom the first contacts were made with the equivalent CPT (Comitato Paritetico Territoriale) of Turin.

Some technical visits were also important, especially the one at the Lotschberg tunnel construction site in June 2004.

3 OBJECTIVES AND MANAGEMENT TOOLS

The main objective of the work was the definition of uniform rules common to both countries, with the aim of choosing the most conservative rules of the two legal frameworks. The objective was therefore to “raise the bar”, aiming to improve safety and the health of workers.

It was not always possible to define a single solution and, in some cases, the national rules prevailed, albeit often relating to the same European directive.

A second objective, to protect and verify the application of the rules, was the set up of a common inspection commission, which can act jointly throughout the development of the work.

The regulatory harmonisation of a project involving more than ten years of construction was based on the design stage of the project and on known and disseminated technologies. However, the same document defines updating methods, which are inevitable at a time when technological development is taking place very rapidly, and when anticipating what tools will be available in the immediate future is very difficult.

In addition to this, implying that living conditions off site are also important, it touched upon issues linked to accommodations and services for the workers, thousands of whom will have to live along the Maurienne Valley and in the Susa Valley for over 10 years.

The operating management of the relations between the French and Italian inspection services was entrusted to a “Coordination Structure” that will see the participation of the services of each country, the French and Italian security coordinators, and the client. This structure will meet periodically to analyse the situation and decide on common bi-national coordination actions.

The client establishes also a “Health Coordination Structure” composed of the physicians from each company for the various lots, which will meet at half-yearly intervals and also with the “Coordination Structure” referred to in the previous point.

At the level of each operative lot, it was decided to extend the Hygiene and Safety Committee between Companies, a French institutional body, to the Italian sites too. This committee is established by the client and chaired by the safety coordinator. The works management, the representatives of all contractors and the inspection and insurance bodies (DIRECCTE, CARSAT, etc.) participate in it.

The committee meets approximately every two months and analyses the situation of the site, proposing or validating solutions to specific problems. It also meets in the event of a serious accident in order to understand the causes and determine prevention or protection measures.²



Figure 4a. Meeting in Bardonecchia, December, 2003

Figure 4b. Visit to Modane adit, September, 2006

² The participation of Italian services in these committees is under legal review

4 SOME EXAMPLES

4.1 *Border management*

In most cross-border projects, the regulation of the national jurisdiction is an issue to be addressed in the design phase in order to clearly define the territorial responsibilities of each state, especially in terms of administration of the applicable law and the court with jurisdiction.

Rules must be included in the agreements between the states so that they have regulatory value: technical rules alone are not sufficient to manage these complex situations.

Taking inspiration from other recent cases, considering that the planning of the tunnel excavation will result in the tunnels carried out on the French side entering Italy for several kilometres, it was decided that the nationality of a site should follow the so-called “portal law”. If the site advances and the entrance is on the French side, the entire site will be French. The same applies on the Italian side.

This has already occurred with the excavation of the Maddalena exploratory tunnel, which crossed the border by around 500 m.

Once the tunnels have been drilled, the border returns to its geographic position and each part of the site will fall back into its own territory.

4.2 *Mandatory documents*

A series of documents and registers must therefore be kept for all the lots, such as:

- The daily coordination register, represented by the logbook of the coordinator on duty;
- The safety register, which relates to the machines and equipment;
- The notification of underground works, prior to starting the excavations or works in the tunnel.

4.3 *Worker training*

The parallelism between French and Italian laws has enabled the already existing high standards to be maintained. However, it was agreed to call for the collaboration of the CPT (Comitato Paritetico Territoriale) in Italy and OPPBTP (Organisme Professionnels Prévention Bâtiment Travaux Public) in France for definition of the programmes.

Special emphasis was placed on the training of immigrant workers, which should take place after checking their understanding of the language of reference (French or Italian).

4.4 *Mechanised excavations with TBM*

In the part regarding recommendations and technical instructions during excavations and supports, part of which was taken from the Italian law (Decree of the President of the Republic 320/56 with a few updates, it is worth citing the TBM requirements, such as, for example:

- Full compliance of the machines with directive 2006/42/EC.
- Instruction Manual in the language of the country of operation (French or Italian).
- Availability of the contractor vis a vis work inspections.
- Arrangements for passing through sections with a risk of asbestos.
- Maximum attention to the design of footpaths and escape routes, ergonomics and comfort of the workstations, the most advanced technological choices available and the proper management of the assembly and dismantling phases.
- Standard provision for the employees: refectory/lounge, survival chamber, self-rescue equipment to reach the survival chamber, toilets with running water.

4.5 *Ventilation*

The ventilation system must follow the French CNAM recommendations, which envisage the use of pressure and suction ventilation, reducing situations where pressure alone is used to a minimum. This is a substantially new system for Italy compared to the practice of using pressure ventilation alone.

4.6 *Microclimate*

The provisions of the Italian law have been adopted, since in France there is no reference to the maximum permitted temperature for work environments. This is something new for underground works in France. The ventilation and air conditioning systems must therefore match these parameters.

4.7 *Rescue and emergency*

The rules call for coordination with the public rescue services starting from the planning stage according to the model of the French procedure. This preventive organisation must also be reflected in the contents of the Safety and Coordination Plans of the individual contracts.

Some requirements for the organisation and availability of resources or equipment refer to:

- Systems for evacuation of injured persons from the tunnels.
- Landing areas for the helicopter rescue service.
- Control and positioning systems for staff working underground.
- Installation of survival chambers at a maximum distance of 1,000 m from each other.
- Provision of self-rescue equipment for all the employees.
- Fume abatement systems such as water curtains.

Of course, many other issues have been addressed, some of them left to the application of the respective national standards, such as, for example, explosive atmospheres, the presence of toxic or explosive gases, the presence of asbestos, free silica, and radioactive minerals.

5 CURRENT SITUATION

The “Common Operating Rules” had already been implemented in the final issue of the project published in 2013, albeit adopting a version of the document that was not yet official.

Following the work carried out in 2016 which led to formal validation by the respective Ministries of Labour in spring 2017, the final version was implemented in the new edition of the final project, which was in the process of being reviewed both in France and in Italy.

The document is also included in the tender dossier as an annex to the contract, as required by art. 10.2 of the Treaty of January 2012 between France and Italy.

As of the date of this article, the bi-national Coordination Structure is in the organisation phase and will start at the beginning of 2019.

6 CONCLUSIONS AND ACKNOWLEDGEMENTS

The work begun in 2002 and ended in 2017 has seen the participation of many officials from the French and Italian inspection services. In particular, seven French and ten Italian inspectors alternated in participating in the first drafting of the document. Some of the Italian inspectors came from the prevention services of Local Health Authority 3 of the Piedmont Region.

Three French and eight Italian inspectors participated in the final stage of reviewing and issuing the document, as did the directors of the French Ministry of Labour and the Italian National Labour Inspectorate.

TELT, the company tasked by the French and Italian Governments with the direction of the works, had the opportunity to collaborate in the final review phase with its own proposals and assessments, some of which were implemented in the final version.

The authors wish to thank all those who have participated in various capacities in the writing and publication of the “Common Operating Rules”, which represent a rare example of cross-border collaboration and coordination in a project of common European interest like the Mont Cenis base tunnel.

