Safety and Health Coordination in the Construction of Railway Infrastructures: A practical case in Portugal

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ABSTRACT

The modernization of the railway infrastructure goes with the objectives established by the Portuguese government through REFER (the national entity responsible for the railway infrastructure) in view to offer to the users a modern, safely and competitive way of transport. This modernization involves many different kind of works requiring a detailed planning, in special, when they are to be done near or on the railway under use, although many of the works must be done during the night when no trains are in use, i.e., during interdiction periods. In any of these cases, the risks are high or very high (e.g. electrocution, caught by trains) and special measures have to be implemented to avoid or reduce them. This document presents some of the safety and health challenges that arose during the construction of the works for the modernization of this important infrastructure.

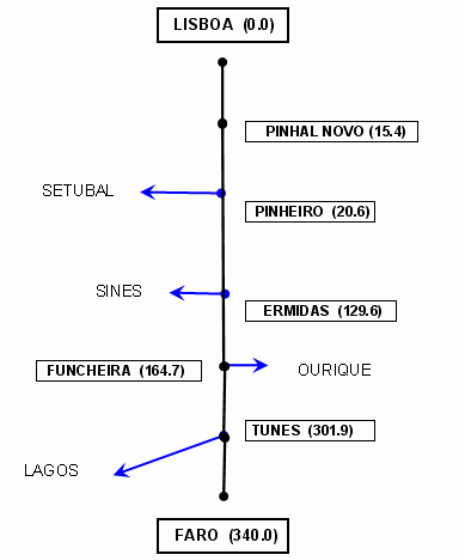
1. INTRODUCTION

The Modernization Project for the connexion Lisbon – Algarve (linking the capital to the south of the country) is part of the objectives of the government, in view to achieve, namely: (i) a higher quality and comfort, as well as a higher capacity of transport and safety; (ii) the reduction of the travel time of about 300 km from about 4 hours to less than 3 hours; (iii) the suppression and/or re-classification of railway passage at the same level (of the 150 existing passages, 123 were suppressed).

The construction works happen between 2000 and 2004, involving a total investment of about 410 millions Euros.

For the realization of this project, a general plan was drawn up to allow the construction of the works while maintaining the railway and roadways running.

CONNEXION LISBON-ALGARVE
SIMPLIFIED SCHEME



This document describes safety and health issues in some of the works related to this infrastructure.

The works included, namely:

(i) railway works including the construction of variants, rectifications of the layout, as well as partial or integral renovation;

(ii) electrification of all the line, besides other secondary lines (these, involving more than 100 km);

(iii) modernization of the telecommunications and signalization infrastructure;

(iv) construction of under and over-bridges for road and pedestrian ways.

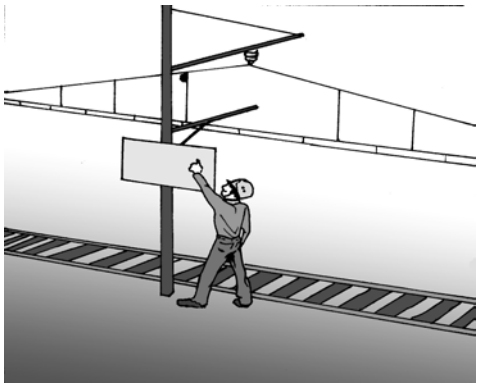
2. SOME OF THE WORKS INVOLVED

The modernisation of this infrastructure includes the construction of many different kinds of works. Some are similar to current works but executed in an adverse environment (e.g. viaducts over railway platforms under use, works in tunnels during the night). Other works are specific to the nature of the infrastructure and involving particular risks (execution of new railway platforms, electrification).

The works included, among other:

- Railway works including the construction of variants, rectifications of the layout, as well as partial or integral renovation;

- Construction or reparation of all the railway platform to allow a maximum speed of 220 km/h;

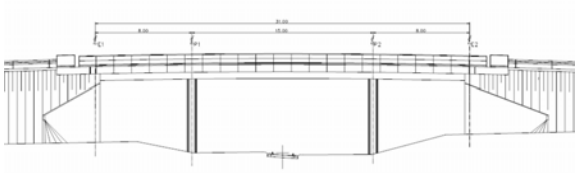


- Electrification of all the line, besides other secondary lines (these, involving more than 100 km);

- Construction of under and over-bridges for road and pedestrian ways.

- Consolidation and profile adjustment of slopes (some with about 40 meters high);

- Construction of 5 viaducts in pre-stressed concrete;



- Construction of 4 pre-stressed bridges;

- Strengthening and reform of 20 metallic bridges;

- Strengthening and reform of 2 tunnels and the enlargement of one of these.

3. IMPLEMENTATION OF SAFETY AND HEALTH IN THIS CONSTRUCTION PROJECT

During the realization of this project, and according to the Construction Sites Directive (92/57/EEC), safety and health coordination was implemented, based on a policy that valorises the human part as an essential condition for the success of the project.

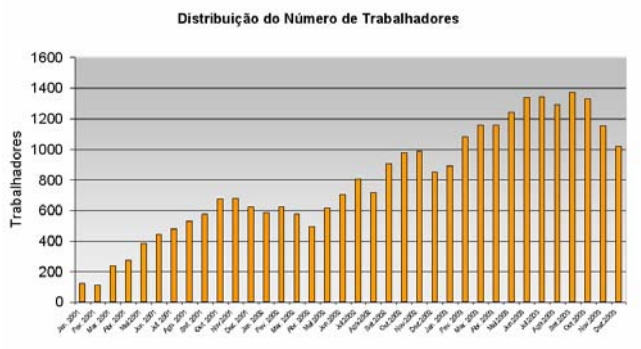
Based on the Occupational Safety and Health Policy of REFER, the general principles of prevention, the applicable legislation and international guidelines, occupational safety and health management systems (OSH-MS) were implemented in view to minimise the risks of occupational accidents and professional diseases.

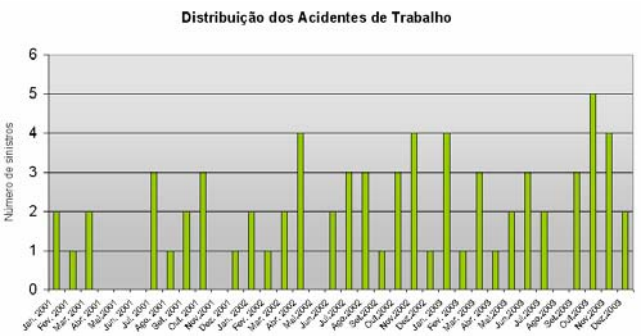
Related to the safety and health coordination, it should be emphasised that the decisions of REFER, at the economic and technical level, were taken based on the risks involved with each option. The safety and health plans were drawn up based on a common matrix taking into account the specificity of the different works to be done.

The OSH-MS implemented by each of the contractors, were based on the conditions established in the tender process, with the safety and health plans for the design phase being part of this process and to be completed and implemented during the construction phase.

These plans included, namely: specific procedures related to OSH, requirements related to the construction sites, to the information and communication management, emergency procedures, etc..

The application of this methodology, based on the recognition of OSH as a task where all those involved in the construction process are part of it and responsible, allowed the construction of this big project with low indexes of occupational accidents.





For the 16 more significant construction sites of this Project running till end of 2003, involving, as a whole, a construction cost of about 270 millions Euros, 28 000 workers and 5 700 000 hours worked, the main indexes of occupational accidents were: the incidence index (number of occupational accidents per 1000 workers) was 2,4; the frequency index (number of occupational accidents per one million of hours worked) was 11,8; the severity index (number of days lost per one million of hours worked) was 0,23 and; the duration index (number of days lost per each occupational accident with days lost) was 19. These indexes include the number of accidents with and without lost days.

4. CONCLUSIONS

The construction of railway infrastructure includes many specific safety and health risks representing a real challenge for those involved in the construction of these specific projects (owner, designers, safety and health coordinators, contractors, workers).

In this project for the modernisation of the railway linking Lisbon to Algarve, occupational safety and health was indeed a very important issue, where the authors implemented a new methodology to face this challenge and learnt new ways to improve continuously safety and health on this kind of infrastructure. This methodology was based on the involvement and responsibility of all stakeholders in the project and many meetings were organised to training and information of all them to this very important issue.

The results achieved on this project concerning safety and health, encourage the authors to continue this mission and continuously improve this methodology in new construction projects.