

A CASE STUDY IN CONSTRUCTION OPTIMISATION FOR SUB-BALLAST LAYER

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KEYWORDS: design optimisation, construction quality, sub-ballast, in-situ testing

ABSTRACT

The performance requirements of modern railway tracks demand a proper design in order to meet safety and passenger comfort standards, taking into account the optimization of the infrastructure life cycle. The sub-ballast layer, namely the characteristics of the materials used, plays a fundamental role in the track behaviour. However the requirements established for these materials are not consensual worldwide. Very stringent requirements have been adopted in many countries, making it difficult to find adequate materials.

The studies presented herein were performed during the construction of an upgraded section of the Portuguese Lisbon – Algarve link, designed for a maximum speed of 220 km/h. During the construction it was difficult to obtain the desired quantity of granite material for the 30 cm thick sub-ballast layer in order to fulfil the applicable standards and the design requirements and still respect the contract deadline. To overcome this problem, the contractor suggested an alternative structural solution that considered the replacement of the bottom 15 cm of the granite material sub-ballast layer by limestone material.

Therefore, it was necessary to study the feasibility of the alternative solution in order to assure the construction quality. Several studies were developed, such as laboratory characterisation and *in situ* testing.

The studies performed and the results presented in this paper show that the implemented alternative was adequate and complied with the quality requirements specified in the contract in a more economic way.