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# 1 TRACK SUBSTRUCTURE ASSESSMENT USING NON-DESTRUCTIVE LOAD TESTS.

## 2 A PORTUGUESE CASE STUDY.

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### 21 ABSTRACT

22 Comfort and safety are crucial aspects in a transport infrastructure project. Depending on axle loads and traffic  
23 speeds, parameters are established carefully in order to ensure a good quality in terms of geometry and bearing capacity  
24 during the entire infrastructure life cycle, preventing deterioration process. Nevertheless, maintenance actions have to  
25 be performed aiming to restore proper track condition.

26 The quality control during the construction is an important factor that can evaluate the performance of materials.  
27 Nowadays, the materials are mainly characterised by their physical and mechanical properties, but there is an increased  
28 interest in developing performance based specifications that can provide more realistic information about the behaviour  
29 of the track during the life cycle.

30 In order to achieve this task, non-destructive tests represent a good solution, as they are cost and time efficient.

31 Among non-destructive loading equipment, one of the most efficient is the Falling Weight Deflectometer (FWD). In  
32 this research, FWD tests were undertaken during the construction of a new railway line 29 km long, at the top of the  
33 substructure and in different months. Based on the performed load tests, the structural modelling of the track was  
34 established through back-calculation, and the variation of the materials moduli for different testing campaigns was  
35 evaluated.

36 The main results obtained are presented and analysed in this paper, as well as some considerations regarding FWD  
37 testing and interpretation.

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39 **Keywords:** track construction, FWD, back-calculation, sub-ballast, structural evaluation.  
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