



Influence of fouling on the dielectric constant of railway ballast

Simona Fontul (1), Francesca de Chiara (2), Eduardo Fortunato (1), and Burrinha Rui (3)

(1) LNEC, Transportation Department, Portugal (simona@l nec.pt), (2) Spienza University of Rome, Italy, (3) REFER, Portugal

In order to evaluate the level of ballast fouling for Portugal aggregates and the influence of antenna frequency on its measurement several laboratory tests were performed on different materials.

Initially the clean granitic ballast was tested in different water content conditions, from dry to soaked in order to see the influence of water on the dielectric characteristics.

The fouling of the ballast was reproduced in laboratory through mixing the ballast with soil, mainly fine particles, in order to simulate the fouling existing in several old lines in Portugal, where the ballast was placed over the soil without any sub ballast layer.

The soil was also tested for different water contents to register the evolution of its dielectric constant.

Five different fouling levels were reproduced and tested in laboratory, with different water contents, four for each contamination level.

Tests were performed with IDS 400 MHz antenna in two different test positions. The water content was evaluated with nuclear gauge, after each GPR test. In situ test pits were then made, in existing railways with ballast in different condition from recently renewed to significantly fouled ballast. The results were used to validate the values of the dielectric constants obtained in laboratory.

The main results obtained are presented in this paper together with troubleshooting associated to measurement on fouling ballast. This abstract is of interest for COST Action TU1208.