Geophysical Research Abstracts
Vol. 18, EGU2016-18417-1, 2016
EGU General Assembly 2016

Nondestructive tests for railway monitoring. European Experience in COST Action TU1208

Simona Fontul (1), Mercedes Solla (2), and Andreas Loizos (3)

(1) National Laboratory for Civil Engineering, LNEC, Lisbon, Portugal, (2) Defense University Center, Spanish Naval Academy, Marin, Spain, (3) National Technical University of Athens, Athens, Greece

The railway monitoring is an important issue for a proper maintenance planning. With the increase in loads and travel speed, it is important to be able to diagnose the track defects and to plan the proper maintenance without interfering with the users. Traditionally, the maintenance actions are planned based on the geometric level parameters assessed without contact with the line, at traffic speed, by dedicated inspection vehicles. Nevertheless, the geometric condition of the line does not provide information on the defects causes. In order to complements the information on the causes, geophysics measurements can be performed in a nondestructive way. Among these later methods, Ground Penetrating Radar (GPR) is a quick and effective technique to evaluate infrastructure condition in a continuous manner, replacing or reducing the use of traditional drilling method. GPR application to railways infrastructures, during construction and monitoring phase, is relatively recent. It is based on the measuring of layers thicknesses and detection of structural changes. It also enables the assessment of materials properties that constitute the infrastructure and the evaluation of the different types of defects such as ballast pockets, fouled ballast, poor drainage, subgrade settlement and transitions problems. These deteriorations are generally the causes of vertical deviations in track geometry. Moreover, the development of new GPR systems with higher antenna frequencies, better data acquisition systems, more user friendly software and new algorithms for calculation of materials properties can lead to a regular use of GPR.
A resume of the European experience in COST Action TU1208 of the application of GPR for railway monitoring and the measurement interpretation is presented in this paper. Also complementary nondestructive tests and other geophysical methods are referred, together with case studies of their application. The main troubleshooting and the needs for data analysis tools that can improve the processing of the measurements are highlighted. Future approaches of combined application of geophysical methods, load tests and track geometry measurements are addressed. A possible methodology of joint interpretation and examples of maintenance measurements adequate to the deterioration causes are presented.