Predicting the Bearing Capacity of Road Flexible Pavements using GPR

Chiara Ferrante¹, Luca Bianchini Ciampoli¹, Fabio Tosti², Amir Morteza Alani², and Andrea Benedetto¹

¹Roma Tre University, Engineering Department, Rome, Italy
²University of West London (UWL), School of Computing and Engineering, London, United Kingdom

Most of the damage in road-flexible pavements occur where stiffness of the asphalt and load-bearing layers is low. To this extent, an effective assessment of the strength and deformation properties of these layers can help to identify the most critical sections [1].

This work proposes an experimental-based model [2] for the assessment of the bearing capacity of road-flexible pavements using ground-penetrating radar (GPR – 2 GHz horn antenna) and the Curviameter [3] non-destructive testing (NDT) methods. It is known that the identification of early decay and loss of bearing capacity is a major challenge for effective maintenance of roads and the implementation of pavement management systems (PMSs). To this effect, a time-efficient methodology based on a quantitative modelling of road bearing capacity is developed in this study. The viability of using a GPR system in combination with the Curviameter NDT equipment is also proven.

The research is supported by the Italian Ministry of Education, University and Research under the National Project “Extended resilience analysis of transport networks (EXTRA TN): Towards a simultaneously space, aerial and ground sensed infrastructure for risks prevention”, PRIN 2017, Prot. 20179BP4SM

