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A guidelines handbook for GPR surveys in tunnels: a COST Action TU1208 contribution

Luca Bianchini Ciampoli (1), Amir M. Alani (2), Lara Pajewski (1), Andrea Benedetto (1), Andreas Loizos (3), and Fabio Tosti (2)

(1) Roma Tre University, Department of Engineering, Rome, Italy (luca.bianchiniciampoli@uniroma3.it; lara.pajewski@uniroma3.it; andrea.benedetto@uniroma3.it), (2) University of West London, School of Computing and Engineering, Saint Mary's Road, W5 5RF, London, UK (Amir.Alani@uwl.ac.uk; tosti.fabio@gmail.com), (3) National Technical University of Athens, Laboratory of Pavement Engineering 5 Iroon Polytechniou St., 15773 Zografou, Athens, Greece (aloizos@central.ntua.gr)

A significant open issue concerning the reliability of geophysical methods and in particular of ground penetrating radar (GPR), both in research and professional context, is a general lack of international standards. This is a major problem to be faced, in order to gain scientific strictness for the GPR practices, and to easily extend to the international community the results achieved within the area of single virtuous countries. Producing international guidelines can represent an important step forward, in this sense.

In the memorandum of understanding of the COST Action TU1208 is clearly stated that one of the main purposes of the Action is the “development of innovative protocols and guidelines which will be published in a handbook and constitute a basis for European Standards, for an effective GPR application in CE tasks; safety, economic and financial criteria will be integrated within the protocols”. Of course this is not a simple task to be accomplished. Firstly, survey procedures are highly dependent on the objective of the survey itself. On the basis of the objective of each geophysical test, the GPR system, the antenna configuration, and even the processing procedures may change. Besides, these procedures are also influenced by the environmental conditions in which the tests are performed. This affects several aspects spanning from hardware to software, but including, for instance, also safety issues. Due to these reasons, one of the main goal of the COST Action TU1208 is the development of several guidelines related to the main applications of GPR in the field of civil engineering.

In this work, the structure of a guidelines handbook for GPR activities in tunnels is outlined. In the first sections, the principal references in the field are provided, and the most common GPR equipment and complementary technologies are described. Subsequently, the survey methodologies are explained. Particular attention is paid to the preliminary activities to be carried out prior to the GPR surveys, which can cover an important role in such a complex environment. Lastly, the main applications of GPR technology in tunnels are discussed.

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