



GPR Imaging Techniques for Non-Destructive Inspection of Concrete Structures

Andrea Randazzo (1), Alessandro Fedeli (1), Matteo Pastorino (1), and Lara Pajewski (2)

(1) Department of Electrical, Electronic, Telecommunications Engineering, and Naval Architecture, University of Genoa, Genoa, Italy, (2) Department of Information Engineering, Electronics and Telecommunications, Sapienza University of Rome, Rome, Italy

The monitoring of concrete structures is of great importance for preventing people injury and collapses. In this respect, Ground Penetrating Radar (GPR) systems can be seen as valuable tools in the non-destructive diagnostic process. However, the interpretation of raw radar data is sometimes very difficult, and therefore suitable reconstruction procedures are needed to properly investigate the presence of internal voids, cracks, defects or metallic rebars. Although a significant number of qualitative and quantitative imaging methods have been proposed in the scientific literature, further investigations are still needed in order to overcome the limitations of currently available techniques and to further improve the attainable results [1]. In this framework, the purpose of this work is to assess and compare the imaging capabilities of some specific GPR imaging techniques in the presence of realistic concrete structures, accurately simulated with a time-domain electromagnetic solver [2].

[1] I. Catapano, A. Randazzo, E. Slob, and R. Solimene, “GPR imaging via qualitative and quantitative approaches,” in *Civil Engineering Applications of Ground Penetrating Radar*, A. Benedetto and L. Pajewski, Eds. Cham: Springer, 2015, pp. 239–280.

[2] S. Meschino and L. Pajewski, “SPOT-GPR: A Freeware Tool for Target Detection and Localization in GPR Data Developed within the COST Action TU1208,” *Journal of Telecommunications and Information Technology*, vol. 3/2017, pp. 43-54, Sep. 2017.