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Geophysical characterization of an engineering infrastructure: laboratory tests.

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The increase of the metropolises stresses the urban areas and intensive planning works is necessary. Therefore, the development of new technologies and methodologies able to explore the subsoil and manage its resources in urban areas becomes an important source in terms of saving time and money. In the last decade, a new subdiscipline in the Applied Geophysics started: Urban Geophysics (Lapenna, 2017). Urban Geophysics analyzes the contribute, in terms of limits and potentialities, that geophysical methodologies can give for providing useful information about the subsoil, environment, buildings and civil infrastructures and supporting the public administrations in planning interventions in urban scenarios.

This work introduces a laboratory test, that was performed at the Hydrogeosite CNR-IMAA laboratory of Marsico Nuovo (Basilicata region, Italy). The test consisted in a multisensor geophysical application on an analogue engineering model. Thanks to the possibility to work in laboratory conditions, a detailed knowledge of the structure was available, providing great advantages for assess the capability of the geophysical methodologies for analyze engineering issues, regarding the characterization of the infrastructural critical zone placed at the interface soil-structure. For this purpose, geoelectrical and electromagnetic methodologies, including Cross hole Electrical Resistivity Tomography and Ground Penetrating Radar, were used to characterize the geometry of the foundation structures and the disposition of the rebar for the reinforced concrete frame. Finally, new geophysical approaches were applied in order to define the corrosion rate of reinforcement.