

Utilization of integrated geophysical investigation for near surface surveying

*Tomio INAZAKI¹

1.Public Works Research Institute, Tsukuba Central Institute

Integrated geophysical investigation has been playing an important role in the near-surface surveying because only it can provide high-resolution, quantitative, and reliable information to the near surface as continuous 2D or 3D profiles. Near-surfaces, mainly composed of man-made strata, weathered layers, and Holocene soft sediments, inherently imply small-scaled irregular or various structures. It means conventional geotechnical boring is inadequate to reconstruct surface 2D geology of the region of interest because of its sparseness. Recently, identification and engineering characterization of local heterogeneity in the near surface has become more important in the viewpoint of sustainable and cost-effective utilization of existing infrastructures. Enhancement of resiliency against natural disasters is also one of the current issues in Japan. Development and utilization of field measurement techniques have been required to deal with the above issues.

The integrated geophysical investigation, we proposed first for the safety assessment of levee systems, is not merely a combined field application of several geophysical methods, but a geotechnical characterization method for the near surfaces. Making use of measured S-wave velocity and resistivity, we assess the safety condition of a levee system on underseepage. Soil types, permeability, and seismic resistance are evaluated.

Case histories of the integrated geophysical investigations successfully applied to levee systems, road embankments, and pavements are presented in association with brief introduction of newly developed field measurement techniques.

Keywords: Near-surface, Integrated geophysics , S-wave velocity, Resistivity , Geotechnical characterization