

Monitoring of water leaks from subsurface structure using 3D ground penetrating radar

Toshiyuki Yokota[1]; Tomoaki Shimizu[2]

[1] Institute for Geo-Resources and Environment, AIST; [2] Okumura Corporation, Technical Research Institute

The main purpose of this paper is to evaluate the applicability of 3D GPR survey to the detection of the water leakage around the underground buildings.

GPR survey is one of the most promising survey methods within a numbers of monitoring techniques for underground structures because of its high resolution and non-destructive characteristics. Among the GPR measuring method, wide-angle survey obtains high-quality results because coherent noise such as direct arrivals, multiples, or time synchronous system artifacts are effectively eliminated by CMP stacking. Moreover, wide-angle method can derive subsurface permittivity distribution which can be the index of water contents.

In the present paper, we tested wide-angle GPR surveys for imaging the various conditions of controlled subsurface water distribution in a test field composed by an artificial sandy ground and a mortar wall.

Repeated 3D GPR survey revealed time-lapse ground water movement. GPR survey results were assured by buried water level recorders and moisture meters.