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The comparative analysis of the seismic test results performed using the cross-hole and down-hole methods in terms of test reliability and efficiency

Abstract

Seismic tests are becoming more meaningful in the modern geoengineering. They allow precise assessment of changes in the analysed profile of soil deformation parametres even in case of minor deformations. In the engineering practice two methods are used for such kinds of tests: reference cross-hole method and a commercial down-hole method. The former is based on the traditional test holes, the latter uses advanced in situ testing techniques such as SCPTU and SDMT. The costs of implementation of this kind of research and the reliability of the obtained results along with any additional benefits resulting from the type of study are not without significance. Seismic tests for which comparative analysis was performed were carried out in a strongly anisotropic ground base of a tailings body. Test results conducted with a standard cross-hole method were compared with those conducted using the down-hole method with the use of the seismic piezocone and seismic dilatometer. Test results have shown that in terms of the assessment of their credibility there was no difference in the quality of the recorded signals. It has been pointed out that there are many advantages of penetration in situ tests, which complement identification of the subsoil structure with many crucial elements that cannot be achieved using the cross-hole method.