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Leakage tests for the building pit of underground metro station Rotterdam CS

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For the connection of the underground light-rail line RandstadRail to the existing underground system of Rotterdam the underground metro station Rotterdam CS is reconstructed. The reconstruction is realised in a dry building pit that will be excavated up to 14 m deep. The retaining structures of the building pit are realised in three contracts by three different contractors. Two contracts require diaphragm walls and one contract prescribes an ice wall to close the building pit because of the existing metro tunnel. The walls are constructed up to a depth of about 40 m where a rather impermeable overconsolidated clay layer takes care of the geohydrological closure of the bottom of the building pit.

To determine the water tightness of the retaining walls leakage tests were executed prior to the excavation of the building pit. Precondition for the execution of these leakage tests was that possible measured leakage can be accounted to the different contracts. For this reason two successive tests were performed. The first test was executed after the construction of the two diaphragm walls, but prior to the construction of the ice wall. The second test was executed after realising the ice wall.

During the first leakage test the building pit was not yet completely closed. Special attention was given to the possible environmental and geotechnical effects of the lowering of the piezometric level outside the building pit.

To distinguish the permeability's of the different parts of the retaining walls more than 50 piezometers were installed, and intensively monitored during the tests. The existing metro station within the building pit was also monitored on settlements.

The paper describes the testing method for the water tightness of the retaining walls as well as the test results.

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