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"Pressures and pore pressures in and around a TBM drilling in saturated sand".

Abstract:

The face pressure is an essential parameter in TBM tunneling. It is normally controlled by measuring the pressure at the pressure bulkhead of the TBM. However, for the stability of the front face it would be ideal to measure the pressure as close as possible near the tunnel front. This was done for a slurry shield where pressure gauges were placed on the rotor of a TBM. It appeared that for a slurry shield there is not so much difference. Recently it appeared that these measurements were also performed for an Earth Pressure Balance (EPB) shield. Analysing the measurement data it appeared that for an EBP there is a difference. The pressure gradient at the bulk head can differ significantly from the pressure gradient at the tunnel face.

In the presentation the EPB machine will be briefly described. It will be shown how in saturated sand the foam properties are influenced by the pore water and the permeability of the sand and how this influence the pore pressures around the TBM. Then we will follow the muck through the TBM (in the mixing chamber and in the screw conveyor) and show and explain as far as possible the various pressures measured.

Short resume

Adam Bezuijen is professor in soil mechanics and geotechnics at Ghent University in Belgium. Part time he is also senior specialist at Deltares, Delft, the Netherlands.

He is chairman of the ISSMGE technical committee TC204 “Underground construction in Soft ground”.

He was involved in the extensive monitoring programme that was executed when the first TBM tunnels were constructed in the soft Dutch soil. This monitoring programme revealed important aspects of soil-tunnel interaction. Contributions of Adam Bezuijen were on the stability of the tunnel face, the application of foam and grout pressure distribution.

He is co-editor of the book: Tunnelling a decade of progress, (co-)author of more than 100 journal or conference papers.

Apart from underground construction he has publications in the fields of physical modeling, geosynthetics, piled embankments, dredging, coastal protection and back ward erosion piping.