

## Discussion Paper

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# Discussion of an instrumented screwpile load test and connected pile-group load-settlement behaviour. - Authors' reply to the discussion by Fellenius, B.H.

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Authors wish to thank the Discusser for his significant effort in analysing the case history and providing a very clear review of the paper. Authors agree with the analysis provided in the review but wish to clarify some points.

Authors agree that a pile capacity of 3000 kN would have allowed for a significant reduction of the number of piles in the system. However, the mentioned pile capacity of 3000 kN is linked to the CPT result *at the location of the test pile*. The actual foundation design was based on a number of CPT results per tank foundation. According to the Belgian NAD of the Eurocode 7, pile capacity is calculated for all available (relevant) CPT results. Within this group of results, the determining value is the lower of the average value and the minimum value, each corrected with their own specific correlation factor. In this specific case, pile capacity was determined by the minimum value (linked to the most critical CPT), which lead to the service load of 780 kN. The mentioned drag force of 180 kN was also based on the relevant CPT result.

Settlement calculations were done based on the stiffness parameters as mentioned in table 1 of the paper. The unconstrained modulus of the underlying OC clay was taken as 17 MPa + 1.87 MPa/m (starting at 24 m depth). The resulting deformations are slightly lower than those obtained by the Discusser, leading to a settlement difference between the tank center and perimeter of about 30 to 40 mm. As inspection of the tanks after the hydrotest has indicated that no significant local bulging is to be expected in the bottom plate, authors believe that the edge-to-center distortion for the tanks is well within allowable limits.

Authors indeed have planned to perform long-term monitoring, consisting of settlement measurements along the edge of the tanks. Additionally, deep CPTu's with dissipation tests will be performed in order to better determine the relevant stiffness- and consolidation parameters of the underlying clay layer, which will allow a re-assessment of the long term deformations.

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