

Title: Probabilistic settlement prediction of an immersed tunnel considering geotechnical and geological uncertainty

Expected Difficulty: High

Project Description: A number of immersed tunnels in the Netherlands are currently experiencing unforeseen settlements, this is largely a result of engineers overestimating the stiffness of the soil due to the presence of soft soil deposits at depth. One of the major problems faced by geotechnical engineers when predicting settlements is in determining how the underlying soil stratigraphy varies. Discrete site testing gives the engineer in question information about the location of soil layers at that point, but the engineer's judgement is required to extrapolate this for the remainder of the site. This can prove problematic at certain sites particularly those with irregular geology and soil bedding. This study proposes to probabilistically predict tunnel settlement using a combination of geophysical tests and CPT tests to determine geological and material uncertainty respectively. The approach will be validated using real settlement data from a Dutch tunnel collected over a 30 year period and used to predict future tunnel response. Best and worst case settlement envelopes will be considered in line with recommendations from Eurocode 7. Projected outcomes from the project will be a probabilistic methodology for predicting future settlements considering geological and geotechnical uncertainty.

To apply please contact Dr. Cormac Reale at c.reale@tudelft.nl, and Prof. Kenneth Gavin at k.g.gavin@tudelft.nl, for informal enquires drop into Room 00.040 or call +31 15 278 8753

