

Geotechnical test sites in Denmark

Characterising the geotechnical properties of problematic soil types and creating an open online database

Laboratories and high-quality field measurements are necessary for us to improve our understanding and modelling of the geotechnical properties of problematic Danish soil types. This is an essential element of developments aimed at optimising and producing more sustainable foundation solutions for infrastructure facilities and buildings. The use of geotechnical test sites, where the soil conditions and geotechnical properties of the soil are characterised by means of detailed examinations, is an important tool when new foundation solutions are to be tested at full scale, and when new field testing equipment to measure the properties of the soil is to be validated.

Aarhus University has recently established two geotechnical test sites in East Jutland, in collaboration with partners from industry, focussing on two problematic soil types which pose problems for infrastructure and construction projects in many places in Denmark. One test site is on Randers Fjord, where organic marine and freshwater deposits extend to a significant depth under the ground. In building and construction projects, the presence of these very soft aqueous sediments calls for compensatory measures, typically in combination with deep pile foundations, to minimise unwanted settling of the structures. The second test site, which is located at the tileworks in Hinge, is intended to analyse the properties of plastic clay. This soil type is known for its poor strength and deformation properties, which require special solutions to prevent upheaval and subsidence problems arising from excavation works, for example.

The present project is intended to provide the basis for further development and use of the two test sites through collaboration between national and international research institutions and industrial partners. It is planned to supplement existing knowledge and findings with further high-quality advanced laboratory and field tests to characterise the complex properties of the organic sediments and plastic clay at the test sites. The results will then be made available through an open online database.

In combination with continued access to and use of the test sites over a number of years, this database will provide a basis for further research and technical development in the geotechnical area, and also help to create a platform for international and national cooperation between universities and industry.