

Summary

One of the on-going project activities is the development of a bearing capacity module in GeoSuite. As a first approach, equations from the design manual *Håndbok 016 – Geoteknikk i vegbygging*, prepared by the Norwegian Public Road Administration, will be implemented for simple undrained and drained cases.

Current design practice and needs within the geotechnical community has been examined through a survey that has been prepared for and sent to relevant partners within the GeoFuture consortium. With in-depth knowledge of current design practice and needs, the intention is for the program development to be directed towards the actual needs within the industry.

Feedback from the survey suggests that bearing capacity calculations are characterized by an extensive use of spreadsheets, most of which are based on equations from *Håndbok 016* (Janbu / NTNU). For more complex cases that are not covered sufficiently by this handbook, programs like Slide, GeoSuite Stability or finite element programs like Plaxis are used.

The spreadsheets seem to be well covering the calculation procedures described in *Håndbok 016*, yet feedback from the survey indicates that users sometimes find these calculation procedures to be inadequate. Thus, the need for a new calculation module seems to be present.

Bearing capacity calculations are most frequently carried out as one out of several steps in retaining wall design (dry stone walls and concrete walls). Hence it would be convenient with a module allowing for geotechnical retaining wall design as well as conventional bearing capacity calculation of point and strip foundations.

Seeing as the module's primary use is for onshore geotechnical engineering, the equations from *Håndbok 016* is a good starting point for the further development of the program. However, opinions from the industry indicate that there are a number of aspects that the module should take into account, for instance layered soil, varying shear strength within the same soil layer for undrained analysis, loads in all degrees of freedom, occurring deformations, variable groundwater level, different load combinations and different geometry around the foundation.

Moreover, it is desired that the program allows the user to effectively specify input in terms of loads and geometry. In addition, the calculation module should provide a clean presentation of the calculation results, for instance in the form of an auto-generated report, giving a thorough documentation of the analyses performed. The report should include load and material properties input, as well as a graphical visualization of the terrain, foundation geometry, rock surface and soil layering.