Back-Analysis of Initial Stress at Shallow Depth – A Case Study

CIVIL • ENVIRONMENTAL • MANUFACTURING • MINING • OIL & GAS • POWER GENERATION

PROJECT DESCRIPTION

BeFo (Swedish Rock Engineering Research Foundation)

Stockholm, Sweden

3DEC™

KUBRIX Geo®

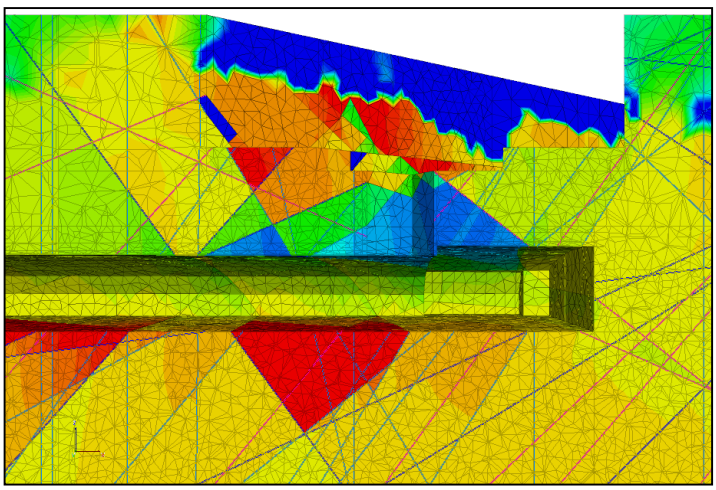
At shallow depth, the initial stress state can significantly affect the behavior of the rock mass around excavations, but stress measurements are usually subjected to high levels of uncertainty. This was the case at the Odenplan railway station in Stockholm where unexpectedly large deformations were measured during the excavation.

ITASCA'S ROLE

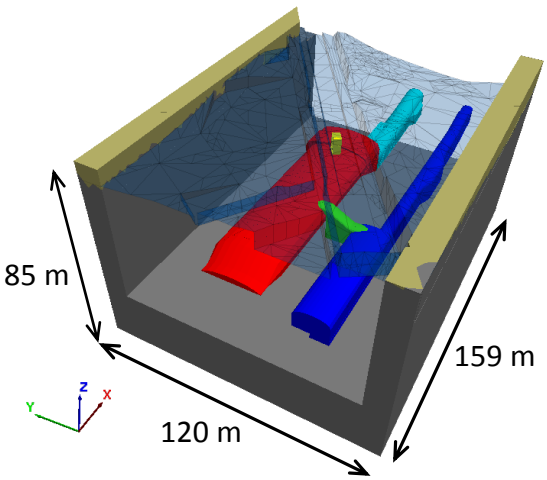
Itasca conducted a sensitivity analysis of the initial stress state in this area. As the rock mass is highly discontinuous, discrete modeling using *3DEC* was performed with three different initial stress cases, estimated from measurements.

PROJECT RESULTS

The results showed that joint slip and rock mass dilatancy explain the large displacements and heaving of the ground and that a continuum approach is not reliable for these conditions. A comparison between the displacements from numerical modeling and those measured *in situ* provided indication on the range of initial stress to be used in the future for this area.



Calculated displacements in the rock mass



Overview of the *3DEC* model

Itasca Consultants AB
Aurorum 2, SE-977 75
Luleå, Sweden | +46 (0)76 768 22 55 | jonny@itasca.se

www.itascainternational.com
www.Itasca.se