Jennifer Hellberg

ITASCA Consultants AB
An Itasca International Company

Geomechanical Engineer

Expertise Rock Mechanics

Education M.Sc. Civil Engineering (Rock Mechanics), 2019
Luleå University of Technology, Luleå, Sweden

Professional Experience

2020 – Present *Itasca Consultants AB, Luleå, Sweden*
Geomechanical Engineer

2017 – 2018 *Ramböll Sverige AB, Geoteknik, Stockholm, Sweden*
Geotechnical Engineer

Project Experience

Soil Engineering:

Planning of geotechnical surveys including field investigations and laboratory tests. Assessment of field and laboratory results and documentation in geotechnical reports (MUR) and drawings. Evaluating soil properties and conducting analyses of expected settlements. Investigating pros and cons of different foundation methods suited for project specific conditions. Authoring of technical documents.

Field work:

Assistant at geotechnical surveys investigating project specific soil properties and soil depth. Amongst the techniques used were Soil-/Rock probing, Ram sounding, Weight sounding and Soil sampling. Assessment of groundwater level in groundwater tubes.

Core logging for Kaunis Iron, including rock mechanics core logging of oriented core.

Conducting joint mapping at site (as subcontractor to Norconsult) for NCC during excavation of rock masses when installing a second turbine at the hydropower plant Rengård, outside Skellefteå. Field mapping was performed as part of a team from Itasca Consultants AB and findings was regularly reported to the client. One of the team members were always on site mapping the rock slope as the excavation proceeded. Additional tasks included regular control of the surveillance system, i.e., results from total station measurements, vibration measurements and water level measurements, as well as surveying the outlet canal for erosion.

Numerical analysis:

Completion of Master Thesis project in which three-dimensional numerical modelling was used to study deformations at the tunnel boundary during an excavation process. Simulation of several tunnels with varying tunnel geometry, rock properties, stresses and at different depths. Modelling was conducted using *FLAC3D*. Cases both with and without reinforcement were studied.

Mining:

Two-dimensional study of large-scale slope stability for Boliden Aitik mine with respect to additional load placed near the slope crest of the hanging wall. Using strength reduction technique, large-scale failure surfaces and safety factors were studied. The analysis was conducted for several different scenarios based on varying (i) groundwater table, (ii) height and width of added load and (iii) depth of mine.

Geomechanical study as part of rock mechanics feasibility study for a sublevel-stoping mine. Conducted work included: (i) creating a geomechanical model for the new mine site based on previous core logging and information from mine geologists, (ii) analysis of suitable room dimensions, both with and without reinforcement, using Modified Stability Graph Method, (iii) estimation of overbreak, (iv) calculation of appropriate fill strength, as well as (v) providing recommendations for reinforcement of stopes and drifts.

Developing analysis-tool for calculating Modified Stability Number for stopes in sublevel stoping mines based on statistically varied input data and estimations using multiple Monte-Carlo simulations. The analysis-tool was implemented at Copperstone Resources underground mine, outside Kiruna.

Rock mechanics analysis of a pilot storage for hydrogen gas, in the form of an underground lined cavern. Analysis have been conducted using three-dimensional continuum modelling, with applied pressures and with lining simulated explicitly.

Literature and case study of different factors influencing ore pass stability e.g., dimension, inclination, stress state, load from material etc. for LKAB. The study also included compilation of previously performed analyses of ore pass stability for Kiirunavaara and Malmberget mines. The theoretical work was combined with analytical calculations studying (i) the optimal distance between ore pass and ore body and (ii) the maximum distance the ore pass diameter can be allowed to expand in an ore pass group at the Kiirunavaara mine. Additional numerical calculations were performed, at a later stage, as a continuation of the ore pass stability investigation at the Kiirunavaara mine, utilizing a global-local numerical approach to account for the secondary stresses from the large-scale mining.

Numerical modelling of underground Creighton mine, Sudbury Canada. Creation of rock mechanical models for analysis and comparison between different production schedules.

Civil:

Three dimensional numerical analyses performed for stability analysis of a civil tunnel in Gothenburg, details of work are confidential.