

Geomechanical Engineer

Expertise Rock Mechanics, mining engineering, numerical modelling

Education M.Sc. Civil Engineering (Rock Mechanics), 2017
Luleå University of Technology, Luleå, Sweden

Professional Experience

2021 – Present *Itasca Consultants AB, Luleå, Sweden*
Geomechanical Engineer

2018 – 2021 *WSP Sverige AB, Geoteknik och Berg, Luleå, Sweden*
Geotechnical Engineer

2017 – 2018 *Reaalprojekt Ltd, Tallinn, Estonia*
Geotechnical Engineer/Site Engineer

Project Experience

Soil Engineering:

Establishing a survey program for the geotechnical drilling within the scope of the project area and directing laboratory tests based on the results. Analyzing field and laboratory results and documenting it in geotechnical reports (MUR) and drawings. Making suggestions and constructing a basic plan for earthworks and foundation (pros and cons of different foundation methods) suited for project specific conditions based on the evaluation of soil properties.

Field work:

On-site inspection and rock mechanical mapping of a rock slope for a planned tunnel outlet for an exploration drift in Gruvberget, Svappavaara. Inspection and rock mechanical mapping was conducted to assess the rock conditions at the location of the planned tunnel portal and a further recommendation was given as to whether the assigned reinforcement was sufficient or needed to be supplemented, as well as a suitable alternative tunnel portal location.

Continuous field mapping of rock structural orientations and conditions during excavation of rock masses for an outlet channel and a pumping pit/station for a tailings dam at the Aitik mine, outside Gällivare. Additional tasks included regular on-site rock mechanical inspection of exposed rock surfaces, check-ups during rock excavation, inspection of rock reinforcement, investigation of slope stability and other actual on-site rock mechanical issues. In addition to continuous on-site structural mapping, rock quality was also assessed according to the *Q*-system and based on this, determination of rock reinforcement was carried out.

On-site ground control engineer at Kaunis Iron. Work comprised of open pit bench performance inspection, stability-and risk assessments with recommendation of actions for problematic benches in the Kaunisvaara open pit mine composing the main part of the work.

Geomechanical core logging (*RQD*-, *RMR*- and *Q*-characterization) for Kaunis Iron new Sahavaara deposit.

Continuous field mapping of joint orientations and conditions during excavation of rock masses when installing a second turbine at the hydropower plant in Rengård, outside Skellefteå. 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.

Conducting subsurface investigations, collecting soil samples from the projects' intended site. Assisting in geotechnical investigations to determine the soil properties and soil depth. Experience with the following techniques used in the field: Soil-/Rock probing, Cone Penetration Test, Ram sounding, Percussion sounding, Weight sounding, Stick sounding, Soil sampling, Peat sampling, and Sampling in test pit, as well as assessment of groundwater level in groundwater pipes.

Numerical Analysis

Mining:

Coupled cave flow-mechanical analysis using *FLAC3D-CAVESIM* for the Fabian orebody in the LKAB Malmberget Mine. The aim of the analysis was to evaluate the increased seismic activity in the orebody and to give a prognosis of future seismic activity.

Situation assessment analysis with the aim of increasing the understanding of governing factors for the quality of the ore passes in Malmbergsgruvan. Work includes data analysis to compile different factors influencing ore pass stability e.g., dimension, inclination, stress state, load from material etc. for LKAB.

Three-dimensional discontinuum analysis with discrete fracture network (*DFN*) on finding optimal footwall drift size and location in the LKAB Kiirunavaara Mine. The purpose of the analysis was to provide recommendations on footwall drift alternative locations, sizes, and profiles for the future sublevel caving operation in Kiirunavaara mine.

Establishing geomechanical design parameters for Copperstone Resources' Viscaria mine. Conducted work included: (i) creation of a geomechanical model based on the results of rock mechanical core logging (*RQD*-, *RMR*-, and *Q*-characterization) (ii) producing preliminary recommendations of design parameters for the pit bench geometry (heights and angles), interramp slopes and the overall slope based on available data, (iii) 2D numerical analysis and evaluation of feasible overall slope angles, and (iv) developing a survey program for the mine to increase the amount of available data based on the preliminary data set.

Numerical analysis of Vale's Creighton mine, located in Sudbury, Canada. The work included the creation of rock mechanical models for analysis and comparison between different production schedules.

Completion of Master Thesis project that involved using a two-dimensional numerical modelling software to study stresses and deformations in the highwall slope, during the excavation process, to determine optimal and safe barrier pillar dimensions. Simulation of a 10-stage model was carried out with each stage advancing in 5 m increments to imitate the punch longwall mining method. Modelling was conducted using *FLAC* and *Rocscience* software *RS2*.

Civil:

Three-dimensional continuum analysis of a new (future) complex tunnel intersection at Västlänken in close proximity to existing underground underground facilities and low rock coverage. The model comprised a detailed, round-by-round excavation sequence with accompanied reinforcement in *FLAC3D*.

Model setup and three-dimensional continuum analysis (*FLAC3D*) of the rock facilities for a new wastewater treatment plant in Kattås Norway. Analysis comprised a verification of rock reinforcement, evaluation of response with regards to excavation sequence and influence from nearby infrastructure.

Three-dimensional discontinuum analysis of a new (future) complex tunnel intersection at Västlänken in close proximity to existing underground underground facilities and low rock coverage. The model comprised a detailed, round-by-round excavation sequence with accompanied reinforcement in *3DEC*.