

Mikael Svartsjaern

Geomechanical Engineer

Expertise

Rock Mechanics, Numerical modelling, Mining Engineering

Education

Ph.D. (Mining and Rock engineering), 2017

Luleå University of Technology, Luleå, Sweden

Licentiate in Engineering (Mining and Rock engineering), 2015

Luleå University of Technology, Luleå,

M.Sc (Civil Engineering), 2011

Luleå University of Technology, Luleå,

Professional Experience

2018 – Present

Itasca Consultants AB, Luleå, Sweden

Geomechanical Engineer

2013 – 2017

Luleå University of Technology, Luleå, Sweden

Ph.D. Student

2011 – 2013

Luleå University of Technology, Luleå, Sweden

Research Engineer

2010

Boliden AB, Kristineberg mine,

Mining engineer, vacation substitute

2009

Boliden AB, Kristineberg mine

7-month internship

Project Experience

Mining

Comprehensive underground damage mapping experience including design of mapping plan, mechanism analysis in-situ, large scale pattern analysis and, documentation procedures.

Design and installation of a monitoring system for large scale rock mass displacement constituting TDR (shear)-cables, hole extensometers and tape-extensometers. Design of a prediction tool for damaged zone extent in the Kiirunavaara mine footwall for future mining steps including development procedures and validation.

Development and interpretation of conceptual models for large scale damage evolution in the Kiirunavaara mine footwall using *UDEC*. The models were used as basis for the design of a monitoring system for large scale underground movement.

Development and interpretation of damage accumulation models for the Kiirunavaara mine footwall in *PFC*. The models were used to understand the progression of infrastructure damage and used to support the design of damage extent nomograms for future mining steps.

Over-break and charging procedure follow-up. Support and reinforcement quality assessment. Operation of filling station for cut-and-fill operations at the Kristineberg mine.

2nd opinion on design of Norwegian open stoping operation including evaluation of input data, design methodology and design recommendations.

Geotechnical characterization and design recommendations for large scale stoping at the Björkdal mine.

Geotechnical characterization and ground support design recommendations for future underground crusher facility at the Aitik open pit.

Civil engineering

Modelling of a new (future) complex tunnel intersection at Västlänken in close proximity with existing underground open rooms. Models included plastic materials and support elements (shotcrete and bolts) in *FLAC3D*. Deliveries included recommendations on support options, monitoring program for the construction and stability analyses.

Evaluation of modelling results from *FLAC3D* and *3DEC* for an underground repository intended for storing hazardous material. The repository life-span is expected to be 3000 years, analyses included long term stability and rock mechanical effects on flow paths. Responsibilities also included project management.

Creating a method description on back analysis of in situ stress field from convergence measurements for SKB.

Preliminary design recommendations for long term geomechanical monitoring at SKB spent nuclear storage.

Geomechanical core mapping.

Teaching

1st cycle courses in fundamentals and introduction to rock mechanics at Luleå University of Technology including pre-investigations, stresses, deformation, rock strength and failure criteria, cavern stability and slope stability. Main teacher at field excursion involving mapping of joint geomechanical properties and *in situ* orientation estimation.

2nd cycle courses in design of rock constructions and applied rock mechanics at Luleå University of Technology including plasticity and yield criteria, post yield behavior and numerical modelling basics. Excursion leader for field work at active mine sites including preparational lectures, field visit and post field analysis supervisor.

Course lecturer for introductory course in *FLAC3D* for mining and civil applications at TEKNA Kursdagene, Trondheim, 9-10 Jan 2019.