Lauriane Bouzeran

General Manager, Senior Geotechnical Engineer

Expertise Geotechnical Engineering, Soil and Rock Mechanics, Numerical Modeling

Education Engineering Diploma (Geophysics), 2010
Ecole & Observatoire des Sciences de la Terre, Strasbourg, France

Professional Experience

2023 – Present	*Itasca Consultants S.A.S., Lyon, France* *General Manager*
2019 – Present	*Itasca Consultants S.A.S., Lyon, France* *Senior Geotechnical Engineer*
2014 – Present	*Itasca Consulting Group, Inc., Minneapolis, Minnesota* *Geotechnical Engineer*
2010 – 2014	*Itasca Consultants S.A.S., Ecully, France* *Geotechnical Engineer*
2010	*Intern*
2009	*Uppsala University, Uppsala, Sweden* *Intern, Seismic Exploration*

Project Experience

Excavation and ground support design for underground gypsum quarries in the Parisian Basin: A series of geomechanical analyses of the short-term and long-term behavior of the excavations are conducted at the pillar scale, using *FLAC3D*, to make recommendations about ground support requirements (including timing of installation) or to assess the pre-feasibility of the underground extension of the quarry focusing on the constraints brought by the presence of the existing adjacent operations.

Ground support design in challenging stress environment for a caving operation: A series of geomechanical analyses of tunnel behavior were conducted at the tunnel scale, using *3DEC*, to make recommendations about the required equivalent ground support pressure necessary to ensure the long-term stability of the mine's infrastructure.

Development of advanced bolt model in Itasca's three-dimensional distinct element code 3DEC: For simulation of ground support performance in highly fractured and bulked rock masses, called 'hybrid bolt'. This new structural element is an improvement on the classic cable bolt model, which features a more realistic resistance to fracture shear displacement and allows bolt installation in a fractured rock mass exhibiting open joints. The use of the Discrete Element Method (DEM) based 3D Bonded Block Model (BBM) to represent the rock and the hybrid bolt model to represent the bolt support is a promising approach for the design of effective support in highly stressed and blocky or fractured rock.

Stoping sequence and ground support optimization in challenging stress environment: A series of geomechanical analyses of stoping sequence options were conducted at the mine scale, using *FLAC3D*, to make recommendations about the stoping sequence to limit exposure to high stress and help manage some of the risks related to ground conditions. More detailed tunnel scale *3DEC* simulations (using the BBM approach to represent the rock and the hybrid bolt model to represent the bolt support) were also performed to understand and optimize ground support.

Recommendations of design guidelines for stoping operation in complex geotechnical environment: The geotechnical characterization of the rock mass was updated, and numerical back-analyses of several locations were performed using *FLAC3D* in order to better understand rock mass performance of both buckling-prone and highly seismic units present and to calibrate the model. A generic study was then completed that resulted in the recommendation of design rules about sequencing and access location for future mining to manage convergence and limit exposure to high stress and potential seismic areas.

Assessment of the impact of the mining schedule on infrastructures for a macroblocks caving operation: A series of geomechanical caving analyses were conducted focusing on comparing two different sequences for caving the macroblocks. The differences in these two sequences were examined with respect to a number of geomechanical factors, with the principal objectives being to assess expected mining-induced abutment stresses and their impact on mine infrastructure.

Rock Mass characterization using Synthetic Rock Mass methodology: Evaluation of the influence of joints on rock mass properties using a micro-macro Distinct Element approach. Fractured rock mass analysis by simulating large-scale tests. Generic study of the influence of random fields when applied to rock properties.

Numerical Model for civil engineering: Tunnel excavation and reinforcement in continuum media. Underground hydro-power plants excavation and reinforcement in continuum media; mechanical and hydraulic studies. Analysis of subsidence caused by large surface or underground structures. Analysis of slope stability with shear wall reinforcement. Analysis of block impact on a gabion reinforcement structure.

Numerical Model for radioactive waste management: 2D and 3D analysis for design of underground nuclear waste disposal for ANDRA, the French National Agency for Radioactive Waste Management, including constitutive law calibration, short-term and long-term analysis.

Seismic Risk Analyses: Stability analysis of various structures (e.g., hydro-power plant, radioactive waste storage, concrete shaft) under seismic loading in 2D and 3D.

Grid generation: Advanced expertise in manual and automatic grid generation for various civil and mining projects using both *Rhino* and *Griddle* mesh generation software and *FLAC3D* built-in tools.

Field Work: Field work on seismic exploration. Core logging in Sweden and in Minnesota.