



ARMA 2021 Virtual Workshop

Saturday, 19 June 2021

13:00-17:00 UTD

Numerical Modeling of Fluid Injection Treatment of Naturally Fractured Rock Masses

Description

Accurate simulation of the treatment of a rock mass by fluid injection is complex due to the need for coupling fluid flow and mechanics (and potentially temperature) within pre-existing discrete fracture networks, as well as fracture propagation in inhomogeneous and fractured rock masses with no assumptions regarding fracture shapes or trajectories. The workshop will overview XSite, a lattice-based numerical modeling program used to design treatments, via fluid and proppant injection for mining, geothermal, unconventional oil and gas applications.

Workshop program

The workshop is organized into two 2-hour sessions with a ten-minute break in-between and a 15-minute Q&A session at the end of each session. The first session introduces the workshop and presenters and reviews concepts on fluid injection treatment, the modeling of synthetic rock mass (SRM), and synthetic microseismicity; a background on the lattice modeling method and working with XSite will also be provided. The second session reviews applications or cases demonstrating modeling treatment by fluid injection, including multi-stage stimulation from multiple boreholes, in practice to evaluate:

- (1) rockmass pre-conditioning to improve fragmentation and recovery and to destress mining regions by redistributing stresses;
- (2) geothermal designs, including injection rate histories, fluid viscosity and completion designs; and
- (3) unconventional oil and gas designs, including wellbore hydraulics, perforations, proppant transport and placement, complex injection rate history, and placement of diverters.

The workshop presentation slides will be available as a downloadable PDF.

Workshop speakers

The workshop will be led by Branko Damjanac and Maurilio Torres.

Branko Damjanac | Principal Engineer

Dr. Damjanac engineering experience includes the design and analysis of underground excavations for oil storage and waste isolation and stability analyses of underground and open pit mines in both hard and soft rocks. He has developed a 3D numerical model to simulate the coupled hydro-mechanical response of a fluid-saturated rock mass. Dr. Damjanac consulted on projects in the mining and energy industries with objective of design and operation optimization of rock mass treatment by fluid injection.

Maurilio Torres | Senior Software Engineer

Mr. Torres is a software engineer with an academic background in civil engineering and computer science. Maurilio's areas of expertise are C/C++ programming, object-oriented programming, and other software-development techniques. He is the XSite software Product Manager.

Who should attend?

This workshop is an overview designed for geomechanical and mining engineers, geoscientists, managers, and academics interested in learning more about numerical modeling of fluid injection treatment of naturally fractured rock masses for mining and energy engineering. Previous experience in numerical modeling is useful but not required.

Price

Workshop registration is \$125