

COUPLED HYDRO-MECHANICAL PROCESSES IN GEOMATERIALS

PETER GRASSL AND THOMAS SHIRE

School of Engineering, University of Glasgow
Rankine Building, Oakfield Avenue, Glasgow G128LT

peter.grassl@glasgow.ac.uk, thomas.shire@glasgow.ac.uk

Key words: geomaterials, fracture, mass transport, hydro-mechanical coupling

ABSTRACT

The macroscopic response of geomaterials, such as rock, soil and concrete, are governed by coupled hydro-mechanical processes occurring at multiple scales. Injection of fluid under high pressure produces fracturing in the solid. Drying of soils and concrete can result in shrinkage induced cracking. Furthermore, external mechanical loads may introduce fracture patterns in the form of microcracks and discrete cracks over long distances. All these fracture processes produce preferential pathways for the transport of fluids. Also, in granular materials liquid or gas flow can induce fluidisation or erosion and fluid pressures can affect the shear strength.

This mini-symposium seeks contributions on the development and application of computational modelling approaches for these coupled processes. Examples of computational approaches include continuum, discrete and mixed models (e.g. DEM, lattice, network, continuum with interface elements, embedded discontinuities, XFEM, MPM, ...). Research on both the development and application of these numerical approaches are expected. Comparison of numerical work with theoretical and experimental benchmarks are welcome, as well as their application to practical problems. The mini-symposium is aimed to provide a forum for exchange of new ideas and developments to advance the capabilities of these numerical techniques.