

Permeability in Fragmented Materials and Its Application to Underground Mining

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Abstract

The block caving mine is considered by the mining industry as one of the natural replacements of the current open cut mines in the near future. The block caving technique is based on the extraction of small broken rocks, created by blasted initially large solid rocks, and the fracture of compact material located in the upper layers because the stress propagation generated by the extraction process. Mudrush is a sudden inflow of a sort mud ore into underground mining facilities. It may cause harm to people and equipment, production delays, dilution and mine closure.

The purpose of this numerical investigation is to obtain a more complete understanding about the permeability in fragmented materials and its applications to underground mining using COMSOL Multiphysics® software. In particular, describe and quantify the flow of a fluid through a granular material under different physical conditions. Numerical simulations have been done using COMSOL Multiphysics in order to solve a system of partial differential equations. The numerical parameters are porosity of the medium and shape of the fragmented zone.

Figures used in the abstract

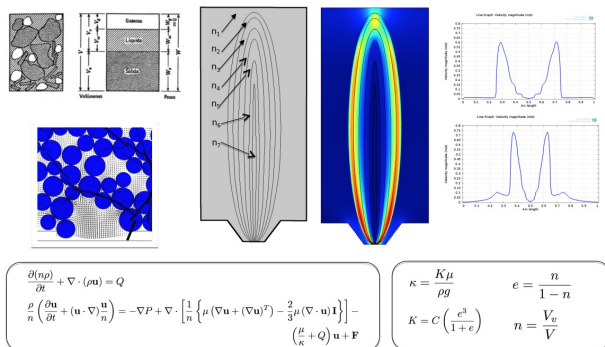


Figure 1



Figure 2



Figure 3



Figure 4