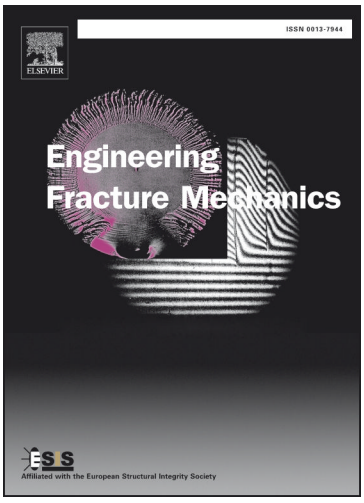

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Experimental and Numerical Investigation of the Punch-through Shear Test for Mode II Fracture Toughness Determination in Rock

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ABSTRACT:

The punch through shear test is a laboratory test used to determine the shear fracture toughness K_{IIC} in rock. In this paper, the punch-through shear test was simulated using a discrete element particle model, and the dependence of K_{IIC} on loading velocity and confinement ranging from 0.1 to 80 MPa was investigated. The numerical results of K_{IIC} vs. confinement match very well with laboratory tests, and the development of complex shear fractures during the test are analyzed in terms of the formation and coalescence of tensile and shear micro-cracking at different confining stresses, and the use of numerical acoustic emission recording.

Key words: punch-through shear test; Mode II fracture toughness; PFC^{3D}; acoustic emission

1 Introduction: