

## Accepted Manuscript

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

Haoyan Wu, John Kemeny, Shunchuan Wu

PII: S0013-7944(17)30499-X

DOI: <http://dx.doi.org/10.1016/j.engfracmech.2017.08.006>

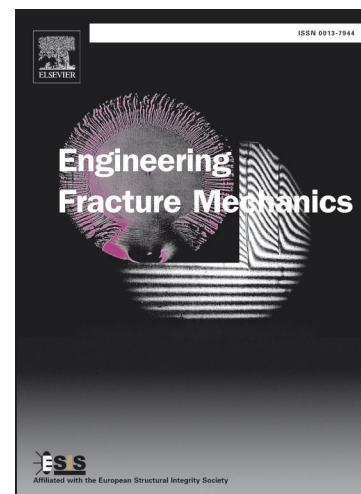
Reference: EFM 5640

To appear in: *Engineering Fracture Mechanics*

Received Date: 9 May 2017

Revised Date: 31 July 2017

Accepted Date: 1 August 2017



Please cite this article as: Wu, H., Kemeny, J., Wu, S., Experimental and Numerical Investigation of the Punch-through Shear Test for Mode II Fracture Toughness Determination in Rock, *Engineering Fracture Mechanics* (2017), doi: <http://dx.doi.org/10.1016/j.engfracmech.2017.08.006>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

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

Haoyan Wu<sup>a,c</sup>, John Kemeny<sup>b</sup>, Shunchuan Wu<sup>a,c,\*</sup>

<sup>a</sup>*University of Science and Technology Beijing, Beijing 100083, China*

<sup>b</sup>*University of Arizona, Tucson 85721, AZ, United States*

<sup>c</sup>*Key Laboratory of Ministry for Efficient Mining and Safety of Metal Mines, University of Science and Technology Beijing, Beijing 100083, China*

E-mail addresses: wuhaoyan@live.cn (H.Wu), kemeny@email.arizona.edu (J.Kemeny), wushunchuan@163.com (S.Wu).

## 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<sup>3D</sup>; acoustic emission

## 1 Introduction:

Download English Version:

<https://daneshyari.com/en/article/5013768>

Download Persian Version:

<https://daneshyari.com/article/5013768>

[Daneshyari.com](https://daneshyari.com)