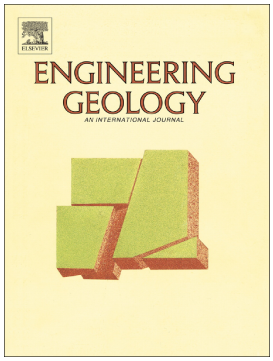


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PII: S0013-7952(16)30747-5
DOI: doi: 10.1016/j.enggeo.2017.04.014
Reference: ENGEO 4552

To appear in: *Engineering Geology*

Received date: 3 December 2016
Revised date: 22 February 2017
Accepted date: 16 April 2017

Please cite this article as: Jooeun Lee, Jung-Wuk Hong, Jae-Wook Jung , The mechanism of fracture coalescence in pre-cracked rock-type material with three flaws. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Engeo(2017), doi: 10.1016/j.enggeo.2017.04.014

# The mechanism of fracture coalescence in pre-cracked rock-type material with three flaws

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## Abstract

This paper presents numerical results from an investigation of the mechanism of coalescing patterns in a rock-type material with three flaws whose arrangements are different under uniaxial compression. The numerical experiments are conducted through the parallelized peridynamics code coupled with the finite element method, which is capable of capturing more realistic fracturing behaviors. Under the effect of various bridging angles, the process of initiation, propagation, and coalescence of new cracks is discussed. In addition, coalescing behaviors affected by the interaction of newly growing cracks are observed along with various flaw arrangements. Several types of coalescence occur due to the interaction of wing cracks, horsetail shear cracks, and anti-wing cracks and the extension of central tensile crack segment, and these results are compared with experimental results. Furthermore, by comparing coalescence types and corresponding flaw arrangements, the coalescence mechanisms are discussed in detail toward the end of the paper.

Keywords: Crack coalescing behavior, Tensile crack segment, Linking structure, Multi pre-existing flaws, Rock-type material