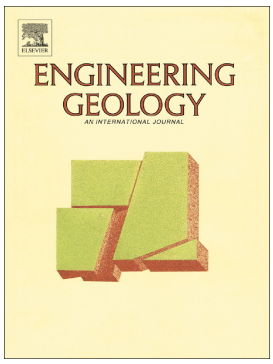


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# Role of natural fractures in damage evolution around tunnel excavation in fractured rocks

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**ABSTRACT**

This paper studies the role of pre-existing fractures in the damage evolution around tunnel excavation in fractured rocks. The length distribution of natural fractures can be described by a power law model, whose exponent *a* defines the relative proportion of large and small fractures in the system. The larger *a* is, the higher proportion of small fractures is. A series of two-dimensional discrete fracture networks (DFNs) associated with different length exponent *a* and fracture intensity $P_{21}$ is generated to represent various scenarios of distributed pre-existing fractures in the rock. The geomechanical