

Discrete element models of rock blasting

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SUMMARY

In the last decade numerical methods are becoming increasingly popular in rock blasting. Various techniques have been used and among others the finite element method as well. However, it is difficult to model a discrete system such as fragmented rock by the method developed for continuum. This means that discrete elements are better suited for the problem of rock blasting, than finite elements.

Within a discrete element model of rock blasting pressure of detonation gas could be supplied as input data or it could be evaluated by the model itself. In order to evaluate pressure of detonation gas, a solid rock-detonation gas interaction has to be considered. In this paper two novel solid rock-detonation gas interaction models are presented. The presented models are applied within the robust rock blasting model that comprises strain softening based fracture model, finite strains as model of rock under high pressure and transient dynamics of fractured rock including detection of contacts and interaction among moving rock fragments. The aim was to simulate the fragmentation, fragmentation pattern, flying distance, muckpile and damage of remaining rock mass in blasting operations.
