"COMPUTER-AIDED BLAST FRAGMENTATION PREDICTION"

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ABSTRACT

The complex mechanism of blast fracturing has resisted conventional design typical approaches. The code developed for this investigation simulates the performance of radial fractures from an array of blastholes, at various burdens and spacings, and instantaneous and delayed detonations. The output is analyzed and a fragmentation size distribution calculated.

The theory governing the distribution of radial cracks and the manner in which they interact are based on theoretical and experimental results. The effect of discontinuities on rock fragmentation by blasting is also incorporated in the model. Those discontinuities which have physical properties such that they can affect decisively the initiation of stress waves and propagation of cracks are treated by the stochastic crack analysis code. Alternatively discontinuities which do not negatively affect the fragmentation process of the rock mass by the dynamic load (i.e. pressurization and growth of cracks), are treated using a mathematical model. This is based on principles from Linear Elastic Fracture Mechanics theory (LEFM) and Kuznetsov's equation (Ref. 9) which relates the mean fragment size obtained to the blast energy, the hole size and rock mass characteristics.

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