

Relation between Energy Absorption and Box Dimension of Rock Fragments under Impact Loading

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Abstract : This study aims to explore the impact energy absorption in the fragmented processes of rock samples during the split-Hopkinson-pressure-bar tests. Three kinds of rock samples including granite, marble and sandstone were tested. The impact energy absorptions were calculated according to the incident, reflected and transmitted strain wave histories measured by a oscilloscope. The degree of fragment rocks after tests was quantified by the box dimension of the fractal theory. The box dimension of rock fragments was obtained from the particle size distribution curve by the sieve analysis. The results can be concluded that: (1) the degree of rock fragments after tests can be well described by the value of box dimension; (2) with the impact energy absorption increasing, the degrees of rock fragments are varied from the very large fragments to very small fragments, and the corresponding box dimension varies from 2.9 to 1.2.

Keywords : SHPB test, energy absorption, rock fragments, impact loading, box dimension

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