

CORRELATION OF SHOT DESIGN PARAMETERS TO FRAGMENTATION

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ABSTRACT

Blast design parameters were studied in an attempt to quantify their relationship to rock fragmentation. The Bureau of Mines conducted a series of 29 reduced-scale shots at the University of Missouri-Rolla's experimental mine with bench size from 40 to 80 inches. Design parameters varied were burden, spacing, explosive diameter and stemming-explosive length. The shots had 3 or 4 blastholes fired at delays of 1-4 ms per foot of burden, based on previous tests that showed hole interaction could improve fragmentation by 12 to 20 percent over single-hole shots or simultaneous firing. All rock, 2000 to 23,000 pounds per shot, was screened and weighed to determine the fragmentation size-weight distribution.

Empirical equations were developed that predict the 50 and 80 percent passing points to within 16 percent. The best fit resulted when two sets of empirical equations were developed, grouping the shots as either high or low powder factor. The equations were applied with some success to full-scale shots after factoring in the influence of existing joints in the bench.