

NEAR BOREHOLE FRACTURE AND FRAGMENTATION STUDIES IN COPPER PORPHYRIES

Catherine T. Aimone
Center For Explosives Technology Research
and
Department of Mining and Geological Engineering
New Mexico Institute of Mining and Technology
Socorro, New Mexico 87801

ABSTRACT

A series of experiments have been performed to characterize fragmentation and microcracking in quartz monzonite copper porphyry. The flyer plate impact method was used to generate plane shock waves in rock specimens for impact pressures between 1.6 and 7.3 GPa and impact pulse durations between 1.1 and 7.0 μ s. The effects of pressures up to 4.8 GPa and pulse duration on fragment size distributions and microcrack densities were studied. The results show that pressures effect particle sizes to a greater extent at higher pulse durations. However, changes in pressure and pulse duration show little influence on the density of microcracks induced during explosive loading. These results indicate that the nucleation and growth of microcracks in rock subjected to shock waves occur uniformly throughout. A substantial decrease in particle sizes for high pulse durations is attributed to more time allowed for microcracks to grow and coalesce, forming individual particles.