

The Optimum Delay

L.C.Lang
L.C.Lang & Associates Inc. Canada

G.Bohus & J.Foldesi
Dept.of Mining Eng.,Tech.University,Hungary

D.Benedek
Central Institute for Mining Development,Hungary

Summary

The breakage process in blasting takes place in space and in time and the latter will determine the degree of fragmentation, shape of the muckpile and the extent of displacement.

The shock wave travels at the velocity of sound in the material and it can easily be measured. The cracks' velocity is only 0.38 % of the velocity of sound. The number of cracks at any distance from the explosion cavity, their length and the time of development can be calculated.

The shock wave's velocity can also be used to calculate the right length of delay between subsequent detonations. There is also an optimum delay for every value of shock wave. When this optimum delay is applied, fragmentation will improve and seismic vibration levels, which are the result of confinement, will be the minimum. The efficiency or the degree of diminution can be expressed in terms of a ratio of vibration levels.

The optimum delay time is shorter in rocks having high sonic velocities and longer in rock formations having low sonic velocities.