

PRECISION DELAY DETONATORS AND THEIR EFFECT ON BLASTING PERFORMANCE IN QUARRY BLASTS

B. Bohant (1,3), G. Lam (1), S. Hung (2) and F. Gauthier (2)

1 Explosives Technical Centre
IIE Explosives Canada
Castroville, Quebec, Canada J3C 1T

2 Technical Services
IIE Explosives Canada
100 Appard Avenue E.
North York, Ontario, Canada M2H 2G2

3 Department of Mining and Metallurgical Engineering,
McGill University
Montreal, Canada H3A 2B7

ABSTRACT

A series of eleven full-scale production blasts has been carried out in a limestone quarry to study the effect of delay interval and its precision on overall blasting performance. The quarry employed F_2 and cartridge alumini ed emulsion in 75 mm diameter boreholes with 2.6 m burden and 2.0 m spacing on a 6.7 m bench. Both π -cut and schelon designs were studied. The types of detonators tested were regular short period electric detonators with expanding delay intervals, a more precise piezoelectric-based electric detonator (E-DET) with a fixed (25 ms) delay interval, and the ultra-high precision electronic delay detonator (EDD) with constant (but site-specific) delay interval. The various techniques employed to assess the blast results are described, and the performance of the three types of detonators compared. The use of both E-DET and EDD lead to improved blast results in schelon design. Of the three delay intervals (25 ms, 30 ms, and 50 ms) studied, the best results were obtained with EDD with a 30 ms delay interval, which translates into a delay of 30 ms/m of effective burden. The results also show the need for modification of current π -cut delay designs to derive full benefits from these high precision detonators.