

SEISMIC MONITORING OF PRODUCTION BLASTS

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Abstract

Seismic observations offer the only possibility for remote sensing of physical processes like shock-front spreading, material crushing and ground movement. A better understanding of these processes will help to increase the economy of blasting. We developed a digital seismic monitoring system for research purposes. The system can simultaneously record up to 64 channels with a maximum sampling rate of 31 kHz per channel. A software package for rigorous analysis of blast induced seismic waves has been developed.

The results of wavefield analysis of four production blasts in a limestone quarry are presented. The shots (18 to 26 holes) were fired with high precision electronic detonators from Dynamit Nobel. All actual firing times have been recorded. These times are compared to the desired firing times. Digital filters for removing the influence of the recording system from the data are applied. Evaluation of energy reports the influence of the individual holes to the seismic wavefield. The great number of observation points allows insight to the time dependent development of the wavefield in distances up to 120 m from the blastholes.