

Optimization of Development Drilling and Blasting in an Underground Mine

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Abstract

A thorough assessment of development drilling and blasting practice was carried out at two underground mines at INCO operations in Thompson, Manitoba. The study showed that significant improvement in productivity can be achieved through careful selection of explosives and loading practice, and modifications of the standard blast lay-out. The analysis involved assessment of the effectiveness of various perimeter blasting methods, employing selected explosives and loading practice in both jumbo and jack-leg rounds. The blasting pattern as well as burden and spacing were varied to determine their effect on the blast results. The various types of explosives used were, pneumatically loaded ANFO, with and without detonating cord tracing, extra-strength detonating cord, and slurry and emulsion explosives with and without cord tracing. The study also dealt with various means to achieve increased rate of advance in both jumbo and jack-leg rounds. The diagnostic measurements consisted of VOD, 'burn' marks or half-barrels on perimeter wall, and blasting vibrations. The effects of geology, firing sequence, blast lay-out, and drill hole deviation on the final results were also examined. The results of the study have been shown to have very important bearing on the design of development round blasting.