SEQUENTIAL TIMING FOR ORE CONTROL BLASTING IN NEVADA

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ABSTRACT

The open pit gold and silver mining operations in the State of Nevada have historically used simple row by row, echelon, or chevron delay patterns. Common practice has been to use detonating cord trunklines and either detonating cord downlines or nonelectric common in-hole delays in conjunction with surface delays. Several operations use a series of downhole nonelectric delays with an entire row loaded with the same delay to develop similar patterns.

Ore control is accomplished by controlling overall powder factor, stemming height, and delay timing between rows. Typical bench heights are twenty feet and dependent upon geology, patterns range from approximately twelve feet by twelve feet out to eighteen feet by twenty feet (using six and one-half inch or six and three quarter inch diameter boreholes).

Almost without exception the disseminated orebody types found in Nevada are extremely inconsistent both geologically and in mineral value continuity. This factor, when balanced with high production volumes and irregular low-grade leach ore zones, dictates that good fragmentation be obtained while at the same time keeping displacement at minimum levels to avoid ore dilution. Ore grade is also rarely consistent vertically, thus necessitating the relatively short bench heights. Explosives distribution throughout the drill pattern is poor by most industry standards but necessary to meet production demands and economic constraints.

While it is widely accepted that sequential timing increases fragmentation and improves control, sequential timing seems to be particularly beneficial for these purposes when applied to open pit ore control shooting. This paper will outline the blast design parameters common to typical Nevada open pit precious metal mining and specifically cover current trends toward sequential timing. Several recent case history examples will demonstrate the advantages of sequential timing when applied to difficult blasting situations in Nevada.