

Blast Simulation for Dilution Control

A Preliminary Study at Omai Gold Mine, Guyana

Stephen H. Chung, Manager
Blasting Technology Development
ICI Explosives Canada, North York, Ontario, Canada
and
Kevin Atherton, Superintendent Engineering
Omai Gold Mines, Guyana

ABSTRACT

The main purpose behind this preliminary study was the reduction of costs while maintaining productivity. Finding a way to achieve this balance without compromising controls on safety and quality of blasting results is of continual interest to the mining industry and of particular interest when ore of lower grade is being mined.

Ore dilution can occur as a result of mining, blasting and muckpile removal, or may be inherent within the ore sample itself. In the case of the Omai Gold Mine (OGM) in Guyana, gold ON reserves are present in varying grades and concentrations. OGM has thus considered developing an operational strategy for blasting as well as mining to ensure a high degree of dilution control and to produce the most suitable mill feed possible.

Omai Gold Mine had studied the feasibility and benefit of blasting a 7.5m bench as opposed to a 5.0m bench based on a block excavation model, but was in search of assistance to confirm whether or not this approach would actually yield significant reductions in mining costs and ore dilution. If blasting would not cause any additional dilution, then the block excavation model indicates that there will be significant savings on reduced drilling and blasting through pattern expansion and in increased mining rate.

Atlas Powder International and the Technical Services of ICI Explosives Canada was invited to conduct a special blast assessment using a variety of high-tech tools and methodologies. These included high-speed imaging and advanced blast modeling technology with SABREX (Scientific Approach to Breaking Rock with Explosives), DMC (Distinct Motion Code) and PowerSieve, an image based particle size distribution analysis program.

This paper will describe how the advanced modeling is used to design blasts for dilution controls. Other dilution problems experienced during mining operation are also discussed.