Selective Mining Using Explosives

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ABSTRACT

This paper deals with a new variation of the cast blasting technique, where-in the object is to cast the economic deposit out front under the overburden, while avoiding dilution from the floor material.

To date, the technique has been successfully applied at two cement quarries in Iowa and at a granite quarry in Minnesota.

The paper describes selective separation of mill-feed rock from overburden and chemically unsuitable floor rock as applied to limestone/dolomite and granite/weathered granite (or kaolinite).

A set of principles is derived and itemized from field testing, results to be utilized by other operators, who might encounter similar situations.

The paper addresses the areas of geology, fragmentation, down-stream productivity, cost reduction and minimization of waste.

The end result of the application has been to improve fragmentation and quality control: reduce drill costs and eliminate the entire drill and blast cycle of overburden removal.

Now, with more than one year of history, the technique is applied for 100% production at one cement operation; where cost reduction has been in the range of $60 K per annum. The technique is used at the other cement operation when dolomite is present on the top. It is also used at the granite operation when weathered granite is to be separated from ballast rock below.

Generic terms are used throughout and the use of specific brand names of explosives has been avoided. Use of operators names in the presentation of the paper is with their approval.