A METHOD FOR CALCULATING THE WEIGHT OF CHARGE TO USE IN LARGE HOLE PRE- SPLITTING FOR CAST BLASTING OPERATIONS

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ABSTRACT

Operations using draglines to remove the overburden above coal seams have increasingly turned to cast blasting to improve productivity and reduce costs. Many such operations also employ active highwall pre- splitting to produce highwalls of well defined configuration, behind which the subsequent blast can be designed and implemented to maximize casting. In some cases isolating the block to be blasted allows water to drain out of the rock mass and provides the opportunity to use less costly explosives.

Pre- splitting is a technique which has been used to provide smooth, competent final walls in open pit mining and construction for many years. To reduce the borehole pressure the explosive is typically decoupled by using an explosive of smaller diameter than the blasthole. Most often pre- splitting for these applications is performed using small diameter blastholes. Methods of calculating the amount of decoupling required and the necessary spacing between pre-split holes have been developed for these typical pre- splitting situations.

When pre- splitting is incorporated into a cast blasting program the explosives charge normally consists of a concentrated load in the bottom of a large diameter pre-split hole. A method has been developed, based on the principles of conventional small hole pre-splitting, which allows one to calculate the weight of charge needed in the bottom of a Large diameter hole to create a good pre-split fracture. The charge weight is dependent on the diameter and depth of the pre-split hole, both of which affect the volume into which the gases expand.

Once the necessary decoupled borehole pressure has been determined the spacing between the pre-split holes can be calculated. It is dependent on the borehole diameter, the expanded borehole pressure and the dynamic tensile strength of the rock mass.

Good results have been obtained in the field with this approach. The technique at one large coal mining operation is described.

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