

BLASTABILITY INDEX ON POOR QUALITY ROCK MASS

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ABSTRACT

The present paper proposes a new combined classification system connecting the quality and blastability of poor and friable rock mass, heavily broken with mixture of angular and rounded rock pieces. The proposed methodology and research that result in the Blastability Quality System (BQS) are described, and three useful diagrams of the above new system aroused from our estimations. The proposed BQS is an easily and widely used tool as it is a quickly calculator for blasting and rock mass quality. Taking into account our research calculations and the parameters of BQS, we came to some conclusions for the relation of the blast ability index magnitude with the space and orientation of discontinuities.

KEYWORDS: Blastability, Blasting, Classification System, Rock Mass

INTRODUCTION

The property, which is referred as “blastability” of a rock mass, determines how easy is to explore a rock mass under specified blast design, explosive characteristics and specified legislative constraints depending on the site specifics. Two different rock masses, when are subjected to identical blast geometry and energy input from explosives, produce quite different degrees of fragmentation (Ajoy & Akhilesh, 2012). This is because they have different resistance to fragmentation by blasting (Blanco & Kumar, 2012). Rock mass comprises of several different rock types and is affected by different stages of alteration in varying stress conditions. Blast ability appears to be a kind of intrinsic property, like the hardness of a rock and, apart from the possibility of blast fragmentation from previous blasting events, it is uncontrollable.

Many rock mass quality classification systems (RQD, Q, RMR, GSI) have been developed for drilling and excavation ability estimation. The present paper is trying to create a new system, connecting the quality and blastability of rockmass, which can be, easily, used as an in situquick method, for tunnel excavation, in order to estimate quickly the explosive results, in addition to drilling and excavation methods.

The rock mass, used in this study, is poor and friable, shared with lack of blockiness due to the close spacing of weak schistosity or sheer planes and disintegrated with poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces. Although the quality is very poor, a light blast may be needed as the small rock pieces are tightly connected.

ALREADY KNOWN APPROACH; BLASTABILITY INDEX CONCERNING ROCK MASS CLASSIFICATION SYSTEMS

The factors, which influence the blasting results, fall into two groups. The first group refers to the intact rock properties, which include strength, hardness, elasticity, deformability, density of rock, etc. These properties depend on rock texture, internal bonds, composition and distribution of minerals forming the rock (Zhang et al., 2011). The second group refers to the discontinuity structure that involves orientation, spacing and extent of discontinuities (Singh & Sinha, 2012). The discontinuity structure has been created by a range of long-term geological processes.