[*] Kuz-Ram and Digital Image Processing System Combination to Determine Specific Blasting Parameters

A. Kahriman, G. Tuncer, A. Karadogan
Istanbul University, Engineering Faculty, Mining Engineering Department, 34320, Avcilar, Istanbul
K.Ozdemir
Istanbul University, Institute of Science and Technology, 34320, Avcilar,Istanbul

Abstract

Determination of optimal blast parameters have been the priority act for blasters on the field due to financial and technical properties of the operation. Therefore many researchs were done to establish a general formula for many years. These intends could reach some empirical and numerical design frames consisting the rock, geology and explosives properties. Blasting parameters have to be adjusted according to the desired fragmentation rate especially on the mines where particle size distrubition after blasting has a great importance. Therefore the blast designs have to be evaluated considering the particle size distribution after the blasts. The Kuz-Ram model which was modified by Cunningham is one of the tools for estimating the particle size. Although it doesn't give an accurate result, it can be very succesful on modifying the blasting design parameters by establishing a back correlation between the blasting parameters and the exact particle size distribution results which can be easily achieved by digital image processing system.

Within the scope of this study, the particle size distribution after blasting was assessed by Split-Desktop digital image processing system and bench blasting parameters were studied considering the desired particle size distribution at Espey colemanite mine using Kuz-Ram and digital image processing system combination to determine the specific blasting parameters for this site.

Introduction

In the condition that drilling and blasting technique is inevitable depending on the rock mass and material characteristics on mining activities, the fragmentation rate and particle size distribution of the muckpile after blasting has important influences on the performance of subsequent mining activities such as loading, hauling, crushing, grinding etc. and the total costs of that mine. (Kahriman A., 1995) The portion of the cost of drilling and blasting among the whole operation costs, varies between 10-35 % of overall costs (depends on if the optimal blasting conditions are proved or not) in open pit mining. (Kahriman A., et al., 2004) One of the fundamental requirements for being able to optimize the blast operations is the ability to predict fragmentation. An accurate blast fragmentation model allows a mine to adjust the fragmentation size for different downstream processes (mill processingvs. leach, for instance), and to make real time adjustments in blasting parameters to account for changes in rock mass characteristics (hardness, fracture density, fracture orientation, etc.).(J. Kemeny, et al., 2001)

[*] This work was supported by the Executive Secreterait of Scientific Research Projects of Istanbul University (Project No: T-480/25062004) and Turkey Scientific and Technique Research Society (Project number is MISAG-283).