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SRI CHANDRAHAS[1,2*], BHANWAR SINGH CHOUDHARY[1],
N.S.R. KRISHNA PRASAD[2], VENKATARAMAYYA MUSUNURI[2], K.K. RAO[3]

AN INVESTIGATION INTO THE EFFECT OF ROCKMASS PROPERTIES ON MEAN FRAGMENTATION

Desired rock fragmentation is the need of the hour, which influences the entire mining cycle. Thus, most engineering segments pay attention to rock fragmentation and neglect by-products like ground vibration and fly rock. Structural and mechanical properties of rock mass like joint spacing, joint angle, and compressive strength of rock pose a puzzling impact on both fragmentation and ground vibration. About 80% of explosive energy that gets wasted in producing ill effects can be positively optimised, with a new set of blast design parameters upon identifying the behaviour of rock mass properties. In this connection, this research aims to investigate the influence of joint spacing, joint angle, and compressive strength of rock on fragmentation and induced ground vibration. To accomplish this task, research was carried out at an opencast coal mine. It was discovered from this research that compressive strength, joint spacing, and joint angle have a significant effect on the mean fragmentation size (MFS) and peak particle velocity (PPV). With the increase in compressive strength, MFS explicit both increase and decrease trends whilst PPV increased with a specific increase in compressive strength of the rock. An increase in joint spacing triggers both increase and decrease trends in both MFS and PPV. While there is an increase in joint angle, MFS and PPV decrease.

Keywords: Mean fragment size (MFS), Peak particle velocity (PPV), Joint angle, Joint spacing, Protodyakonov strength index test, rock mass

I. Introduction

Rock fragmentation has a central influence on overproduction and mining costs. Blasting is one of the essential techniques for achieving desired rock fragmentation in all open cast mines.

[1] DEPARTMENT OF MINING ENGINEERING, IIT(ISM) DHANBAD, INDIA
[2] DEPARTMENT OF MINING ENGINEERING, MALLA REDDY ENGINEERING COLLEGE, HYDERABAD, INDIA
[3] MANAGER, UCIL MINE, KADAPA, INDIA

* Corresponding author: srichandru2009@gmail.com