

BLAST ROUND DESIGN AND CASTING IN SURFACE COAL MINING

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ABSTRACT

Casting design for bench blasting in surface coal mines is a new focus and a fairly recent success. This study aims at the development of a mathematical model to predict the throw of overburden material based on geological conditions of a bench and charges in blast holes. The procedure, derived on the basis of blasting theories and dynamics of the multiple-particle system, explores the mechanisms of casting rocks into pits. Implementing the model with a computer program is a part of the study. The computer program will supply quantitative data for evaluation. It serves the purposes of verification for the model and, hopefully, field applications.

More specifically, the suggested model calculates the resultant forces exerted on the overburden material by the gas pressures in the blast holes. The trajectory velocity of the overburden material after the heave can be determined from the impulse-momentum theorem. Ranges of overburden displacement for different spacing-to-burden combinations are the results. Due to the fact that hypothetical assumptions are made and, further, that so many factors in the field can affect the outcome of a shot, the predictions are not recommended to be taken as absolute values but relative indications. The prediction, which is based on charge, geological condition, burden, and spacing can be used to determine the number of rows of blast holes to be drilled on the bench.

**THIS PAPER HAS BEEN WITHDRAWN FROM PUBLICATION. ANYONE INTERESTED IN MORE INFORMATION MAY CONTACT: R.R. Rollins, Ph.D., West Virginia University, Mining Engineering Program, College of Mineral Energy Resources, 215 White Hall, Morgantown, WV 26506-6070, (304) 293-5695