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“New Quarry Blast Model for Rock Fragmentation”

Executive summary

In mining and quarrying operation, the aim of blasting is to extract the largest possible quantity of rock at minimum cost in a safer manner with minimum side effects happens, in which, blasting must be in a safe manner with minimum side effects like ground vibration, fly rock and noise. There few case incidents of the fly rock, reported, one of them was on July 2013, where a factory worker was killed while 10 others were injured after being hit by rock debris from blasting at nearby quarry located in Johor, the incident also damaged 18 cars and 14 factories along the road, Mohamad et al. (2013). The aim of this research is to identify the significant parameters related to the blasting operation and establish a blast design model for better prediction of fragment size distribution. The study will focus on the granite quarry operation. This yet, to be studied by carrying out the fieldwork on the geological mapping of the quarry face with the knowing blast design utilized, and obtaining the engineering properties of the rock through the laboratory work. To further investigate the influencing parameters, a series of parametric study on rock fragmentation in quarry blasting using a computational method in LS-DYNA software modules was performed. The parameters involved are burden, spacing, stemming, hole diameter, bench height and powder factor. In addition, Machine Learning method also will be utilized to predict the mean particle size and uniformity index as the output product. The blasting prediction model develops in this study will be very beneficial to policymakers, practitioners and designers associated with quarry blasting for a safe quarry blasting operation. It may deliver engineering justification that may help the engineer to make crucial decisions during the planning, design and production stages of a quarry.

