

## **PRODUCTION OPTIMIZATION BY USE OF PROPER BLAST DESIGN (A CASE STUDY OF MAMBOLEO QUARRY LIMITED)**

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### **ABSTRACT**

Quarry mining activities involve short-hole drilling and blasting techniques which are used to shatter and break the rock. Drilling and blasting are an economical and viable method for rock excavation and displacement in mining. The ill effects of blasting, that is, ground vibrations, air blasts, fly rocks, over breaks, noise, poor rock fragmentation and blast damage are unavoidable and cannot be completely eliminated but certainly minimized up to permissible levels to avoid damage to the surrounding environment with the existing structures. These blasting ill effects make the blasting environment unsafe and increase production costs. One of the main and most effective ways to minimize these effects and optimize production is putting in place a proper blast design before the blasting operation is executed.

This project entails production optimization in Mamboleo Quarry Limited which produces aggregates used for construction. It involves coming up with a proper blast design to increase safety and optimize production at this quarry. The quarry currently doesn't utilise proper blast design and also uses match and igniter cord blast initiation method. This makes their blasting be associated with the above mentioned ill effects making it unsafe and costly. The project tries to minimise these ill effects in Mamboleo quarry by coming up with a proper blast design hence optimize production.

The project involves evaluating the parameters that effect a given blast design. These include burden, spacing, sub-drilling, hole diameter, powder factor and delay pattern. In order to design proper the proper blast design data is obtained from the quarry and analysed. After data analysis a blast design incorporating all the necessary blast design parameters is designed for the quarry. These parameters are determined using blast design parameters formulae. The cost associated with the current blasting method is also determined. The cost associated with an electrical blast

initiation is also determined. From the findings comparisons are made and the correct blast design parameters and blast initiation method proposed.

Recommendations are then suggested to Mamboleo quarry on areas of improvement to optimize production. This is realized by proposing a proper blast design and also a correct blast initiation method. The project is concluded by justifying that the objectives of the project were fully met.