BUSITEMA UNIVERSITY
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DEPARTMENT OF MINING AND WATER RESOURCES ENGINEERING

FINAL YEAR RESEACH PROJECT REPORT ON OPTIMIZING A BLAST TO ACHIEVE A DESIRABLE ROCK FRAGMENT SIZE AT TORORO CEMENT LIMESTONE QUARRY

NAME: PETER SEKATAWA

REG NO: BU/UP/2012/591

Email: andrazebro@gmail.com
Tel.:+256705970150/+256778273606

MAIN SUPERVISOR
MR. THOMAS MAKUMBI

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FINAL YEAR RESEACH PROJECT REPORT IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF A BSc DEGREE IN MINING ENGINEERING

ABSTRACT

Tororo cement limestone quarry is experiencing some sub-standard blast results, blast results are considered poor when the fragmentation is too big, back break into the new high wall, capping is experienced and/or excess overburden material is thrown into the void. Poor blasting leads to lower productivity, increased costs, equipment breakdowns, and poor drilling and blasting results on the adjacent blast.

An investigation into the causes of poor blast results was done through consultations and use of questionnaires and therefore by use of the rule of thumb equations blasting parameters where established these included hole diameter, Bench height, burden, spacing, subgrade drilling, charge length, stemming, blast hole angle these was done to find a basis for optimization.

A simulation was developed in Microsoft Excel with the use of the Kuzram model to predict fragmentation results, it could be seen that a change of blast design could be beneficial, proper adoption of drilling and blasting can contribute significantly towards profitability and therefore optimization of these parameters is essential. These results are quite specific and subject to variable inputs. The purpose of the simulation process was done to find the optimal blast parameters most feet to minimize excessive oversize fragments and demonstrate how the simulation can be used as a tool to assess blast design variations.

DECLARATION

I, Peter Sekatawa do declare that this research project report is my original work and has never been presented to any university for the award of a bachelor's degree in mining engineering.

Signature: ....

Date: ...25/05/2016...........

DEDICATION

I dedicate this project proposal to my dear father Rev Seezi Musoke Edward and Mrs. Martha Kironde for all the financial, moral and spiritual support they have always offered to me during my education carrier.

May the heavenly father bless them abundantly!

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APPROVAL

This project report has been submitted for examination with approval from the following supervisor:

Signature: ....

Date: ....

Mr. Thomas Makumbi

LIST OF ABBREVIATIONS

ANFO	Ammonium nitrate
GSI	Geological strength index
GPS	Global positioning system
Kg/T	kilogram per tone
PPE	Personal protective equipment
VOD	Velocity of detonation
%	Percentage
Wt	weight

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CHAPETER ONE: INTRODUCTION

1.0 Background

Mining industry is the backbone for the development of any nation that has tried to extract minerals. In mining the basic aim is to achieve maximum extraction of minerals keeping in view the environmental, economic and lease constraints where Critical parameters for controlling the degree of fragmentation for a blast are highly affected by drilling and blasting parameters, properties of rock at which the blasting is taking place such as density of rock mass, hardness factor of the rock, young's modulus of the rock, compressive strength of the rock also properties of explosive used during the blasting activities such as density of explosive used, strength of the explosive, detonation velocity of explosive and detonation pressure of the explosive (Manmit, 2007)

Drilling and blasting activity is among the major unit operations in quarrying and has historically been regarded as a stand-alone operation usually reported as a single cost in most analyses. In spite of the best efforts to mechanize the surface mines, blasting continue to dominate. Drilling and blasting cost in any project with the aggregate cost of drilling and blasting taken together can be as high as 30% of the total production cost, explosives contribute currently about 5% of the direct cost of production. (Kumar, 2007)

Large fragments adversely affect the loading and hauling equipment's and increase the frequency of sorting of oversize boulders and secondary blasting costs, thereby increasing the cost of mining, fragmentation of rock represents one of the key problems in maximizing economic efficiency for exploitation of mineral deposits. (Manmit, 2007)

When large rocks fill the bucket, not all the space is utilized this reduces the amount of material moved per swing and therefore lowers the material shifted per cycle affecting the excavator productivity through a lower bucket fill factor, proper adoption of drilling and blasting can contribute significantly towards profitability and therefore to cut down the cost of production optimal fragmentation from properly designed blasting pattern has to be achieved (Dlamini, 2008)

The quarry is located in eastern part of Uganda about 232km from the capital Kampala. It is 8km before the Uganda/Kenya border town of Malaba. Access to Kampala is an all-weather tarmac road, the Main constituents of these carbonatites rock are Calcium and Carbon dioxide which generally make up more than 50wt% of the rock. Na is the dominant element,

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