BUSITEMA UNIVERSITY
Pursuing Excellence

FACULTY OF ENGINEERING
DEPARTMENT OF MINING AND WATER RESOURCES ENGINEERING

FINAL YEAR PROJECT

OPTIMISATION OF BLASTING PARAMETERS TO MINIMISE ON THE FINES GENERATED

SUPERVISOR: Mr. WANGI MARIO

CO SUPERVISOR: Miss. NANGENDO JACQUELINE

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

OLWENY ALDO

BU/UG/2012/590

Email:jalolweny@gmail.com

DECLARATION

I, **Olweny Aldo** 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: 31/05/2017

DEDICATION

I dedicate this project proposal to my dear sister Jane Pachoryema and all other relatives for all the financial support they have always offered to me during my education carrier.

May the heavenly father bless them abundantly.

ACKNOWLEDGEMENT

First and foremost, I would like to thank Almighty God for His protection and guidance up to this stage in my life and the Department of Mining and Water Resources Engineering Busitema University for their academic and professional guidance given to me.

In the same spirit I would like to thank my supervisors for their support toward a successful project.

APPROVAL

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

Signature: .....

Date: .....

Mr. Wangi Mario

Contents

LIST OF FIGURES

ABSTRACT

The main objective of the project was to optimize blasting to minimize the fine materials generated. The optimization of the blast an effort to eliminate excessively fine materials or to minimize the amount of big fragments in the ore stock pile. Nevertheless, to optimize the whole production system, it is better to use blasting layout that would produce the material fragmentation required by the remaining part of the production process. This has been used to evaluate blast design options and reduce the amount of trial blasting to produce the required blast fragment size.

LIST OF TABLES

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
UCS	uniaxial compressive strength

CHAPTER ONE: INTRODUCTION

1.0 Background

Mining is the extraction of valuable minerals or other geological materials from the earth from an orebody, lode, vein, seam, reef or placer deposits. These deposits form a mineralized package that is of economic interest to the miner.

Mining of stones and metal has been a human activity since pre-historic times. Modern mining processes involve prospecting for ore bodies, analysis of the profit potential of a proposed mine, extraction of the desired materials, and final reclamation of the land after the mine is closed (Madigan, 1981)

Mining techniques can be divided into two common excavation types: surface mining and subsurface mining. Targets are divided into two general categories of materials: *placer deposits*, consisting of valuable minerals contained within river gravels, beach sands, and other unconsolidated materials; and *lode deposits*, where valuable minerals are found in veins, in layers, or in mineral grains generally distributed throughout a mass of actual rock. Both types of ore deposit, placer or lode, are mined by both surface and underground methods.

Sub-surface mining consists of digging tunnels or shafts into the earth to reach buried ore deposits. Ore, for processing, and waste rock, for disposal, are brought to the surface through the tunnels and shafts. Sub-surface mining can be classified by the type of access shafts used, the extraction method or the technique used to reach the mineral deposit.

Underground mining involves the excavation of tunnels and rooms beneath earth's surface compared to surface mining, underground mining is expensive and dangerous.
Therefore, it is used primarily in situations where high value ores such as gold are concentrated in narrow veins or other usually rich deposits.

REFERENCES

Abdelaali, 2013. Prediction of Porosity and Density of Calcarenite Rocks from P-Wave Velocity Measurements. In: *Petrophysical proprieties.* s.l.:s.n., pp. 123-126.

Chang, Z., 2012. Prediction of Detonation Pressure and Velocity of Explosives with Micrometer Aluminum Powders.. *Central European Journal of Energetic Materials,* pp. 82-85.

Cunningham., 2006. Concept of Borehole Pressure During the Detonation of Explosive in the Blasthole. In: *Explosive Application In Mining Industry.* s.l.:s.n., pp. 78-80.

Dowding, 1993. SME mining engineering Hand Book. In: S. AIME, ed. New York: s.n.

Haney, 1994. The relationship between tensile and compressive strengthsfor selected sandstones as influenced by index properties and petrographic characteristics. In: *Proceedings, 7th International Congress of the International Association of Engineering Geologists , Volume II.* s.l.:s.n., pp. 493-400.

Hilliard, L. F., 1999. Calculations & Terms used in Drill & Blast Operations. In: T. A. D. I. T. Committee, ed. s.l.:National Centre for Vocational Education Reseah.

Johnson, 1988. Engineering properties and behavior of soils and rocks. In: *Principles of Engineering Geology.* s.l.:s.n., p. 497.

Kumar, P. C., 2007. *optimisation of blasting parameters in open cast mines,* s.l.: National Institute of Technology.

Kwasny, 2010. Shock, Explosion, Temperature and Friction Hazards Identification and Mitigation. In: s.l.:Process Safety News, pp. 298-310.

Manmit, P. C. k., 2007. *optimization of blasting parameters,* s.l.: National Institute of Technology Rourkela.

Ouchterlony, 2005. linking fragmentation by blasting and Crushing. In: *The Swebrec function Vol.114.* s.l.:Mining Technology, pp. 29-44.

Palmstrom, 2002. The deformation modulus of rock masses:. In: *comparisons between in situ tests and indirect estimates.* s.l.:Tunnelling and Underground Space Technology, pp. 115-131.

Rajbal, A., 2001. The deformation modulus of rock masses. *comparisons between in situ tests and indirect estimates,* p. 5.

Rajpot, M. A., 2009. *The Effect of Fragmentation Specification on cost,* Kingston, Ontario, Canada: Queen's University.

Santi, 1995. *Classification and testing of weak and weathered rock materials A model based on Colorado shales Ph.D. Thesi,,* s.l.: Colorado School of mines.

Schmertmann, W. S., 1970. In: *Introductory Soil and rock Mechanics and foudations.* s.l.:Geotechnical Engineering, pp. 253-260.

Schneider, S. B., 1988. Evaluation of Soil and Rock Properties. In: s.l.:Geotechnical Engineering Circular No. 5,FHWA-IF-02-034, pp. 135-145.

Shankar, 2010. Blasting technology for mining. In: s.l.:Mangalam Publications first edition, pp. 18-19.

Siskind, 1973. Ground and air vibrations from blasting. In: *SME Mining Engineering.* New York: Vol-I, USA, pp. 11-99..

Thompson, 2005. In: *surface strip coal mining handbook.* s.l.:southafrican colliery managers association, p. 32.

Venkatesh, A. G., February 1999. An approach for optimizing a blast design for surface mines. *The Indian Mining & Engineering Journal,* pp. 25-28.

Verma, 1993. Performance ratings of explosives. *The Indian Mining & Engineering Journal,* pp. 49-52.

Vječislav, 2013. Influence of the Initiation Energy on theVelocity of Detonation and strength of ANFO Explosive. *Central European Journal of Energetic Materials,* Volume ISSN 1733-7178, pp. 555-568.