BUSITEMA UNIVERSITY

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FACULTY OF ENGINEERING

DEPARTMENT OF MINING AND WATER RESOURCES ENGINEERING

SELECTION OF AN OPTIMAL UNDERGOUND ACCESS METHOD TO A GOLD ORE BODY.

(CASE STUDY : ALJOURDA MINING COMPANY).

BY

ARAPMWOTIL SAMUEL

Reg No. BU/UP/2014/341.

Email:sikoriasamuel@gmail.com

SUPERVISOR: ENG. NASASIRA MICHAEL BAKAMAA

CO- SUPERVISOR: Ms. NANGENDO JACQUELINE

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ABSTRACT

This project aims in choosing primary access and transportation options for underground mine. The main accesses to underground orebodies are shafts, Adits and ramps. They serve both as a way to transport ore or waste, and move people, equipment or supplies. In underground mines, the ore transport option significantly affects the productivity and profitability of the company. Then, choice of access is a way to reduce costs and improve production. This study is primarily based on case study in Bukana- Namayingo .More economically attractive alternatives to ramp is changing from 350 m to 1000 m, depending on the mining country and cultural underground mine development. For some of them the depth of 1000 m would be the threshold for use of the access by decline/ramp. The main criteria in determining access are depth, rate of production and mine life. In Uganda, mines reach depths greater than 150 m and shaft access is more common. In Australia there are mines that use a ramp (decline) to a depth greater than 1000 m. In Brazil, underground mines are still shallow (depth up to 800 m) and feature short mine life and, most of them have chosen access by decline/ramp. Results of this study corroborate the statement that decline is ideal for shallow mines and low production rates and that shaft is for deep mines, high production rate and poor underground conditions.

DECLARATION

I ARAPMWOTIL SAMUEL a student pursuing a Bachelor's degree in Mining Engineering at BUSITEMA UNIVERSITY declare that this research project report is an original work of mine and has never been submitted in this way or any other to any university

This report has never been published by any other student/individual in any institution.

SIGNATURE......Samuel.......................... 12th/06/2018

APPROVAL

This final project report has been submitted to the Faculty of Engineering for examination with approval of my supervisors

MAIN SUPERVISOR

Eng. NASASIRA MICHAEL BAKAMAA

Signature……………………………

Date …………………………………

CO. SUPERVISOR

Ms: NANGENDO JACQUELINE

Signature..Nangendo………

Date…17/08/2018……….

DEDICATION

This report is dedicated to my beloved parents Mr.Mwotil Jackson & Chemutai Janet in appreciation for their selfless care and unflinching support provided to me since childhood, and for the spirit of hard work, courage and determination instilled into me, which attributes to successes, I have cherished with firmness and which have indeed made me what I am today.

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LIST OF ACRYNOMS

Acronyms

1. BU - BUSITEMA UNIVERSITY
2. GIS- GEOGRAPHICAL INFORMATION SYSTEM
3. GPS-GEOGRAPHICAL POSITIONING SYSTEM
4. t/d- tones per day
5. g/t -grams per tone

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CHAPTER ONE : INTRODUCTION

1.0 INTRODUCTION

1.1 BACKGROUND

Ever since mining began, miners have driven Adits and shafts into the earth **(Hartman, H.L. and Mutmansky , J.M., 2002).** Vertical shafts are known to have existed in the 15th century or even earlier. Many inclined shafts (in excess of 300 m are shown on plans) were sunk during the first 20 years of mining in the Witwatersrand Basin. These were seen as the most obvious way of following the narrow steeply-dipping tabular gold reefs. Soon their capacity and length constraints became apparent and vertical shafts from surface became the norm **(Wilson, R.B., Willis, R.P.H. and Du Plessis, A.G., 2004, October).** As mining progressed even deeper, and while the extent of the orebody was still in doubt, inclined shafts were again introduced as sub-incline shafts. Later sub-vertical shafts were widely applied in preference to sub-incline shafts. Recently, however, sub-inclines are again finding favor as a means of accessing orebodies below existing shaft infrastructure.

The application of a suitable mining method has always been a topical problem **(Pang, B. and Lee, L., 2008).** The dynamic conditions impose specific requirements for the processes of mining mineral resources. The geological conditions, economical changes and the improvement of mining technology and tech-niques are few of the factors which determine the choice of mining method**(Gligoric, Beljic and Simeunovic, 2010)**. In order to prosper, each mining organization needs to consider the possibilities of utilizing underground or open-pit mining or combining both methods depending on the conditions, as well as to look for certain tendencies in a global scale for a preferred method**(Stacey, 2009)**

In Aljourda Mining Company site of Bukana

1. The Current Status

Surface approach has failed to yield sizable profitable runoff mine

2. Need

References

1. Didari, V. and Gerçek, H. (1988) 'Sinking of the deepest shaft in Turkey', *Mining Science and Technology*, 7(2), pp. 217–224. doi: 10.1016/S0167-9031(88)90622-6.
2. Friedman, K. (2003) 'Theory construction in design research: criteria: approaches, and methods', *Design studies*, 24(6), pp. 507–522. doi: 10.1016/S0142-694X(03)00039-5.
3. Gligoric, Z., Beljic, C. and Simeunovic, V. (2010) 'Shaft location selection at deep multiple orebody deposit by using fuzzy TOPSIS method and network optimization', *Expert Systems with Applications*, 37(2), pp. 1408–1418. doi: 10.1016/j.eswa.2009.06.108.
4. Graham, C. and Evans, V. (2008) 'The evolution of shaft sinking systems in the western world and the improvement in sinking rates', *CIM Magazine*, 3(4), pp. 77–79.
5. Kwinta, A. (2015) 'Conditions of deformation prediction in the shaft', in *Vertical and Decline Shaft Sinking - Proceedings of the International Mining Forum 2015.*
6. Livak, K. J. and Schmittgen, T. D. (2001) 'Analysis of relative gene expression data using real-time quantitative PCR and the 2(-Delta Delta C(T)) Method.', *Methods (San Diego, Calif.)*, 25(4), pp. 402–8. doi: 10.1006/meth.2001.1262.
7. Stacey, P. (2009) 'Pit slope design process', in *Slope Stability 2009.*
8. Wang, B. *et al.* (2015) 'Mechanical properties of a self-walking sinking platform for ultra-deep shaft sinking', *Electronic Journal of Geotechnical Engineering*, 20(18), pp. 10995–11006.