BUSITEMA UNIVERSITY

Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF MINING AND WATER RESOURCES ENGINEERING

ESTABLISHMENT OF BACKFILL REQUIREMENTS. CASE STUDY: KILEMBE MINES.

BY

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ABSTRACT

This report is mainly showing the details of how a suitable backfill type and the volumes needed were got considering geotechnical and economic factors.

It mainly talks about background of the study the problem statement, the purpose of the study, justification of the study, the objectives of the project and finally the scope and the limitations of the project. It gives details on literature about backfilling, work that was done by different people about backfilling and the theoretical requirements when choosing a backfilling type. All the methodologies which were followed in selecting a backfill type. This mainly involved subjection of the materials to mechanical tests and also cost analysis. The analysis and discussion of the results from chapter three as per the objectives were also discussed in a full chapter. Conclusions and recommendations were derived from the results of the research.

DECLARATION

I KIIZA AMINA BAKULIMYA do hereby declare with academic honest that with the exception of quotes and work for other people, which I have duly referenced to and acknowledged herein, this report is the result of my own original research work. No part of it has been presented in pursuit of another degree in this university or anywhere else.

Signature: .....

Date: 30/05/2016 .....

APPROVAL

This project proposal has been submitted to the faculty of Engineering for examination with approval of my supervisor mentioned below;

SUPERVISOR: Mr. Lwanyaga Joseph Ddumba

Signature.....

Date.....

DEDICATION

I dedicate this project to my dearest Dad and Mum, Hajj Sulaiman Hirome and hajjat Fatuma, my siblings Zainab, Arafat and Hatim who by their support, love and care I have made it finally.

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CHAPTER ONE

1.0 INTRODUCTION

This chapter outlines the relevant information and clearly shows the problem of interest for the intended research. It stipulates how this study will help reduce the problem through fulfillment of objectives discussed below.

1.1 BACKGROUND OF THE STUDY

Backfill is material that is used to fill voids created during mining activities. The use of backfill in underground mines is increasingly becoming an integral part of overall mining operations all over the world. This is largely driven by the need to increase ore recovery, productivity and as a means to aid the stabilization of mine due to mined out stopes and the disposing of mining wastes. Environmental protection and increasing need for economic use of surface land have demanded use of underground waste as backfill material. (Lang, et al., 2015)

The underground mining activities give rise to large volumes of voids which if not well taken care of would lead to long term instability of the mine. The ever increasing depths reached by underground mining will in future place more demands on sound backfill and mine design systems if safe and efficient operating conditions are to be maintained. Failure to adequately consider the unique context can shorten the life of a mine. For example, a decision not to backfill in one situation may risk sterilizing ore or creating unsafe mining conditions, whereas in another situation, a decision to backfill may result in cost-over-runs. The bottom line is that we need to know why we are filling by understanding the cost of backfill versus its benefits. (Carvalho, 2014)

Establishment of backfill requirements of the mine will enable them to know the kind of backfill to be used to create stable working conditions for their workers by proper filling of the voids, increase ore recovery, productivity and reduce production costs in the long run. Backfill can also play a role in ventilation. Its presence can effectively plug mined out areas or cause the redirection of airflow. When planned in advance, ventilation through backfilled areas can offer an inexpensive intake or exhaust route. (Hartman, 1992)

References

Baker, S. J., 1986. Assessment of hydraulic backfilling in metal mines within the state of Idaho. *Department of Water Resources,* pp. 1-44.

Benzaazoua, M., M, F. & T, B., 2004. A contribution to understanding the hardening process of cemented paste fill. *Special edition of Minerals Engineering,* Volume 17, pp. 141-152.

Carvalho, J. F. F., 2014. *VARIATION OF STRENGTH AND DEFORMABILITY OF THE BACKFILL OVER TIME,* s.l.: s.n.

Cooke, R., 2001. Design procedure for hydraulic backfill distribution systems. *The Journal of The South African Institute of Mining and Metallurgy,* pp. 97-102.

Fernberg H, 2007. Mining methods in underground mining. pp. 1-140.

Fernberg, 2007. Mining methods in underground mining. In: Orebro, Sweden: Ulf Linder, pp. 1-140.

Grice, T., 1998. Underground mining with Backfill. pp. 1-14.

Hartman, H. L., 1992. *SME Mining Engineering.* 2nd ed. Littleton, Colorado: Society for Mining, Metallurgy, and Exploration, Inc..

Lang, L., Song, K.-I., Lao, D. & Kwon, T.-H., 2015. Rheological Properties of Cemented Tailing Backfill and the Construction of a Prediction Model. *Materials,* Volume 8, pp. 2076-2092.

Masniyom, 2009. *Systematic Selection and Application of Backfill in Underground Mines,* Germany: Technical University Bergakadimie Freiberg.

Sargeant, 2008. *The Application of Post-Consumer Glass as a Cementing Agent in Mine Backfill. A thesis submitted to the Department of Mining Engineering in conformity with the requirements for the Degree of Master of Science (Engineering),* Ontario, Canada: Queen's University Kingston.

Sivakugan, N., 2008. Geotechnical issues of mining with hydraulic backfills. *Electronic Journal of Geotechnical Engineering,* pp. 1-8.

T, G., 1998. Underground mining with Backfill. *The2nd Annual Summit-Mine tailing disposal systems,* pp. 1-14.

Yao, Y. C. Z. a. W. R., 2012. Development and Challenges on Mining Backfill Technology, Journal of Materials Science Research. Volume 1, pp. 73-78.