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FACULTY OF ENGINEERING

DEPARTMENT OF MINING AND WATER RESOURCES ENGINEERING

FINAL YEAR PROJECT REPORT

**DESIGN AND SIMULATION OF A VENTILATION SYSTEM
FOR TIBET HIMA MINES**

BY

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BU/UG/2012/1975**



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Mining Engineering.*

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ABSTRACT

The atmosphere underground is limited and confined, and is thus readily reduced to a substandard or even dangerous condition if contaminants produced in the course of operations like drilling, blasting, welding and hauling using diesel locomotives are not controlled, or diluted to harmless levels. Hence proper design of a ventilation system is very important for any mine.

Tibet Hima owns a copper mine at the foot hills of mount rwenzori in Kasese district and the major activities that take place include; drilling, blasting and ore transportation all of which emit dust and gases that reduce the quality of underground air leading to health problems and production delays.

This study focusses on the design of a ventilation system for Tibet Hima mines to improve the air quality and reduce the time needed to clear the blasting contaminants from the mine air. This involves carrying out ventilation surveys in the mines, studying and analyzing the data obtained from these field surveys.

From the analyzed data, obtaining suitable fans and ducting to use for building a ventilation model in a ventilation software called Ventism, running the various simulations, then obtaining results of the proper ventilation system.

DECLARATION

I KAKURU GRACE, Reg. No BU/UG/2012/1975 hereby declare that this research project is my original work except where explicit citation has been made and it has not been presented to any Institution of higher learning for any academic award.

Sign: Kakuru Grace.....

Date: 26th May 2016.....



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APPROVAL

This is to certify that the research project under the title “design and simulation of a ventilation system for Tibet Hima mine” has been done under my supervision and is now ready for examination.

Mr. Joseph Dumba Lwanyaga

Department of Mining and Water Resources Engineering

Sign:

Date:

ACKNOWLEDGEMENT

I would like to extend my sincere thanks to the almighty GOD who has gifted me with life and has enabled me to reach this level as he has been the provider of all the necessary requirements.

Great thanks to my beloved sister Kobusingye Maureen for her financial and moral support and I promise her that as long as I live, she will live.

Let me convey my heartfelt appreciation to my supervisor, Mr. Joseph Dumba for the advice as well their guidance during the preparation of this research.

More thanks go to the project manager Tibet Hima mine, Mr. Kwatampora Alex for allowing me to conduct this research at his company and the engineering and geology team at this company for their assistance.

DEDICATION

I dedicate this report to my beloved parents Mr. Beinomugisha Abel and my friends especially Byamugisha Nathan and to all my beloved ones who prayed for my success and gave me advice in the core areas of training.

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involves drilling and blasting at least two to three times a day which brings about a lot of combustible gases, dust aerosols and fumes in the mine workings. Also other processes like human respiration, rotting timber and oxidation of reactive sulphides contaminate the mine air and there is need for them to be removed. After blasting, the miners stay outside the mine for a period of approximately 1 hour for the fumes to reduce by natural ventilation but this system is not effective because it is subjected to variations due to its dependency on the temperature difference between two air columns, elevation, local climate condition and depth from surface. The fumes and dust in the mine air are not cleared to the required or acceptable quantities. This affects the health of miners and causes delays in production. Hence in order to maintain healthy working conditions underground there is need for an adequate ventilation system to clear air in time after blasting and to clear the steam jet that is produced by the jack hammers during drilling.

The mines are located at the slopes of the Mountain Rwenzori ranges which makes normal or simple ventilation design difficult due to the high cost of sinking shafts for ventilation from the surface. According to the Third Quarter Report 2015 of Tibet Hima Mining Company Limited, on 16th October 2015 in chapter two (Tibet Hima 2014), there is mention of a need for increased ventilation in the mine.

1.2 Problem Statement

After blasting, a lot of dust and gases (CO, NO) choke the mine. The dust and gases compromise the vision inside the mine leading to accidents. They also increase the risk of miners suffering from infections like tuberculosis and rhinitis. This increases workers' absenteeism and reduces their efficiency. Due to the dust and gases that choke the mine atmosphere, the miners stay outside the mine waiting for the fumes to clear which leads to delays in production.

1.3 Objectives

1.3.1 Main Objective

To improve the ventilation system of Tibet Hima through designing and simulation

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