



**BUSITEMA
UNIVERSITY**
Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF MINING AND WATER RESOURCES ENGINEERING

**DESIGN AND FABRICATION OF A DUST
COLLECTION SYSTEM**

BY

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A final year project report submitted to the faculty of Engineering as a partial fulfillment of the requirements for the award of a Bachelor's Degree in Mining Engineering of Busitema University.



ACKNOWLEDGEMENTS

First and foremost, I thank the Almighty God who has been faithful and always will be for making it possible for me to finish my project successfully.

I then extend my sincere appreciation to my parents; Mr. and Mrs. Luyiga, sisters; Erinah, Edna and Easter, my brothers Ronald and Nathan. Not forgetting all my relatives, my friend most especially Noerine and all my beloved course mates and year mates for the support they have given me throughout the project period, thank you very much. God bless you all

I am infinitely indebted to my supervisor Mr. Wangi Mario and the entire department for having found time to supervise and contribute to my work in spite of their busy schedules.

ABSTRACT

A lot of dust is generated during the course of various mine operation and also other economic activities most especially due to rock fragmentation. The dust is usually beyond allowable concentrations hence causing negative effects to human life and the environment. Wet suppression has been tried out but it interferes with the mine operations. This is why I came up with an idea for a dust collection system which couldn't interfere with operations and yet affordable.

The dust collection system was designed and the fabricated to avoid the circulation of dust from point sources and the case study was limestone dust in Tororo cement Quarry. The designed and fabricated dust collection system comprises of the hood for capturing the dust from a point source, a cyclone for separating dust using centrifugal force, a hopper for breaking the vortex and an airtight container for collecting the dust. The machine was also tested to examine its efficiency and the efficiency of the dust collection system designed was dependent on the length and diameter of the cyclone.

Conclusions and recommendations were drawn from the discussed results got after testing. The prototype had an efficiency of 78% total dust and replaceable filters and an air lock were recommended for further cleaning of the air. The major costs to be incurred by the dust collection system designed are the power costs since it has no movable parts. The designed and fabricated system is the best to be used in all areas whether arid or not, but only needs availability of power.

DECLARATION

I KISAAKYE EMILY LUYIGA, declare that the work in this project report is my original work from the research I carried out under supervision. No part of this project report has been submitted to any university or higher institute of learning for examination and degree award.

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Date: *27th May 2016*

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APPROVAL

This project report has been compiled and is submitted to the department of mining and water resources Engineering of Busitema University under the supervision and approval of:

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TABLE OF CONTENTS

| | |
|--|------|
| ACKNOWLEDGEMENTS..... | i |
| ABSTRACT..... | ii |
| DECLARATION..... | iii |
| APPROVAL..... | iv |
| TABLE OF CONTENTS..... | v |
| LIST OF TABLES..... | viii |
| LIST OF FIGURES..... | ix |
| CHAPTER ONE: INTRODUCTION..... | 1 |
| 1.0 BACKGROUND..... | 1 |
| 1.1 PROBLEM STATEMENT..... | 2 |
| 1.2 PROJECT OBJECTIVES..... | 2 |
| 1.2.1 Main objective..... | 2 |
| 1.2.2 Specific objective..... | 3 |
| 1.3 JUSTIFICATION..... | 3 |
| 1.4 SIGNIFICANCE..... | 3 |
| 1.5 SCOPE..... | 3 |
| CHAPTER TWO: LITERATURE REVIEW..... | 4 |
| 2.0 INTRODUCTION..... | 4 |
| 2.1 DEFINITION, DESCRIPTION AND CONCEPTS..... | 4 |
| 2.1.1 Dust..... | 4 |
| 2.1.2 Major composition of limestone dust..... | 4 |
| 2.2 HOW DUST IS GENERATED..... | 5 |
| 2.3 TYPES OF DUST..... | 5 |
| 2.4. EFFECTS OF DUST..... | 5 |
| 2.5 DUST CONTROL..... | 6 |
| 2.5.1 Steps in controlling dust..... | 7 |
| 2.6 EXISTING DUST CONTROL TECHNIQUES USED AT THE QUARRY..... | 7 |
| 2.6.1 Wet dust suppression..... | 7 |
| 2.7. THE DESIGNED SYSTEM..... | 8 |
| 2.7.1. Designed system description..... | 8 |

| | |
|--|----|
| 2.7.2. Mode of operation of the design | 8 |
| CHAPTER THREE: METHODOLOGY..... | 9 |
| 3.0 INTRODUCTION | 9 |
| 3.1 DESIGN CONSIDERATION | 9 |
| 3.2 DESIGN ANALYSIS AND CALCULATIONS..... | 9 |
| 3.2.1 Determination of power requirements of the system..... | 9 |
| 3.2.2 Design of a fan | 10 |
| 3.2.3 Design of the hood and hopper | 11 |
| 3.2.4 Design of the cyclone..... | 11 |
| 3.2.5 Design of the stand | 12 |
| 3.3 FABRICATION AND ASSEMBLY OF THE PROTOTYPE | 13 |
| 3.3.1 Selection of materials | 13 |
| 3.3.2 Fabrication processes, methods, and assembly of the prototype..... | 14 |
| 3.3.3. Fabrication of the stand | 15 |
| 3.3.4 Fabrication of the hood | 15 |
| 3.3.5 Fabrication of the fan..... | 15 |
| 3.3.6 Fabrication of the cyclone..... | 15 |
| 3.3.7 Fabrication of the hopper | 15 |
| 3.3.8 Assembly of the prototype | 16 |
| 3.4 TESTING FOR THE EFFICIENCY OF THE PROTOTYPE..... | 16 |
| 3.5 ECONOMIC EVALUATION OF THE PROTOTYPE | 17 |
| CHAPTER FOUR: RESULTS AND DISCUSSIONS..... | 18 |
| 4.0 DESIGN OF DIFFERENT COMPONENTS..... | 18 |
| 4.0.1 Components and sizes | 18 |
| 4.1 FABRICATION AND ASSEMBLY OF THE PROTOTYPE | 18 |
| 4.2 EFFICIENCY AND ECONOMIC ANALYSIS | 19 |
| 4.2.1 Efficiency of the prototype | 19 |
| 4.2.2 Economic analysis | 19 |
| CHAPTER FIVE: CONCLUSIONS AND RECOMENDATIONS | 21 |
| 5.0 Conclusion..... | 21 |
| 5.1 Recommendation..... | 21 |
| REFERENCES..... | 22 |

| | |
|--|----|
| APPENDIX A..... | 23 |
| Appendix A1: Shows the dimensions of an air outlet..... | 23 |
| Appendix A2: Shows the dimensions of the cyclone..... | 24 |
| Appendix A3: Shows the dimensions of an involute inlet..... | 25 |
| Appendix A4: Shows the dimensions of the stand..... | 26 |
| Appendix A5: Shows the dimensions of a vortex breaking hopper..... | 27 |
| Appendix A6: Shows the dimensions of a fan..... | 28 |

LIST OF TABLES

| | |
|--|----|
| Table 1 Physical and chemical properties of limestone dust | 4 |
| Table 2 Selection of material | 13 |
| Table 3 Different methods with their corresponding tools and equipment that were used..... | 14 |
| Table 4 Components and sizes..... | 18 |
| Table 5 Fabrication of the prototype..... | 18 |
| Table 6 Test of collection efficiency results | 19 |

LIST OF FIGURES

| | |
|--|----|
| Figure 1 Dust generated at the crusher..... | 1 |
| Figure 2 A normal and infected lung.(source : (NOISH, 2002)..... | 6 |
| Figure 3 The assembled prototype..... | 16 |

CHAPTER ONE: INTRODUCTION

1.0 BACKGROUND

Mining, like other activities such as construction, demolition, unpaved road transport, etc. are good sources of dust emission into the atmosphere. In mining, a lot of dust is generated during the course of performing the different activities in the mine. These activities include: extraction (it involves drilling, blasting, excavation), mineral processing (crushing, milling screening and concentration) and material handling (transportation of material).

During extraction, mineral processing and transportation, there is rock fragmentation due to impaction, abrasion, cutting etc. and the rock mass is reduced to different size particles ranging from fine to coarse (WHO/SDE/OEH/99.14, n.d.). The generated fine particles circulate into the atmosphere by the aid of moving air and settle slowly after some time under the influence of gravity on the different surfaces in the environment. This dust contains mineral elements depending mainly on the composition of the rock from which it is generated (Cecala, 2003).



Figure 1 Dust generated at the crusher

A dust release spreads throughout the workplace, and the mineral dust was harmful to the human life and environment depending on their compositions, concentrations and time of exposure (Cecala, 2003). This creates a need for health, safety and environmental management to ensure that mining activities are harmonized with the need to protect human health and to conserve the

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