



FACULTY OF ENGINEERING
DEPARTMENT OF MINING ENGINEERING
FINAL YEAR PROJECT
DESIGN OF AN ANTI-COLLISION SYSTEM FOR UNDERGROUND MINE HAUL
TRUCK
CASE STUDY: GOLD MINE COMPANY (U) LIMITED
BY
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A final year project report submitted to the Department of Mining Engineering, Faculty of Engineering and Technology in partial fulfillment of the requirement for the award of the Bachelor of Science in Mining Engineering of Busitema University.

ABSTRACT

Accidents involving trucks in underground mines present a significant safety concern, often resulting in injuries, fatalities, and operational disruptions. This project aims to address this critical issue by designing an advanced anti-collision system tailored specifically for trucks operating in underground mine environments. The primary objective is to minimize the risk of collisions and enhance overall safety within the mine site.

This anti-collision system leverages a combination of cutting-edge technologies, including ultrasonic sensor. By integrating these technologies, the system will provide real-time monitoring and detection of potential collision hazards, such as other vehicles, stationary objects, tunnel walls or personnel, within the mine's confined spaces.

Key features of the system include precise truck dynamic obstacle detection, and automatic braking for collision avoidance strategies, audible warning system using a sound buzzer, display warnings on the LCD and the LEDs, a communication module for sending of messages to management for truck driver behaviors. Through continuous data analysis and predictive modeling, the system will be capable of anticipating collision risks and initiating proactive measures to prevent accidents before they occur.

The design process involves thorough consideration of the unique challenges posed by underground mining environments, including limited visibility, uneven terrain, and restricted maneuvering space. Human factors such as operator interface and user experience is carefully integrated into the design to ensure ease of use and acceptance by truck operators.

DECLARATION

I Masette Priestone, hereby confirm that I authored this report and that it accurately reflects the events and activities during the project development period. I assure that the research conducted for this report was thorough, utilizing credible sources and suitable methodologies. Any external sources utilized have been duly acknowledged, referenced, and credited.

This report has not been employed for obtaining any academic recognition by any individual or educational institution.

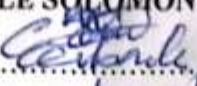
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APPROVAL

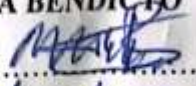
I MASETTE PRIESTONE, submits this final year project report to the faculty of engineering in the department of mining engineering for examination with approval of my supervisors.

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DEDICATION

I dedicate this report to my entire family for the tireless efforts to see me reach this level, may the good lord reward you abundantly.

ACKNOWLEDGEMENT

I take this opportunity to thank the almighty **GOD** for granting me life, good health and the ability to research and gather information that is integrated in this report.

I am deeply indebted to my dear supervisors: **MR. LUBAALE SOLOMON AZARIUS** and **MR. MASERUKA BENDICTO** for the time, support, guidance, knowledge, and advice provided to me during the preparation of this research proposal. May the almighty reward you abundantly.

Contents

ABSTRACT.....	ii
DECLARATION	iii
APPROVAL	iv
DEDICATION.....	v
ACKNOWLEDGEMENT	vi
1 CHAPTER ONE.....	1
1.1 Background	1
1.2 Problem statement.....	2
1.3 Objectives of study.....	2
1.3.1 Main objective	2
1.3.2 Specific objectives	2
1.4 Justification	3
1.5 Scope of study	3
1.5.1 Design scope	3
1.5.2 Geographical scope.....	3
1.5.3 Time scope	3
2 Chapter Two	4
2.1 Introduction	4
2.2 MAIN CONCEPTS OF THE PROJECT	4
2.3 COLLISION AVOIDANCE	6
2.3.1 Forms of collision in underground mines	6
2.3.2 Causes of truck collisions in underground mines	7
2.4 REVIEWS ON VEHICLE COLLISION AND ACCIDENT AVOIDANCE	7
2.5 COMPARISION ON TECHNOLOGIES OF VARIOUS PAPERS USED TO AVOID COLLISION IN HAUL TRUCKS.....	9
2.6 Conclusion.....	11
2.7 Existing haul trucks used.....	11
2.7.1 Gaps identified within using this convectional haul trucks	11
2.8 Designed system.....	11
3 Chapter 3.....	13
3.1 Methodology	13
3.1.1 Field studies	13

3.1.2	Tools used in data collection.....	13
3.1.3	Data collection	13
3.2	Specific objective one: To determine the parameters contributing to collision accidents of haul trucks.....	13
3.2.1	Data Collection	14
3.2.2	Human 0000000000000000Factors Analysis.....	14
3.2.3	Data Analysis.....	14
3.3	Methodology for objective two; Selecting and designing the system components	15
3.3.1	System operation.....	15
3.3.2	System functions.....	15
3.4	COMPONENT SELECTION	15
3.4.1	Selection of the system components using Analytical Hierarchy Process (AHP)..	15
3.4.2	Procedures applied to select the system components	16
3.4.3	Key criteria for component selection.....	17
3.5	Microcontroller selection	17
3.5.1	Criterion weight table for microcontroller components.....	17
3.6	Ultrasonic sensor selection.....	20
3.6.1	CRITERIA DETERMINATION	20
3.6.2	NORMALISED PAIRWISE CRITERIA MATRIX	21
3.6.3	NORMALISED SENSOR PAIRWISE MATRIX	21
3.7	Other components selected include.....	21
3.8	SYSTEM DESIGN	23
3.8.1	Hardware tools/Components.....	23
3.8.2	Software tools	24
3.9	System block diagram	24
3.9.1	The Control unit:.....	25
3.9.2	H Bridge:.....	25
3.9.3	Warning Systems	25
3.9.4	The Power Supply Unit.....	26
3.9.5	Design and Interfacing for LEDs.....	26
3.9.6	GSM communication Module.....	26
3.10	System design considerations	26
3.10.1	FLOW CHART.....	27

3.11	Automatic Braking System	28
3.11.1	Braking system block diagram.....	28
3.11.2	Obstacle Detection System	29
3.12	Modeling of a mathematical model for braking distance.....	29
3.12.1	ODE Equation:.....	30
3.12.2	Relationship between vehicle speed, braking force and obstacle distance	30
3.12.3	Braking force applied on the brake pads by the servo motor	30
3.13	AUTOMATIC BRAKING SYSTEM DESIGN	31
3.13.1	System Design Assumption	Error! Bookmark not defined.
3.14	Methodology three: To test the performance of the system.....	33
3.14.1	Unit Testing:	33
3.14.2	Integration Testing:	33
3.14.3	Full System Testing:	34
4	CHAPTER THREE	35
4.1	RESULTS AND DISCUSSIONS	35
4.2	Objective one result.....	35
4.2.1	Data integration.....	37
4.3	Objective two results	38
4.3.1	Selection of the microcontroller.....	39
4.4	Objective three	42

List of abbreviations

ACS	Anti-Collision System
SDG	Sustainable Development Goal
LiDAR	Light Detection and Ranging
WSN	wireless sensor network
LCD	Liquid Crystal Display
IOT	Internet Of Things
LEDs	Light Emitting Diodes
SG	Specific Gravity
AHP	Analytical Hierarchy Process
SMS	Short Message Service
Adx335	Accelerometer
L298N	H-Bridge Motor driver
CPU	Central Processing Unit

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