



**BUSITEMA
UNIVERSITY**
Pursuing Excellence

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MINING ENGINEERING

FINAL YEAR PROJECT REPORT

**DESIGN OF AN AUTOMATED DUST SUPPRESSION SYSTEM FOR A QUARRY
CRUSHER.**

CASE STUDY: ROKO STONE QUARRY

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BU/UG/2021/0047

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*A research proposal report submitted to the department of Mining Engineering in partial
fulfilment of the Bachelor of Science in Mining Engineering at Busitema University*

Submission date

ABSTRACT

Dust emission from quarry crushers poses health risks and environmental concerns, especially in unregulated industrial settings. This project focused on the design of an automated dust suppression system that detects and controls airborne particulate matter using real-time monitoring. A review of related technologies highlighted the efficiency of sensor-based automation and the effectiveness of water-based suppression methods. The system was developed using a DSM501A dust sensor, an Arduino Uno microcontroller, a relay and a water pump, with data displayed via an LCD and logged on the serial monitor. In the methodology, simulated dust values were used to test the system response to varying concentrations, with the threshold set at 5000 $\mu\text{g}/\text{m}^3$ as per OSHA guidelines. Results show a significant reduction in dust levels post-activation of the system, with efficiency above 70% in most trials. Additionally, the economic analysis confirmed the system's viability with a project pay back period of less than three years. The solution presents a scalable and cost-effective approach for enhancing air quality in quarry environment.

DEDICATION

I would like to dedicate this report to my parents, my lectures and friends.

ACKNOWLEDGEMENT

I take this opportunity to thank the almighty **GOD** for the gift of 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 BAGOOLE CHRISTOPHER and MR. LUBAALE SOLOMON AZARIUS** for the time, support, guidance, knowledge, and advice provided to me during the preparation of this research proposal. May the almighty reward you abundantly.

DECLARATION

I **DIBYA HAMUZA** declare that this final year project proposal report is my own research work and has not been previously submitted to any institution of higher learning for any kind of award to be achieved

Signature

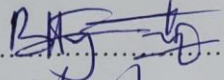
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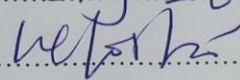
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APPROVAL

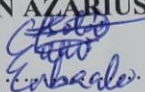
I, DIBYA HAMUZA, submitted this proposal report of my final year project to the faculty of engineering in the department of mining engineering for examination with approval of my supervisor.

Mr. BAGOOLE CHRISTOPHER

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Date: 

Mr. LUBAALE SOLOMON AZARIUS

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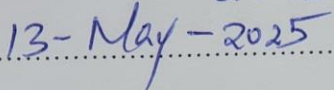
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