



FACULTY OF ENGINEERING

**DEPARTMENT OF WATER RESOURCES AND MINING
ENGINEERING**

FINAL YEAR PROJECT REPORT

**TITLE: DESIGN AND CONSTRUCTION OF AN OVERBURDEN
SOIL STRIPPING MACHINE**

CASE STUDY: TIIRA SMALL SCALE MINING AREA

BY

KWIKIRIZA MATHIAS

&

NATUKWASA DANHILL

Supervisors

Mr. SOLOMON AZARIUS LUBAALE

Mr. BAGOOLE CHRISTOPHER

A final year project report submitted to the Department of Water Resources and Mining Engineering as partial fulfillment of the requirements for the award of a Bachelor of Science in mining engineering

ABSTRACT

Manual overburden excavation is a tedious process. The report presents the design of an overburden soil stripping machine based on the principles of mechanical engineering. The components and sub-processes involved in the design are backup by literature presented by different scholars and engineers. Literature has many alternatives for solving a similar problem or designing a particular component but the most relevant and crucial ones towards the current design have been selected. The forces acting on the cutting tool have been computed based on the soil parameters detailed by the fundamental earthmoving equation and the computed force value of 33.9 N was used to select an appropriate material (Reinforced steel) to minimize breakage, wear, and tear. The prototype was designed to run on a 9hp petrol engine and to excavate 3.534 tons of soft material, 2.718 tons of medium hard material, and 1.698 tons of hard material in the same interval of time (1 hour) with efficiencies of 86.7%, 75.8%, and 60.1% respectively. Overall, the project will excavate and load material in a single process, overcoming the common cyclic excavation and loading procedures and as well the elementary modes of overburden soil stripping.

Keywords: Overburden soil, stripping, soil characterization, prototype, FEE, excavator.

DECLARATION

I **KWIKIRIZA MATHIAS and NATUKWASA DANHIL**, hereby declare to the best of our knowledge, that this project report is an outcome of our efforts and that it has not been presented to any institution of learning for an academic award.

KWIKIRIZA MATHIAS

Signature:

Date:/...../.....

NATUKWASA DANHIL

Signature:

ACKNOWLEDGEMENT

Great thanks to the Almighty God for the gift of good health, knowledge and guidance throughout our entire lives at school and being able to work on this design project

Further appreciation goes to supervisors Mr. SOLOMON AZARIUS LUBAALE and Mr. BAGOOLE CHRISTOPHER for the continuous support and guidance they have provided to us through this entire project.

Great thanks to Mr. Kibirige Ali (our technician), course mates, friends, and family members for their practical help and prayers during the course of doing this work.

APPROVAL

This is to certify that KWIKIRIZA MATHIAS and NATUKWASA DANHIL students pursuing bachelor’s degree of science in mining Engineering have been able to submit their final year project report.

This report is a true record of the work they have been able to do under close supervision. We hereby approve this report for submission to the head of Department Water Resources and Mining Engineering of Busitema University.

SUPERVISOR

Mr. BAGOOLE CHRISTOPHER

Signature..... Date...../...../.....

CO-SUPERVISOR:

Mr. SOLOMON AZARIUS LUBAALE

Signature..... Date...../...../.....

DEDICATION

We dedicate this report to our friends and families and to anyone that would find its content useful or appropriate for future improvement. We also dedicate this report to Artisanal and small-scale miner in Tiira region for whom the design was intended to help.

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List of Acronyms

FEE – Fundamental Earthmoving Equation

FS – Factor of Safety

RPM – Revolutions Per Minute

PCD -Pitch Circle Diameter

OD - Standard Outside Diameter

NPV- Net Present Value

NV – Net Value

ROI – Return on Investment

P.I – Profitability Index