



**BUSITEMA
UNIVERSITY**
Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF MINING AND WATER RESOURCES ENGINEERING

FINAL YEAR PROJECT REPORT

OPTIMISATION OF MATERIALS HANDLING FLEET PERFORMANCE

CASE STUDY: HIMA CEMENT QUARRY

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*A research project report Submitted in to the Department of Mining and Water
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Abstract

In the surface mining industry, fleets of trucks and loaders are the most commonly used for materials handling. In order to maximize truck per shovel match factor, fleet management has to be well organized. The equipment selection problem therefore involves choosing a fleet of trucks and loaders that have the capacity to move the materials specified in the mine plan. The optimisation problem is to select these fleets such that the overall cost of materials handling is minimised. The scale of operations is such that although a single machine may cost several million dollars to purchase, the cost of operation outweighs this expense over several years. The equipment selection problem is cursed with a cascade of inter-dependent variables and parameters. For example, the cost of operating a piece of equipment depends on its utilisation; the utilisation depends on the availability of the equipment; and the availability depends on the age of the equipment

At Hima cement quarry, the expected productivity is never being met and one of the main problems is mismatching fleet. As a result, more is spent on power (more kiloWatts for each ton of limestone), maintenance costs, risk of stopping the clinkering plant (billions lost for each stoppage), higher charges from the contractor – fuel, spares.

This research project was therefore aimed at optimizing fleet in terms of performance. This objective was achieved by assessing current fleet performance of Hima cement quarry, developing a mathematical model and the results of the model were tested in MATLAB using experimental methods. Several tests had to be run before making conclusions and recommendations.

DECLARATION

I, **WANKWAKI SHARON**, registration number **BU/UP/2014/356**, declare that this research project report is my original work and has never been presented to any university or institution for the award of a bachelor's degree in mining engineering or any other related award.

Signature:

Date:

Approval

This proposal report has been ideally submitted to the department of Mining and Water Resources Engineering for examination with approval from my supervisor

MR BAKAMA MICHEAL

Signature:

Date:

DEDICATION

I dedicate this report to my parents who have raised me up, given me financial assistance, parental guidance and counseling plus encouragement in all my academic endeavors, my lecturers for the skills imparted into me, the management of Hima Cement limited for the untimely support they gave me and finally my fellow course mates whom we worked together to provide useful information in this report

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