



**FACULTY OF ENGINEERING**

**DEPARTMENT OF MINING AND WATER RESOURCES ENGINEERING**

**DEVELOPING A MODEL FOR PREDICTION OF BLAST  
INDUCED GROUND VIBRATIONS**

*Case study: Seyani International Company Limited*

By

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## ABSTRACT

The increased development within countries in terms of infrastructure has created a high demand for the production of materials such as stone aggregate and sand for the infrastructure construction. This is basically achieved by blasting which has been proven to be an economical and viable method for rock excavation, however, it is associated with negative effects such as ground vibrations, air blast and fly rock thus endangering the surrounding environment.

This research addresses a model which actually predicts the amount of ground vibrations produced during blasting. The case study area was Seyani International Company Limited. Seyani International Company Limited deals with extraction of granite for commercial purposes where by its processed to make slabs, stone dusts etc. it is located in Buntaba (Off – Gayaza Kayunga Road) 35km from Kampala capital city. The coordinates of the quarry are 00 39 36N, 34 09 18E (Longitude: 0.6600; latitude:34.1550).

Through research, literature reviews, consultations around 142 datasets from 142 different previous blasting days were got and used in the development of the model.

These datasets included parameters like bench height, hole diameter, burden length, spacing, sub-drill length, charge length, stemming length, powder factor, delay time and uni-axial compressive strength of the rock in question.

The study also involved taking samples to the laboratory at Makerere university to test for rock strength and it was found to be 149.33Mpa

The regression algorithm was used in training the model and the programming language used was python.

DECLARATION

I, **KOMAGUM SHARON, BU/UG/2016/42**, hereby declare that this report is the work of my hands and this report has never been presented by any person or institution for an academic award.

Signature: .....

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

APPROVAL

This work has been compiled with the guidance and consultation from my supervisor.

Supervisor

Mr. NASASIRA MICHAEL BAKAAMA

Signature.....

Date...../...../.....

## DEDICATION

I dedicate this report to my mother KOMAGUM JACINTA ACHIENG and my lovely brothers KOMAGUM EDWIN AND KOMAGUM STEPHEN STUART for the tireless efforts to see me accomplish this report. May the good Lord reward you abundantly.

## ACKNOWLEDGEMENT

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## ACRONYMS

ANN-ARTIFICIAL NEURAL NETWORK

SICL- SEYANI INTERNATIONAL COMPANY LIMITED

PPV- PEAK PARTICLE VELOCITY

MLP- MULTI LAYER PROTOCOL

MSE- MEAN SQUARE ERROR

RMSE- ROOT MEAN SQUARE ERROR

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