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FACULTY OF ENGINEERING

DEPARTMENT OF MINING AND WATER RESOURCES ENGINEERING

DESIGN OF SUPPORT SYSTEM FOR THE MAIN TUNNEL USING EMPIRICAL METHOD

CASE STUDY: KI3R MINERALS LTD-NYAMULIRO WOLFRAM MINE- RUBANDA DISTRICT

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ABSTRACT

Empirical design method relates practical experience gained on previous projects to the conditions anticipated at a proposed site and requires experience as well as engineering judgement. In the underground industry the classifications systems forms the basis of many empirical design methods, as well as the basis of failure criteria used in many numerical modeling programs.(Lateef, 2014).

Rock mass classification systems are an integral part of empirical tunnel design and have been successfully applied throughout the world as a unique method for design. Support is provided by structural members installed in the ground where they are anchored to mobilize support by resisting the stresses causing deformation or displacement. In designing the support system, it is necessary to know the direction and magnitude of rock pressure, and also, the strength of the rock around the or tunnel.

Nyamuliro Wolfram mine is located on 422 kilometres southwest of Kampala. It is located in Rubanda district, Kigezi region, in the south west part of Uganda, approximately 35km northwest of Kabale.

Accurate prediction of the support system and their properties to be applied in the tunnel excavated during mining is essential for reliable technical and financial planning. This is achieved through empirical determining of the support requirements and analyzing them using phase2 numerical software and the presentation of the results in a form that is accessible to the mine engineers. The support has been designed to maximize safety and productivity. The study was conducted basing on several analysis both from the field and laboratory to come up with the support requirements and design. The findings indicated that the rock mass for the ore body of Nyamuliro mine is Fair with a Uniaxial Compressive strength of 100MPa, the general rock quality being 52% and a rock mass rating of 42. The determined support requirements include shotcrete of 120 mm thick, with the mixing ratios of concrete of UCS value 30MPa, also rock bolts of 4.5m long.

DECLARATION

I NAMUYANJA LYDIA, BU/UG/2016/71, do declare that the work contained in this project proposal work is my original work except where explicit citations have been made. Therefore, it has never been submitted to any institution of higher learning for any academic award.

Signature……...

Date……...

APPROVAL

This project proposal has been compiled and submitted to the Department of Mining and Water Resources Engineering for examination with the approval of my supervisor.

Mr. TUGUME WYCLIFFE

Signature……...

date…….

ACKNOWLEDGEMENT

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LIST OF ABBREVIATIONS

c cohesion (kPa) D

Disturbance factor

E_m Deformation modulus (GPa)

ESR Excavation support ratio

H Overburden or tunnel depth (m)

GSI Geological strength index

J_a Joint alteration number

J_{n-} Joint set number J_{r-} Joint

roughness number $J_{v\,-}$ Volumetric

joint count (joint/m_3)

$J_{w\ -}$Joint water reduction factor

J_S Joint spacing