

**INFLUENCE OF CYCLIC WETTING AND
DRYING USING ACID SOLUTION ON
MECHANICAL PROPERTIES OF ROCK
SLOPE WEATHERED SANDSTONE**

MUHAMMAD FARIS QUSYAIRI BIN HAMAT

**Bachelor of Engineering (Hons) Civil
(Infrastructure)
UNIVERSITI TEKNOLOGI MARA
JANUARY 2018**

**INFLUENCE OF CYCLIC WETTING AND
DRYING USING ACID SOLUTION ON
MECHANICAL PROPERTIES OF ROCK SLOPE
WEATHERED SANDSTONE**

By

MUHAMMAD FARIS QUSYAIRI BIN HAMAT

This report is submitted as a
partial requirement for the degree of
Bachelor of Engineering (Hons) Civil (Infrastructure)

**UNIVERSITI TEKNOLOGI MARA
JANUARY 2018**

DECLARATION BY THE CANDIDATE

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This topic has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Under Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Candidate	:	Muhammad Faris Qusyairi Bin Hamat
Candidate I.D. No.	:	2015238366
Programme	:	Bachelor of Engineering (Hons) Civil (Infrastructure)
Faculty	:	Civil Engineering
Thesis Tittle	:	Influence Cyclic Wetting and Drying using Acid Solution on Mechanical Properties Of Rock Slope Weathered Sandstone.
Signature of Candidate	:
Date	:	January 2018

ABSTRACT

A geotechnical structure need to consider the strength of rock mass structure to ensure its stability is adequate for sustainable structures. There are many type of strength parameters of rock mass structures that need to be justified before construction of tunnels, rock slope and underground subways. In tropical climates, mechanical properties of rock such as sandstone are influenced by the degree of weathering which affect overall strength capability of rock mass structures. Cyclic of wetting drying as a part of weathering process and this paper is devoted to the laboratory study of effect wetting drying cycles to the mechanical behavior of sandstone. Meanwhile, the Schmidt Rebound Hammer test is introduced to classify the weathering grade of the host rock sample. The sandstone samples were immersed in acid solutions with different cycles after 7, 14 and 28 days to undergo chemical reaction. The percentage of porosity was determined by the saturation and caliper techniques with the same specimen. Uniaxial Compressive strength test is a standard test used to evaluate the compression strength parameters. Other rock properties were obtained such P-wave velocity from Portable Ultrasonic Non-Destructive Test (PUNDIT) and density for the rock sample. In conclusion, as the degree of weathering and cyclic of wetting drying increases the porosity of the sandstone increases, p-wave velocity decreases. It was found that strength of sandstone decreases as the weathering degree and cycles increases since contact forces acting on the particle skeleton increases as the porosity increases

ACKNOWLEDGEMENTS

First of all, thanks to glorious Allah, for giving opportunity in completing this report in the giving time.

I would like to thank my supervisor, Sir Ahmad Syauqi Bin Md Hasan for sound technical guidance and for her immense support and understanding. I am amazingly thankful to Puan Nur Masyitah Binti Osman, co-supervisor, for all the support, advice and continuous guidance to ensure the completion of this research. Thank you for the support, patience and ideas in assisting me with this project.

My appreciation goes to the staff of the Laboratory Technician, Encik Roseffendy Bin Ramlan for providing the facilities, knowledge and assistance. Special thanks to all my friends for their help and advice during the completion of this study. I also place on record, my sense of gratitude to all who directly or indirectly have lent their hand in completing this research. I would also like to thank Universiti Teknologi Mara (UiTM) Pulau Pinang for providing me the necessary facilities for the research.

Finally, this thesis is dedicated to my mother Zarinan Binti Zakaria for all the motivated support and encouragement. This piece of victory is dedicated to you. Alhamdulillah.