THE OBSERVATION OF ROCK BEHAVIOUR IN UNIAXIAL COMPRESSION TEST (STRESS-STRAIN CURVE) GRANITE

By

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ABSTRACT

The Uniaxial Compression Test (UCT) is one of the most common laboratory test undertaken for rock mechanics studies especially to establish the rock strength.
This research focuses on the evaluation of physical properties, mechanical properties and engineering properties of granite. The samples of rock were collected from Jabatan Mineral & Geosains Malaysia, which is located at Ipoh Perak. The existing of sample is from Kuala Berang, Terengganu. Twenty samples were prepared for Uniaxial Compression test. For Physical properties test, ten lumps of granite were used to determine specific gravity, porosity and moisture content.
From physical properties test, the result of moisture content, for granite is 0.21 %, the value of the density for granite is between 2.7g/cm^3 to 3.0g/cm^3, specific gravity for granite is 2.95 and for porosity, the result gives is 0.92 % which can be classified as very low percentage of porosity according to (Anon, 1979).
From laboratory performance the uniaxial compressive strength for all samples are 104.8 MPa to 200.9 MPa which can be classified as very strong rock.
For the behavior of the granite, twelve behave in Elastic manner as load was applied to the material, six behave in Elastic – Plastic manner and another two behave in Plastic – Elastic manner. The mode of failure for the sample in this test is in multiple shear.
From correlation value, it shows that there is a low degree of positive correlation between the two variables. Therefore, it can be concluded that there is no relationship between Young's Modulus and Uniaxial Compressive Strength, and no relationship between Poisson's Ratio and Uniaxial Compressive Strength for the testing sample.

CHAPTER 1

INTRODUCTION

1.1 Background

Rock is an aggregate of different sized mineral grains cemented together by a matrix and it is a naturally occurring aggregate of minerals and/or mineraloids. Rocks are classified by mineral and chemical composition, the texture of the constituent particles, and also by the processes that formed them. These indicators separate rocks into igneous, sedimentary, and metamorphic.

Rock is an engineering material whose strength and other properties can vary widely. Rock mechanics is the study of the properties of rock that influence its performance as an engineering material, and of the behavior of rock masses in the field. The science of rock mechanics is a relatively new discipline, however, engineering in rock has gone on for thousands of years. Historically, rock engineering design has been based on past experience and this technique has enabled the building of significant structure in rock. Rock, as an engineering material, possesses extraordinary qualities. On a scale of some cubic decimeters, it behaves almost as an elastic, isotropic medium, often of superior mechanical properties than conventional construction materials. In large volumes, the continuity of the material is interrupted by separation planes and the behavior converts to be inelastic and anisotropic. These separations, punctiliously termed 'discontinuities', are planes of mechanical failure, associated with rock overloading during past tectonic events, plastic phenomenon or other