

# INFLUENCE OF CHEMICAL PROPERTIES AND MINERAL CONTENTS ON SANDSTONE STRENGTH

Haryati Awang 1, Nor Hayati A Hamid 2 and M Idris Ali 1, Noram I Ramli 1, Ramadhansyah PJ 1

1 Faculty of Civil Engineering & Earth Resources, Universiti Malaysia Pahang, Malaysia;

2 Institute for Infrastructure Engineering & Sustainable Management,  
Universiti Teknologi MARA, Shah Alam, Malaysia

## Abstract:

Malaysia is a country which experiencing wet tropical weathering. Rock material in this country is affected by weathering action as they exposed to the weathering process throughout the year. In verifying the material properties of rock, laboratory tests are needed to ensure a safe design of structures and foundations. This paper presents the results of laboratory investigation of chemical properties, mineralogical content and mechanical properties of the rocks and the influence of the chemical and mineral contents to the rock strength. This experimental works is about to investigate the significant of chemical content to the rock strength particularly in sedimentary rock of sandstone type. For this purpose, Alkali Silica Reactivity (ASR), Petrographic Image Analysis, Unconfined Compression Strength (UCS), Shear strength and Tensile strength tests were carried out. The correlations between the chemical properties, petrographic characteristics (minerals) and engineering properties of sixteen sandstones samples by simple regression analysis and bar chart were presented. Abundance of quartz mineral, carbonate minerals and cement in the sandstone increase the rock strength, and reduction of easily dissolve mineral like carbonate minerals, reduced the strength of the rocks. This study also suggested that the ASR has less significant to the Shear strength and uniaxial compression strength as the quantity of these deleterious minerals such as opal, chalcedony, volcanic glass, cristobalite, tridymite and cryptocrystalline quartz are very low compared to main minerals.

**Keywords:** Mineral Content; Strength Properties; Weathering; Chemical Properties; Sandstone

## **Acknowledgement**

The support provided by Malaysian Ministry of Higher Education and Universiti Malaysia Pahang in the form of a research grant (RDU/UMP) vote number RDU1803160 for this study are highly appreciated.