

## Some engineering geological and geophysical properties of weathered granitic soils in Fraser Hill, Pahang

ZAW WIN\*, UMAR HAMZAH & ABDUL RAHIM SAMSUDIN

Programme Geology, School of environmental and natural resource science  
Faculty of Science and Technology, University Kebangsaan Malaysia, 43600 Bangi, Selangor

\*Email Address: rofiquezw@gmail.co

The Bukit Fraser granite exhibits a full range of weathering grades. The variation of engineering geological characteristics and geophysical properties were measured through the weathering profile. The thickness of each grade materials varies from place to place and the weathering profiles are gradational in nature. Most of the profile shows thin residual soil layer. The completely weathered (CW) Grade V is thick, and frequently contains highly weathered (HW) core stones. The highly and moderately weathered materials are commonly thicker and the fresh rock is normally encountered beyond the slightly thin weathered layer. From grain size analysis, the soil range from clay with some gravel and sandy silt to very silty sand. Results show that highly weathered to residual granitic soil in the study area have intermediate plasticity (10 – 15%), low moisture content (12.67 – 26.67%) and higher shear strength ( $\phi = 11 - 33^\circ$ ;  $c = 24 - 35$  kPa). The grain size increases with depth as the weathering grades decreases. An increase in the degree of weathering results in an increase in pore volume and a decrease in relative density. Field observations and geophysical surveys show that the rock has been weathered up to 30 meters depth along the survey lines. Geophysical surveys result also show that the seismic P-wave velocities range from 300 – 800 m/s for top residual soil to completely weathered soil layers, 900 to 1500m/s for compacted saturated soil layer and 1500 – 2500 m/s for highly to moderately weathered rock. The surface electrical resistivity also varies with the increase of weathering grade. Average resistivity changes from 1500 ohm/m for grade VI to 4000 ohm/m for grade IV material. Both seismic velocities and resistivity increase with decrease in the weathering grades. The seismic refraction data are reliable and show consistent results. Seismic velocity was correlated to the properties of geomaterials and depths of bedrock. The variations of the properties of weathered materials show some good correlations with the degree of weathering. The data presented in this paper are important input in geotechnical engineering such as slope stability for highway constructions projects in Malaysia.