In situ measurement of geoelectrical resistivity in relation to weathering profile of a sedimentary rock mass at Lubuk Paku, Pahang: a case study

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2-D geoelectrical resistivity imaging using the Wenner configuration was conducted to investigate the weathering profile of a sedimentary rock cut slope at Lubuk Paku, Pahang. The rock which belongs to the Tembeling Formation was cut into three terraces and it consists of, from bottom to top, thick layers of basal conglomerate, massive pebbly sandstone and highly weathered shale. The resistivity imaging results show that the rock cut slope can be characterised into several zones of low, moderately low, moderately high and high resistivities. The low resistivity zone which has resistivity values ranging from 150 to 500 Wm is associated with the residual soil with high water content. It is classified as grade VI according to the IAEG (1981)

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weathering index with an average layer thickness of about 1.8 m. A moderately low resistivity zone with weathering index of grade V shows resistivity values ranging from 650 to 800 Wm. This layer appears to have low water content and its thickness varies from 1.1 to 1.7 m. Weathered rock material of grade IV shows resistivity values ranging from 800 to 1,200 Wm. A zone of moderately high resistivity is represented by the weathered rock mass of grade III. The resistivity value for this particular zone is relatively high and ranges from 1,232 to 2,000 Wm. This zone is dominated by a slightly weathered layer of pebbly sandstone. A slightly weathered rock of grade II represents the high resistivity zone with values ranging from 2,000 to 3,000 Wm. This zone is correlated well with the massive and solid rocks of basal conglomerate and pebbly sandstone. The results of the present study illustrate empirically that the geoelectrical resistivity values decrease as the weathering grades of the rock material increase. The presence of discontinuities and fractures in the rock mass appears to have lowered the overall resistivity of the rock mass. This empirical correlation could be used to map zones of different grades of weathered sedimentary rock mass and to study other subsurface geological structures related to slope cuts.