

Engineering properties and slope inventory of clayey soil from the Trusmadi Formation in Bundu Tuhan, Sabah

ABSTRACT

The study area in Bundu Tuhan mainly consists of the metasedimentary rock of the Trusmadi Formation. Trusmadi Formation aged Palaeocene to Middle Eocene made up of interbedded dark grey shale and thin sandstone that shows the characteristics of deep marine sediment. Shale bed also known as phyllite unit is the major rock unit in Trusmadi Formation that is usually weathered and produced clayey soil. Clayey soil is often acknowledged as problematic soil due to its properties that tend to hold water highly compared to sandy soil, which will cause further engineering problems due to the soil creeping. The study area is prone to landslide activity, especially in the Trusmadi Formation's slopes. Hence, this paper aims to determine the engineering properties of clayey soil from the Trusmadi Formation. Two slopes were also selected for laboratory analysis and slope inventory. The results of the analysis show that both samples are poorly sorted materials which are classified as sandy and silty clay soil and silty clay soil. The moisture content is 25.98% to 37.10%, specific gravity ranged from 2.52 to 2.57, and plasticity index ranged from 21.68% to 23.91%. The soil has inactive to a normal type of clay (0.59 to 0.97) with a very high swelling capacity (9.29% to 11.43%). The maximum dry density (MDD) ranged from 1.44 to 1.53 and optimum moisture content (OMC) of 25.47% to 25.67%. Also, both samples are classified as impermeable soil with a K value ranging from 1.74×10^{-8} m/s to 2.45×10^{-8} m/s. While, based on the slope inventory inspection, both slopes were comprised of metagreywacke, where the first slope was an embankment slope, and the second slope was a cut slope. The first slope has poor vegetation cover which leads to moderate erosion and instability that further caused failure which is rotational debris slide. As for the second slope with average vegetation cover, there is only minor erosion and instability present on the slope, and this slope also shows slow soil movement that indicates soil creep.