

Engineering Properties of Soil from Unstable Slopes in Ranau-Kundasang, Sabah, Malaysia

Abstract

A total of five soil samples were collected from different sedimentary rock units namely Trusmadi Formation, Crocker Formation and Pinosouk Gravel in order to analysis the engineering properties of the soils. The soil samples were collected from unstable soil slopes in Ranau-Kundasang, Sabah. The result of analysis shows that the soil moisture content was in the range of 6.94% to 22.70%, the soil organic content range from 0.60% to 1.79%, and the soil specific gravity in the range of 2.49 to 2.65. All samples show the acidity to low alkaline in pH. The average liquid limit of soil samples were from 20.93% to 65.00%, while the plasticity indexes were in the range of 5.67% to 20.98%. The plasticity chart plot of soil found that soils from Trumadi and Crocker Formation were classified as low plasticity soil, while Pinosouk Gravel samples were classified as intermediate to high plasticity. Clay activity analysis showed the existence of illite and kaolinite in soil of Trusmadi and Crocker Formation, while kaolinite and Ca-montmorillonite appeared in soil of Pinosouk Gravel. The result shows that the optimum moisture contents range from 11.50% to 21.13%, while the maximum dry density was within a range from 1.52 Mg/m³ to 1.90 Mg/m³. The unconfined compression strength indicated that all samples are classified as soft soil where soil samples of Pinosouk Gravel showed the lowest strength. The permeability of all soil samples is best classified as very low permeability to impermeable. The porosity analysis showed that Trusmadi and Crocker Formation are sandy-dominated soil with 61.73% to 69.08%, while Gravel Pinosouk samples are poorly-sorted soil with 42.90% to 61.50%.