

Soil plasticity and standard proctor compaction characteristics of stabilized Kota Kinabalu clay using biomass silica (SH-85)

ABSTRACT

In the Pan Borneo Highway (PBH) project, the occurrence of clay soils is likely to increase construction costs, due to its low shear strength and high compressibility characteristics. In recent years, the use of non-traditional stabilizers e.g., Biomass Silica (SH-85) compound is becoming more prevalent. This study aims to determine the soil plasticity behaviour and to ascertain the Standard Proctor Compaction characteristics of clay soil by mixing it with varying dosages of SH-85. After soil classification was carried out, the Initial Lime Consumption Test was performed to estimate the suitable SH-85 dosage. The compound was mixed with the soil at concentrations of 3, 6, 9 and 15% (by soil sample weight). Moreover, Atterberg Limits test was also carried out to determine the change in soil plasticity. Subsequently, the compaction tests were performed to obtain the Maximum Dry Density (MDD) and Optimum Moisture Content (OMC) on the natural and stabilized soil. The trend of test results show that the OMC increases with increasing SH-85 dosages, while reducing the overall MDD values. The optimal quantity of SH-85 to achieve good compactibility was discovered to be 9%, producing a stabilized mix with a strength gain of +366% compared to the natural soil.