VARIATIONS IN PLASTICITY CHARACTERISTICS OF LATERITIC SOIL ASSOCIATED WITH BENTONITE TREATMENT

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ABSTRACT

This study was initiated to evaluate changes in the plasticity characteristics and related geotechnical properties of lateritic soil treated with low percent bentonite (up to 10% by dry weight of soil). The evaluation included some index parameters with very wide universal acceptance such as particle size distribution, Atterberg limits, compaction characteristics together with some engineering properties related to the plasticity characteristics namely swelling and shrinkage behaviour as well as hydraulic conductivity. Soil mixtures for the engineering properties tests were compacted with British Standard Light (BSL) compactive effort at predetermined optimum moisture content. From the results, it was observed that bentonite treatment generally caused an increase in plasticity of the soil. While soil mixtures containing 0 – 5% bentonite classifies as inorganic clay soils of intermediate plasticity (CI), mixtures with 7.5 – 10 bentonite are classified as CH soils in accordance with Unified Soil Classification System. Correlation between bentonite content and the measured engineering properties of the resulting soil mixtures revealed an increase in optimum moisture content, free swell as well as desiccation induced shrinkage strain but a reduction in dry unit weight and hydraulic conductivity of specimens with higher bentonite content.

Keywords: Bentonite, desiccation shrinkage, hydraulic conductivity, lateritic soil, plasticity characteristics,

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