

## Lime Stabilization of Tropical Soils from Sudan for Road Construction

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**ABSTRACT:** The objective of this paper is to study the effects of hydrated lime on the engineering properties of interest for road design and construction for three tropical clays, two highly plastic potentially expansive soils from Republic of Sudan and one red tropical “lateritic” soil from Republic of South Sudan. The studied properties include Atterberg limits, compaction parameters, permeability, CBR,  $M_R$  and unconfined strength. The effects of compaction energy on the end result compaction material property parameters were studied. Also, the effect of salinity/sodicity on the plasticity and strength of lime stabilized swelling soils was studied. The study showed that lime efficiently reduces the plasticity of the three soils considered and that for the same increment of lime content the reduction in plasticity is higher for montmorillonitic clays compared to kaolinitic clays. The addition of lime to the three soils increased their maximum dry density and reduced their optimum moisture content. Substantial improvement in the strength and compaction characteristics of lime stabilized tropical clays could be expected on increasing the compaction effort. Permeability substantially increased on adding the optimum lime content to the three soils. Lime increased the strength and stiffness of the treated soils and the amount of lime needed to improve lateritic clay soils is less than that needed to improve swelling soils. The  $M_R$  test results indicate increased stiffness of the lime stabilized kaolinitic clay soils compared to montmorillonitic clays. The increase in salinity/sodicity resulted in decrease of plasticity and increase in strength for the natural untreated and lime treated sodic soil tested.

**Keywords:** Lime Stabilization, Tropical Soils, Salinity, Compaction Energy, CBR,  $M_R$