

## A B S T R A C T

The Equilibrium Strength of Trinidad Clay Subgrades

Raymond Francis Charles

The factors that control the subgrade moisture, density and strength conditions beneath sealed pavements were investigated and an empirical method for assessing the subgrade strength was sought for design purposes. A total of twenty-two (22) sites were investigated; the sites were selected so that they covered a variety of soil deposits and the rainfall spectrum for the Island.

In situ observations of subgrade moisture distribution, density, suction and strength (CBR) conditions were done while laboratory investigations were done to determine the physical, structural, suction and remoulded strength (CBR) properties of the subgrade soils. The Thornthwaite Moisture Index (TMI) at various sites was determined graphically and its relationship with the in situ subgrade suction was investigated.

It is shown that the clays of Trinidad are highly plastic and that there is a tendency for the heavier clays (Group Index 14,18) to be dispersive (structurally unstable) in water. The average degree of field compaction attainable by the subgrade is 92.5% of the maximum dry density at Standard Proctor Level while the in situ equilibrium moisture contents are much greater than

the respective optimum moisture contents from laboratory compaction. This is due mainly to the progressive wetting of the subgrades from the environment (rainfall and the Ground Water Table); the in situ moisture content of the suction of the subgrade is generally higher than that at the central section. A unique relationship between the TMI and the in situ subgrade suction is confirmed and its use in predicting the equilibrium subgrade moisture content is shown to be acceptable. The use of the RRL method for determining the equilibrium subgrade moisture content from the depth of the G.W.T is also acceptable even though the estimates are slightly lower than the in situ values. *In particular, the values*

At equilibrium conditions, the in situ subgrade suction approaches or is at the field capacity ( $pF 2.5$ ) value.

The in situ equilibrium CBR attainable by the subgrade at their worst conditions approaches the soaked CBR. However, the 4-day soaking procedure currently employed in Trinidad and Tobago is too severe as most of the heavy clays undergo structural breakdown on soaking and so produce very low CBR values (0.8%). A unique relationship between in situ CBR and suction, for different group indices, is developed and justified and may be used to assess the equilibrium or final subgrade strength for pavements in very wet climates.