

Dynamic Cone Penetrometer - A Low Cost Solution for Road Subgrade Evaluation

This paper explains a field and laboratory study carried out to establish relationships among Dynamic Cone Penetrometer (DCP) with California Bearing Ratio (CBR) and other soil parameters used in the road subgrade evaluation, specially for the Sri Lankan residual soils. The DCP is an effective low cost solution for road subgrade evaluation. A series of field tests were carried out to find out relationships between the DCP and the CBR in order to predict CBR for road design purposes. Laboratory experiment was designed to identify the effect of moisture content and the dry density on the DCP. Then to find out relationships between the DCP and other soil parameters that can be used to evaluate existing subgrade conditions.

Regression analysis for the field test results shows that there is a significant correlation between the DCP and the CBR for Sri Lankan residual soils. Three correlations were established between the DCP and the disturbed unsoaked CBR, the DCP and the disturbed soaked CBR and the DCP and the undisturbed unsoaked CBR for clayey or silty sand and sandy fine soils. All three equations showed good correlations between the DCP and the CBR with coefficient of determination (R^2) more than 0.6.

Analysis of the laboratory results also confirmed that a good estimate of CBR could be obtained from the DCP. The test results pointed out that the DCP increase with the moisture content. Considering the effect of moisture content, significant relationships between the DCP and some other important soil parameters were also established.