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Prediction of ultimate one dimensional settlement of peaty soils

Peaty soils pose serious foundation problems because of their high compressibility and poor strength. It is very important to predict the 1-d settlement of the soft layer under a given loading condition for design of foundations on organic soft grounds with or without ground improvement. Most of the methods available to predict 1-D consolidation settlement of a soft organic soil layer take only primary consolidation settlement in to account. Moreover, those methods require soil parameters obtained from tests done on undisturbed soil samples. This paper attempts to use a novel method to predict the ultimate 1-D settlement of Sri Lankan peaty soils with reasonable accuracy using their basic soil properties such as organic content, therefore eliminating the need for costly sampling techniques and testing procedures.

The ultimate laboratory settlement of peaty soils agrees reasonably well with the Gibson and Lo 1961) long term solution for Merchant and Taylor's consolidation theory which requires two soil parameters, a and b. Based on Gibson and Lo theological model, Gunaratne et al. (1998) developed analytical expressions for parameters a and b in terms of organic content and consolidation pressure for Florida organic soils. Florida organic soils are characterized by very high organic content and void ration. After analyzing the

consolidation test results of some Sri Lankan organic soil samples it was observed that the test results agree well with the Gibson and Lo model. Based on these results, authors found a good correlation between the organic content and the void ratio for Sri Lankan peaty soils and modified the analytical expression suggested by Gunaratne et al.(1998) to suit the Sir Lankan peaty soils. Furthermore, the authors compared the variation of parameters a and b with the applied stress levels and found that the experientially estimated parameters are close to modified theoretical predictions suggested by Gunaratne et.at. (1998).