

## Consolidation Behavior of Lebanese Soil and Its Correlation with the Soil Parameters

**Authors :** Robert G. Nini

**Abstract :** Soil consolidation is one of the biggest problem facing engineers. The consolidation process has an important role in settlement analysis for the embankments and footings resting on clayey soils. The settlement amount is related to the compression and the swelling indexes of the soil. Because the predominant upper soil layer in Lebanon is consisting mainly of clay, this layer is a real challenge for structural and highway engineering. To determine the effect of load and drainage on the engineering consolidation characteristics of Lebanese soil, a full experimental and synthesis study was conducted on different soil samples collected from many locations. This study consists of two parts. During the first part which is an experimental one, the Proctor test and the consolidation test were performed on the collected soil samples. After it, the identifications soil tests as hydrometer, specific gravity and Atterberg limits are done. The consolidation test which is the main test in this research is done by loading the soil for some days then an unloading cycle was applied. It takes two weeks to complete a typical consolidation test. Because of these reasons, during the second part of our research which is based on the analysis of the experiments results, some correlations were found between the main consolidation parameters as compression and swelling indexes with the other soil parameters easy to calculate. The results show that the compression and swelling indexes of Lebanese clays may be roughly estimated using a model involving one or two variables in the form of the natural void ratio and the Atterberg limits. These correlations have increasing importance for site engineers, and the proposed model also seems to be applicable to a wide range of clays worldwide.

**Keywords :** atterberg limits, clay, compression and swelling indexes, settlement, soil consolidation

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