

Compression Index Estimation by Water Content and Liquid Limit and Void Ratio Using Statistics Method

Authors : Lizhou Chen, Abdelhamid Belgaid, Assem Elsayed, Xiaoming Yang

Abstract : Compression index is essential in foundation settlement calculation. The traditional method for determining compression index is consolidation test which is expensive and time consuming. Many researchers have used regression methods to develop empirical equations for predicting compression index from soil properties. Based on a large number of compression index data collected from consolidation tests, the accuracy of some popularly empirical equations were assessed. It was found that primary compression index is significantly overestimated in some equations while it is underestimated in others. The sensitivity analyses of soil parameters including water content, liquid limit and void ratio were performed. The results indicate that the compression index obtained from void ratio is most accurate. The ANOVA (analysis of variance) demonstrates that the equations with multiple soil parameters cannot provide better predictions than the equations with single soil parameter. In other words, it is not necessary to develop the relationships between compression index and multiple soil parameters. Meanwhile, it was noted that secondary compression index is approximately 0.7-5.0% of primary compression index with an average of 2.0%. In the end, the proposed prediction equations using power regression technique were provided that can provide more accurate predictions than those from existing equations.

Keywords : compression index, clay, settlement, consolidation, secondary compression index, soil parameter

Conference Title : ICGEEPL 2020 : International Conference on Geotechnical Engineering and Environmentally Protected Lands

Conference Location : Miami, United States

Conference Dates : March 12-13, 2020