

Reliability of Using Standard Penetration Test (SPT) in Evaluation of Soil Properties

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Abstract : Soil properties are used by geotechnical engineers to evaluate and analyze site conditions for designing purposes. Although basic soil classification tests are easy to perform and provide useful information to determine the properties of soils, it may take time to get the result and add some costs to the projects. Standard Penetration Test (SPT) provides an opportunity to evaluate soil parameters without performing laboratory tests. In addition to its simplicity and cheapness, the results become available immediately. This research provides a guideline on the application of the SPT test method, reliability of adapting the SPT test results in evaluating soil physical and mechanical properties such as Atterberg limits, shear strength, and compressive strength compressibility parameters. A total of 70 boreholes were investigated in this study by taking soil samples between depths of 1.2 to 15.25 meters. The project site was located in Morrow County, Ohio. A regression-based formula was proposed based on Tobit regression with a stepwise variable selection analysis conducted between SPT and other typical soil properties obtained from soil tests. The results of the research illustrated that the shear strength and physical properties of the soil affect the SPT number. The proposed correlation can help engineers to use SPT test results in their design with higher accuracy.

Keywords : standard penetration test, soil properties, soil classification, regression method

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020