

Analysis of Shallow Foundation Using Conventional and Finite Element Approach

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Abstract : For structural evaluation of shallow foundation, the modulus of subgrade reaction is one of the most widely used and accepted parameter for its ease of calculations. To determine this parameter, one of the most common field method is Plate Load test method. In this field test method, the subgrade modulus is considered for a specific location and according to its application, it is assumed that the displacement occurred in one place does not affect other adjacent locations. For this kind of assumptions, the modulus of subgrade reaction sometimes forced the engineers to overdesign the underground structure, which eventually results in increasing the cost of the construction and sometimes failure of the structure. In the present study, the settlement of a shallow foundation has been analyzed using both conventional and numerical analysis. Around 25 plate load tests were conducted on a sand fill site in Bangladesh to determine the Modulus of Subgrade reaction of ground which is later used to design a shallow foundation considering different depth. After the collection of the field data, the field condition was appropriately simulated in a finite element software. Finally results obtained from both the conventional and numerical approach has been compared. A significant difference has been observed in the case of settlement while comparing the results. A proper correlation has also been proposed at the end of this research work between the two methods of in order to provide the most efficient way to calculate the subgrade modulus of the ground for designing the shallow foundation.

Keywords : modulus of subgrade reaction, shallow foundation, finite element analysis, settlement, plate load test

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