

Abstract

The bearing capacity studies probably is one of most important issue for soil and geotechnical engineering. For foundation safety design, it is necessary to predict stability of footings under saturated or unsaturated soil. The ultimate bearing capacity is the pressure at the base which causes the foundation to failure and a sudden movement. The investigation of undrained bearing capacity of shallow foundation on soft soil is sparse in the past and most of data comes from Uk's national soil test site, in Bothkennar, Scotland. In recent five years, Australian National Filed Tesing Facility (NFTF) was constructed in Ballina, NSW for site investigation. A series of in situ and laboratory tests were conducted on site in order to investigate the foundation behaviour correlate with load settlement response, soil properties, etc.

During the last few decades, existing methods of estimating short term undrained bearing capacity have been developed by various researchers. Limit equilibrium methods or empirical equations are commonly used for estimating bearing capacity. However, uncertainties such as slope height, distance between footing and excavation wall, soil properties are not considered, which make calculations imprecisely.

In this study, foundation tests data from Ballina is analysed by using empirical bearing capacity theory. The procedures include estimate undrained shear strength, ultimate bearing capacity, effective settlement by using empirical bearing capacity equation and find the load -settlement response for each type of test. A finite element analysis is used to simulate the foundation geometry and load behaviour. The input data for numerical analysis such as Young's modulus, permeability, unit weight of soil, undrained shear strength should be determined from previous foundation tests data. The load settlement response for both hand calculation and numerical analysis are compared in this paper.