IMPROVING BEARING CAPACITY OF SANDY SOIL USING VERTICAL INSERTS

Name of Student : Amandeep Singh (1311868)
Deptt. : Civil
Guide : Harvinder Singh
Mode of Study : P. Time

ABSTRACT

The bearing capacity of the soil is a function of two parameters i.e. the shear failure of soil and the settlement of the soil and in general most of the times the settlement criterion governs the bearing capacity. There can be significant improvement in the bearing capacity of the soil if we are able to reduce the settlement; this is due to the fact that settlement will get reduced by more closed packing of soil particles which in turn can be done by compaction of the soil mass, by using peripheral vertical inserts around the existing footing. Although the use of horizontal reinforcement for improving bearing capacity have been studied by many researchers and scholars but this technique involves a complete removal of soil from beneath the footing for placement of the reinforcement, hence this technique cannot be employed for the bearing capacity enhancement for the existing structures. In the present study an attempt was made to improve the load bearing capacity of the foundation soil reinforced with peripheral vertical inserts by using micropiles as a vertical reinforcement for improvement of bearing capacity. Many research works have been carried out in this regard, but, very few results were presented in the form of design charts that could be used to arrive at configuration and other geometrical parameters of reinforcing elements. Most of the methods involve using reinforcing element in horizontal direction which generally disturbs the soil strata. The present study was attempted to derive /plot design chart that can address this problem and can be easily used in the footing underpinning. A numerical analysis is carried out using PLAXIS – 3D. The problem is modelled in PLAXIS – 3D and analysed to study the effect of various parameters that affects the bearing capacity. A good agreement between the results of numerical analysis and experimental results from literature is observed. The results are then further analysed in MS – excel using what – if solver tool to predict the constants of expression for BCR formulated using dimensionless analysis. Length/depth of reinforcement is directly influencing the BCR whereas the spacing and edge distance are inversely proportional to BCR.