



Response of Skirted Foundations Resting on Dry Medium Dense Sand

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Abstract

Experimental model tests were carried out to study the response of skirted foundation resting on dry sand. The experiments were performed in a large soil container (1000 × 1000 mm in cross section and 800 mm in height). Skirts with three different lengths (L) varied from 0.5D to 1.5D was attached to the edge of shallow circular foundations having three different diameters (D=60, 90 and 120 mm). Different parameters have been studied; these parameters involve skirt length, foundation size and skirt conditions. Skirts with open end and closed end were used. The relative density was kept constant and equals to 60%. The case of foundation without skirt (L=0) was initially tested and set as a reference for comparison purpose. From the results of experimental tests, it was found that the skirt modifies the load-settlement behaviour, increasing the load carrying capacity and reducing the foundation settlement. The results also indicate that load carrying capacity of skirted foundation increases with increase skirt length as well as foundation size. The results show that using skirt with closed end brought a considerable increase in load carrying capacity than that of open end.

Keywords: Medium Dense Sand; Skirt; Load Carrying Capacity; Circular Foundation; Physical Model Tests; Dry.

1. Introduction

The poor ground conditions like loose to medium dense sand pose the problem of low bearing capacity and large settlement of foundation resting on it under relatively lesser loads, therefore it became necessary to develop and apply various methods of soil improvement, for example soil reinforcement, deep compaction, grouting ... etc. Some of these methods may be expensive, restricted by the site conditions and difficult to apply. Thus geotechnical engineers are trying to find out alternative methods to enhance bearing capacity and reduce settlement of the structures. The use of skirts is one of the most alternative methods for improving soil capacity. Skirted foundation have proven to be competitive alternatives to more traditional foundation solutions like piles in various types of soils due to their economic benefits which lead to cost saving through reduction in materials and in time required for installation. It is also utilized as an alternative to deep foundation in soil has low strength at its surface.

The term skirted foundations is utilized to define shallow foundations with vertical or inclined thin structural elements fixed along its edges, called "skirt" to increase the bearing capacity and/or provide scour protection which penetrate the soil and surround one or more sides of the soil underneath the foundation and thus constrain its lateral movement.

When using skirts an enclosure is formed in which the soil mass is restrict and work as a soil plug to transfer superstructure loads to depths where the soil is stronger, thereby increasing its bearing capacity. Skirts may be used with new or existing foundations of circular, rectangular and square shape. It can be of any shape but generally the shape of

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