

Experimental Study on Improving the Engineering Properties of Sand Dunes Using Random Fibers-Geogrid Reinforcement

Authors : Adel M. Belal, Sameh Abu El-Soud, Mariam Farid

Abstract : This study presents the effect of reinforcement inclusions (fibers-geogrids) on fine sand bearing capacity under strip footings. Experimental model tests were carried out using a rectangular plates [(10cm x 38 cm), (7.5 cm x 38 cm), and (12.5 cm x 38 cm)] with a geogrids and randomly reinforced fibers. The width and depth of the geogrid were varied to determine their effects on the engineering properties of treated poorly graded fine sand. Laboratory model test results for the ultimate stresses and the settlement of a rigid strip foundation supported by single and multi-layered fiber-geogrid-reinforced sand are presented. The number of layers of geogrid was varied between 1 to 4. The effect of the first geogrid reinforcement depth, the spacing between the reinforcement and its length on the bearing capacity is investigated by experimental program. Results show that the use of flexible random fibers with a content of 0.125% by weight of the treated sand dunes, with 3 geogrid reinforcement layers, $u/B = 0.25$ and $L/B = 7.5$, has a significant increase in the bearing capacity of the proposed system.

Keywords : earth reinforcement, geogrid, random fiber, reinforced soil

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