

Abstract

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Improving Sand Dunes Bearing Capacity Using Reinforced Soil Technique

Soil improvement techniques such as soil reinforcing systems are used to increase the bearing capacity of soil and to reduce the structures settlement. Geosynthetics have been increasingly used as reinforcing construction materials in civil engineering projects such as roads, retaining walls, landfills, etc. Now, many types of products (geogrid, geotextile, geocell, geomembrane, etc.) are available in the engineering process. Each product is designed to solve a particular range of civil engineering problems. This study presents the effect of reinforcement inclusions (geogrids) on the dune sand bearing capacity under strip footings. The effect of the first geogrid reinforcement depth (u/B), the spacing between the reinforcement (h/B) and its length (L/B) on the bearing capacity is investigated by experimental program and numerically using finite element package PLAXIS version 8.2. Unreinforced bases are tested for comparison purposes to determine the bearing capacity ratio (BCR). The results are analyzed to find relationships between the bearing capacity and the geogrid parameters. Laboratory model tests are carried out on the soil (Dune sand) and the inclusion material (geogrid). The results show that the bearing capacity of rigid strip footings on dune sand can be significantly increased by the inclusion of geogrid layers in the dune sand, and that the magnitude of bearing capacity increase depends greatly on the geogrid depth from the footing level (u/B), the spacing between the geogrid layers (h/B) and its length (L/B). Keywords: Reinforced soil, Geogrids, Dune sand, Bearing Capacity.