

Behaviour of Model Square Footing Resting on Three Dimensional Geogrid Reinforced Sand Bed

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Abstract : The concept of reinforced earth has been used in the field of geotechnical engineering since 1960s, for many applications such as, construction of road and rail embankments, pavements, retaining walls, shallow foundations, soft ground improvement and so on. Conventionally, planar geosynthetic materials such as geotextiles and geogrids were used as the reinforcing elements. Recently, the use of three dimensional reinforcements becomes one of the emerging trends in this field. So, in the present investigation, three dimensional geogrid is proposed as a reinforcing material. Laboratory scaled plate load tests are conducted on a model square footing resting on 3D geogrid reinforced sand bed. The performance of 3D geogrids in triangular and square pattern was compared with conventional geogrids and the improvement in bearing capacity and reduction in settlement and heave are evaluated. When single layer of reinforcement was placed at an optimum depth of 0.25B from the bottom of the footing, the bearing capacity of conventional geogrid reinforced soil improved by 1.85 times compared to unreinforced soil, where as 3D geogrid reinforced soil with triangular pattern and square pattern shows 2.69 and 3.05 times improvement respectively compared to unreinforced soil. Also, 3D geogrids performs better than conventional geogrids in reducing the settlement and heave of sand bed around the model footing.

Keywords : 3D reinforcing elements, bearing capacity, heavy, settlement

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