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Experimental study of behaviour of circular footing on geogrid-reinforced sand

Abstract

Load tests were carried out with a circular foundation of diameter, $B = 100$ mm, supported on geogrid-sand reinforced contained in a circular-steel tank with diameter of 600 mm and depth of 450 mm, to determine the increase produced in the bearing capacity by including geogrid layers in the sand. Two types of geogrid, uniaxial and biaxial, were used as reinforcement material. Besides, a parametric study was carried out to verify the effect of several factors on the behaviour of reinforced soil. The parameters considered in the study include the depth of the first geogrid layer, vertical separation between layers of geogrid, diameter of the geogrid, number of reinforcement layers, deep of the foundation, geogrid type, and relative density of the sand. Moreover, the effect of folding the edges of the geogrid layer was studied. Finally, regression models will be developed from the laboratory model test to perform an initial calculation of the bearing capacity of the reinforced sand. Results showed that the parameters studied have a significant influence on the performance of the footing in terms of bearing capacity. The proposed regression models presented an adequate approximation to the experimental results.