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The Behavior of Polypropylene Fiber Reinforced Sand Loaded by Squair Footing

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Abstract : This research involves the effect of both sizes of reinforced zone and the amount of polypropylene fiber reinforcement on the structural behavior of model-reinforced sand loaded by square footing. The ratio of the side of the square reinforced zone to the footing width (W/B) and the ratio of the square reinforced zone depth to footing width (H/B) has been varied from one to six and from one to three, respectively. The tests were carried out on a small-scale laboratory model in which uniform-graded sand was used as a fill material. It was placed in a highly dense state by hitting a thin wooden board placed on the sand surface with a hammer. The sand was reinforced with randomly oriented discrete fibrillated polypropylene fibers. The test results indicated a significant increase in the bearing capacity and stiffness of the subgrade and a modification of load–the settlement behavior of sand with the size of the reinforced zone and amount of fiber reinforcement. On the basis of the present test results, the optimal side width and depth of the reinforced zone were 4B and 2B, respectively, while the optimal percentage of fibers was 0.4%.

Keywords : square footing, polypropylene fibers, bearing capacity, stiffness, load settlement behavior, relative density
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