

عنوان مقاله:

Experimental and Numerical Modeling of the Effect of Groundwater Table Lowering on Bearing Capacity of Shallow Square Footings

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خلاصه مقاله:

The lowering of the groundwater table causes the area above the water table to become unsaturated and capillary phenomena to appear in this zone. This means that the bearing capacity of shallow footings will be influenced by capillary stress or matric suction. In this research, the effect of groundwater table lowering on the bearing capacity of a shallow square model footing on dense sand has been investigated by conducting plate load tests under different groundwater table conditions. Numerical simulations of the experiments also were performed using the finite element software Optum G2. The results of the experiments showed that lowering of the water table increased the matric suction. At a suction 0.5 to 4.5 kPa, the ultimate bearing capacity in the soil increased non-linearly from 2.5 to 4-times the bearing capacity of the saturated state. Numerical simulation of the experiments by assuming cohesion due to matric suction for the upper part of the groundwater table predicted the same behavior. Very good agreement was obtained between the predicted bearing capacity and the measured values.

کلمات کلیدی:

Bearing Capacity, Experimental Model, Numerical modeling, Groundwater Table, Unsaturated soils

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