

Determination of the Bearing Capacity of Granular Pumice Soils by Laboratory Tests

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Abstract : Pumice soils are countered in many projects such as transportation roads, channels and residential units throughout the World. The pumice deposits are characterized by the vesicular nature of their particles. When the pumice soils are evaluated considering the geotechnical viewpoint, they differ from silica sands in terms of physical and engineering characteristics. These differences are low grain strength, high friction angle, void ratio and compressibility. At stresses greater than a few hundred kPa, the stress-strain-strength behaviour of these soils is determined by particle crushing. Particle crushing leads to changes in the density and reduction in the components of shear stress due to expansion. In this study, the bearing capacity and behaviour of granular pumice soils compared to sand-gravels were investigated by laboratory model tests. Firstly the geotechnical properties of granular pumice soils were determined; then, the behaviour of pumice soils with an equivalent diameter of sand and gravel soils were investigated by model rectangular and circular foundation types and were compared with each other. For this purpose, basic types of model footing (15*15 cm, 20*20 cm, $\Phi=15$ cm and $\Phi=20$ cm) have been selected. When the experimental results of model bearing capacity are analyzed, the values of sand and gravel bearing capacity tests were found to be 1.0-1.5 times higher than the bearing capacity of pumice the same size. This fact has shown that sand and gravel have a higher bearing capacity than pumice of the similar particle sizes.

Keywords : pumice soils, laboratory model tests, bearing capacity, laboratory model tests, Nevşehir

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