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Effect of Bentonite on Shear Strength of Bushehr Calcareous Sand

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Abstract : Calcareous sands are found most commonly in areas adjacent to crude oil and gas, and particularly around water. These types of soil have high compressibility due to high inter-granular porosity, irregularity, fragility, and especially crushing. Also, based on experience, it has been shown that the behavior of these types of soil is not similar to silica sand in loading. Since the destructive effects of cement on the environment are obvious, other alternatives such as bentonite are popular to be used. Bentonite has always been used commercially in civil engineering projects and according to its low hydraulic conductivity, it is used for landfills, cut-off walls, and nuclear wastelands. In the present study, unconfined compression tests in five ageing periods (1, 3, 7, 14, and 28 days) after mixing different percentages of bentonite (5%, 7.5% and 10%) with Bushehr calcareous sand were performed. The relative density considered for the specimens is 50%. Optimum water content was then added to each specimen accordingly (19%, 18.5%, and 17.5%). The sample preparation method was wet tamping and the specimens were compacted in five layers. It can be concluded from the results that as the bentonite content increases, the unconfined compression strength of the soil increases. Based on the obtained results, 3-day and 7-day ageing periods showed 30% and 50% increase in the shear strength of soil, respectively.

Keywords : unconfined compression test, bentonite, Bushehr, calcareous sand
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