Effect of geotextiles on the load-carrying capacity and deformation characteristics of sabkha soil

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Abstract: Road construction on sabkha terrain along the coastal regions of the Arabian Gulf and the Red Sea is often faced with different types of damage due to the low bearing capacity of sabkha deposits, especially when they are wetted. Such conditions necessitate the improvement of sabkha prior to any construction. The purpose of this investigation was to upgrade the load-carrying capacity of sabkha soil using geotextiles by varying the geotextile type, base thickness, moisture condition and the magnitude of the deviatoric stress. To achieve these objectives, a special mould was fabricated to accommodate the soil-fabric-aggregate (SFA) systems. The performance of SFA systems was evaluated by measuring the permanent deformation under the applied 'dynamic' load. Results of this study indicate that the selection of an appropriate geotextile type can bring about significant improvement in the load-carrying capacity of the water-sensitive sabkha soils, particularly under soaked conditions. The inclusion of a geotextile layer on top of the sabkha subgrade reduced the thickness of the graded base layer by 34%. In addition, the geotextile increased the stiffness of the sabkha subgrade and reduced the permanent deformation after a certain number of load reputations.