Effect of geotextile and cement on the performance of sabkha subgrade

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Building and Environment
Vol. 41, Issue.6, 2006

Abstract: Many construction and post-construction problems have been reported in the literature when sabkha soils have been used without an understanding of their abnormal behavior, especially their inferior loading capability in their natural conditions. The strength of these soils can be further significantly decreased if the sabkha is soaked. The main objective of this study was to upgrade the load-carrying capacity of pavements constructed on sabkha soils using geotextiles, and to assess the effect of geotextile grade, base thickness, loading type (static and dynamic) and moisture condition (as-molded and soaked) on the performance of soil-fabric-aggregate (SFA) systems. In addition, the sabkha soil was treated with different dosages (5%, 7%, and 10%) of Portland cement and the performance of cement-stabilized sabkha was compared to that of the SFA system under different testing conditions. The ANOVA results indicated that the use of geotextile has a beneficial effect on sabkha soils, especially under wet conditions. Although the improvement in the load-carrying capacity of sabkha samples with high dosages of cement showed better results than the inclusion of geotextile, an economic analysis showed that the use of geotextiles would be superior. Moreover, mechanistic analysis was used to develop a prediction model for the percentage increase in the modulus of resilience.