

## **Geotechnical Investigation of Soil Foundation for Ramps of Dawar El-Tawheed Bridge in Jizan City, Kingdom of Saudi Arabia**

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**Abstract :** The soil profile at site of the bridge project includes soft fine grained soil layer located between 5.0 m to 11.0 m in depth, it has high water content, low SPT no., and low bearing capacity. The clay layer induces high settlement due to surcharge application of earth embankment at ramp T1, ramp T2, and ramp T3 especially at heights from 9m right 3m. Calculated settlement for embankment heights less than 3m may be accepted regarding Saudi Code for soil and foundation. The soil and groundwater at the project site comprise high contents of sulfates and chlorides of high aggressiveness on concrete and steel bars, respectively. Regarding results of the study, it has been recommended to use stone column piles or new technology named PCC piles as soil improvement to improve the bearing capacity of the weak layer. The new technology is cast in-situ thin wall concrete pipe piles (PCC piles), it has economically advantageous and high workability. The technology can save time of implementation and cost of application is almost 30% of other types of piles.

**Keywords :** soft foundation soil, bearing capacity, bridge ramps, soil improvement, geogrid, PCC piles

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