

Geotechnical properties of some tidal flat sediments of Khor-Abdullah coast, southern Iraq

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Abstract - This research involves geotechnical studies for some tidal flat sediments of Khor-Abdulla coast in the southern Basra city. This area has an important strategic location in future, the Iraqi Government intending to establish large engineering projects such as a big Basrah port. Sediment samples have been taken at a depth of 1.25 m to study the physical, chemical, and engineering properties of this region's sediment. The investigation results reveal that its average high natural moisture was 37.5 %, Liquid Limit *LL* 45.5 %, Plastic Limit *PL* 26.5 %, Plasticity Index *PI* 19%. Hence, these sediments show high clay percentages (85-65%). It can be classified as Silty Clay sediments with low plasticity. Engineering tests resulted in average Compression Strength of 206 kN/m², Max. dry density 1.63 g/cm³ while consolidation coefficient 0.15 m²/year, consolidation index (0.28) with initial consolidation 35.5 kN/m², and swelling index 0.071. These factors indicate a weak sediment with low plasticity. Chemical tests results reveal high concentrations of sulfates chlorides, and organic matters. TDS were 30666 mg/l, CaCO₃ 41 mg/l, sulfate 2987 mg/l, Mg 600 mg/l, Ca 46.6 mg/l, and chlorides 1334.2 mg/l. while EC 44.5 mmhos/cm, pH 7.7.

Introduction

Khor Abdullah is considered as an important funnel shape water intake in south Iraq. This Khor lies between Shatt Al-Arab estuary and Bubian Island at the head of the Arabian Gulf (Fig.1). It represents an interface between Mesopotamian basin and Bubian Island. It links Khor Al-Zubair and the Arabian Gulf. This region is located within intertidal flat which is continuously submerged during flood periods, and then appearing at ebb periods (Fig. 2). Hence, it is subjected to a continuous deposition and erosion processes. The investigated area is influenced by the delta of Shatt Al-Arab River which is considered as essential source of fine grains (Khalaf and Ala, 1980; Darmoian and Lindrist, 1988 in Al-Badran, 1993). However, the sedimentation processes are influenced by the supplies of Shatt Al-Arab river and tidal current of Khor Abdullah channel (Al-Badran, 1993).

It is also, an important navigational channel linking Iraq with neighboring countries. So, it demands exploiting this coastal region and establish a large engineering structures such as Big Basrah port. So, these big projects need wide investigation of the port area and the neighboring lands. This research involves geotechnical studies of some tidal flat sediments.