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The effect of dolomite on some geotechnical properties of Khor Abdullah soil – Northwest Arabian Gulf

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Abstract

Six soil samples collected at approximately equal distance along Khor Abdullah –northwest of Arabian Gulf. The grain size analysis showed that these samples texturally consist of siltyclay type with subordinate amount of fine sand. These soils are classified as low plasticity according to the unified soil classification. Mineralogically, Khor Abdullah soil samples consist mainly of kaolinite, chlorite, montmorillonite, illite, and palygoreskite. The chemical analyses confirm the very low contents of gypsum. The present study adopted the adding of dolomite to illustrate its effect in improving of the geotechnical properties of Khor Abdullah costal soils. The uniaxial test, Bearing capacity, Atterberg limits, and Compaction test indicate decrease in plastic limits and an increase plastic index with the increase of dolomite content, as well as, the improving of soil strength after compaction.

Introduction

The Shore lines of the north western part of Arabian Gulf extends for more than Sixty km², comprises of Khor Abdullah and also forms the distal part of Mesopotamian plain. This area is characterized by the wide distribution of recent sediments. These sediments contributed by Tigris and Euphrates Rivers, as well as, dust fallout (1). Owing to Parson (1957) , the plain is built up mostly of deltaic, lacustrine, and fluvatile sediments connected mutually by many facial variation and replacing each other horizontally and vertically as a result of periodical repeated phases of accumulation and erosion. Estuarine sabkha characterize Basrah- Fao- Umm Qaser regions, this area characterized by its dark grey or brownish fine texture sediments, and greater abundance of evaporate minerals (2). Khor Abdullah area has simple topographic features; the area is flat with no prominent features. The climatic is arid with dry summer and cooler winter. The rain is irregular and fall only during winter. The average annual precipitation in Basrah area is about 140 mm, and evaporation ranges between 50 to 250/600 mm a month (January and July) (3). The ground water level is shallow i.e. less than one meter. Its chemistry is affected by the chemistry of the Arabian Gulf water. Limit or cement has been added to fine grained soils to improve physical properties. This process is generally known as limit or cement stabilization. And it has been beneficial in improving the strength and stiffness characteristics of road foundation (4). Dolomites are very abundant in the geological formations of various age, covering large areas western and northern Iraq. The present study attempts to use dolomite for the improvement the geotechnical properties of Khor Abdullah recent sediments. The main task of this research is to improve the geotechnical properties of Khor Abdullah tidal flat recent sediments.