FIELD STUDY OF THE DISTRIBUTION OF LATERAL SWELLING PRESSURE OF EXPANSIVE SOIL ON RETAINING STRUCTURE

Omer Zakaria Mohamed, Yehia K. Taha and El-Sharif M. Abd El-Aziz

Abstract:

The important requirements for civil engineer are economic and technical in the field and this appears in fill work. The civil engineer needs a suitable soil for fill works, so the expansive soil is studied as one of the possible solution. For this research the physical, mechanical and field tests are performed. The purpose of the present paper is examining the distribution of lateral swelling pressure developed in clay soils on retaining walls after adding water and to predict the values and shape of pressures distribution for design purposes. So, five cells of strain gauges were prepared, the distance between them equals 50cm. and they were fixed at wooden sheet on bedroom’s wall in one of Assiut el gadida city projects. Prediction of lateral earth pressures has been a problem to civil engineers for a long time. The first rational approach by which lateral earth pressures could be estimated was simple and practical, and they have come to be known as the classical methods of prediction of lateral earth pressure. The behaviour of soil is swelling after adding water then affects on retaining structures. The effect of soil is depending on many factors like water content, depth, the type and quantity of mineral in soil composition, the time, etc. The results of this research give a good knowledge about the value and the distribution of lateral swelling pressure, and the results showed that the swelling pressure on retaining structure increases by increasing the water content and montmorillonite minerals content in soil. Then, the results enable the civil engineers to attain safe and suitable design for retaining structure without engineering problems...

Keywords:

Lateral swelling, expansive soil, Assiut el Gadida city

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EXPERIMENTAL STUDY ON THE EFFECT OF LATERAL SWELLING PRESSURE OF EXPANSIVE SOIL ON RETAINING STRUCTURE

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Abstract:

The lateral swelling of expansive soil on retaining structures investigation is very important for civil engineer. The used soil in this research is obtained from Assiut El gadida city projects; Assiut, Egypt. It contains SiO2, AL2O3 and Fe2O3 as main oxides. For this research the physical and mechanical properties of soil are obtained, the purpose of the present paper is examining the phenomenon of lateral swelling pressure developed in clay soils after adding water to it. Also suggest useful means to predict the magnitude and distribution of those pressures for use in retaining structure design. The behaviour of soil is swelling after adding water then affects on retaining structure. The effect of soil is depending on many factors as water content, depth, the type and quantity of mineral in soil composition, the time etc. The results showed that the swelling pressure on retaining structure increases by increasing the depth at soil up to depth equals 60 cm and decreases beyond that. Also, the maximum swelling pressure occurred after 48 hours measured from adding water to expansive soil.

Keywords:

Lateral swelling, expansive soil, Assiut El gadida city

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TREATMENT OF EXPANSIVE SOIL WITH CHEMICAL ADDITIVES

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Abstract:

Expansive soil is found in many regions in Egypt, especially in the new desert cities including New Sohag City (town in upper Egypt). In this study, the soil samples were taken from the place of the Faculty of Veterinary Medicine at New Sohag University from a depth of 5 meters and it is used in the experimental program. The physical and mechanical properties of the natural soil were obtained. Then the soil was treated with chemical additives (Addicrete P and Addicrete BV) 0.5%, 1% and 2% by dry weight of soil. After treatment of soil the properties of the samples were investigated. The natural soil properties were used as control points for comparison purposes. The main results show that with increase of Addicrete P the plastic limit increases and liquid limit decreases, hence decreases plasticity index and it is revealed that a change of expansive soil texture takes place when Addicrete P are mixed with expansive soil. While Addicrete BV does not effect on the Atterberg limits or the soil texture of the soil. As the amount of Addicrete P and Addicrete BV is increased, there are an apparent reduction in optimum moisture content, unconfined compressive strength, free swell, swelling potential and swelling pressure, and a corresponding increase in maximum dry density. The paper contains many important test results and these results were analyzed to establish optimum dosage levels for each of the treated additives. Based on the results obtained, it can be concluded that the expansive soil can be successfully improved by Addicrete P and Addicrete BV.

Keywords:

Expansive soil, Swelling soil, Soil Stabilization, Addicrete P, Addicrete BV, clay minerals, swelling potential, swelling pressure.

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