CONTRIBUTION TO THE EXPERIMENTAL IDENTIFICATION OF THE COLLAPSE POTENTIAL OF SOILS

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ABSTRACT

The soils of arid and semi arid regions are metastable, of a weak opened structure, unsaturated nature, being in the deposits form. In the dry state, a natural cementation between grains confers them an important intergranular liaison and can support very high loads. However, the saturation, even without an additional load provokes the liaisons disintegration, giving a dense structure followed by a sudden collapse of the soil particles. Among the saturation causes, there is the groundwater level rising, the water infiltration and leaks in pipes. Because of the important collapse potential and critical consequences that can occur in the constructions, this type of soils is considered as unstable foundations seat. Experimental and theoretical studies aiming to understanding the great number of uncertainties implied in the phenomenon of collapse are currently undertaken. The literature revealed that the majority of research was devoted to the collapse mechanisms and the identification methods, of treatment and prediction. Because of the structural composition of these soils, reconstituted samples, made up of various proportions of sand and fine particles were tested. The first phase of the present investigation concerns the experimental determination of the geotechnical characteristics. A comprehensive testing program using the ultrasonic apparatus and the cone penetrometer was carried out, in order to identify the factors which control the collapse mechanism. The results obtained clearly show the influence of certain parameters such as; initial moisture content, the energy of compaction and the quantity of fine particles, on the collapse potential, limit penetration and the ultrasonic.

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