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SOME EFFECTS OF ECO-CEMENT STABILIZATION OF EXPANSIVE SOILS ON CRITICAL STATE PARAMETERS

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Abstract

The objective of this paper is to investigate the effect of expansive soil treatment with Eco-Cement (EC) stabilizer, as being composed of an alternative binder that partly substitutes the Ordinary Portland Cement (OPC). The extended use of EC in soil stabilization will carry several significant environmental benefits. Firstly the by-product resulted from the production of iron in a blast furnace will be reused, that otherwise will be stored on the ground in deposits representing an important source of pollutants. Secondly it will be reduced the OPC consumption, which is conservatively used at present in soil stabilization, with well-known unsustainable features. The introduction of a new stabilizing agent in expansive soil treatment requires detailed research on the treated soil improved physical and mechanical properties. The soil critical state models as the Original Cam-Clay (OCC) model and the Modified Cam-Clay (MCC) model incorporate both soil compressibility and shear strength in defining a 3D unique critical surface. Using these models in characterizing the behavior of the EC stabilized clay it shows that the new soil-cement mix structure has higher shear strength and lower volume variation under current loads, compared with the behavior of the natural expansive clay. These results lead to the conclusion that the EC can be used as an expansive soil stabilizing agent, reducing the consumption of the OPC up to 50%.

Key words: Cam-Clay models, Eco-Cement, expansive clay, soil critical state, swelling prediction

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