

The Behavior of Ordinary and Encased Stone Columns in Soft Clay Soil of Egypt: A Finite Element Study

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Abstract : Soft to very soft soil deposits are widely speared in some areas of Egypt such as East Port Said, Damietta, Kafr El-Sheik, Alexandria, etc. The construction projects in these areas have faced the challenge of the presence of extended deep layers of soft and very soft clays which reach to depths of 40 to 60 m from the ground level. Stone columns are commonly used to support structures overlying soft ground soils and surcharged by embankment type loading. Therefore, this paper introduces a wide comparison numerical study between the ordinary stone columns (OSC) versus the geosynthetic encased stone columns (ESC) installed in soft clay soil deposit using finite element method (FEM). Parametric study of an embankment on soft soils reinforced with stone columns is performed using commercial computer program based on the finite element technique (PLAXIS 2D). The investigation will present the influence of the following parameters: diameter of stone columns, stiffness of geosynthetic encasement, embedded depth of stone column from ground level, and the length encasement of the stone column on the consolidation time, vertical settlement, and lateral displacement of soft clay soil formations.

Keywords : finite element method, geosynthetic, lateral displacement, settlement, soft clay

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