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Performance Analysis of Encased Sand Columns in Different Clayey Soils Using 3D Numerical Method

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Abstract : One of the most decent and low-cost options in soft clayey soil improvement is using stone columns to reduce the settlement and increase the bearing capacity which is used for different ways to do this in various projects with diverse conditions. In the current study, it is tried to evaluate this improvement method in 4 different weak soils with diverse properties like specific gravity, permeability coefficient, over consolidation ratio (OCR), poison's ratio, internal friction angle and bulk modulus by using ABAQUS 3D finite element software. Increment and decrement impacts of each mentioned factor on settlement and lateral displacement of weak soil beds are analyzed. In analyzed models, the properties related to sand columns and geosynthetic cover are assumed to be constant with their optimum values, and just soft clayey soil parameters are considered to be variable. It's also demonstrated that OCR value can play a determinant role in soil resistance.

Keywords : stone columns, geosynthetic, finite element, 3D analysis, soft soils
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