

## 3D Numerical Analysis of Stone Columns Reinforced with Horizontal and Vertical Geosynthetic Materials

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**Abstract :** Improvement and reinforcement of soils with poor strength and engineering properties for constructing low height structures or structures such as liquid storage tanks, bridge columns, and heavy structures have necessitated applying particular techniques. Stone columns are among the well-known methods applied in such soils. This method provides an economically justified way for improving engineering properties of soft clay and loose sandy soils. Stone column implementation in these soils increases their bearing capacity and reduces the settlement of foundation build on them. In the present study, the finite difference based FLAC3D software was used to investigate the performance and effect of soil reinforcement through stone columns without lining and those with geosynthetic lining with different levels of stiffness in horizontal and vertical modes in clayey soils. The results showed that soil improvement using stone columns with lining in vertical and horizontal modes results in improvement of bearing capacity and foundation settlement.

**Keywords :** bearing capacity, FLAC3D, geosynthetic, settlement, stone column

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