

## Comparison Study between Deep Mixed Columns and Encased Sand Column for Soft Clay Soil in Egypt

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**Abstract :** Sand columns (or granular piles) can be employed as soil strengthening for flexible constructions such as road embankments, oil storage tanks in addition to multistory structures. The challenge of embedding the sand columns in soft soil is that the surrounding soft soil cannot avail the enough confinement stress in order to keep the form of the sand column. Therefore, the sand columns which were installed in such soil will lose their ability to perform needed load-bearing capacity. The encasement, besides increasing the strength and stiffness of the sand column, prevents the lateral squeezing of sands when the column is installed even in extremely soft soils, thus enabling quicker and more economical installation. This paper investigates the improvement in load capacity of the sand column by encasement through a comprehensive parametric study using the 3-D finite difference analysis for the soft clay of soil in Egypt. Moreover, the study was extended to include a comparison study between encased sand column and Deep Mixed columns (DM). The study showed that confining the sand by geosynthetic resulted in an increment of shear strength. That result paid the attention to use encased sand stone rather than deep mixed columns due to relative high permeability of the first material.

**Keywords :** encased sand column, Deep mixed column, numerical analysis, improving soft soil

**Conference Title :** ICGEG 2017 : International Conference on Geotechnical Engineering and Geology

**Conference Location :** Amsterdam, Netherlands

**Conference Dates :** February 07-08, 2017