

# UNDRAINED SHEAR STRENGTH OF SOFT CLAY REINFORCED WITH SINGLE ENCAPSULATED LIME BOTTOM ASH COLUMN

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## ABSTRACT

Soft clay soils are type of problematic soil that causes bearing capacity failure and excessive settlement, leading to severe damage to buildings and foundation. In this study, bottom ash is used to replace the natural aggregate while quicklime is used to increase the bonding between bottom ash particles. This research is aimed to investigate the role of single encapsulated lime bottom ash column (LBAC) in improving the shear strength by using laboratory scale model. Kaolin is being used as soil sample while lime bottom ash as the reinforced column and the column is encapsulated with non-woven geotextile. Laboratory tests are conducted to determine the physical properties of bottom ash, kaolin clay, and quicklime sample. Unconfined Compression Test (UCT) also used to test the shear strength of the reinforced kaolin samples. There are 21 kaolin samples being tested in this study and the dimension of the specimen used is 50mm in diameter and 100mm in height. However, there are two different types of diameter of single lime bottom ash column being used which are 10mm and 16mm. The heights of the column are 60mm, 80mm and 100mm. The improvement of shear strength of single encapsulated lime bottom ash column with area replacement ratio of 4.00% (10mm column diameter) and 10.24% (16 mm column diameter) are 43.58%, 50.00%, 49.17% and 38.08%, 42.67%, 32.75% at sample penetration ratio,  $H_c/H_s$  of 0.6, 0.8 and 1.0 respectively. It can be concluded that the shear strength of soft clay could be improved by installation of single encapsulated lime bottom ash column.

**Keywords:** sand column, sustainable construction, single encapsulated lime bottom ash column