

Shear Strength of Soft Soil Reinforced with Singular Bottom Ash Column

M.S.I.Zaini, M.Hasan* and M.H.Mohd Ali

College of Engineering, Universiti Malaysia Pahang, 26300 Gambang, Pahang, Malaysia

*Corresponding author: muzamir@ump.edu.my

Abstract

Structures construct on soft clays are often affected by stability and settle-ment problems due to high compressibility, low shear strength and low per-meability of soft clay which will lead to bearing capacity failure and exces-sive settlement. The soft clay samples had the dimensions of 50 mm diameter and 100 mm in height. The bottom ash column had two (2) different area re-placement ratios which were 4% and 9% (10 mm and 15 mm diameters re-spectively) with the bottom ash column penetration ratio of 0.3, 0.7 and 1.0. The results of the unconfined compression test show that there is an im-provement in shear strength of soft kaolin clay when reinforced with bottom ash column. For samples with area replacement ratio 4%, the results show the increment of 25%, 37.5% and 50% at H_c/H_s of 0.3, 0.7 and 1.0, respectively in shear strength. Meanwhile, for samples of 9% area replacement ratio, the shear strength of the soft kaolin clay increased about 14.29, 28.57 and 57.14%, respectively. It can be concluded that by reinforcing the soft clay us-ing singular bottom ash column, the shear strength of the soils increases and become more significant as the area replacement ratios and the column pene-tration ratios increase.

Keywords: Ground improvement; Bottom ash column; Shear strength; Stone column; Bottom ash.