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Undrained Shear Strength of Soft Clay Reinforced with Single Encapsulated Bottom Ash Columns

Muzamir Hasan
Universiti Malaysia Pahang
muzamir@ump.edu.my

Suzillco Suki
Universiti Malaysia Pahang
suzillcosuki@gmail.com

Abstract

Stone column is one of the most commonly used in soil improvement technique around the world which capable to increase the bearing capacity of soft clay and reduce settlement of structure constructed on them. Due to its higher value of strength and stiffness, it can sustain larger proportion of the applied load which improves the performance of foundation beds. Meanwhile, the substantial amount of bottom ash disposed in the landfills have causes a serious environment pollution. As the bottom ash is part of the residue of combustion of coal and also the by-product produced in a furnace of the power plant. Hence, by reutilize the bottom ash as granular material in vertical granular column, the cost of construction can be reduced and able to achieve more strength of soft clay after being reinforced with a single bottom ash column which been encapsulated with geotextile. Remolded specimens of 50 mm in diameter and 100 mm in height soft kaolin clay installed with single encapsulated bottom ash columns with 10 mm and 16 mm diameter was subsequently tested under Unconfined Compression Test. It can be concluded that the shear strength parameters shows some significant improvement on encapsulated and non-encapsulated bottom ash columns and were affected by the diameter and height of the column.

Keyword: bottom ash, shear strength, encapsulated bottom ash columns

1. Introduction

Constructing structure on poor ground such as soft clay will affect the stability and settlement of the structure. There are numbers of ground improvement methods that can be used to improve the soft clay properties such as preloading, sand drains, piling, vibrated granular columns, stone column and sand column.