

Atijit Sukpunya 2014: Stress-Strain Behavior of Soil Cement Column by Large Direct Simple Shear Test. Master of Engineering (Civil Engineering), Major Field: Civil Engineering, Department of Civil Engineering. Thesis Advisor: Assistant Professor Apiniti Jotisankasa, Ph.D. 234 pages.

This research is aimed at studying stress-strain behavior of soft clay stabilized with soil cement column (SCC) in a newly developed large direct simple shear apparatus. This study is also intended to improve the understanding of failure mechanism assumption of SCC-stabilised soil, subject to lateral loading condition. Another aim is to compare the efficiency of different SCC-stabilization patterns, namely, Square Single Column, Longitudinal Wall Column, and Transverse Wall Column, with reconstituted soft clay without SCC-stabilization. This study also proposed empirical relationships to estimate shear strength of soft clay with SCC-stabilization.

Results of this study indicate that soft clay with all SCC-stabilization patterns has two failure mechanisms of the SCC in common, namely, bending failure and tilting failure. With Longitudinal Wall Column (LWC) pattern, bending failure of SCC was more frequently observed and, if considering the efficiency of stabilization, LWC pattern shows tendency of higher shear strength compared with other patterns, for shear strain about 10-12%. On the other hand, for smaller values of shear strain, Square Single Column (SSC) pattern showed higher shear strength. By and large, LWC pattern tended to have greater shear strength than soil without SCC stabilization both in drained and undrained conditions. LWC pattern also exhibited lower excess pore water pressure during shearing than other patterns of stabilization. In addition, empirical relationships were proposed to estimate the shear strength of soft clay with different SCC-stabilization patterns which can be used as a guideline for design and analysis of SCC stabilized soil in the future.

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