

THESIS INFORMATION

Title: EFFECT OF MONTMORILLONITE CONTENT ON THE BEARING CAPACITY OF SOFT GROUND IMPROVED BY DEEP CEMENT MIXING COLUMNS.

Major: Geotechnical Engineering

Major Code: 62.58.60.01

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Mekong Delta, the largest delta in Vietnam, covered by Holocene sediment due to sedimentation of Mekong River system. The soft clay in this area usually contains minerals, including Montmorillonite (MMT), Illite, Chlorite, and Kaolinite. The presence of MMT in clay has been reported to significantly affect to the swelling properties of the soil. The development of swelling pressure or shrinkage of swelled soil could reduce the stability of light building constructs and macroscopic structures of road surface.

This research study focused on the influence of MMT content onto the unconfined compressive strength of Cement Deep Mixing (CDM) by using the unconfined compression test, X-ray CT method and laboratory scale model. All samples were stabilized in fresh water for 7, 14 and 28 days before performing the test. The effect of MMT content on the unconfined compression property of CDM specimens has been performed using the standard samples (the diameter of 50 mm and the height of 100 mm), which were made of Kaolinite clay, cement (20%) and different MMT content (0%, 3,3%, 6,5% and 9,8%) with 80% water content. From the experimental results, we found that the unconfined compressive strength of CDM specimens and the CT-value of soil cement specimens decreased with increasing the MMT content. The similar behavior was also observed in the CDM specimens made of Mekong delta clay with different MMT contents. This study also provide a good reference chart to optimize the cement and MMT contents for improving the unconfined compressive strength of the CDM specimens made of clays, which contain different amount of MMT, including clay from Mekong River delta.

In addition, the 1-g laboratory model has been used to evaluate the influence of MMT content in the clays on the compressive strength of soft ground supported CDM columns. The results proved that the compressive strength of soft ground improved by CDM columns when the MMT content increased.

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