

Sompong Rojkansadarn 2009: Soil Properties Effect on Construction of Soil-Cement Column: Case Study on Drainage System Suvarnabhumi International Airport Project. Master of Engineering (Civil Engineering), Major Field: Civil Engineering, Department of Civil Engineering. Thesis Advisor: Associate Professor Warakorn Mairaing, Ph.D. 141 pages.

The signification of soil improvement on foundation of the road embankment is considerably important and acting as one major part of the drainage system of Suvarnabhumi International Airport. The construction of 246,300 soil-cement columns has strengthened soil body and much more able to support the heavy traffic load on the road embankment, since they have been constructed parallel to the main drainage canal. The test performance of soil-cement and the data collection have been treated and interpreted efficiently. By using the Geographic Information System (GIS), this research evidently presents the soil profile characteristic and statistical relationship among the soil properties. Finally the key procedure is zoning area of soil layer and has compared the construction method of soil-cement column from the whole test performance.

From the research result, Bangkok Clay can be divided into different layers according to the soil properties and strength characteristics. Upper layers from 0.00 to 15.00 meters (M.S.L.), the next consisting of stiff clay from 15.00 to 20.00 meters (M.S.L.) and layers of clayey sand above the layer of first sand which is located at the depth of 20.00 meters (M.S.L.). The analysis of soil strength versus depth characteristic within the multi layer soil stratum was then interpreted and classified into two typical patterns. The first is called soil strength line pattern "C" (SSL"C") and the second is called soil strength line pattern "CC" (SSL"CC"). Soft Clay in considerable project area is high plasticity clay with has the mean of Plasticity Index (PI) about 55%, and the mean of natural water content (W_n) is very close to the Liquid Limit (LL) that is between 83% and 93%. The mean of Undrained Shear Strength from Unconfined Compression Test (S_{uc}) is 1.18 t/m^2 . Also when compare the physical properties and engineering properties of soil-cement column, it shows that the High Pressure Mechanical Mixing Method and Low pressure Mechanical Mixing represent the properties nearly equal in strength and elasticity. A part of Modified Dry Mixing Method and Jet Grouting Method represent the properties of high strength and consider a hard material but more brittle.

Student's signature

Thesis Advisor's signature