# PENGARUH METODE GABUNGAN KOLOM PASIR *VERTICAL DRAINS* DAN *LAYER* PASIR *HORIZONTAL DRAINS* SERTA PENGGUNAAN TRUCUK BAMBU TERHADAP PENURUNAN TANAH LEMPUNG MENGGUNAKAN UJI LABORATORIUM

Oleh:

Ridwan Kurniawan
NIM 16510134014

## ABSTRAK

Tanah lempung merupakan tanah yang mempunyai daya dukung rendah, memiliki sifat kohesif, bersifat kembang susut yang tinggi, penurunan yang besar, dan waktu proses konsolidasi lama. Tujuan dari penelitian ini mengetahui klasifikasi jenis tanah, properti tanah pengujian dan pengaruh penggunaan metode gabungan kolom pasir *vertical drains* dan *layer* pasir *horizontal drains* terhadap penurunan tanah lempung.

Penelitian ini termasuk eksperimen dengan menggunakan model. Ada 2 variasi pengujian yaitu metode gabungan kolom pasir *vertical drains* dan *layer* pasir *horizontal drains* yang dibuat di boks besi berukuran 100 cm x 100 cm x 40 cm. Untuk setiap variasi pengujian berukuran 50 cm x 50 cm sedalam 20 cm pada drainase vertical dan sedalam 10 cm pada perkuatan trucuk bambu. Pengamatan dilakukan dengan cara memberi beban di atas tanah menggunakan bandul beban konsolidasi dan penurunan dicatat seperti pencatatan waktu proses konsolidasi laboratorium. Data berupa penurunan tanah dan penurunan kadar air dan diolah dengan analisis akar waktu derajat konsolidasi 90% dan analisis penurunan tanah.

Hasil dari penelitian ini didapatkan jenis tanah termasuk jenis CH menurut klasifikasi USCS dan kelompok 4-7-6(40) menurut klasifikasi AASTHO, G=2.63, LL=74.71%, PL=29.76%, IP=44.95%, SL=19.06%, C=0.75 kg/cm$^2$. Pengaruh penggunaan metode gabungan *vertical drains* dan *horizontal drains* mengurangi penurunan tanah sebesar 45.05 %, waktu untuk mencapai derajat konsolidasi 90% sebesar 89.44% dan mengurangi kadar air sebesar 5.94%, sedangkan untuk perkuatan trucuk bambu efektif pada beban ringan tetapi mengalami penurunan yang drastis pada beban 0.1 kg/cm$^2$ yaitu 2.95 mm hanya selisih 0.678% atau 0.02 mm, waktu untuk mencapai derajat konsolidasi sebesar 144 menit pada tekanan 0.05 kg/cm$^2$ dan 11.56 menit pada tekanan 0.1 kg/cm$^2$, dan mengurangi kadar air sebesar 0.176 % dibandingkan dengan tanah asli tanpa drainase dan perkuatan.

**Kata kunci: *horizontal drains*, tanah lempung, trucuk bambu, *vertical drain***

# THE EFFECTS OF THE COMBINED METHODS OF VERTICAL DRAINS SAND COLUMN AND HORIZONTAL DRAINS SAND LAYER AND THE USE OF TRUCUK BAMBOO ON CLAY DECREASE USING LABORATORY TEST

By:

Ridwan Kurniawan
NIM 16510134014

## Abstract

*Clay is a soil that has a low carrying capacity, has cohesive properties, has high shrinkage properties, a large decrease, and a long time consolidation process. The purpose of this study was to determine the classification of soil types, soil properties testing and the effect of the use of a combined method of drains vertical sand column and horizontal drains sand layer on clay soil degradation.*

*This research included experiments using models. There are 2 variations of testing, namely the combined method of drains vertical sand columns and horizontal drains sand layers made in iron boxes measuring 100 cm x 100 cm x 40 cm. For each test variation sized 50 cm x 50 cm with 20 cm deep in vertical drainage and 10 cm deep in the reinforcement of trucuk bamboo. The observation were made by placing a load on the soil using a pendulum of consolidation load and the decrease is recorded as recording the time of the process of laboratory consolidation. The fact is form of soil degradation and water content reduction and treated with 90% consolidation time root analysis and soil degradation analysis.*

*The results of this research found soil types including CH species according to USCS classification and groups 4-7-6 (40) according to AASTHO classification, G = 2.63, LL = 74.71%, PL = 29.76%, IP = 44.95%, SL = 19.06%, C = 0.75 kg / cm2. The effect of the use of the combined vertical drains and horizontal drains method reduces soil degradation by 45.05%, the time to achieve a 90% consolidation degree is 89.44% and reduces water content by 5.94%, while for bamboo shoot reinforcement is effective at light loads but has a drastic decrease in load 0.1 kg / cm2 which is 2.95 mm only the difference of 0.678% or 0.02 mm, the time to reach the degree of consolidation is 144 minutes 0.05 kg / cm2 at pressure and 11.56 minutes at a pressure of 0.1 kg / cm2, and reduce water content by 0.176% compared to the original soil without drainage and reinforcement.*

***Keywords: clay, horizontal drains,* trucuk *bamboo, vertical drains***