SAND-LIME COLUMN STABILIZATION ON THE CONSOLIDATION OF SOFT CLAY SOIL

Final Project

To fulfill partial of requirement to

achieve S-1 graduate degree in Civil Engineering

Prepared by :

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UNIVERSITAS MUHAMMADIYAH SURAKARTA

2015

CERTIFICATION SHEET

SAND-LIME COLUMN STABILIZATION ON THE CONSOLIDATION OF SOFT CLAY SOIL

Final Project

Submitted and defended in Final Examination of

Final Project in front of Board of Examiners

On 8th May 2015

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DECLARATION OF AUTHORSHIP

Bismillahirrahmanirrahim

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Declare that this Final Project is made and presented by mine, except the quotations and summaries that I have explained from all of the sources. If at a later it is found that this Final Project is a product of plagiarism, I am willing to accept any legal consequences that may be imposed to me.

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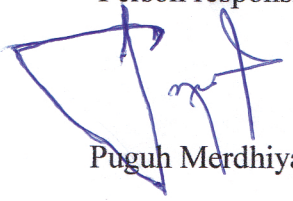

Puguh Merdhiyanto

MOTTO

"And whenever you give your word, say the truth"
(al-An`aam 6:152)

"The only way to have the greatest work in your life
is love what you do first"
(Anonim)

"You are creator for your own future "
(Anonim)

"Idza shodaqol 'azmu wadhohas sabil"
(Mahfudzot)

"Do your own thingking independently
Be the chess player, not the chess piece"
(Anonim)

"Make up one idea. Make that idea on your life
– think of it, dream of it, live on that idea.
Let the brain, muscles, nerves, every part
of your body, be full of that idea,
and just leave every other idea alone.
This is the way to success.
(Swami Vivekananda)

PREFACE

Assalamu'alaikum Wr. Wb.

Alhamdulillah, all praise to Allah azza wa jalla who has given blessing and mercies until this Final Project can be completed. This Final Project to complete most the requirement to achieve S-1 graduate degree in Civil Engineering Department, Engineering Faculty, Universitas Muhammadiyah Surakarta. The author also says thanks for all parties who give any support for arrangement this Final Project until it can be completed.

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The author realize that the arrangement this Final Project is not a perfect one. Because of that, the author hope there are any suggestion and criticism to make this Final Project better and can be useful for us. Aminnn

Wassalamu`alaikum Wr.Wb.

Surakarta, 8th May 2015

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ABSTRACT

The area in Indonesia has many kind of soft clay, can be found in Central Java area includes Blora, Purwodadi, Solo, Sragen, Klaten and Yogyakarta. It exposes a problem when building on soft clay sites. Therefore to improve infrastructure, many construction activities are increasingly focused on the behavior of the soil. Especially with different soil conditions not always the same in each area of construction that requires accuracy in the planning and execution of construction itself. To overcome the soil conditions are not as expected, then there are several techniques used in order to improve the quality of a particular soil, among which are add other materials (lime) and the vertical drain technique. This research aims to determine the effect of sand-lime column stabilization on soft clay soil from Troketon Pedan Klaten in terms of the consolidation coefficient (Cv), compression index (Cc), and the settlement consolidation (Sc) along with some physical properties. Spacing sampling variation is 50 cm; 33.33 cm and 16.67 cm from sand-lime column. The results physical properties show, from spacing sampling variation of the sand-lime column that specific gravity (Gs) and liquid limit (LL) values decreased, whereas the plastic limit (PL) and shrinkage limit (SL) values actually increased, whereas plasticity index (PI) decreased when the closer spacing sampling of sand-lime column. From the test mechanical properties results show, the closer the sampling of the sand-lime column Cv value tends to increase, the highest average Cv values are 0.00177 cm^2/s occur in soil samples 16.67 cm from sand-lime column. While the value of compression index (Cc) tends to decrease, the Cc value was smallest are 0.655 occur in the soil samples using a sand-lime column at a spacing sampling 16.67 cm. While settlement consolidation (Sc) decreases, the smallest Sc value are 0.245 cm occurs in soil samples with sand-lime column at a spacing of 16.67 cm. Based on the above study showed that the addition of sand-lime column can increase/improve the physical properties and mechanical properties of soft clay from Troketon Pedan Klaten.

Keywords: Coefficient Consolidation, Compression Index, Physical Properties, Sand-lime Column, Settlement Consolidation, Soft Clay.