

I. INTRODUCTION

1.1. Background

In Indonesia the existence of clays becomes problems in construction project area such as for infrastructure development. Soil improvement for problematic soil is required especially for construction project area. Problematic soils are commonly characterized by low strength and high compressibility (Ho and Chan, 2011; Huat, 2006; Kazemian et al., 2011). It can be achieved by stabilization or modification through the soil. Many of soil improvement method focus in order to improve the index properties and increasing the strength of soil related to the material properties. Moreover, the advantage of this method is it can achieve the adequate strength in a short time.

Considering about environmental issue, many studies try using waste material as soil stabilizer additive, such as fly ash, rice husk ash, bagasse ash and biomass ash. Waste materials has been widely applied in practice. Nevertheless, the utilization of press mud from sugarcane waste as a stabilizer is limited in engineering practice. Whereas, press mud can be used as alternative for soil stabilizer in soil improvement.

Press mud is a waste from sugar cane industry. Physically press mud is soil-like waste material. Press mud is the residue from the filtration of sugar cane juice before proceeded to the concoction and crystallization. In sugarcane industry, press mud is produced in huge amount but its utilization is not maximized. The reason

because press mud is easily burnt and contains high organic dosage, therefore it was disposed and no action to utilize it.

Lime has been is used to stabilize clays. In addition to press mud, lime needed to makes a pozzolanic reaction between the two materials. Lime (Ca(OH)_2 -rich materials) need to combine with press mud as a pozzolanic material to improve properties of clays. However, the optimal input of press mud mixed with lime can control strength development.

This study attempts to solve the environmental issue by using press mud as a soil-like waste material for soil improvement. In order to solve those problem, it is needed to investigate the strength characteristics of lime-press mud stabilized clays. Appropriate applications to utilize of lime-press mud are important to be developed as a cementitious material.

1.2. Problem statement

The existence of clays in construction project needs for solve. Regarding to environmental issue, this study is done intended to know about:

1. The changes in the index properties of lime-clay mixtures.
2. Does soil stabilization use lime-press mud can improve the strength of the clays?

1.3. Problem scope

In this research, several problem limitations were stated in order to achieve the main objectives. Problem limitations in this research are:

1. This study focused on the shear behaviour of clays.
2. Clay classified by doing physical and mechanical test.
3. This research using clays from Godean, Special Region of Yogyakarta.
4. Limestone is taken from Gunung Kidul, Special Region of Yogyakarta.
5. Press mud is taken from PT. Madukismo, Bantul, Special Region of Yogyakarta.
6. To investigate the strength of clays, direct shear test will be used.
7. The variations of lime content are 0%, 2%, 4%, 6% and 8%.
8. The variations of press mud content are 0%, 10%, 15% and 20%.

1.4. Originality

Environmental issue becomes interesting topics in engineering field. Many studies try using waste material as soil stabilizer additive. Nevertheless, the utilization of press mud from sugarcane waste as a stabilizer is limited in engineering practice. Press mud as a pozzolanic material needs to be combined with lime (Ca(OH)_2 -rich materials) to improve properties of clays. According to the author's knowledge the study about shear behaviour of lime-press mud stabilized clays using direct shear test has not been executed by other researchers.

1.5. Objectives and benefits

This study was done in order to:

1. Investigate the changes in the index properties of clays by varying the proportions of lime.
2. Find the best mixture of lime-press mud stabilize clays to get the optimum result in order to improve the soil properties.

