

ABSTRAK

Tanah adalah lapisan dasar perletakan suatu struktur konstruksi harus mempunyai sifat dan daya dukung yang baik, karena kekuatan suatu struktur secara langsung akan dipengaruhi oleh kemampuan tanah dasar dalam menerima dan meneruskan beban yang bekerja. Stabilisasi tanah merupakan suatu proses untuk memperbaiki sifat-sifat tanah dengan menambahkan sesuatu pada tanah tersebut, agar dapat menaikkan kekuatan tanah dan mempertahankan kekuatan geser. Pencampuran tanah dapat dilakukan dengan menggunakan bahan-bahan buatan pabrik agar sifat-sifat teknis dari tanah bisa lebih baik. Salah satu limbah yang dihasilkan dari pabrik adalah *fly ash*. *Fly ash* adalah limbah hasil pembakaran batu bara pada tungku pembangkit listrik tenaga uap yang berbentuk halus, bundar, dan bersifat *pozzolan*. Penelitian ini bertujuan untuk mengetahui pengaruh matos *soil stabilizer* pada campuran *fly ash* dan tanah terhadap karakteristik kembang susut tanah. Tahapan penelitian terdiri atas 2 tahapan, tahap pertama berupa pengujian pendahuluan berupa pengujian sifat fisik tanah yang terdiri atas : berat jenis, batas-batas atterberg, analisa hydrometer dan saringan. Kemudian tahap kedua berupa pengujian sifat mekanis tanah berupa pengujian pemadatan, pengujian pengembangan, pengujian *swelling pressure* dan pengujian *free swelling index*. Pengujian sifat fisik dan mekanis tanah dilakukan pada campuran 10% *fly ash* dan variasi 1%, 2%, 4%, dan 8% matos *soil stabilizer*. Dari hasil penelitian didapatkan untuk tanah terganggu yaitu nilai indeks plastisitas 21,937% klasifikasi tanah berdasarkan AASTHO A-7-6, berdasarkan USCS termasuk MH, dan berdasarkan USDA termasuk lempung berlanau, memiliki pengembangan sebesar 2,653% , memiliki *swelling pressure* sebesar 2,427%, dan *free swelling index* sebesar 26,667%. Berdasarkan nilai-nilai tersebut tanah kapala memiliki potensi pengembangan sedang. Maka ditambahkan *bentonite* sebanyak 40% sehingga didapatkan hasil indeks plastisitas sebesar 36,437%, pengembangan 5,533% , *swelling pressure* sebesar 4,133 dan *free swelling index* sebesar 45,455% yang semua hasil yang menggunakan *bentonite* termasuk kedalam potensi pengembangan tinggi. Pada pengujian dengan variasi didapatkan nilai terbaik pada campuran 8% matos *soil stabilizer* dengan nilai indeks plastisitas 10,073%, pengembangan 1,269% , *swelling pressure* sebesar 1,246% dan *free swelling index* sebesar 6,667%. Didapatkan peningkatan pada setiap pengujian antara lain : pada pengujian indeks plastisitas sebesar 48,005% 59,201% 62,297% 71,714%, pengujian pengembangan (metode CBR) sebesar 58,592%, 72,161%, 72,226%, 76,338%, pengujian *swelling pressure* sebesar 41,368%, 50,489%, 51,140%, 69,055% dan untuk pengujian *free swelling index* sebesar 34,545%, 52,00%, 56,364%, 84,00%. Sehingga dapat diambil kesimpulan bahwa dengan semakin banyak kadar matos *soil stabilizer* yang digunakan maka semakin menurun pengembangan dari tanah.

Kata Kunci : Matos *Soil Stabilizer*, *Fly ash*, *Bentonite* , *Swelling*, Stabilisasi, Tanah.

ABSTRACT

Soil as the base layer for laying a construction structure must have good properties and carrying capacity, because the strength of a structure will directly be affected by the ability of the subgrade soil to receive and transmit the working load. One type of soil that has a low carrying capacity is expansive soil. Expansive soil is clay soil that has a high swelling and shrinkage when there is a change in the soil water content system. So to fix the soil problem, soil stabilization is carried out. Soil stabilization is a process to improve soil properties by adding something to the soil, in order to increase soil strength and maintain shear strength. Soil mixing can also be done using factory-made materials so that the technical properties of the soil can be better. One of the waste generated from the factory is fly ash. Fly ash is a waste product of coal combustion in a steam power plant furnace which is smooth, round and pozzolanic in shape. This study aims to determine the effect of matos soil stabilizer in a mixture of fly ash and soil on the swelling and shrinkage characteristics of the soil. The research phase consists of 2 stages, the first stage is in the form of preliminary testing in the form of testing the physical properties of the soil consisting of: specific gravity, atterberg limits, hydrometer and sieve analysis. Then the second stage is testing the mechanical properties of the soil in the form of compaction testing, swelling testing, swelling pressure testing and free swelling index testing. Testing of the physical and mechanical properties of the soil was carried out on a mixture of 10% fly ash and variations of 1%, 2%, 4% and 8% matos soil stabilizer. From the research results, it was found that for disturbed soil, the plasticity index value was 21.937%, the soil classification was based on AASTHO A-7-6, based on USCS including MH, and based on USDA including silt clay, had a swelling of 2.653%, had a swelling pressure of 2.427%, and free swelling index of 26.667%. Based on these values, capkala land has moderate development potential. Then 40% of bentonite was added to produce a plasticity index of 36.437%, swelling of 5.533%, swelling pressure of 4.133 and a free swelling index of 45.455%, all of the results using bentonite are included in high swelling potential. In the test with variations, the best value was obtained for a mixture of 8% matos soil stabilizer with a plasticity index value of 10.073%, swelling of 1.269%, swelling pressure of 1.246% and free swelling index of 6.667%. There was an increase in each test, including: on the plasticity index test of 48.005% 59.201% 62.297% 71.714%, development test (CBR method) of 58.592%, 72.161%, 72.226%, 76.338%, swelling pressure test of 41.368%, 50.489% , 51.140%, 69.055% and for free swelling index testing of 34.545%, 52.00%, 56.364%, 84.00%. So it can be concluded that the more levels of matos soil stabilizer used, the lower the development of the soil.

Keywords: Matos Soil Stabilizer, Fly ash, Bentonite ,Swelling, Stabilization, Soil.