

## Abstrak

Tanah merupakan unsur penting dalam suatu konstruksi karena beban struktur apapun pasti akan ditopang oleh tanah melalui pondasi. Di Indonesia tanah jenis lempung merupakan yang paling umum ditemui dengan karakteristik memiliki plastisitas yang tinggi serta kembang susut yang besar pada tempat tertentu. Penelitian ini bertujuan untuk mengetahui sifat fisik dan mekanik tanah, mengetahui perubahan daya dukung tanah asli dan tanah yang telah dicampur dengan bahan stabilisasi, mengetahui efektifitas penambahan serbuk keramik pada peningkatan daya dukung tanah.

Perbaikan tanah dilakukan dengan penambahan bahan stabilisasi berupa serbuk keramik dengan presentase 0%, 5%, 10%, 15%, 20% dan 25%. Tanah sampel berasal dari Desa Warukaranganyar, Purwodadi, Grobogan. Pengujian dilakukan di Laboratorium Mekanika Tanah Unissula dengan mengacu pada Standar Nasional Indonesia (SNI).

Setelah dilakukan percobaan di laboratorium tanah sampel termasuk dalam kategori tanah lempung plastisitas tinggi (USCS) dan kelompok A-7-6 (AASHTO), dengan  $G_s=2,48$ , nilai PI 32%,  $w_{opt}$  22,8%,  $\gamma_d$  1,44 kg/cm<sup>3</sup>,  $\phi$  (sudut geser dalam) 13° dan  $t_{90}$  sebesar 94,25 menit pada kondisi tanah asli (0% campuran). Setelah dilakukan penambahan serbuk keramik pada tanah sampel, nilai PI mengalami penurunan terendah pada kadar 5% serbuk dengan nilai 30,5%. Nilai  $w_{opt}$  mengalami penurunan terbesar pada kadar 5% serbuk dengan nilai 18%. Nilai sudut geser dalam ( $\phi$ ) secara kontinyu mengalami kenaikan seiring dengan penambahan serbuk keramik. Nilai  $t_{90}$  konsolidasi tercepat terjadi pada kadar 5% serbuk dengan nilai 81 menit. Kesimpulan dari penelitian ini adalah bahwa penambahan bahan stabilisasi serbuk keramik efektif dalam meningkatkan daya dukung tanah dengan presentase penambahan serbuk keramik sebesar 5%.

*Kata Kunci : Tanah Lunak, Stabilisasi, Lempung, Plastisitas, Kadar Air, konsolidasi, Grobogan.*

## Abstract

Soil is an important element in a construction because any structural load will definitely be supported by soil through the foundation. In Indonesia, clay type soil is the most commonly encountered with characteristics of high plasticity and large shrinkage growth. This research aims to determine the physical and mechanical properties of the soil, the changes in the original soil bearing capacity and the soil which has been mixed with stabilizing material, and the effectiveness of adding ceramic powder on increasing soil carrying capacity

Soil improvement is carried out by adding ceramic powder stabilization materials with a percentage of 0%, 5%, 10%, 15%, 20% and 25%. The sample soil came from Warukaranganyar Village, Purwodadi, Grobogan. The test is carried out at the Unissula Soil Mechanics Laboratory with reference to the Indonesian National Standard (SNI).

After soil experiments in laboratory, the samples were included in the category of high plasticity clay (USCS) and group A-7-6 (AASHTO), with  $G_s = 2.48$ , PI value 32%,  $w_{opt}$  22.8%,  $\gamma_d$  1.44 kg/cm<sup>3</sup>,  $\phi$  (shear strength) 13° and  $t_{90}$  in 94,25 minutes in the original soil condition (0% mixture). After adding ceramic powder to the sample soil, the PI value decreased the lowest at 5% powder with a value of 30.5%. The  $w_{opt}$  value experienced the largest decrease in the 5% content of powder with a value of 18%. The value of the shear strength ( $\phi$ ) continuously increases during the addition of ceramic powder. Fastest consolidation value  $t_{90}$  occurs at levels of 5% powder with a value of 81 minutes. The conclusion of this research is that the addition of ceramic powder stabilization material is effective in increasing the carrying capacity of the soil with the percentage of addition of ceramic powder by 5%.

*Keywords: Soil, Stabilization, Clay, Plasticity, Water Content, Consolidation, Grobogan.*