

ABSTRAK

Octorio Situmeang: *Studi Experimental Pemadatan Tanah Metode ASTM D-698 dengan Variasi Lapisan, Jumlah Tumbukan, dan Berat Penumbuk (Studi Kasus Tanah Lempung, Kelurahan Silandit, Kecamatan Padang Sidempuan Selaatan, Kabupaten Tapanuli Selatan)*. Skripsi. Fakultas Teknik Universitas Negeri Medan. 2024.

Penelitian ini bertujuan untuk mengkaji sifat fisik tanah lempung Desa Silandit, menentukan nilai berat isi kering dan kadar air optimum tanah dengan prosedur ASTM-D698, menganalisis pengaruh variabel pemadatan terhadap berat isi kering dan kadar air, serta memberikan rekomendasi optimalisasi pemadatan lapangan. Hasil pengujian menunjukkan bahwa tanah lempung Desa Silandit memiliki berat jenis $2,65 \text{ gr/cm}^3$, batas cair 59,61 %, batas plastis 44,81 %, dan indeks plastisitas 14,8, sehingga diklasifikasikan sebagai tanah lempung organik (OH) berdasarkan sistem USCS dan kelompok A-2-7 dengan Group Index (GI) 0 pada sistem AASHTO. Uji Proctor ASTM-D698 menghasilkan berat isi kering maksimum $1,37 \text{ gr/cm}^3$ dengan kadar air optimum 32,98 %. Sedangkan dengan kombinasi variabel jumlah lapisan dan jumlah tumbukan berat isi kering berada dalam rentang $1,06 - 1,48 \text{ gr/cm}^3$ pada kadar air 23 – 47 %. Analisis statistik menunjukkan jumlah lapisan berkontribusi sebesar 72,6% terhadap berat isi kering dan 46,6% terhadap kadar air, sementara jumlah tumbukan berkontribusi masing-masing 8,4% terhadap berat isi kering dan 13,7% kadar air optimum. Disarankan untuk meningkatkan jumlah lapisan dahulu sebelum meningkatkan jumlah tumbukan dalam kondisi lapangan untuk mencapai kepadatan optimal, dengan contoh hasil laboratorium menunjukkan konversi 15 lintasan pada vibrator tandem roller setara dengan kombinasi 5 lapisan dan 25 tumbukan.

Kata kunci: Berat Isi Kering, Jumlah Lapisan, Jumlah Tumbukan, Kadar Air Optimum

ABSTRACT

Octorio Situmeang: *Experimental Study of Soil Compaction Using ASTM D-698 Method with Variations in Layers, Number of Blows, and Rammer Weight (Case Study of Clay Soil in Silandit Village, Padang Sidempuan Selatan District, Tapanuli Selatan Regency)*. Thesis. Faculty of Engineering, State University of Medan. 2024.

This research aims to study the physical properties of clay soil from Silandit Village, determine the dry unit weight and optimum moisture content of the soil using the ASTM-D698 procedure, analyze the effect of compaction variables on dry unit weight and moisture content, and provide recommendations for optimizing field compaction. Test results indicate that the clay soil in Silandit Village has a specific gravity of 2.65 g/cm^3 , a liquid limit of 59,61 %, a plastic limit of 44,81 %, and a plasticity index of 14.8. It is classified as organic clay (OH) based on the USCS system and as group A-2-7 with a Group Index (GI) of 0 according to the AASHTO system. Proctor tests following ASTM-D698 yielded a maximum dry unit weight of 1.37 g/cm^3 with an optimum moisture content of 32,98 %. Variations in the number of layers and blows resulted in dry unit weights ranging from 1.06 to 1.48 g/cm^3 at moisture contents between 23 % and 47 %. Statistical analysis shows that the number of layers contributes 72.6% to the dry unit weight and 46.6% to the moisture content, while the number of blows contributes 8.4% to the dry unit weight and 13.7% to the optimum moisture content. It is recommended to increase the number of layers before increasing the number of blows in field conditions to achieve optimal compaction, with laboratory results demonstrating that 15 passes of a vibratory tandem roller are equivalent to a combination of 5 layers and 25 blows.

Keywords: Dry Unit Weight, Number of Blows, Number of Layers, Optimum Moisture Content