

ABSTRAK

Ance Fungki Manik: Analisis Perubahan Kuat Tekan Bebas dan Kuat Geser Tanah Lempung yang Dicampur Dengan Kombinasi Abu Sekam Padi, NaOH dan Abu Sekam Padi Ditambah NaOH. Skripsi. Fakultas Teknik. Universitas Negeri Medan. 2025.

Tanah lempung merupakan salah satu jenis tanah dengan karakteristik yang umumnya memiliki daya dukung yang rendah dan kurang baik digunakan sebagai bahan dasar konstruksi karena sifat dari mineral lempung yang mudah menyerap dan menyimpan air. Penelitian ini bertujuan untuk menganalisis perubahan kuat tekan bebas dan kuat geser tanah lempung yang dicampur dengan kombinasi abu sekam padi, NaOH, dan abu sekam padi ditambah NaOH. Metode penelitian mencakup uji laboratorium terhadap sampel tanah asli dan tanah yang telah distabilisasi dengan variasi kadar bahan tambah dengan pemeraman sampel selama 7 hari. Hasil penelitian menunjukkan bahwa penambahan kombinasi abu sekam padi, NaOH, dan abu sekam padi ditambah NaOH menunjukkan perubahan pada setiap variasinya. Pengujian menunjukkan bahwa penambahan abu sekam padi cenderung memperbaiki sifat indeks tanah, seperti menurunkan kadar air, batas cair, dan plastisitas, serta meningkatkan batas susut dan berat jenis. Penambahan NaOH justru cenderung meningkatkan nilai plastisitas dan batas cair, serta memberikan hasil yang fluktuatif terhadap berat jenis. Kombinasi abu sekam padi dan NaOH memberikan pengaruh paling signifikan dalam menurunkan kadar air dan plastisitas, serta meningkatkan batas susut dan berat jenis. Dari aspek kekuatan, tanah yang dicampur abu sekam padi menunjukkan peningkatan kuat tekan bebas dan kuat geser pada campuran dengan persentase 8% abu sekam padi, meskipun cenderung menurun pada kadar yang lebih tinggi. Campuran NaOH cenderung menurunkan nilai kuat tekan bebas dan nilai kuat geser meningkat pada variasi 10% namun tidak begitu signifikan. Sedangkan penambahan abu sekam padi ditambah NaOH menyebabkan kuat geser cenderung meningkat pada variasi tertentu. Namun demikian, nilai kuat tekan bebas menunjukkan tren penurunan drastis, yang mengindikasikan bahwa meskipun interaksi kimia antara kedua bahan dapat meningkatkan kohesi, namun tidak cukup membentuk struktur tanah yang mampu menahan beban aksial secara efektif.

Kata kunci: Tanah Lempung, Stabilisasi Tanah, Indeks Propertis, Kuat Tekan Bebas, Kuat Geser, Abu Sekam Padi, NaOH.

ABSTRACT

Ance Fungki Manik: *Analysis of Changes in Free Compressive Strength and Shear Strength of Clay Soil Mixed with Combination of Rice Husk Ash, NaOH and Rice Husk Ash Plus NaOH. Thesis. Faculty of Engineering, State University of Medan. 2025.*

Clay soil is one type of soil with characteristics that generally have low bearing capacity and are not suitable for use as a construction material due to the nature of clay minerals, which easily absorb and retain water. This study aims to analyze changes in the unconfined compressive strength and shear strength of clay soil mixed with a combination of rice husk ash, NaOH, and rice husk ash plus NaOH. The research method includes laboratory tests on original soil samples and stabilized soil samples with varying levels of additives, with the samples cured for 7 days. The results show that the addition of combinations of rice husk ash, NaOH, and rice husk ash plus NaOH results in changes in each variation. The tests showed that the addition of rice husk ash tended to improve soil index properties, such as reducing moisture content, liquid limit, and plasticity, while increasing shrinkage limit and specific gravity. The addition of NaOH, however, tended to increase plasticity and liquid limit values, and produced fluctuating results for specific gravity. The combination of rice husk ash and NaOH had the most significant effect in reducing moisture content and plasticity, as well as increasing shrinkage limit and bulk density. In terms of strength, soil mixed with rice husk ash showed an increase in unconfined compressive strength and shear strength in mixtures with an 8% rice husk ash content, although it tended to decrease at higher concentrations. The NaOH mixture tends to reduce the unconfined compressive strength value, while the shear strength value increases at the 10% variation but not significantly. Meanwhile, the addition of rice husk ash combined with NaOH caused shear strength to increase at certain variations. However, unconfined compressive strength showed a drastic decrease, indicating that while the chemical interaction between the two materials can enhance cohesion, it is insufficient to form a soil structure capable of effectively withstanding axial loads.

Keywords: Clay, Soil Stabilization, Property Index, Unconfined Compressive Strength, Shear Strength, Rice Husk Ash, NaOH.