

ABSTRAK

Dalam proyek konstruksi, tanah merupakan material utama yang menentukan kekuatan serta stabilitas struktur. Clay shale, yaitu batuan sedimen halus yang mudah melapuk, sering menimbulkan masalah seperti kelongsoran. Contoh kasus dapat ditemukan pada Jalan Tol Cipularang dan Hambalang. Penelitian ini bertujuan menguji stabilisasi tanah *clay shale* menggunakan campuran kapur untuk meningkatkan kuat tekan bebas pada Ruas Tol Serang–Panimbang STA 53+900. Penelitian dilakukan di lokasi tersebut karena jenis tanah *clay shale* yang bermasalah. Sampel tanah diambil dengan bantuan dosen pembimbing serta pekerja lokal, kemudian disimpan di Kampus S2 Universitas Sangga Buana YPKP sebelum diuji di laboratorium Kampus S1 untuk analisis stabilisasi menggunakan kapur.

Hasil pengujian menunjukkan peningkatan kuat tekan bebas yang signifikan seiring penambahan kapur: campuran 10% menghasilkan q_u 12,760 kg/cm², campuran 20% mencapai 19,404 kg/cm², dan campuran 30% mencapai 21,297 kg/cm². Semakin tinggi kadar kapur, semakin baik daya dukung tanah. Stabilisasi kapur terbukti efektif mengurangi sensitivitas tanah terhadap air dan meningkatkan kekuatan untuk konstruksi jalan tol. Disarankan penelitian lanjutan menggunakan bahan stabilisasi lain seperti semen atau polimer, serta melakukan pengujian kuat geser (*triaxial*) dan evaluasi jangka panjang untuk menilai perubahan kekuatan akibat faktor waktu, cuaca, dan kondisi lingkungan.

Kata kunci : Clay shale, Stabilisasi tanah, Kuat tekan bebas (UCS)

ABSTRACT

In construction projects, soil is the primary material that determines structural strength and stability. Clay shale, a fine-grained sedimentary rock that easily weathers, often causes problems such as landslides. Examples of such cases can be found on the Cipularang and Hambalang Toll Roads. This study aims to examine the stabilization of clay shale soil using lime mixtures to improve unconfined compressive strength (UCS) on the Serang–Panimbang Toll Road at STA 53+900. The research was conducted at this location due to problematic clay shale soil conditions. Soil samples were collected with the assistance of academic supervisors and local workers, stored at the postgraduate campus of Universitas Sangga Buana YPKP, and subsequently tested in the undergraduate laboratory to analyze lime stabilization.

Test results showed a significant increase in UCS with lime addition: 10% lime produced 12.760 kg/cm², 20% reached 19.404 kg/cm², and 30% reached 21.297 kg/cm². The higher the lime content, the better the soil bearing capacity. Lime stabilization proved effective in reducing soil sensitivity to water and improving its strength for toll road construction. Further studies are recommended using other stabilizing materials such as cement or polymers, performing shear strength tests (triaxial), and conducting long-term evaluations to assess strength changes due to time, weather, and environmental conditions.

Keywords: *Clay shale, Soil stabilization, Unconfined compressive strength*