

ABSTRAK

Serang–Panimbang di Provinsi Banten menghadapi tantangan geoteknik yang signifikan akibat keberadaan tanah lempung serpih (*clayshale*) di STA 53+900. Tanah jenis ini memiliki plastisitas tinggi, daya dukung rendah, serta sangat rentan terhadap pelapukan, sehingga tidak layak digunakan langsung sebagai lapisan dasar perkerasan jalan. Penelitian ini bertujuan untuk mengevaluasi efektivitas stabilisasi tanah clayshale menggunakan bahan kapur, dengan fokus pada peningkatan nilai CBR rendaman dan kuat tekan bebas (UCS). Pengujian dilakukan di laboratorium melalui serangkaian tes mekanik dan fisik terhadap sampel tanah asli serta sampel tanah yang dicampur kapur dalam berbagai kadar (10%, 20%, dan 30%). Hasil penelitian menunjukkan bahwa penambahan kapur, terutama pada kadar 30%, mampu meningkatkan nilai CBR dari 2,84% menjadi 9,93%, serta meningkatkan kepadatan maksimum dari 1,392 gr/cm³ menjadi 1,49 gr/cm³. Analisis mikrostruktur juga menunjukkan pembentukan agregat partikel yang lebih stabil dan berkurangnya pori mikro dalam tanah. Dengan demikian, stabilisasi tanah menggunakan kapur terbukti efektif dalam memperbaiki karakteristik tanah clayshale, menjadikannya lebih layak untuk mendukung konstruksi jalan tol di wilayah dengan kondisi tanah serupa.

Kata kunci: clayshale, stabilisasi tanah, kapur, CBR rendaman, kuat tekan bebas, daya dukung.

ABSTRACT

The construction of the Serang–Panimbang Toll Road in Banten Province faces significant geotechnical challenges due to the presence of clayshale soil at STA 53+900. This soil type has high plasticity, low bearing capacity, and is highly susceptible to weathering, making it unsuitable for direct use as a base layer for road pavement. This study aims to evaluate the effectiveness of clayshale soil stabilization using lime, with a focus on increasing the CBR (Cushion-to-Concrete) and unconfined compressive strength (UCS) values. Laboratory testing was conducted using a series of mechanical and physical tests on native soil samples and soil samples mixed with lime at various concentrations (10%, 20%, and 30%). The results showed that the addition of lime, particularly at a concentration of 30%, increased the CBR value from 2.84% to 9.93% and increased the maximum density from 1.392 g/cm³ to 1.49 g/cm³. Microstructural analysis also indicated the formation of more stable particle aggregates and a reduction in micropores in the soil. Thus, soil stabilization using lime has proven effective in improving the characteristics of clayshale soil, making it more suitable for toll road construction in areas with similar soil conditions.

Keywords: *clayshale, soil stabilization, lime, submerged CBR, unconfined compressive strength, bearing capacity.*