

INTISARI

Tanah dasar (*subgrade*) merupakan bagian yang penting dalam konstruksi jalan karena menopang beban perkerasan dan lalu lintas di atasnya. Salah satu cara mengatasi kerusakan konstruksi jalan akibat pengaruh tanah dasar berupa tanah lempung ekspansif yang mempunyai sifat kembang susut dan plastisitas tinggi adalah stabilisasi tanah secara kimiawi menggunakan kapur dan *Portland Composite Cement (PCC)* yang bertujuan memperbaiki karakteristik tanah dengan meningkatkan kapasitas dukung tanah asli agar dapat digunakan sebagai tanah dasar konstruksi jalan dan menurunkan *swelling*. Kapur akan efektif untuk tanah berplastisitas tinggi, sedangkan PCC akan efektif untuk percepatan pekerjaan, mudah didapatkan dan lebih ramah lingkungan.

Tanah asli yang berasal dari Kecamatan Sentolo, Kabupaten Kulon Progo diidentifikasi untuk mengetahui karakteristik dan klasifikasinya melalui uji difraksi sinar-X dan uji *index properties* yang dilaksanakan pada Laboratorium Geologi dan Laboratorium Mekanika Tanah Universitas Gadjah Mada. Selanjutnya ditentukan kadar kapur optimum dari campuran tanah dan variasi kadar kapur 0%, 2%, 4%, 6%, 8%, yang hasilnya dicampurkan dengan PCC dengan variasi kadar PCC 0%, 3%, 6%, 9%, 12%, untuk dianalisis pengaruhnya terhadap campuran tanah melalui uji fisis dan mekanis seperti uji *specific gravity*, batas *Atterberg*, analisis butiran, pemadatan (*proctor*), *California Bearing Ratio (CBR)* dan *swelling*.

Hasil pengujian menunjukkan bahwa tanah asli merupakan tanah lempung ekspansif dengan PI 45,92% dan nilai CBR 2,01%, yang didominasi mineral *smectite (montmorillonite)*. Campuran tanah dengan kapur kadar optimum 6% (berdasarkan CBR *unsoaked* 29,34%) dan PCC, menunjukkan perubahan karakteristik tanah asli, peningkatan nilai CBR dan penurunan *swelling*, seiring penambahan kadar PCC. Hasil campuran untuk pemeraman 7 (tujuh) hari dan perendaman 4 (empat) hari pada campuran tanah, 6% kapur (kapur optimum) dan 3% PCC telah memenuhi persyaratan *subgrade* dengan nilai CBR *soaked* 41,18% (meningkat 1946,88%), dan hasil campuran terbaik didapatkan pada campuran tanah, 6% kapur (kapur optimum) dan 12% PCC dengan nilai CBR *soaked* 189,91% (meningkat 9040,64%), PI sebesar 14,52% (menurun 68,02%) dan *swelling* sebesar 0,031% (menurun 99,21%) terhadap tanah asli.

Kata kunci : stabilisasi, *subgrade*, CBR, *portland composite cement*, kapur

ABSTRACT

Subgrade is an important part of road construction because it supports pavement loads and traffic on it. One way to overcome damage to road construction due to the influence of expansive clay subgrade which has shrinkage properties and high plasticity is the chemical stabilization of soil using lime and Portland Composite Cement (PCC) which aims to improve soil characteristics by increasing the support capacity of original soil in order to used as subgrade construction and lowering swelling. Lime will be effective for high plasticity soils, while PCC will be effective for accelerating work, easy to obtain and more environmentally friendly.

The original soil was taken from Sentolo Subdistrict, Kulon Progo Regency was identified to find out its characteristics and classification through X-ray diffraction test and index properties test carried out at the Geology Laboratory and Soil Mechanics Laboratory at Gadjah Mada University. The following phase was determined the optimum lime content from the mixtures between soil and variation of lime content 0%, 2%, 4%, 6%, 8%, and the result was mixed with PCC with variation of PCC 0%, 3%, 6%, 9%, 12%, to analyze its effect on soil mixture through physical and mechanical test such as specific gravity test, *Atterberg* limit, Grain size analysis, compaction (*Proctor*), California Bearing Ratio (CBR) and swelling.

The test results showed that the original soil was expansive clay soil with PI 45.92% and CBR value 2.01%, which was dominated by mineral smectite (montmorillonite). The optimum soil mixture with lime content is 6% (based on unsoaked CBR 29.34%) and PCC, showing changes in the characteristics of original soil, an increase in CBR value and a decrease in swelling, along with the addition of PCC levels. The results of the mixture for 7 (seven) days curing and 4 (four) days soaking in the mixture of soil, 6% lime (optimum lime) and 3% PCC have met the subgrade requirements with a soaked CBR value of 41.18% (increased 1946.88%), and the best mix results obtained in the soil mixture, 6% lime (optimum lime) and 12% PCC with a soaked CBR value of 189.91% (increased 9040.64%), PI of 14.52% (decreased 68.02%) and swelling of 0.031% (decreasing 99.21%) against original soil.

Keyword : stabilization, *subgrade*, CBR, *portland composite cement*, *lime*.