

INTISARI

Kerusakan perkerasan jalan disebabkan oleh beberapa penyebab, salah satunya yaitu kondisi fisik tanah dasar yang kurang baik. Jika konstruksi perkerasan jalan dibangun di atas tanah dasar (*subgrade*) yang buruk, maka dapat merusak struktur perkerasan di atasnya. Stabilisasi tanah dengan semen dan aspal emulsi adalah salah satu solusi untuk meningkatkan kapasitas kuat dukung tanah untuk konstruksi *subgrade* perkerasan jalan. Tujuan penelitian ini yaitu untuk menganalisis potensi penggunaan semen dan aspal emulsi sebagai material stabilisasi tanah secara kimiawi untuk konstruksi *subgrade* perkerasan jalan.

Pada penelitian ini, sampel tanah dicampur dengan semen (3%, 6%, 9%) dan aspal emulsi (3%, 6%) dan diperam selama 0, 3, dan 7 hari. Campuran tanah, semen, dan aspal emulsi diuji kuat dukung dan pengembangannya dengan pengujian CBR dan pengembangan tanah didasarkan pada ASTM D 1883-99.

Hasil pengujian pendahuluan menyimpulkan bahwa tanah asli termasuk dalam kelas A-7-5 dalam sistem klasifikasi AASHTO dan didominasi oleh mineral lempung *smectite* sehingga termasuk dalam tanah lempung ekspansif. Hasil pengujian pemadatan campuran tanah lempung, semen, dan aspal emulsi dapat meningkatkan berat volume kering tanah dan menurunkan kadar air optimum, dimana variasi 6% semen dan 3% aspal emulsi dapat meningkatkan berat volume kering tanah maksimum sebesar 1,340 gr/cm³ dan menurunkan kadar air optimum sebesar 25%. Hasil pengujian CBR dan nilai pengembangan tanah campuran tanah lempung, semen, dan aspal emulsi dapat meningkatkan kuat dukung tanah dan menurunkan pengembangan tanah, dimana nilai CBR (*soaked* dan *Unsoaked*) dan penurunan pengembangan tanah terbesar terdapat pada variasi 9% semen dan 3% aspal emulsi dengan pemeraman 7 hari sebesar 56,9% (*CBR Soaked*), 44,01% (*CBR Unsoaked*), dan 0,13% (nilai pengembangan tanah). Nilai CBR pada variasi campuran 9% semen dan 3% aspal emulsi dengan pemeraman 7 hari telah memenuhi persyaratan *subgrade* perkerasan jalan berdasarkan SNI 03-1744-1989. Berdasarkan pengujian tersebut, maka semen dan aspal emulsi dapat menjadi bahan stabilisasi tanah untuk konstruksi *subgrade* perkerasan jalan.

Kata kunci: Stabilisasi Tanah, Tanah Lempung, Semen, Aspal Emulsi

ABSTRACT

Pavement deterioration can be caused by several causes, one of them was caused by poor subgrade. If the pavement construction was built on poor subgrade, it can damage pavement construction at the top of subgrade. Chemical soil stabilization with cement and bitumen emulsion is one of the solutions to improve soil bearing capacity for pavement subgrade construction. The purpose of this study was to analyze the potential use of cement and bitumen emulsion as materials of chemical soil stabilization for pavement subgrade construction.

In this study, soil samples were mixed by cement (3%, 6%,9%) and bitumen emulsion (3%,6%) and cured for 0, 3, and 7 days. The mixture of soil, cement, and bitumen emulsion was tested for soil bearing capacity and soil swelling by CBR and soil swelling test based on ASTM D 1883-99.

Preliminary test results concluded that the original soil is included in class A-7-5 at AASHTO classification system and it is dominated by smectite clay minerals so that the original soil is expansive clay soil. The results of compaction test reveal that soil stabilization with cement and bitumen emulsion can increase the mass of dry density of the soil and reduce the optimum moisture content, where the variation of 6% cement and 3% bitumen emulsion can increase the mass of dry density by 1,340 gr / cm³ and reduce the optimum moisture content of 25%.

The CBR and swelling test also reveal that soil stabilization with cement and bitumen emulsion can increase soil bearing capacity and reduce swelling, where the highest CBR values (soaked and unsoaked) are found in variation of 9% cement and 3% bitumen emulsion cured by 7 days, where the value is 56.9% (CBR Soaked) and 44.01% (CBR Unsoaked). The variation of 9% cement and 3% bitumen emulsion also can reduce soil swelling, where the value is 0,13%. CBR values at the variation of 9% cement and 3% bitumen emulsion cured by 7 days have met the requirements of the road pavement subgrade based on SNI 03-1744-1989. Based on these tests, the cement and bitumen emulsion can use for soil stabilization material for subgrade pavement construction.

Keywords: *Soil stabilization, Clay, Cement, Bitumen Emulsion*