

ANALISIS MODULUS ELASTISITAS PADA MATERIAL *CRUSHED LIMESTONE* BERDASARKAN HASIL UJI CBR LABORATORIUM DAN PLAXIS 2D

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ABSTRAK

Dalam rangka meningkatkan perekonomian Indonesia, pembangunan jalan merupakan salah satu prasarana yang menjadi prioritas yang ditingkatkan. Untuk pembangunan jalan itu sendiri, diperlukan survei, kajian dan penelitian terhadap kondisi tanah dimana jalan itu akan dikonstruksi. Selain itu, diperlukan juga tinjauan terhadap ketersediaan bahan ataupun material di lokasi proyek, jenis kendaraan yang akan melalui jalan tersebut dan jenis perkerasan yang akan digunakan.

Tujuan penelitian yaitu menganalisis modulus elastisitas (E) hasil uji CBR laboratorium dengan menggunakan *software* Plaxis 2D. Material yang dikaji adalah material *crushed limestone* Padalarang dengan gradasi *poorly graded* serta 56 tumbukan per *layer* dan material *crushed limestone* Sukabumi dengan gradasi *well graded* dan 25 tumbukan per *layer*. Pemodelan Plaxis 2D menggunakan *axisymmetric cylinder, prescribed displacements, rigid plate* dan Mohr-Coulomb.

Hasil analisis uji CBR laboratorium hanya dapat menghasilkan parameter *modulus of subgrade* (C_u) untuk kedua material uji. Hasil analisis Plaxis 2D menunjukkan bahwa nilai modulus elastisitas (E), *poisson's ratio* (ν) dan sudut geser dalam (ϕ) yang bersesuaian dengan kurva *stress-penetration* hasil uji CBR laboratorium untuk material *crushed limestone* Padalarang bergradasi *poorly graded* adalah: modulus elastisitas, $E = 25000\text{kPa}$; *poisson's ratio*, $\nu = 0,25$ dan sudut geser dalam, $\phi = 48^\circ$. Sementara untuk material *crushed limestone* Sukabumi bergradasi *well graded* nilai yang bersesuaian adalah: modulus elastisitas, $E = 20000\text{kPa}$; *poisson's ratio*, $\nu = 0,2$ dan sudut geser dalam, $\phi = 50^\circ$. Selisih nilai CBR hasil Plaxis 2D dengan CBR hasil uji laboratorium untuk material *crushed limestone* Padalarang dengan gradasi *poorly graded* adalah sebesar 4,30%, sementara *crushed limestone* Sukabumi dengan gradasi *well graded* adalah sebesar 2,36%.

Kata kunci: *crushed limestone*, modulus elastisitas, *modulus of subgrade*, CBR

ANALYSIS OF MODULUS OF ELASTICITY ON MATERIAL CRUSHED LIMESTONE BASED ON RESULTS OF CBR LABORATORY AND PLAXIS 2D

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ABSTRACT

In order to improve the Indonesian economy, road construction is one of the priority enhanced infrastructures. For the construction of the road itself, it is necessary to survey, study and research on the condition of the land on which the road will be constructed. In addition, there is also a review of the availability of ingredient or materials at the project site, the type of vehicle that will go through the road and the type of pavement to be used.

The purpose of this study is to analyze the modulus of elasticity (E) from CBR test result in laboratory using Plaxis 2D. The materials studied include crushed limestone from Padalarang with the gradient type is poorly graded and crushed limestone from Sukabumi with the gradient type is well graded. Plaxis 2D modeling uses axisymmetric cylinder, prescribed displacements, rigid plate and Mohr-Coulomb.

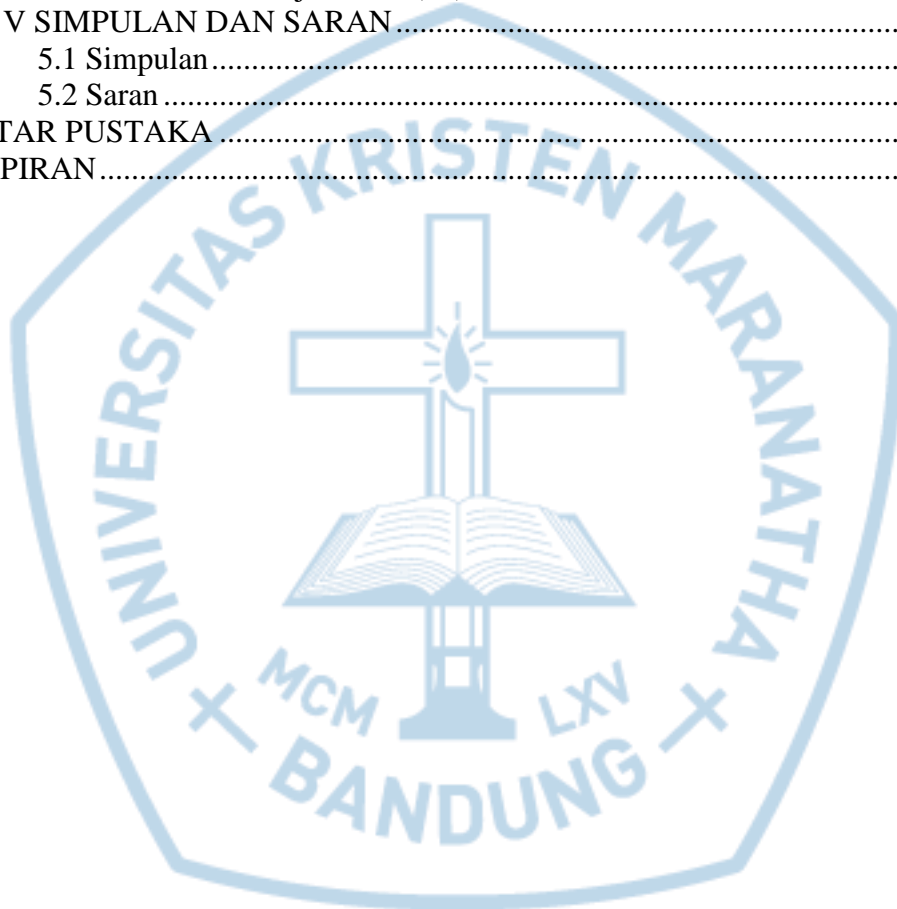
The results of the CBR laboratory test analysis can only produce modulus of subgrade (C_u) parameter for both materials. The result of Plaxis 2D analysis show that modulus of elasticity (E), poisson's ratio (ν) and angle of friction (ϕ) corresponding to stress-penetration curve of CBR laboratory test for crushed limestone material from Padalarang with the gradient poorly graded are: modulus of elasticity value, $E = 25000\text{kPa}$; poisson's ratio, $\nu = 0,25$ and angle of friction, $\phi = 48^\circ$. While for crushed limestone material from Sukabumi with the gradient well graded corresponding value are: modulus of elasticity value, $E = 20000\text{kPa}$; poisson's ratio, $\nu = 0,2$ and angle of friction, $\phi = 50^\circ$. Difference of CBR value from Plaxis 2D with laboratory CBR test for crushed limestone material from Padalarang with the gradient poorly graded is 4,30%, while crushed limestone material from Sukabumi with the gradient well graded is 2,36%.

Keywords: *crushed limestone, modulus of elasticity, modulus of subgrade, CBR*

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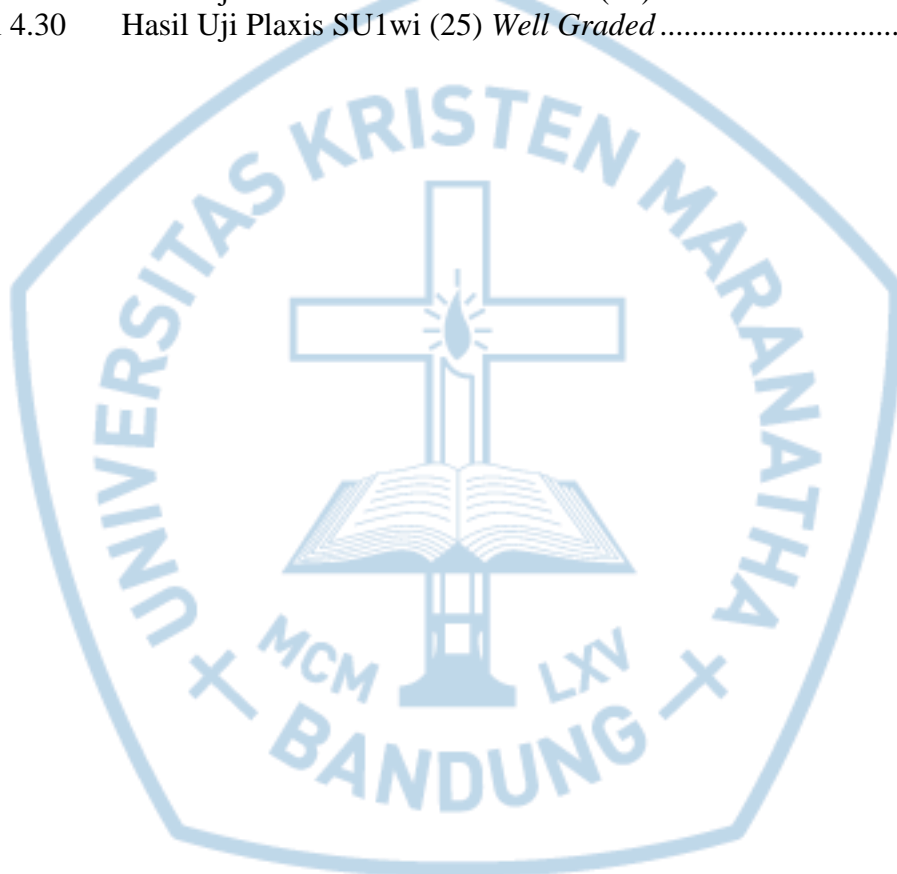
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δ	<i>Displacement</i>
γ_{sat}	Berat isi tanah jenuh
γ_{unsat}	Berat isi tanah
ν	<i>Poisson's Ratio</i>
ϕ	Sudut geser dalam
A	<i>Area</i> (luas penampang)
c	Kuat geser, kohesi
C_u	<i>Modulus of subgrade</i>
E_{ref}, E	Modulus Elastisitas
F_y	Gaya arah y
k_x	Koefisien permeabilitas arah x
k_y	Koefisien permeabilitas arah y
p	Stress
U_y	Penurunan arah y
w	Berat



DAFTAR LAMPIRAN

Lampiran L.1 Contoh *Output* Plaxis untuk SU2wi (56) *Poorly Graded*116

