

**ANALISIS PENGARUH SUBSTITUSI ZAT ADITIF KARET  
ALAM CAIR (*LATEKS*) PADA CAMPURAN PERKERASAN  
*HOT ROLLED SHEET-WEARING COURSE (HRS-WC)***

**TUGAS AKHIR**



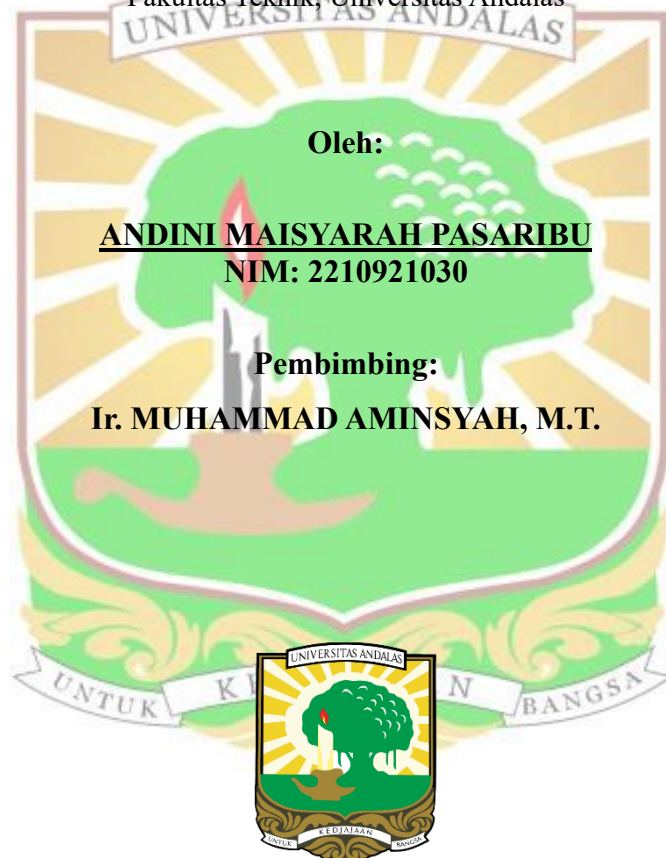
**PROGRAM STUDI SARJANA TEKNIK SIPIL  
DEPARTEMEN TEKNIK SIPIL  
FAKULTAS TEKNIK  
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**PADANG  
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## **TUGAS AKHIR**

Diajukan sebagai salah satu syarat untuk menyelesaikan pendidikan  
Program Strata-1 pada Departemen Teknik Sipil,  
Fakultas Teknik, Universitas Andalas



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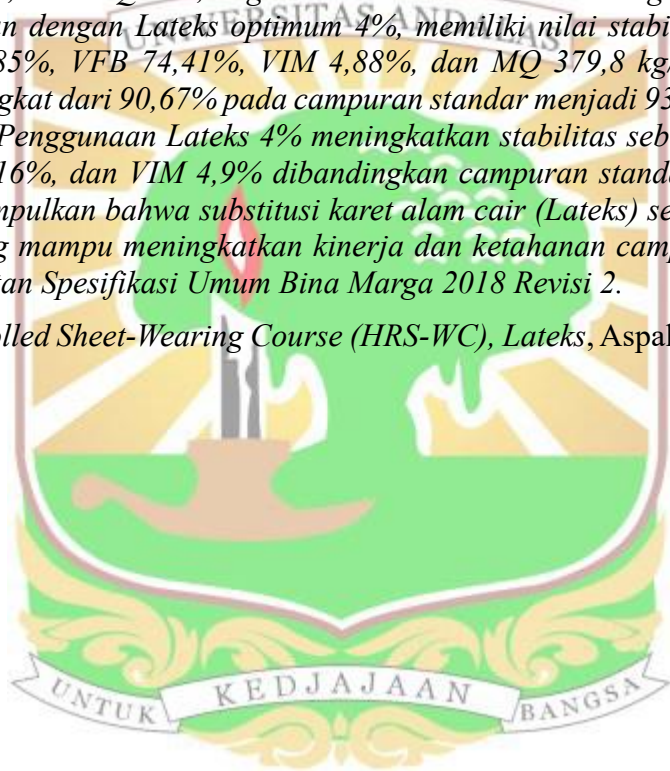
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## ABSTRAK

*Perkerasan jalan jenis Hot Rolled Sheet-Wearing Course (HRS-WC) merupakan lapisan aus yang berfungsi menerima langsung beban lalu lintas dan pengaruh lingkungan. Diperlukan inovasi material untuk meningkatkan kinerja campuran perkerasan. Salah satu alternatif yang dapat digunakan adalah substitusi karet alam cair (Lateks) sebagai zat aditif pada campuran aspal. Penelitian ini bertujuan untuk menganalisis pengaruh substitusi karet alam cair (Lateks) terhadap karakteristik Marshall campuran HRS-WC serta menentukan kadar Lateks optimum yang memenuhi persyaratan Spesifikasi Umum Bina Marga 2018 Revisi 2. Penelitian dilakukan di Laboratorium Transportasi dan Perkerasan Jalan Raya Universitas Andalas menggunakan aspal penetrasi 60/70, agregat batu pecah dari Kota Padang, dan variasi kadar Lateks sebesar 4%, 7%, dan 10%. Campuran HRS-WC standar terlebih dahulu dirancang untuk memperoleh Kadar Aspal Optimum (KAO). Hasil penelitian menunjukkan bahwa campuran HRS-WC standar pada KAO memiliki nilai stabilitas 1.973,3 kg, flow 4,46 mm, VMA 18,23%, VFB 74,29%, VIM 4,27%, dan MQ 546,8 kg/mm. Substitusi Lateks meningkatkan nilai stabilitas campuran, campuran dengan Lateks optimum 4%, memiliki nilai stabilitas 2.006,3 kg, flow 5,28 mm, VMA 18,85%, VFB 74,41%, VIM 4,88%, dan MQ 379,8 kg/mm. Selain itu, nilai stabilitas sisa meningkat dari 90,67% pada campuran standar menjadi 93,29% pada campuran dengan 4% Lateks. Penggunaan Lateks 4% meningkatkan stabilitas sebesar 2,2%, flow 18%, VMA 3,4%, VFB 0,16%, dan VIM 4,9% dibandingkan campuran standar. Berdasarkan hasil tersebut, dapat disimpulkan bahwa substitusi karet alam cair (Lateks) sebesar 4% merupakan kadar optimum yang mampu meningkatkan kinerja dan ketahanan campuran HRS-WC serta memenuhi persyaratan Spesifikasi Umum Bina Marga 2018 Revisi 2.*

**Kata kunci :** *Hot Rolled Sheet-Wearing Course (HRS-WC), Lateks, Aspal, Pengujian Marshall.*



## ABSTRACT

*Hot Rolled Sheet-Wearing Course (HRS-WC) is a surface layer of flexible pavement that directly withstands traffic loads and environmental effects. Material innovation is required to improve the performance of asphalt mixtures. One alternative is the incorporation of natural liquid rubber (latex) as an additive in asphalt mixtures. This study aims to analyze the effect of latex addition on the Marshall characteristics of HRS-WC mixtures and to determine the optimum latex content that satisfies the requirements of the 2018 General Specifications for Highways (Bina Marga), Revision 2. The research was conducted at the Transportation and Highway Pavement Laboratory, Universitas Andalas, using 60/70 penetration grade asphalt, crushed stone aggregate obtained from Padang City, and latex contents of 4%, 7%, and 10% by weight of asphalt. A conventional HRS-WC mixture was first designed to determine the Optimum Asphalt Content (OAC), followed by Marshall testing for each latex variation. The results showed that the conventional HRS-WC mixture at the OAC achieved a stability of 1,973.3 kg, a flow value of 4.46 mm, Void in Mineral Aggregate (VMA) of 18.23%, Void Filled with Bitumen (VFB) of 74.29%, Void in Mix (VIM) of 4.27%, and a Marshall Quotient (MQ) of 546.8 kg/mm. The addition of latex improved the performance of the HRS-WC mixture, with the optimum latex content of 4% producing a stability of 2,006.3 kg, a flow value of 5.28 mm, VMA of 18.85%, VFB of 74.41%, VIM of 4.88%, and MQ of 379.8 kg/mm. Furthermore, the retained stability increased from 90.67% for the conventional mixture to 93.29% for the mixture containing 4% latex. Compared with the conventional mixture, the addition of 4% latex increased stability by 2.2%, flow by 18%, VMA by 3.4%, VFB by 0.16%, and VIM by 4.9%. Based on these findings, it can be concluded that the incorporation of 4% natural liquid rubber (latex) is the optimum dosage for improving the performance and durability of HRS-WC mixtures while satisfying the requirements of the 2018 General Specifications for Highways (Bina Marga), Revision 2.*

**Keywords :** *Hot Rolled Sheet-Wearing Course (HRS-WC), Natural Liquid Rubber (Latex), Asphalt, Marshall Test.*

