ABSTRAK

STABILITAS DAN KUAT TEKAN PERKERASAN *WEARING COURSE* (WC) MENGGUNAKAN BAHAN PENGIKAT LIMBAH PLASTIK LDPE (*LOW-DENSITY POLYETHYLENE*)

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Penelitian ini bertujuan untuk menganalisis pengaruh pemanfaatan limbah plastik *Low-Density Polyethylene* (LDPE) sebagai bahan pengikat pada campuran *Wearing Course* (WC) terhadap karakteristik *Marshall* dan kuat tekan. Metode yang digunakan adalah eksperimen laboratorium dengan variasi kadar LDPE sebesar 5%, 7,5%, 10%, 12,5%, dan 15% menggunakan metode *wet process*. Parameter yang dianalisis meliputi stabilitas, *flow*, *Marshall Quotient* (MQ), serta kuat tekan untuk mengetahui perubahan perilaku mekanis campuran akibat penambahan LDPE.

Hasil penelitian menunjukkan bahwa penambahan LDPE memberikan pengaruh signifikan terhadap peningkatan kinerja campuran hingga batas tertentu. Nilai optimum berdasarkan uji *Marshall* diperoleh pada kadar LDPE 7,5% dengan stabilitas 2934,05 kg, *flow* 2,07 mm, dan MQ 1432 kg/mm. Sementara itu, nilai kuat tekan maksimum dicapai pada kadar 12,5% sebesar 10,90 MPa. Secara umum, penambahan LDPE mampu meningkatkan kekuatan dan ketahanan campuran, namun kadar berlebih menyebabkan penurunan kinerja akibat berkurangnya *interlocking* antar agregat.

Kata kunci: LDPE, *Wearing Course*, Stabilitas, Kuat Tekan, Limbah Plastik

ABSTRACT

STABILITY AND COMPRESSIVE STRENGTH OF WEARING COURSE (WC) PAVEMENT USING LDPE (LOW-DENSITY POLYETHYLENE) PLASTIC WASTE AS A BINDER

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This study aims to analyze the effect of utilizing Low-Density Polyethylene (LDPE) plastic waste as a binder in Wearing Course (WC) mixtures on Marshall characteristics and compressive strength. The research was conducted using a laboratory experimental method with LDPE content variations of 5%, 7.5%, 10%, 12.5%, and 15% using the wet process method. The parameters analyzed include stability, flow, Marshall Quotient (MQ), and compressive strength to evaluate changes in the mechanical behavior of the mixture due to the addition of LDPE.

The results show that the addition of LDPE has a significant effect on improving the performance of the mixture up to a certain limit. The optimum value based on the Marshall test was obtained at 7.5% LDPE content, with a stability of 2934.05 kg, flow of 2.07 mm, and MQ of 1432 kg/mm. Meanwhile, the maximum compressive strength was achieved at 12.5% LDPE content, reaching 10.90 MPa. In general, the addition of LDPE enhances the strength and durability of the mixture; however, excessive content leads to performance reduction due to decreased aggregate interlocking.

Keywords: LDPE, Wearing Course, Stability, Compressive Strength, Plastic Waste