

ABSTRAK

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EVALUASI PENGGUNAAN *SUPERPLAST* POLIMER TERHADAP TINGKAT ADHESI CAMPURAN ASPAL HANGAT BERDASARKAN *DIGITAL IMAGE ANALYSIS SOFTWARE IMAGE J*

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Indonesia adalah negara yang terletak di garis khatulistiwa. Sebagai akibatnya Indonesia memiliki iklim tropis yang membentuk musim penghujan dan musim kemarau. Curah hujan yang tinggi beresiko menimbulkan *moisture damage* pada aspal salah satunya adalah fenomena *stripping*. Fenomena tersebut diakibatkan air yang ditandai dengan hilangnya daya adhesi antara bitumen dan agregat. Penelitian ini bertujuan menggunakan jenis campuran aspal hangat atau disebut juga WMA. WMA memiliki suhu pencampuran yang lebih rendah ketimbang campuran aspal panas (HMA) sehingga lebih rendah emisi. Namun suhu yang lebih rendah menjadikan WMA rentan terhadap *moisture damage* khususnya di Indonesia. Oleh karena itu dipilihlah bahan aditif polimer yang telah dikenal mampu meningkatkan performa mekanis aspal sekaligus menguji pengaruhnya terhadap peningkatan daya adhesi bitumen dan agregat. Penelitian ini menggunakan WMA dengan teknik pembusaan dengan zeolit sebagai bahan aditifnya dan pencampuran kering sebagai metode pencampurannya. Benda uji yang dihasilkan memiliki kadar aspal optimum sebesar 5,5% terhadap berat campuran. Polimer yang digunakan diproduksi oleh Iterchimica dengan merk dagang *Superplast* dengan variasi kadar 4%, 5%, 6% dan juga 0% sebagai benda uji kontrol. Setelah pengujian *boiling water test* (BWT), nilai *coating ratio* diperoleh melalui *digital image analysis* serta secara kuantitatif. Hasilnya penelitian menunjukkan penambahan polimer *Superplast* pada WMA berhasil meningkatkan sifat adhesi antara bitumen dan agregat sebesar 4,52% hingga 7,8% berdasarkan hasil *digital image analysis*. Kadar penambahan polimer yang optimum ialah sebesar 5% terhadap berat bitumen yang telah menghasilkan nilai *coating ratio* sebesar 85,95%.

Kata Kunci : adhesi, *boiling water test* (BWT), campuran aspal hangat, *coating ratio*, *Image j*, polimer *Superplast*, *stripping*, zeolit.

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ABSTRACT

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EVALUATION OF POLYMER *SUPERPLAST* EFFECT ON THE ADHESION LEVEL OF WARM MIX ASPHALT BASED ON DIGITAL IMAGE ANALYSIS USING IMAGE J SOFTWARE

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As a country located on the equator, Indonesia has tropical climate that forms both dry season and a rainy season. High rainfall is at risk of causing moisture damage to asphalt, one of which is the stripping phenomenon. This phenomenon is caused by the loss of adhesion between bitumen and aggregate caused by water. This study aims to use a type of warm asphalt mixture or also called WMA. WMA has lower mixing temperature than hot mix asphalt (HMA) and thus lower emissions. However, the lower temperature makes WMA vulnerable to moisture damage, especially in Indonesia. Therefore, polymer additives have been chosen which are known to be able to improve the mechanical performance of asphalt and at the same time test their effect on increasing the adhesion of bitumen and aggregates. In this study WMA was used by a foaming process with zeolit as the additive and dry mixing as the mixing method. The resulting test object has an optimum asphalt content of 5.5% by weight of the mixture. The polymer used was produced by Iterchimica with the trademark *Superplast* with varying levels of 4%, 5%, 6% and 0% as control specimens. After going through the boiling water test (BWT), the coating ratio value was obtained through digital image analysis and quantitatively. The results showed that the addition of *Superplast* polymer to WMA succeeded in increasing the adhesion properties between bitumen and aggregate by 4.52% to 7.8% based on the results of digital image analysis. The optimum polymer addition level is 5% by weight of bitumen which has resulted in a coating ratio value of 85.95%.

Keywords : adhesion, boiling water test (BWT), warm mix asphalt, coating ratio, ImageJ, polymer *Superplast*, stripping, zeolite.

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