ABSTRACT

DURABILITY OF ASPHALT CONCRETE MIXTURE – BINDER COURSE WITH POLYETHYLENE POLYETHYLENEREFTALAT PLASTIC WASTE AS AN ENHANCER OF ASPHALT BINDING MATERIAL

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Road damage often occurs due to excessive volume of heavy vehicles so that vehicle loads cause strain and stress of the pavement layer. One way to improve the quality of asphalt mixtures is by adding PET plastic. Research was conducted to determine the effect of durability and strength of AC-BC mixtures with the addition of PET plastic waste as a binder additive in asphalt on Marshall parameters. Based on the results of the study, the specific gravity of asphalt increased and the penetration value decreased as the PET content increased because the asphalt became harder. Ductility decreased as more PET content made the asphalt more brittle. The softening point value increases as the PET content increases because the addition of PET increases the wax content in the asphalt. The IKS value of the PET mixture meets the minimum Bina Marga standardof 90%. This shows that the greater the percentage of PET mixture, the greater the IKS value. The greater the percentage of PET mixture, the greater the decrease in IDP value. The higher the percentage of PET mixture, the smaller the strength loss on the IDK value. The longer the soaking time and the more PET mixture in the mixture, the smaller the increase in stability and performance. The best durability in terms of IKS, IDP and IDK values occurred in the 60/70 AC- BC penetration asphalt mixture with 5% PET mixture.

Keywords : asphalt concrete-binder course, polyethylene terephthalate, durability, Marshallparameter, residual strength index, first durability index, second durability index.

ABSTRAK

DURABILITAS CAMPURAN ASPHALT CONCRETE – BINDER COURSE DENGAN LIMBAH PLASTIK POLYETHYLEN TEREPHTHALATE SEBAGAI PENAMBAH BAHAN PENGIKAT ASPAL

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Kerusakan jalan sering terjadi karena berlebihnya volume kendaraan berat sehingga beban kendaraan mengakibatkan regangan dan tegangan lapisan perkerasan. Salah satu cara untuk menaikkan mutu campuran beraspal dengan menambahkan plastik PET. Penelitian dilakukan untuk mengetahui pengaruh durabilitas ketahanan dan kekuatan dari campuran AC-BC dengan penambahan limbah plastik PET sebagai additive pengikat pada aspal terhadap parameter Marshall. Berdasarkan hasil penelitian, berat jenis aspal mengalami kenaikan dan nilai penetrasi semakin menurun seiring bertambahnya kadar PET karena aspal menjadi lebih keras. Daktilitas menurun karena semakin banyak kadar PET membuat aspal semakin getas. Nilai titik lembek meningkat seiring bertambahnya kadar PET karena penambahan PET meningkatkan kandungan lilin pada aspal. Nilai IKS pada campuran PET memenuhi standar Bina Marga minimal sebesar 90%. Hal tersebut menunjukan semakin besar persentase campuran PET maka semakin besar nilai IKS. Semakin besar persentase campuran PET maka semakin besar penurunan Nilai IDP. Semakin tinggi persentase campuran PET maka kehilangan kekuatan pada Nilai IDK semakin kecil. Semakin lama waktu perendaman dan semakin banyak campuran PET dalam campuran, maka campuran beraspal mengalami kenaikan stabilitas dan kinerja yang semakin kecil. Durabilitas terbaik ditinjau dari nilai IKS, IDP dan IDK terjadi pada campuran aspal penetrasi 60/70 AC-BC dengan campuran PET 4%.

Kata kunci : aspal, *polyethylene terephthalate,* durabilitas, parameter *Marshall,* indeks kekuatansisa, indeks durabilitas pertama, indeks durabilitas kedua