

ABSTRAK

Masalah kerusakan jalan beraspal akibat genangan air ditambah beban berlebih serta 75% kebutuhan aspal dalam negeri masih impor. Di sisi lain adanya masalah tumpukan limbah plastik yang bernilai rendah yang terus bertambah dan kesamaan unsur kimia plastik dengan aspal. Penelitian sebelumnya menunjukkan bahwa dimungkinkan untuk menggunakan limbah plastik di perkerasan aspal untuk meningkatkan kinerja perkerasan jalan dan umur pelayanan jalan. Penelitian ini dilakukan untuk mengetahui pengaruh air terhadap stabilitas campuran panas AC-WC dengan menggunakan kolaborasi campuran limbah plastik (40% LDPE,30% PP,30% PS) sebagai pengganti aspal dan metode pencampuran kering. Variasi limbah plastik yang digunakan adalah 0%,8%,10%,12%,14% terhadap berat aspal. Pelaksanaan penelitian terdiri dari pemeriksaan karakteristik bahan dan campuran panas aspal AC-WC, perancangan gradasi agregat, pengujian marshall untuk penentuan kadar aspal optimum, pengujian marshall untuk penentuan kadar plastik optimum. Dari campuran Kadar Plastik Optimum yang didapat di lanjutkan mengukur pengaruh rendaman air dengan variasi waktu rendaman 30 menit, 24 jam,48 jam,72 jam, 96 jam pada suhu 60°C terhadap stabilitas dan durabilitas campuran aspal modifikasi limbah plastik. Tinjauan Indeks Durabilitas campuran berdasarkan indikator Index of Retained Stability (IRS) dan Stability Deformation Index, yaitu Indeks Durabilitas Pertama (IDP), Indeks Durabilitas Kedua (IDK), Nilai Absolut Ekuivalen Kekuatan Tersisa (Sa) atau Retained Marshall Stability (RMS). Dari penelitian didapatkan campuran kadar plastik optimum 10 % pada kadar aspal optimum 6,3%. Hasil penelitian menunjukkan bahwa campuran laston AC-WC modifikasi limbah plastik mampu lebih lama direndam air, dengan nilai IRS 94.64 % durasi perendaman 24 jam, 91.04 % durasi perendaman 48 jam, 85.18 % durasi perendaman 72 jam dan 82.57 % durasi perendaman 96 jam. Nilai IDP menunjukkan nilai r positif yang mengidentifikasi kehilangan kekuatan, dengan nilai r 0.228 % pada durasi perendaman sampai 24 jam, 0,150 % pada durasi perendaman 24 jam sampai 48 jam. 0.0244 % pada durasi perendaman 48 jam sampai 72 jam. 0.109 % pada durasi perendaman 72 jam sampai 96 jam. Nilai IDK menunjukkan nilai a positif yang mengidentifikasi kehilangan kekuatan, dengan nilai a 2.734 % dan sa 97.266 % pada durasi perendaman 24 jam. Pada durasi perendaman 24 jam sampai 48 jam nilai a 2.703 % dan sa 94.563 %. Durasi perendaman 48 jam sampai 72 jam nilai a 4.881 % dan sa 89.683 % dan pada durasi perendaman 72 jam sampai 96 jam nilai a 2.283 % dan sa 87.400 %.

Kata Kunci : AC - WC, Limbah plastik, Durabilitas

ABSTRACT

The problem of damage to paved roads due to waterlogging and excess loads as well as 75% of domestic asphalt needs are still have imported. On the other hand, there has been a problem of piles of low-value plastic waste arising and the similarity of the chemical elements of plastic with asphalt. Previous research has shown that it is possible to use plastic waste in asphalt pavements which aim to improve the pavement performance and the age of road services. This research was conducted to find out the effect of water on the stability of the hot mixture AC-WC by using a mixed mixture of plastic wastes (40% LDPE, 30% PP, 30% PS) as a substitute for asphalt and dry mixing methods. The variation of plastic waste used was 0%,8%,10%,12%,14% of the asphalt weight. The implementation of the research consisted of examining the characteristics of the material and hot mixture of AC-WC asphalt, designing the aggregate gradation, marshall testing for determining the optimum asphalt content, marshall testing for determining the optimum plastic content. From the mixture of Optimum Plastic Content obtained, it was continued to measure the effect of water immersion with variations in immersion time of 30 minutes, 24 hours, 48 hours, 72 hours, 96 hours at 60°C on the stability and durability of the modified asphalt mixture of plastic waste. The mixed Durability Index is based on the Index of Retained Stability (IRS) and Stability Deformation Index indicators, namely the First Durability Index (IDP), Second Durability Index (IDK), Absolute Equivalent Value of Remaining Strength (Sa) or Retained Marshall Stability (RMS). From the research, it was found that the optimum plastic content mixture was 10% at the optimum asphalt content of 6.3%. The results showed that the mix of AC-WC modified plastic waste was able to soak in the water longer, with an IRS value of 94.64 % with an immersion duration of 24 hours, 91.04 % with an immersion duration of 48 hours, 85.18% with immersion duration of 72 hours and 82.57 % with immersion duration of 96 hours. The IDP value shows a positive r value that identifies the loss of strength, with an r value of 0.228% for the duration of immersion up to 24 hours, 0.150 % for the duration of immersion of 24 hours to 48 hours, 0.244% for the duration of immersion of 48 hours to 72 hours, 0.109% on the duration of immersion of 72 hours to 96 hours. The IDK value shows a positive a value that identifies the loss of strength, with a value of 2.734% and sa 97.266% at the duration of immersion of 24 hours. The duration of immersion of 24 hours to 48 hours results in a value of 2.703% and sa 94.563%. The immersion duration of 48 hours to 72 hours results in a value of 4.881 % and sa 89.683 % and the duration of immersion of 72 hours to 96 hours results from a value 2.283% and sa 87.400 %.

Keyword : AC - WC, Plastic waste, Durability