

INTISARI

Ketersediaan agregat merupakan salah satu aspek penting yang perlu dipertimbangkan dalam perancangan pembangunan konstruksi jalan raya dan harus mempunyai nilai abrasi tidak lebih dari 40%. Seiring dengan tuntutan kebutuhan agregat di masa yang akan datang dan dalam mengatasi kelangkaan agregat dengan nilai abrasi yang disyaratkan, maka pada penelitian ini agregat kasar yang digunakan sebagai bahan campuran beton aspal (*AC-Wearing Course*) mempunyai nilai abrasi tinggi ($\pm 50\%$).

Penelitian ini dilakukan dengan membuat benda uji dari tiga variasi gradasi agregat, variasi I, variasi II dan variasi III dengan kadar agregat kasar masing-masing 50 %, 57 % dan 65 % pada campuran beton aspal yang dilaksanakan dalam dua tahap. Tahap pertama, pada masing-masing variasi gradasi dibuat benda uji dengan variasi kadar aspal 5,5 %, 6,0 %, 6,5 %, 7,0 % dan 7,5 % untuk mencari kadar aspal optimum dengan menggunakan metode Marshall. Kemudian dibuat benda uji pada kadar aspal optimum pada masing-masing variasi gradasi perendaman standar dan 24 jam, benda uji kepadatan mutlak dan benda uji *Cantabro*. Pengujian dilakukan dengan metode Marshall terhadap benda uji perendaman standar dan perendaman 24 jam, pengujian kepadatan mutlak dilakukan dengan pemadatan 2 x 400 dan pengujian *Cantabro* dengan alat mesin abrasi Los Angeles tanpa bola-bola baja, kemudian dilakukan uji Marshall.

Hasil penelitian menunjukkan bahwa kadar aspal optimum pada campuran beton aspal masing-masing variasi gradasi agregat diperoleh variasi I, variasi II dan variasi III sebesar 6,64 %, 6,60 %, dan 6,54 % terhadap total campuran. Pada kadar aspal optimum masing-masing variasi gradasi agregat pada perendaman standar variasi I, variasi II dan variasi III diperoleh nilai stabilitas sebesar 1748,39 kg, 1554,59 kg dan 1338,90 kg, nilai *flow* sebesar 3,77 mm, 3,67 mm dan 4,03 mm, nilai VITM sebesar 5,59 %, 5,66 % dan 5,83 %, nilai VMA sebesar 17,59 %, 17,90 % dan 18,34 %, nilai density sebesar 2,239 kg/cc, 2,229 kg/cc dan 2,216 kg/cc. Untuk perendaman 24 jam pada variasi I, variasi II dan variasi III diperoleh nilai stabilitas sebesar 1457,95 kg, 1361,25 kg dan 1107,99 kg, nilai *flow* sebesar 4,23 mm, 4,33 mm dan 4,50 mm. Indek Perendaman pada variasi I, variasi II dan variasi III diperoleh sebesar 83,39 %, 87,56 % dan 82,75 %. Nilai VITM untuk kepadatan mutlak pada variasi I, variasi II dan variasi III diperoleh sebesar 1,20 %, 1,04 % dan 0,66 %. Kehilangan berat pada pengujian *Cantabro* setelah 300 putaran pada variasi I, variasi II dan variasi III diperoleh sebesar 3,56 %, 4,02 % dan 3,41 %. Secara keseluruhan, penggunaan agregat kasar bernilai abrasi tinggi ($\pm 50\%$) pada campuran beton aspal sesuai spesifikasi Departemen Kimpraswil (2000) hanya mampu melayani beban lalulintas rendah (lalulintas <0,5 juta ESA) untuk variasi I dan variasi II.

Abstract

The aggregate availability is one of the important aspects that require consideration in the highway construction. Moreover, the abrasion value of the aggregate must not more than 40%. In line to the increasing demand of aggregate in the future as well as to cope with the problem of aggregate extinction and the abrasion value requirements, the coarse aggregate used in this research as the material of the asphaltic concrete (AC-Wearing Course) mixture retains high abrasion value ($\pm 50\%$).

The research was performed in two steps by composing specimen from the three aggregate gradations, which are referred to as Variation I, Variation II, and Variation III, of which content of 50%, 57%, and 65%, coarse aggregate respectively. In the first step, specimens with asphalt contents of 5.5%, 6.0%, 6.5%, 7.0% and 7.5% were manufactured for each gradation variation using the Marshall method to obtain optimum asphalt content. Then, specimens were manufactured the optimum asphalt content for standard and 24 hours immersion of each gradation variation, specimens for percentage refusal density as well as the *Contabro* specimens were also produced. The Marshall method was used for testing the standard and the 24 hours immersion specimens. The percentage refusal density was conducted using the 2 x 400 compactions and the *Contabro* test with the Los Angeles abrasion equipment without the steel balls. The specimens were subsequently tested with Marshall Test.

Results of the investigation show that the optimum asphalt content of the asphalt concrete of each aggregate gradation variations of I, II, and III were 6.64%, 6.60%, and 6.54% of the total mix respectively. At the optimum asphalt content, the stability values of each aggregate gradation variation at standard immersion of variation I, II and III, were obtained at 1,784.39 kg, 1,554.59 kg, 1,338.90 kg respectively with flow values of 3.77 mm, 3.67 mm, and 4.03 mm respectively. The VITM values are 5.59%, 5.66% and 5.83% with VMA of 17.59%, 17.90%, and 18.34% and density value of 2.239 kg/cc, 2.299 kg/cc and 2.216 kg/cc respectively. As for the 24 hours immersion of Variation I, II and III, stability values are obtained at 1,457.95 kg, 1,361.25 kg, and 1,107.99 kg, with flow values of 4.23 mm, 4.33 mm and 4.50 mm respectively. The immersion index at variation I, II, III were obtained at 1.20%, 1.04% and 0.66 %. The mass loss in the *Contabro* test after 300 revolutions for variation I, II and III were obtained at 3.56%, 4.02%, and 3.41%. In overall, the use of coarse aggregate with high abrasion value ($\pm 50\%$) in the asphalt concrete mix in accordance to the Departemen Kimpraswil Specification (2000) is only able to serve low traffic load (traffic < 0.5 million ESA) for Variation I and II.