INTISARI

Dalam beberapa kasus yang terjadi, banyak konstruksi jalan yang mengalami masa kerusakan dalam masa pelayanan tertentu, padahal tujuan akhir adalah tersedianya jalan dengan standar baik yang sesuai dengan fungsinya. Penelitian ini dilaksanakan untuk mengetahui pengaruh penggunaan limbah karbon sebagai bahan *additive* pada SMA 0/11, disamping limbah karbon yang berasal dari baterai kering belum termanfaatkan dengan baik.

Penelitian ini dilakukan dengan memberikan limbah karbon yang berasal dari baterai kering sebagai bahan *additive* pada campuran SMA 0/11 yang sesuai dengan spesifikasi Depkimpraswil 2000. Penelitian dilakukan dengan membuat 115 benda uji dengan variasi limbah karbon 0 %, 0,1%, 0,2%, 0,3%, 0,4% dengan agregat kasar (CA) 74 %, halus (FA) 16%, dan 10% *filler,* karbon ditambahkan setelah agregat dan aspal dicampur hal ini dilakukan berdasarkan penelitian pendahuluan. Dengan metode Marshall ditentukan kadar aspal optimum pada masing-masing variasi karbon. Benda uji pada kadar aspal optimum selanjutnya direndam selama 0,5 jam dan 24 jam. Setelah perendaman dilakukan pengujian Marshall untuk mengetahui nilai stabilitas, Marshall Quotient (MQ) serta Indeks Perendaman (IP) dan pengaliran aspal (*draindown*).

Hasil penelitian menunjukkan kadar aspal optimum benda uji variasi karbon 0 %, 0,1%, 0,2%, 0,3%, 0,4% berturut-turut adalah 6,7%, 6,6%, 6,6%, 6,65%, 6,7%. Pada perendaman standar 0,5 jam, benda uji variasi limbah karbon 0 %, 0,1%, 0,2%, 0,3%, 0,4% berturut-turut memiliki nilai stabilitas 1136 kg, 1241 kg, 1247 kg, 1198 kg, 1183 kg, perendaman 24 jam nilai stabilitas adalah 1040 kg, 1142 kg, 1121 kg, 1127 kg, 1127 kg. Indeks Perendaman yang paling tinggi pada benda uji kadar *additive* limbah karbon 0,4% dengan kadar aspal optimum 6,7% yaitu 92,5%, dimana benda uji variasi limbah karbon 0%, 0,1%, 0,2% dan 0,3% berturut-turut memiliki nilai IP sebesar 91,5%, 92%, 89,9%, 94%. *Additive Roadcell* yang berfungsi dengan baik sebagai stabilisator, dimana nilai *draindown* yang dihasilkan adalah sebesar 0,023%, 0,019%, 0,027%, 0,015%, 0,034% untuk masing-masing kadar limbah karbon 0%, 0,1%, 0,2%, 0,3%, 0,4%. Dengan ini menunjukkan bahwa kadar *additive* limbah karbon yang optimal pada 0,3% dengan kadar aspal optimum 6,6% karena campuran tidak mudah mengalami *cracking* dan deformasi oleh pembebanan lalu lintas, serta memiliki durabilitas yang tinggi, selain itu penambahan limbah karbon didalam campuran dapat mengurangi kadar aspal optimum yang dibutuhkan.

Kata kunci : SMA 0/11, limbah karbon,baterai kering, Marshall, *Additive Roadcell*, IP, *Draindown.*

ABSTRACT

In some cases, there are many road constructions which are damaged in certain service life, though the goal is to provide roads in a good standard along with their functions. To achieve this objective, one of the efforts to increase the service life is by increasing the function of the asphalt as the binding material by utilizing an additive materials. This research was conducted to explore the effects of utilizing carbonate waste as an additive material to SMA 0/11 mixture, despite the carbonate waste of the dried batteries is not used well yet.

This research was conducted by introduction carbonate waste of the dried batteries as the additive material to SMA 0/11 mix, according to the 2000 Depkimpraswil specification. This research was performed by manufacturing 115 specimens with 0%, 0.1%, 0.2%, 0.3%, and 0.4% of carbonate waste contents variation within 74% of Coarse Aggregate (CA), 16% of Fine Aggregate (FA), and 10% of filler, The carbonate was added after the aggregate and asphalt were mixed, referring to the former researches. Using the Marshall Method, the optimum asphalt content of each carbonate waste variation was determined. Further tests was subsequently generated based on the optimum asphalt contents of each variation in accordance to the Marshall Immersion test for a half hour and 24 hours at 60° C. Subsequently the Marshall stability, flow, MQ value and Retained Marshall Stability was obtained with this test.

The research results show that the optimum asphalt content within 0%, 0.1%, 0.2%, 0.3%, and 0.4% of carbonate waste variation specimens were 6.7%, 6.6%, 6.6%, 6.6%, and 6.7% respectively. At the standard immersion (30 minutes, 60° C), carbonate waste of variation 0%, 0.1%, 0.2%, 0.3%, and 0.4% specimens had the stability value of 1136 kgs, 1241 kgs, 1247 kgs, 1198 kgs, and 1183 kgs respectively, further more in the 24-hours-immersion the stability value were 1040 kgs, 1142 kgs, 1121 kgs, 1127 kgs, and 1128 kgs respectively. The highest Retained Marshall Stability within 0.4% carbonate waste additive content specimen and 6.7% of optimum asphalt content was 92.5%, of which the carbonate waste variation of 0%, 0.1%, 0.2%, and 0.3% specimens were 91.5%, 92%, 89.9%, and 94% respectively. *Additive Roadcell* have a good as stabilisator, in *draindown* point which are 0.023%, 0.019%, 0.027%, 0.015%, 0.034% for carbonate waste 0%, 0.1%, 0.2%, 0.3%, 0.4%. It shows that the optimum additive content of the carbonate waste was 0.3% within 6.6% of the optimum asphalt content, since the mix did not get any crackings and deformation due to the traffic load easily, and had a high durability, in spite of the adding the carbonate waste into the mix could decreased the optimum asphalt content.

Keyword: SMA 0/11, carbonate waste, dried batteries, Marshall, *Additive Roadcell*, IP, *Draindown.*

BAB I
PENDAHULUAN