STRENGTH AND DURABILITY OF ASPHALT CONCRETE MODIFIED CRUMB RUBBER

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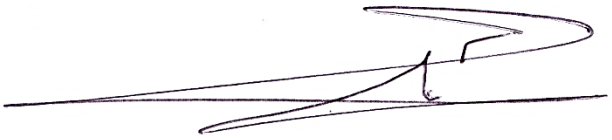

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ABSTRACT

Environmental problem becomes big problem if the trash is renewable and can not decompose. One of trashes which very dangerous to be neglected is tire rubber. Crumb rubber is an innovation for the development of asphalt concrete. The use of crumb rubber which is come from the recycle of tires is very beneficial on the environment and economic aspects. Based on the background, there are two research statements, namely: How is the influence of crumb rubber on asphalt concrete modification of strength aspect? How is the influence of crumb rubber on asphalt concrete modification on the durability aspect?

In the context of this research, the use of crumb rubber as asphalt modification to increase the strength and durability was depend on the asphalt content and percentages of crumb rubber itself. In terms of labolatory test, this research has been through many test for materials such as ITS, ITSM, UCS and OBC. All of the test were conducted to get the result about the influence of strength and durability on asphalt concrete modification with crumb rubber with several percentages, namely 0%, 3%, 4%, and 5%.

The existence of crumb rubber in asphalt mixture influenced the strength. The increased of the crumb rubber content, will influenced the decreased of the strength of mixture. It can be seen from the stability, ITS, UCS and ITSM. The score for those tests showed that the increased of crumb rubber would decreased the strength. The crumb rubber which can be recommended for the mixture was 4% with 5-5.5% of asphalt content. Then, the temperature also influenced the strength of the mixture. The higher of temperature would decreased the strength of mixture. The modification of asphalt with crumb rubber also influenced the durability. It can be seen from the density score, the maximum density was come from 4% crumb rubber content. Then, the increased of crumb rubber in the mixture (more than 4%) would decrease the density.

Keywords: crumb rubber, strength, durability

ABSTRAK

Masalah lingkungan menjadi masalah besar jika sampah yang tidak dapat terbarukan tidak dapat terurai. Salah satu sampah yang sangat berbahaya adalah karet ban. Karet remah adalah sebuah inovasi untuk pengembangan beton aspal. Penggunaan karet remah yang berasal dari daur ulang ban sangat bermanfaat terhadap lingkungan dan aspek ekonomi. Berdasarkan latar belakang, ada dua pernyataan penelitian, yaitu: Bagaimana pengaruh karet remah pada beton aspal modifikasi dalam aspek kekuatan? Bagaimana pengaruh karet remah di aspal modifikasi beton pada aspek daya tahan?

Dalam konteks penelitian ini, penggunaan karet remah sebagai modifikasi aspal untuk meningkatkan kekuatan dan daya tahan adalah tergantung pada kadar aspal dan persentase karet remah sendiri. Dalam hal uji labolatorium, penelitian ini telah melalui banyak tes seperti ITS, ITSM, UCS dan OBC. Semua tes dilakukan untuk mendapatkan hasil tentang pengaruh kekuatan dan daya tahan di aspal modifikasi beton dengan karet remah dengan beberapa persentase, yaitu 0%, 3%, 4%, dan 5%.

Keberadaan karet remah dalam campuran aspal dipengaruhi kekuatan. Peningkatan remah kadar karet, akan mempengaruhi penurunan kekuatan campuran. Hal ini dapat dilihat dari stabilitas, ITS, UCS dan ITSM. Rata bagi mereka tes menunjukkan bahwa peningkatan karet remah akan menurun kekuatan. Karet remah yang dapat direkomendasikan untuk campuran adalah 4% dengan 5-5,5% dari kadar aspal. Kemudian, suhu juga mempengaruhi kekuatan campuran. Semakin tinggi suhu akan menurunkan kekuatan campuran. Modifikasi aspal dengan karet remah juga dipengaruhi daya tahan. Hal ini dapat dilihat dari nilai kerapatan, kepadatan maksimum berasal dari 4% kadar karet remah. Kemudian, peningkatan karet remah dalam campuran (lebih dari 4%) akan menurunkan kepadatan.

Kata Kunci: karet remah, Kekuatan, daya tahan

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A	=	Weight of dry speciment in air
b	=	Volumetric flash + water + sand
B0	=	Optimum Bitumen Content
B1	=	% asphalt content at maximum unit weight.
B2	=	% asphalt content at maximum stability.
B3	=	% asphalt content at specified percent air voids in the total mix
Bsg	=	Bulk specific gravity
Bsg SSD	=	Bulk specific gravity SSD
c	=	Volumetric flash + water
d	=	Diameter of the specimen in mm to one decimal place.
d	=	Oven dry sand
D	=	The mean amplitude of the horizontal deformation obtained from 2 or more applications of the load pulse (mm),
F	=	Flow
$\mathbf{h_{ave}}$	=	Average height of the specimen in mm to one decimal place.
I	=	Volume of bitumen
ITS	=	Indirect Tensile Strength in KPa.
ITSM	=	Indirect Tensile Stiffness Modulus
L	=	The peak value of the applied vertical load (N),
L	=	Volume of air voids
B	=	Marshall quotient
P	=	Maximum applied load in N.
P (Kn)	=	Maximum applied load in N
S	=	Weight of saturated surface dry speciment
t	=	The mean thickness of the test specimen (mm)
v	=	Poisson’s ratio (a value of .35 is normally used).
VIM	=	The average of VIM
W	=	Stability