Propertis Porous Asphalt used Quarsite Dolomite Stone with Buton Natural Asphalt After Loading

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Abstract

The lot deposit of Quarsite Dolomite Stone as local material from sea location in Banggai island in half Sulawesi of Indonesia. Was still not be exploited better. Some reseaarch in the field of road construction showed that Quarsite Dolomite Stone was powefull enough when mixtured asphalt structure. Permeable asphalt pavement or porous friction course is commonly knows as porous asphalt. The porous pavement used in japanes and europe. The pavement consists in a porous overlay allowing rainwater to flow down to the botton the overlay and then to drain on the edges of the pavement. Quality of porous asphalt was developed to drain pavement surface flow through it?s pores, because of is specific propertis to mesure it?s ability to drain the water. Indirect Tensile Strength 0.0673 for asphalt quality 3

Index terms— quarsite dolomite stone, cantabro loss, indirect tensile strength, unconfined compresship strenght.

1 Introduction

ermeable asphalt pavement or porus friction course is commonly knews as porous asphalt. The porous pavement is commonly used in Europe and Japan. The pavement cousist in a porous overlay and then to drain on he edges to the pavement (Michael. E Barret. Ph.D). The lot deposit of Quarsite Dolomite Stone in Indonesia was still not be exploited better. Among the exiting utilization of it most of it was exploited for traditional needs fireplace material, some last rasearch in the field of road construction showed that Quarsite Dolomite Stone was powerfull enough when mixtured material for pavemen stabilization. Quarsite Dolomite Stone is local material from sea location in the island of banggai half Sulawesi Indonesia. Its was kwarsit Dolomitan material Celebes **??**Car Donald, 1985). This Experimental be done for mesuring propertis permeability asphalt pavement with using Quarsite Dolomite Stone as Local material who was come from sea location at the Banggai Island half Celebes Indonesia with used Rice Hash as Filler.

As course agregate on the surface layer Road Pavement. Capasity drain porous Asphalt were Author: Doctor Civil Enginering from Hasanuddin University, in duty Atma Jaya University Makassar. e-mail: Firdauschairuddin@gmail.com.

connecting correlasion with spacing hight and small porousity in structure Asphalt. Stability and Durability and Hydrolic conductivity its must be hight test than **??**0% (Ruz. et. al, 1990). Asphalt porous is open graded course Aggregate. Porousity asphalt porous (10%-15%) the structure made drain for flow water **??**Nur Ali, et al. 2005).

Aggregate was specimen mineral who was done for mixture road konstruktion in the asphalt pavement it's mush be 90%-95% for the total weight strukture or 77%-85% for all volume **??**Alkin, et. al 1997).

Clasification agregate be measured by spacing at all : course aggregate it must be lost for filter No.8 it is higher than 2,36 mm.

2 Literature Review

Two different test, the indirect tensile test (IDT) and the semi-circular bending test (SCB) were performed on a Permeable asphalt pavement. The mixture was a 10 mm nominal maximum size produced with limestone and marly limestone, calcarenite, and fine and coarse sand. It has 6.5% (±0.5%) air void and 5.4% design asphalt content, produced with 60/70 PEN virgin bitumen. Specimens were compacted using a Superpave Gyratory compactor at N = 109 revolutions to produce a 6500 g, 150 mm diameter Gyratory-compacted specimen. Specimens 150 mm diameter by 25 mm thick were used to perform Superpave IDT test with the system developed by Roque and Buttlar ??9, ??0]. Some of these thin specimens were sliced to obtain 75 mm height semi circular specimens in order to conduct SCB test.

The tests were performed on three replicates at 10 o C using an MTS closed-loop servo-hydraulic loading system. The experimental set-up of each test is shown in Fig. 1.

3 a) The indirect tensile test (IDT)

The IDT loads monotoniealiy a 152 mm diameter circular specimen to failure applying a constant stroke of 0.084 mm/s. Two strain gauges with a length of 38.1 mm are placed at the centre of the specimen to measure vertical and horizontal deformations during loading. The horizontal stress occurring at the centre of the specimen is computed using the following IDT plane stress equation, according to the superpave indirect tension test procedure [9,10]: ?h= 2P/?Dt where: ?h tensile stress at the centre of the specimens, P load of the specimen, D diameter of the specimen, t thickness of the specimen.

In addition, the procedure developed by Roque and Buttlar [9,10] was used to calculate horizontal and vertical strains at the center of the specimen from horizontal and vertical train gauge measurements.

4 III.

5 Materials and Methods

6 a) Indirect Testing

Permeable asphalt pavement was produced with used Quarsite Dolomite Stone as course aggregate. The Quarsite Dolomite Stone broked in the spacing 3/8" ½"-¾" with the BNA Blend Pertamina penetration 60/70. Briket at the Bitumen be done as the standard variation asphalt 3%, 3,5%, 4%, and 5% for testing experimental Indirect Tensile Strength (ITS) and Catambro Lost. We was controlling testing for composition asphalt permeable pavement with Standar National Indonesia (SNI) and American Association for Testing and Material (ASTM), Permeability and Marshal Test with asphalt variation 4-7% integral spacing 1% who use variation open gradation. Asphalt optimum standar is 4% be used to controlling variation asphalt. For optimum asphalt test be use variation asphalt 3% -5% with spacing 5%.

For open gradation we use lost aggregate ¾", ½" and lost filter by comparative 50 : 50. Fine aggregate we use filter number 4, finally number 200, we used 10%. BNA Blend Pertamina we use all variation asphalt category: 3%, 3.5%, 4%, 4.5% and 5%. Test Indirect Tensil Strength (ITS) be controlling by ASTM D6931-07.

7 b) Mix Design Permeable Asphalt Pavement Testing

Mix design permeable asphalt pavement the used composition open graded sistem. Who was Mix Trial Gradation lost of material ¾", 1/2 " be stoped filter ½" and lost of material ½" be stoped filter 3/8" with composition comparative 50-50 to course aggregate. The used fine aggregate lost filter number 4, and stoped filter number 200 all of 10% for mould capacity. Asphalt Blend Pertamina the use variation standard 3%, 3.5%, 4%, 4.5% and 5%. Briket make in for 10 cm and depth + 6.5cm and Briket make in 40x40 cm, depth + 6.5cm. 1. Indirect tensile strength 0,1140 MPa for total load 125 Kgf, for the quality asphalt 3% R maks 0,0180. Indirect tensile strength 0, 2483 MPa for total load 275 Kgf, for the quality asphalt 3.5% R maks 0,0234. Indirect tensile strength 0, 3574 MPa for total load 400 Kgf, for the quality asphalt 4% R maks 0, 0283. Indirect tensile strength 0, 2927 MPa for total load 325 Kgf, for the quality asphalt 4.5% R maks 0,0253. Indirect tensile strength 0,2346 MPa for total load 250 Kgf, for the quality asphalt 5% R maks 0,0225. [1]

1

Figure 1: Figure 1 :

2

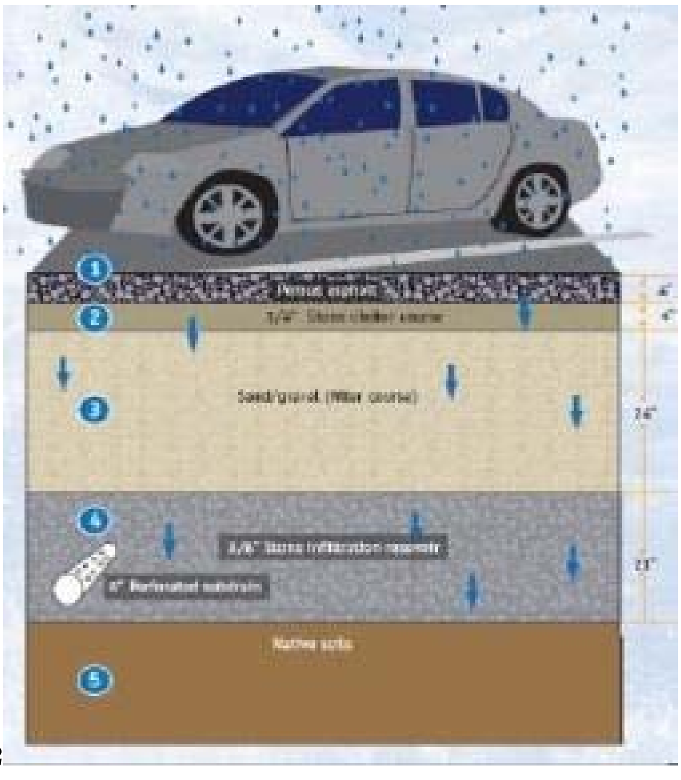

Figure 2: Figure 2 :

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Figure 3: Figure 6 :

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Figure 4: Figure 12 :Figure 13 :

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Figure 5: Figure 9 :

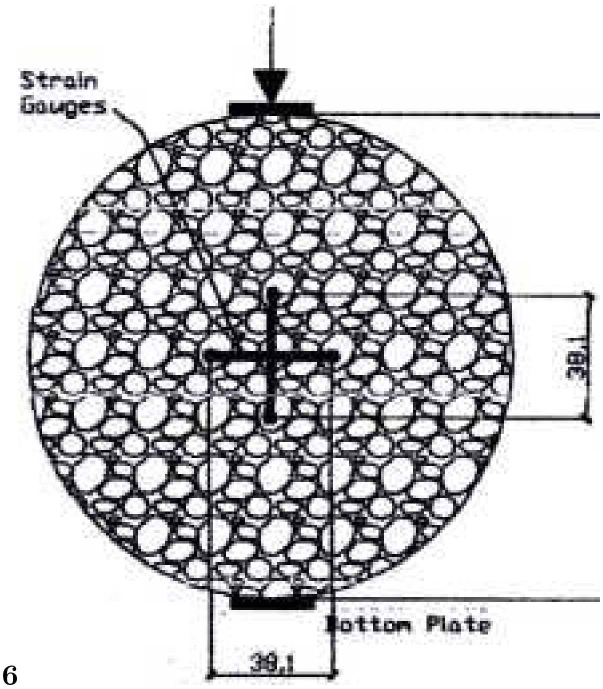

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Figure 6: Figure 14 :Figure 16 :

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Figure 7: Figure 17 :

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Figure 8: Figure 19 :

2

Sampel	Percentage asphalt quality (%)	Diameter briket mm	High Briket mm	Load Value (P) kgf	ITS Value Mpa
		D	H		
I		102.3	66.9		0
II		102.22	69.3	75.00	0.066134591
III		102	68.5	100.00 0.089401701	

Figure 9: Table 2 :

4

Sam pel	Percentage quality asphal	Wei ght before test (Gram) Mo	Weight after test (Gram) (Gram) (%) Loss Loss Weight Weight Mi L		
I		1081	244	837.00	77.43
II		1083	248	835.00	77.10
III IV V	3.0	1090 1091 1070	281 226 241	809.00 865.00 829.00	74.22 79.29 77.48
		Average			77.10
I II		1085 1089	731 760	354.00 329.00	32.63 30.21
III IV V	3.5	1071 1069 1088	748 711 705	323.00 358.00 383.00	30.16 33.49 35.20
		Average			32.34
I II III	4.0	1081 1082 1088	913 936 931	168.00 146.00 157.00	15.54 13.49 14.43
IV V		1086 1090	944 913	162.00 177.00	13.09 16.24
		Average			14.56
I II		1084 1082	959 952	125.00 130.00	11.53 12.01
III IV	4.5	1086 1088	940 961	146.00 127.00	13.44 11.67
V I II	5.0	1084 Average 1075	948 956 968 984	136.00 119.00	12.55 12.24 11.07
III IV		1084 1090 1078	994 1003	116.00 106.00	10.70 9.72 7.79
V		1105 Average		84.00 102.00	9.23 9.70

[Note: E © 2016 Global Journals Inc. (US)]

Figure 10: Table 4 :

2. Permeable asphalt pavement

Cantabro test we can see that optimum BNA Blend Pertamina for the coarse agregate Quarsite Dolomite Stone it was bigger porous when quality asphalt 3%. Loss weight Cantabro 77.10% correlation with quality asphalt 3%, loss weight Cantabro 32,34% correlation with quality asphalt 3.5%, loss weight Cantabro 14,56% correlation with quality asphalt 4%, Loss weight Cantabro 12,24% correlation with quality asphalt 4.5% and loss weight Cantabro 9,70% correlation with quality asphalt 5%.

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