

Study of Influence of Using Various Types of Filler on the Characteristics of Laboratory Mixed AC-BC and AC-WC 2010 Revised General Specification Version III

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Abstract

Filler is a substance that serves as charger cavities of an asphalt mixture. Kinds of filler that can be used are: stone dust, lime extinguished, Portland cement (PC), etc. A small percentage of the filler for asphalt mixture does not mean that does not have a great effect on the properties of Marshall. The eruption of mount Sinabung some time ago at the Tanah Karo, North Sumatra lot leaving the material shed from the eruptions. Then there are around limestone hill in Sipoholon, North Tapanuli Regency, North Sumatera Province too many underutilized by society around. This paper attempts to compare the filler test result from authors with volcanic ash and lime ash againts rock ash as filler AC-BC by researchers previously with only using volcanic ash againts rock ash as filler in AC-WC. The goal from this paper is to knowing if the authors make a volcano ash and lime ash as a filler but this use in AC-WC, would be same with the result marshall test requirement from researchers previously. In the step the authors collected result Marshall Test from researches previously. Then Compare with the authors research result [1-3], with provision mix parameter such as compare The optimum asphalt content from each. Then compare from the result percentage marshall test from authors which make percentage filler from 0-6% and previously researches from 0-4%. The result from requirement marshall test from percentage marshall AC-BC from 0-6%. The Authors earn 4% while previous research AC-WC earn 3% which eligible from marshall test requirement.

It can be concluded that make differences mix formula with Volcano ash againts Lime ash or without fly sand from percentage marshall test requirement. Then The layer is same with previous researchers is AC-WC. It would be same result by previously researchers where the result is 3% from percentage marshall test requirement from 0-6%. it could be happen because from gradation mixing factor from specification requirement from Highway departement in Indonesia.

Keywords: AC-BC; AC-WC; Cement; Filler; Hotmix; Lime ash sipoholon; Sinabung mountain ash

Introduction

Issue background

Filler is a substance that serves as charger cavities of an asphalt mixture. Kinds of filler that can be used are: stone dust, lime extinguished, Portland cement (PC), etc. A small percentage of the filler for asphalt mixture does not mean that does not have a great effect on the properties of Marshall. The eruption of mount Sinabung some time ago at the Tanah Karo, North Sumatra lot leaving the material shed from the eruptions. Then there are around limestone hill in Sipoholon, North Tapanuli Regency, North Sumatera Province too many underutilized by society around. This paper attempts to compare The filler test result from Authors with volcanic ash and lime ash againts rock ash as filler AC-BC by researchers previously with only using volcanic ash againts rock ash as filler in AC-WC [4,5].

Problem identification

This Paper make a reveal problem from previous research who did it by undergraduated student. There was a previous resarch who conducted by undergraduated student and my previous research too when I'm still undergraduated student. Then this person make a reseach about hotmix Laboratory AC-WC by added Filler from Volcano ash, which the filler content result from marshall requirement is 3%. Meanwhile from my research about hotmix laboratory AC-BC by added Filler from Volcano ash and Lime ash, which the filler content result from marshall requirement is 4%.

The purpose from paper

The goal from this paper is to knowing if the authors make a volcano ash and lime ash as a filler but this use in AC-WC, would be same with the result marshall test requirement from researchers previously.

Research Methodology

Research methodology from previous research (AC-WC)

From The previous Research AC-WC, the researchers make a marshall test by filler content from 1-4% (Figure 1).

Research methodology from previous research (AC-BC)

From the previous research AC-BC, the researchers make a marshall test by filler content from 0-6% (Figure 2 and Table 1).

Data Analysis and Results

Data Analysis and result from previous research (AC-WC)

From the data obtained Marshall Test, which meets all the requirements of the specification Department of Public Works in 2010 revision III it was the volcanic ash filler of 3% that is obtained by the value of stability of 1515 kg, flow amounted to 6, VIM amounted to 4.67% and VIM PRD 2.18%, VMA amounted to 15.08%, and its VFB amounted to 69.53% and the remainder Strength Index of 91.09%.

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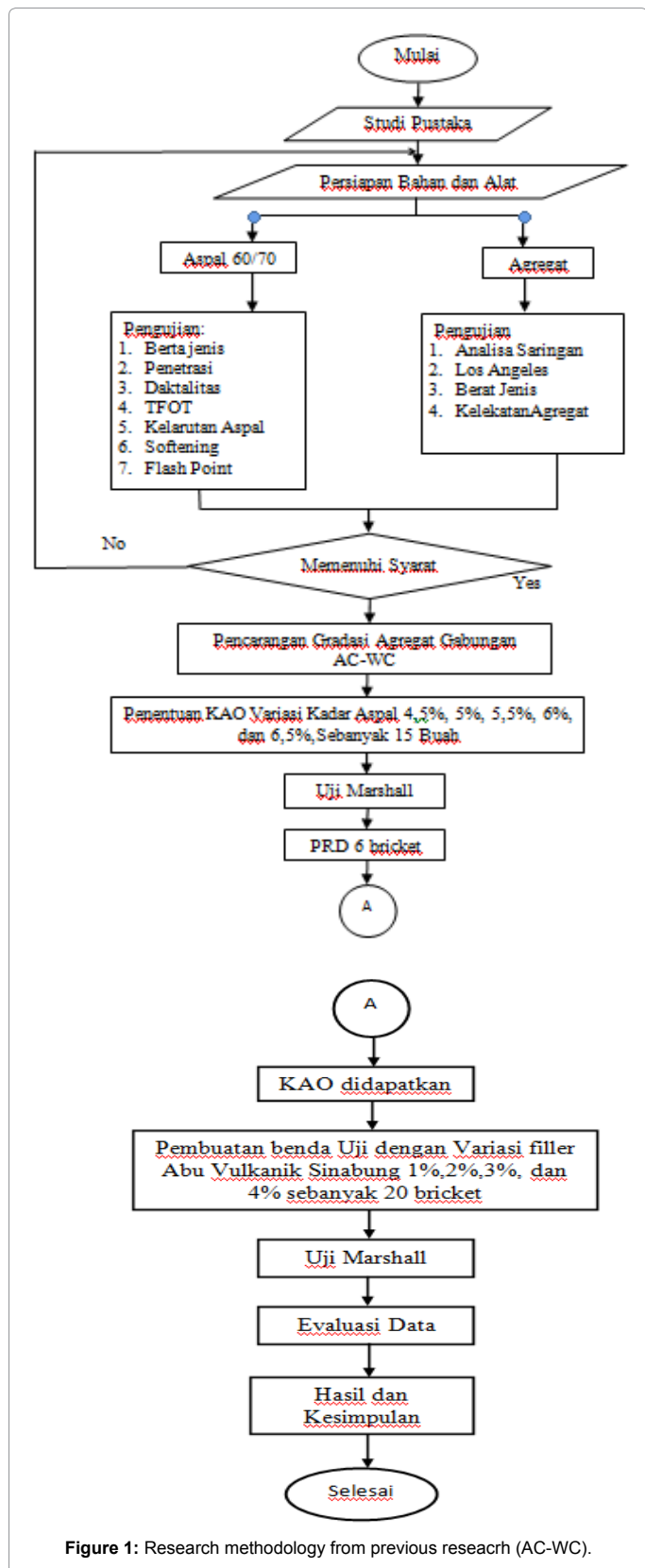


Figure 1: Research methodology from previous research (AC-WC).

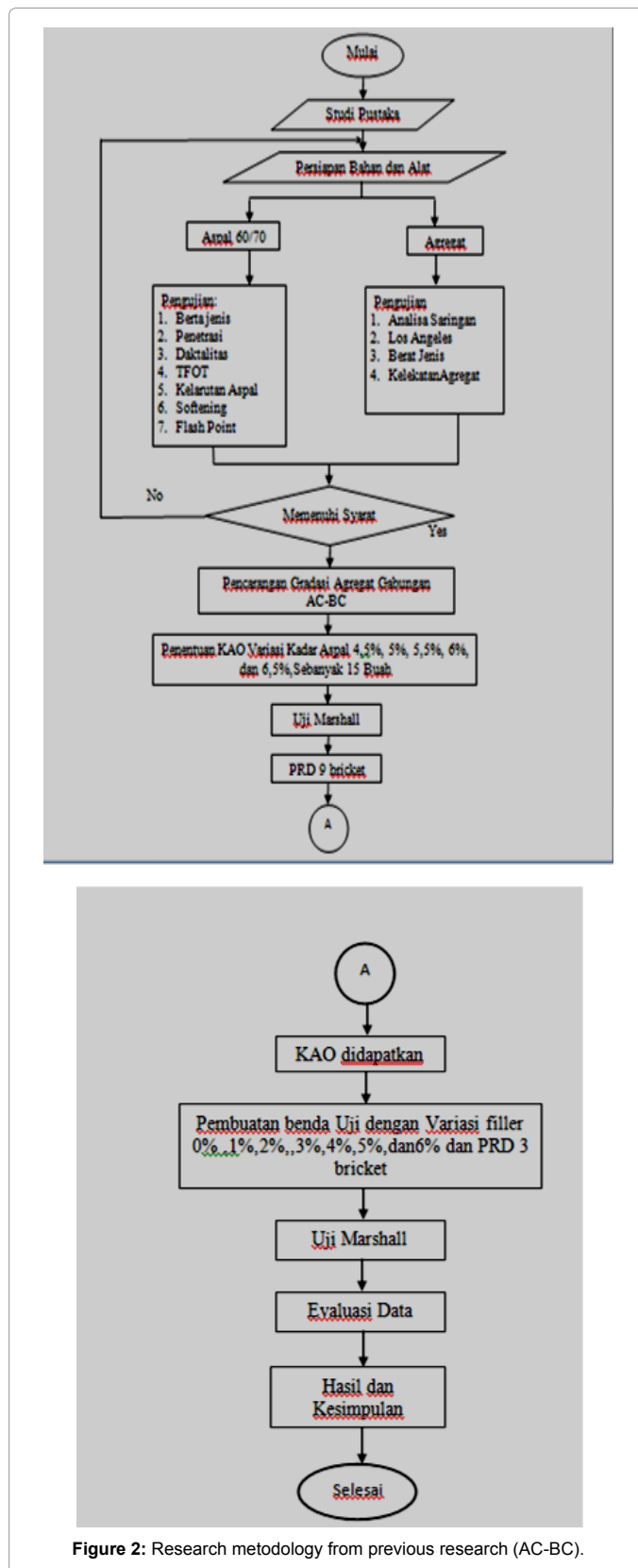


Figure 2: Research methodology from previous research (AC-BC).

Sifat-sifat Campuran		Laston		Pondasi
		Lapis Aus	Lapis Antara	
Jumlah tumbukan per bidang		75		112 (1)
Rasio partikel lolos ayakan 0.075 mm dengan kadar aspal efektif	Min		1.0	
Rongga dalam Agregat (VMA)(%)	Maks		1.4	
	Min		3.0	
Rongga Terisi Aspal	Maks		5.0	
	Min	15	14	13
Stabilitas Marshall (kg)	Min	65	65	65
	Min	800		1800 (1)
Pelelehan	Min	2		3
	Maks	4		6 (1)

Table 1: The requirement Marshall test from Indonesian Road Highway of Department 2010 Revised General Specification Version III.

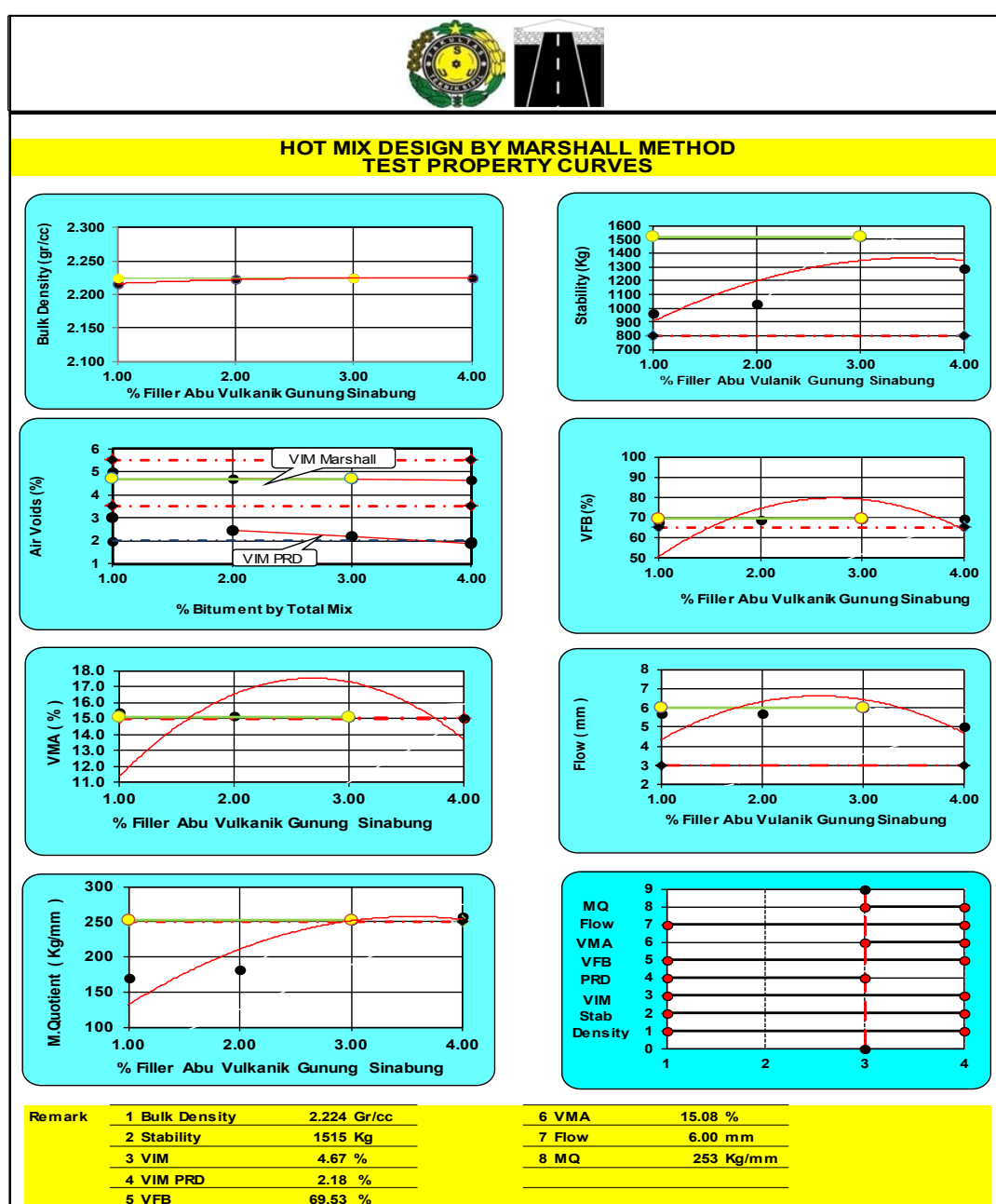


Figure 3: Data analysis and result from previous research (AC-WC).

It can be concluded that the filler content of 3% which meets all the requirements of Marshall Test (Figure 3).

Data analysis from previous research (AC-BC)

From the data Marshall Test obtained, based on the requirements specification of the Ministry of Public Works in 2010 Revision III is filler which 4% average filler content from volcanic ash, cement ash and lime ash has obtained the requirement from data Marshall Test by

the value of stability of 842 kg, flow amounted to 3.9, VIM amounted to 4.68% and VIM PRD 2.33%, VMA amounted to 16.62%, and its VFB amounted to 71.86% and the remainder Strength Index of 91.31%. It can be concluded that the filler content of 4% which meets all the requirements of Marshall Test (Table 2 and Figure 4).

Conclusion

From the data obtained Marshall Test, which meets all the

Ukuran Ayakan (mm)	% Berat Yang Lolos terhadap Total Aggregate dalam Campuran								
	Latasir (SS)		Lataston (HRS)		Gradasi Semi Senjang		Laston (AC)		
	Kelas A	Kelas B	Gradasi Senjang ³	Gradasi Senjang ²	WC	Base	WC	BC	Base
37.5									100
25								100	90-100
19	100	100	100	100	100	100	100	90-100	76-90
12.5			90-100	87-100	90-100	90-100	90-100	75-90	60-78
9.5	90-100		75-85	65-90	55-88	55-70	77-90	66-82	52-71
4.75							53-69	46-64	35-54
2.36		75-100	50-72 ³	35-55 ³	50-62	32-44	33-53	30-49	23-41
1.18							21-40	18-38	13-30
0.600			35-60	15-35	20-45	15-35	14-30	12-28	10-22
0.300					15-35	5-35	9-22	7-20	6-15
1.150							6-15	5-13	4-10
0.075	10-15	8-13	6-10	2-9	6-10	4-8	4-9	4-8	3-7

- Note:
1. For the HRS and HRS-WC-base truly gap. at least 80% aggregate to qualify sieve 8 (2.36 mm) must pass a sieve # 30 (0.600 mm). See Table 6.3.2.4 as an example of the limits of "bahab graded gap" in which the material passes No. 8 (2.36 mm) and retained on 30 meshes (0.600 mm).
 2. For all kinds of mixed type. refer to Table 6.3.2. (1). (B) for a maximum nominal aggregate size of the stack of material pemasik cold.
 3. If it is not set out in Figure. penggunaan gradation election in accordance with the instructions of the Engineer With reference to section 6.3 of this guide.

Table 2: Combined aggregate gradation envelope for asphalt mixes.

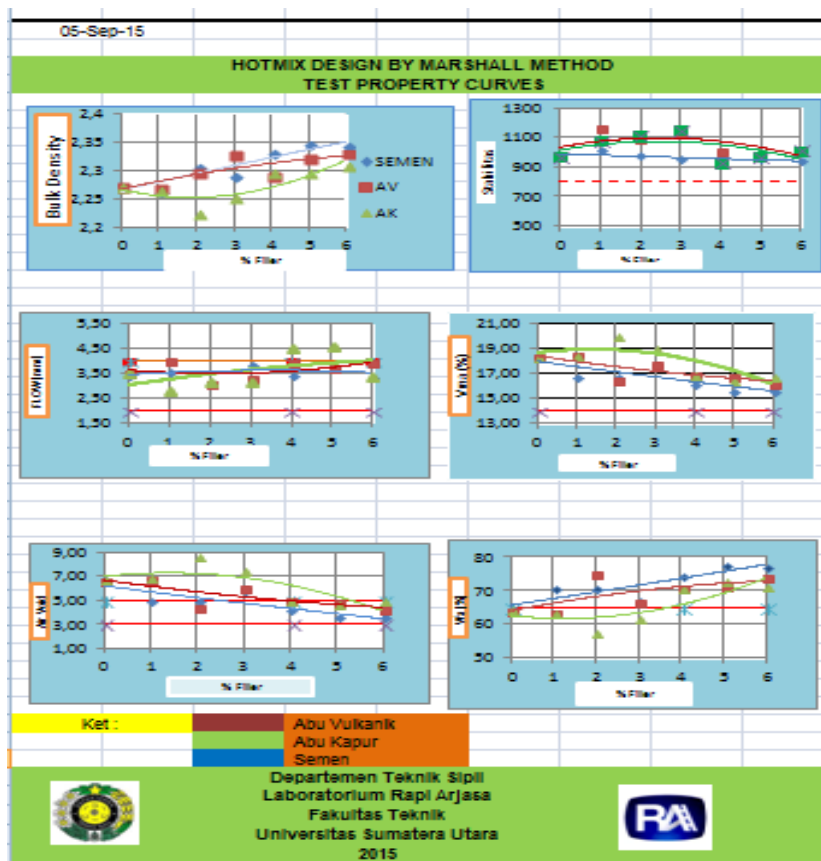


Figure 4: Data analysis from previous research (AC-BC).

requirements of the specification Department of Public Works in 2010 Revision III. That The Filler Content 3% for AC-WC and 4% AC-BC has meets all requirement marshall test. It can be concluded that make differences mix formula with Volcano ash againts Lime ash or without fly sand from percentage Marshall Test requirement. Then The layer is same with previous researchers is AC-WC. It would be same result by previously researchers where the result is 3% from percentage marshall test requirement from 0-6%. it could be happen because from gradation mixing factor from specification requirement from Highway departement in Indonesia.

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