

# KARAKTERISTIK AGREGAT BANTAK DITINJAU DARI PENGUJIAN *ULTRASONIC PULSE VELOCITY* DAN STABILITAS MARSHALL

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## ABSTRAK

Penelitian ini bertujuan untuk mengetahui nilai *Ultrasonic Pulse Velocity* dan nilai karakteristik Marshall menggunakan bahan pengikat aspal AC 60/70 dengan menggunakan agregat bantak tanpa serat *polypropylene* dan agregat bantak ditambahkan serat *polypropylene*, ditinjau dari nilai percepatan gelombang, nilai Stabilitas Marshall, *VIM* (*Void in Mix*), *VFB* (*Void Filled Bitumen*), *VMA* (*Void in Mineral Aggregate*), *MQ* (*Marshall Quotient*).

Penelitian ini menggunakan eksperimen campuran aspal AC 60/70 dengan kadar aspal 6%. Benda uji pada penelitian menggunakan agregat bantak tanpa serat *polypropylene* dan menggunakan serat *polypropylene*. Untuk benda uji tanpa serat *polypropylene* (benda uji A) proporsi agregat yang digunakan adalah 68% agregat kasar, 26% agregat halus, 6% *filler* dengan jumlah 3 benda uji. Sedangkan benda uji yang menggunakan serat *polypropylene* terdiri dari 2 varian, (benda uji B) menggunakan proporsi agregat bantak 68% agregat kasar, 26% agregat halus, 6% *filler* dengan jumlah 3 benda uji dan (benda uji C) proporsi agregat bantak 70% agregat kasar, 30% agregat halus dengan jumlah 2 benda uji. Pelaksanaan penelitian dilakukan di Laboratorium Bahan Bangunan Jurusan Teknik Sipil dan Perencanaan, Fakultas Teknik, Universitas Negeri Yogyakarta. Tahapan pelaksanaan meliputi pemeriksaan agregat (agregat halus dan agregat kasar), pemeriksaan *filler*, pembuatan benda uji campuran beton aspal, pengujian UPV dengan metode *direct* dan pengujian menggunakan Metode Marshall.

Hasil nilai kecepatan perambatan gelombang UPV dan karakteristik Marshall pada pengujian ini adalah sebagai berikut: nilai rerata kecepatan perambatan gelombang UPV tanpa serat *polypropylene* (benda uji A) 3,57 km/s dan yang menggunakan serat *polypropylene* (benda uji B) 3,42 km/s (benda uji C) 3,42 km/s, nilai rerata Stabilitas Marshall tanpa serat *polypropylene* (benda uji A) 1792,01 kg dan yang menggunakan serat *polypropylene* (benda uji B) 1749,34kg (benda uji C) 1589,34 kg, nilai rerata *VIM* tanpa serat *polypropylene* (benda uji A) 15,86 % dan yang menggunakan serat *polypropylene* (benda uji B) 16,88 % (benda uji C) 17,67 %, nilai rerata *VFB* tanpa serat *polypropylene* (benda uji A) 23,72 % dan yang menggunakan serat *polypropylene* (benda uji B) 22,16 % (benda uji C) 21,04 %, nilai rerata *VMA* tanpa serat *polypropylene* (benda uji A) 20,74 % dan yang menggunakan serat *polypropylene* (benda uji B) 21,69 % (benda uji C) 22,37 %, , dan nilai rerata *MQ* tanpa serat *polypropylene* (benda uji A) 299,95 kg/mm dan yang menggunakan serat *polypropylene* (benda uji B) 267,00 kg/mm (benda uji C) 644,05 kg/mm.

**Kata Kunci:** *Ultrasonic Pulse Velocity*, Metode Marshall, Agregat Bantak, Aspal AC 60/70

# **CHARACTERISTICS OF MANY AGGREGATE BASED ON TESTING ULTRASONIC PULSE VELOCITY AND STABILITY MARSHALL**

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## **ABSTRACT**

This study aims to determine the value of Ultrasonic Pulse Velocity and Marshall characteristic values using asphalt binder AC 60/70 using bantak aggregate without aggregate bantak polypropylene fibers and polypropylene fibers added, in terms of the value of the acceleration waveform, the value of Marshall Stability, VIM (Void in Mix), VFB (Void Filled Bitumen), VMA (Void in Mineral Aggregate), MQ (Marshall Quotient).

This research uses experimental AC 60/70 mix asphalt with asphalt content of 6%. The test object on research using bantak aggregate without the use of polypropylene fibers and polypropylene fibers. To the specimen without the fiber polypropylene (specimen A) the proportion of aggregate used is 68% coarse aggregate, fine aggregate 26%, 6% filler with an amount of 3 specimen. While the test specimen using polypropylene fibers consist of two variants, (specimen B) use the proportion of aggregate bantak 68% coarse aggregate, 26% fine aggregate, 6% filler with an amount of 3 specimen and (specimen C) the proportion of aggregate bantak 70% coarse aggregate, 30% of fine aggregate by the number 2 specimen. Implementation of research conducted at the Laboratory of Building Materials Department of Civil Engineering and Planning, Faculty of Engineering, University of Yogyakarta. Stages of implementation includes examining aggregate (fine aggregate and coarse aggregate), examination of filler, the manufacture of test specimens of asphalt concrete mixtures, testing UPV by direct methods and testing using Marshall Method.

The results of the wave propagation speed of the UPV and Marshall characteristics in this test are as follows: the average value of the wave propagation speed UPV without fiber polypropylene (specimen A) 3,57km/s and the use of polypropylene fibers (specimen B) 3,42km/s (specimen C) of 3,42km/s, the average value of Marshall Stability without fiber polypropylene (specimen A) 1792,01 kg and the use of polypropylene fibers (specimen B) 1749,34kg (specimen C) 1589,34kg, the average value of VIM without fiber polypropylene (specimen A) 15,86% and the use of polypropylene fibers (specimen B) 16,88% (specimen C) 17,67%, the average value of VFB without fiber polypropylene (specimen A) 23,72% and the use of polypropylene fibers (specimen B) 22,16% (specimen C) 21,04%, the average value of VMA without fiber polypropylene (specimen A) 20,74% and the use of fiber polypropylene (specimen B) 21,69% (specimen C) 22,37%, and the average value of MQ without fiber polypropylene (specimen A) 299,95 kg/mm and the use of polypropylene fibers (specimen B) 267,00 kg/mm (specimen C) 644,05 kg/mm.

**Keywords:** Ultrasonic Pulse Velocity, Method Marshall, Bantak Aggregate, Asphalt AC 60/70