ABSTRAK

PENGARUH *HYBRID FIBER* (SINTESIS DAN LOGAM) TERHADAP KINERJA ASPAL PORUS PG-70

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Aspal porus merupakan salah satu alternatif perkerasan yang mampu meningkatkan drainase permukaan serta mengurangi risiko genangan air dan aquaplaning, namun tingginya kadar rongga pada campuran dapat menyebabkan penurunan stabilitas dan durabilitas. Penelitian ini bertujuan menganalisis pengaruh penambahan serat hibrida terhadap karakteristik campuran aspal beton porus menggunakan Aspal *Performance Grade* (PG-70) dengan variasi kombinasi serat *iron wool* dan *nylon* (IR+NY), *iron wool* dan *peet poliester* (IR+PE), serta *iron wool* dan *Glass Wool* (IR+GW). Pengujian yang dilakukan meliputi *Marshall*, permeabilitas, *Cantabro*, dan *Marshall* Sisa. Hasil penelitian menunjukkan bahwa campuran IR+NY pada Kadar Aspal Optimum (KAO) memiliki kinerja *Marshall* terbaik dengan nilai stabilitas sebesar 1.164 kg dan *Marshall Quotient* (MQ) sebesar 116,249 kg/mm, sedangkan pada pengujian permeabilitas diperoleh koefisien sebesar 0,62 cm/s untuk campuran IR+NY dan 0,22 cm/s untuk campuran IR+GW yang masih memenuhi persyaratan *Australian Asphalt Pavement Association* (AAPA, 2004) sebesar 0,1–0,5 cm/s. Pengujian *Cantabro* menunjukkan bahwa campuran IR+GW memiliki ketahanan abrasi terbaik dengan nilai kehilangan berat rata-rata terendah sebesar 2,464%, sedangkan hasil *Marshall* Sisa menunjukkan seluruh variasi campuran memenuhi persyaratan minimum 90%, dengan nilai tertinggi pada campuran normal sebesar 104,199% dan pada campuran berserat sebesar 98,405% untuk IR+GW. Berdasarkan hasil tersebut, penambahan serat hibrida berpengaruh terhadap karakteristik campuran aspal beton porus, dengan kombinasi serat *iron wool* dan *Glass Wool* (IR+GW) memberikan kinerja paling optimal karena mampu menghasilkan keseimbangan antara stabilitas, permeabilitas, ketahanan abrasi, dan ketahanan terhadap pengaruh air.

Kata Kunci: Aspal, Serat, *Marshall*, Permeabilitas, *Cantabro*.

ABSTRACT

THE EFFECT OF HYBRID FIBERS (SYNTHETIC AND METALLIC) ON THE PERFORMANCE OF PG-70 PORUS ASPHALT

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Porous asphalt is an alternative pavement type that can improve surface drainage and reduce the risk of water ponding and hydroplaning. However, its high air void content may reduce the stability and durability of the mixture. This study aims to analyze the effect of hybrid fiber addition on the characteristics of porous asphalt concrete mixtures using Performance Grade Asphalt (PG-70). The hybrid fiber variations consisted of iron wool and nylon (IR+NY), iron wool and PET peet poliester (IR+PE), and iron wool and Glass Wool (IR+GW). The tests conducted included Marshall, permeability, Cantabro, and Marshall Immersion tests. The results showed that the IR+NY mixture at the Optimum Asphalt Content (OAC) exhibited the best Marshall performance, with a stability value of 1,164 kg and a Marshall Quotient (MQ) of 116.249 kg/mm. In the permeability test, the IR+NY mixture achieved the highest permeability coefficient of 0.62 cm/s, while the IR+GW mixture produced a coefficient of 0.22 cm/s, which still met the Australian Asphalt Pavement Association (AAPA, 2004) specification of 0.1–0.5 cm/s. The Cantabro test indicated that the IR+GW mixture had the best abrasion resistance, with the lowest average weight loss of 2.464%. The Marshall Immersion test showed that all mixture variations satisfied the minimum requirement of 90%, with the highest retained Marshall stability of 104.199% for the control mixture and 98.405% for the IR+GW fiber-reinforced mixture. Based on these findings, the addition of hybrid fibers significantly influenced the characteristics of porous asphalt concrete mixtures. Overall, the combination of iron wool and Glass Wool (IR+GW) provided the most optimal performance by achieving a balanced combination of stability, permeability, abrasion resistance, and moisture resistance.

Keywords: *Asphalt, Fiber, Marshall, Permeability, Cantabro.*

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