# ANALISIS PERBANDINGAN KARAKTERISTIK *MARSHALL* ASPAL PG 76 DAN PEN 60/70 DENGAN PENAMBAHAN ZAT ADITIF *ANTI-STRIPPING AGENT* PADA KINERJA CAMPURAN ASPAL BETON LAPIS *ASPHALT CONCRETE-WEARING COURSE* (AC-WC)

**Dewi Sukma Anggraini, Sheren Bery Lauryin**
Jurusan Teknik Sipil, Politeknik Negeri Sriwijaya

## ABSTRAK

Penelitian ini bertujuan menganalisis pengaruh penambahan *Anti-Stripping Agent* (ASA) terhadap karakteristik *Marshall* dan ketahanan terhadap pengaruh air pada campuran *Asphalt Concrete-Wearing Course* (AC-WC) yang menggunakan aspal PG 76 dan PEN 60/70. Penambahan ASA dilakukan untuk meningkatkan daya lekat antara aspal dan agregat serta mengurangi kerusakan akibat air (*stripping*) pada perkerasan jalan. Metode penelitian dilakukan melalui pengujian *Marshall* untuk menentukan Kadar Aspal Optimum (KAO) dan mengevaluasi karakteristik campuran yang meliputi *stabilitas, flow, VIM, VMA, VFA, dan Marshall Quotient* (MQ). Variasi kadar aspal yang digunakan yaitu 5%, 5,5%, dan 6%, sedangkan variasi kadar ASA sebesar 0%, 0,1%, 0,2%, 0,3%, dan 0,4% terhadap berat aspal. Ketahanan campuran terhadap air dievaluasi menggunakan pengujian *Index of Retained Strength* (IRS). Hasil penelitian menunjukkan bahwa KAO campuran aspal PEN 60/70 sebesar 5,96% dan aspal PG 76 sebesar 5,95%. Pada kondisi KAO, campuran dengan aspal PG 76 memiliki kinerja lebih baik dengan nilai stabilitas 1931 kg, MQ 591 kg/mm, dan VFA 72,71%. Penambahan ASA meningkatkan karakteristik *Marshall* pada kedua jenis aspal. Kinerja optimum diperoleh pada kadar ASA 0,3% untuk PEN 60/70 dan 0,2% untuk PG 76. Seluruh campuran memenuhi spesifikasi IRS di atas 90%, dengan nilai tertinggi pada aspal PG 76 sebesar 93,12%. Oleh karena itu, kombinasi aspal PG 76 dan ASA 0,2% direkomendasikan untuk perkerasan jalan dengan lalu lintas berat.

**Kata kunci** : AC-WC, Aspal PG 76 dan PEN 60/70, *Anti-Stripping Agent*, Karakteristik *Marshall*, *Index of Retained Strength* (IRS).

# ANALISIS PERBANDINGAN KARAKTERISTIK *MARSHALL* ASPAL PG 76 DAN PEN 60/70 DENGAN PENAMBAHAN ZAT ADITIF *ANTI-STRIPPING AGENT* PADA KINERJA CAMPURAN ASPAL BETON LAPIS *ASPHALT CONCRETE-WEARING COURSE* (AC-WC)

**Dewi Sukma Anggraini, Sheren Bery Lauryin**
Jurusan Teknik Sipil, Politeknik Negeri Sriwijaya

## ABSTRACT

This study aims to analyze the effect of adding Anti-Stripping Agent (ASA) on the Marshall characteristics and water resistance of Asphalt Concrete-Wearing Course (AC-WC) mixtures using PG 76 and PEN 60/70 asphalt binders. The addition of ASA was intended to improve the adhesion between asphalt and aggregates and to reduce moisture-induced damage (*stripping*) in pavement layers. The research method involved Marshall testing to determine the Optimum Asphalt Content (OAC) and evaluate mixture characteristics, including stability, flow, Void in Mix (VIM), Void in Mineral Aggregate (VMA), Void Filled with Asphalt (VFA), and Marshall Quotient (MQ). Asphalt content variations of 5%, 5.5%, and 6% were used, while ASA contents of 0%, 0.1%, 0.2%, 0.3%, and 0.4% by asphalt weight were applied. Water resistance was evaluated using the Index of Retained Strength (IRS) test. The results showed that the OAC was 5.96% for PEN 60/70 asphalt and 5.95% for PG 76 asphalt. At the OAC condition, the PG 76 mixture exhibited better performance, with a stability value of 1931 kg, MQ 591 kg/mm, dan VFA 72,71%.The addition of ASA improved the Marshall characteristics of both asphalt types. The optimum performance was achieved at an ASA content of 0.3% for PEN 60/70 and 0.2% for PG 76. All mixtures satisfied the IRS specification of above 90%, with the highest IRS value of 93.12% obtained for PG 76 asphalt. Therefore, the combination of PG 76 asphalt and 0.2% ASA is recommended for pavement applications subjected to heavy traffic.

**Keywords:** AC-WC, PG 76 Asphalt, PEN 60/70 Asphalt, Anti-Stripping Agent, Marshall Characteristics, Stability, Marshall Quotient, Retained Marshall Stability, Water Resistance, Stripping.