PERFORMANCE OF ASPHALTIC CONCRETE INCORPORATING SBR
SUBJECTED TO AGING

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Specially Dedicated To…

My Inspiration

*My Parents (MOHAMMED MOHAMMED SALAH and HAMAMH QAID) and all my family members*

My Supervisor

*DR. RAMADHANSYAH PUTRA JAYA for his guidance*

My Co-supervisor

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All my friends who helped me
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The influence of styrene butadiene rubber (SBR) on asphaltic concrete properties at different aging condition presented in this study. These aging conditions are named as un-aging, short-term and long-term. The conventional asphalt binder of penetration grade 60/70 was used within this work, modified with styrene butadiene rubber (SBR) at four different modification levels namely 0%, 1%, 3%, and 5% by weight binder. Asphalt concrete mixes were prepared at selected optimum asphalt content (5.0%) and then tested to evaluate their mechanical properties which include Marshall stability, resilient modulus and dynamic creep tests. From the experimental results, the findings showed that the mixes modified with SBR polymer have an improved stability and permanent deformation characteristics under aging conditions. The result also showed that the stability, resilient modulus and dynamic creep tests under long term aging is the highest among than that of the short term and un-aged. The use of 5 percent SBR has added to local knowledge the ability to produce more durable asphalt concrete mixtures with better serviceability.

Keywords: styrene butadiene rubber, aging, stability, creep resilient modulus
ABSTRAK

Kajian ini berkaitan pengaruh styrene butadiene rubber (SBR) terhadap sifat-sifat konkrit asfalt pada keadaan penuaan yang berbeza. Keadaan penuaan ini dinamakan sebagai anti penuaan, jangka masa pendek dan jangka masa panjang. Pengikat konvensional asfalt daripada penusukan gred 60/70 telah digunakan di dalam kajian ini. SBR telah diubahsuai kepada empat tahap pengubahsuaian yang berbeza iaitu 0%, 1%, 3%, dan 5% dengan menggunakan pengikat berat. Campuran konkrit asfalt disediakan apabila kandungan optimum asfalt (5.0%) telah ditentukan, kemudian ia diuji untuk menentukan sifat-sifat mekanikalnya termasuk kestabilan Marshall, modulus kebingkasan dan ujian rayapan dinamik. Hasil keputusan kajian menunjukkan, campuran yang diubahsuai dengan polimer SBR mempunyai kestabilan yang lebih baik dan ciri-ciri ubah bentuk yang kekal di bawah keadaan penuaan. Keputusan tersebut juga menunjukkan bahawa kestabilan, modulus kebingkasan dan ujian rayapan dinamik adalah yang tertinggi pada jangka masa panjang jika di berbandingkan jangka masa pendek dan anti penuaan. Penggunaan 5 peratus daripada SBR adalah nilai tambah kepada pengetahuan umum tentang keupayaannya untuk menghasilkan campuran konkrit asfalt yang lebih tahan lama dengan keupayaan perkhidmatan yang lebih baik.

_Kata kunci: Bitumen, SBR, penuaan, kestabilan, modulus kebingkasan._