

PROFESSIONAL DETAILS



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SPECIALTIES

Highway and Transportation Engineering

EDUCATION

May, 2013

MASTER (MSC.)

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Jul, 2008

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Civil Engineering

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TITLE

Dec, 2014

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PUBLICATION JOURNAL

Apr, 2022

[Mechanistic Analysis and Durability of Thiophene Paving Mixtures](#)

Journal of Materials in Civil Engineering, (Issue: 0899-1561) (Volume: 34)

When compared to conventional bitumen, thiophene bitumen produced in northern Iraq is abundant and inexpensive (on the order of 125 USD=ton). This type of bitumen contains higher sulfur content in terms of the heterocyclic compound (not elemental sulfur); furthermore, long-term aging (LTA) effects are not considered in research on this type of bitumen for use in paving mixtures. In

this research, the influence of LTA at 85 °C for 120–150 h on thiophene mix asphalt (TMA) properties in terms of stability, indirect tensile strength at 25 and 60°C, rigidity, resilient modulus, and tensile strength ratio were determined and compared with hot-mix asphalt (HMA) containing conventional bitumen. Under a 40-kN dual load with a 105 mm wheel radius, pavement responses in terms of fatigue strain (ϵ_{fmax}), rutting strain (ϵ_{rmax}), and surface deflection (δ_{zmax}) were analyzed using multilayer elastic analysis software (BISAR). The test results of TMA showed slightly higher stability, indirect tensile strength, and resistance to moisture damage (higher durability) with a slightly lower resilient modulus than HMA. Generally, results showed that the performance of TMA at a mixing temperature of 130°C is considered similar to that of HMA under the effect of LTA. Furthermore, using thiophene bitumen can reduce the mixing temperature of paving mixes above about 20°C in a manner comparable to HMA. In addition, the results also indicated that LTA-TMA showed 10% higher fatigue life than LTA-HMA. In addition, it was found that the granular base layer in the LTA-TMA pavement system can be reduced by 55%.

Mar, 2022

[Influence of Laboratory Aging on the Engineering Properties of DGAMs Containing Two Different Iraqi Asphalts](#)

JOURNAL OF CIVIL ENGINEERING FRONTIERS (Issue: 2709-6904) (Volume: 3)

The influence of laboratory aging on Marshall stability (MS), Marshall quotient (MQ), indirect tensile strength (ITS) at 25 and 60° C, tensile strength ratio (TSR), resilient modulus (MR), modulus of rupture (MOR), cohesion, and aging index (AI) of dense graded asphalt mixes (DGAMs) containing Baiji (B) and Qayarah (Q) Iraqi asphalt was examined. The results of DGAMs containing B and Qasphalt showed 46% and 43%, and 37% and 24% higher MS, 132% and 99%, and 111% and 78% higher MQ, 24%, and 20%, and 14% and 10% higher ITS at 25° C, 4%, and 3% and 20%, and 13% higher ITS at 60° C, 27% and 19%, and 26% and 24% higher MOR at 0° C, and 25% and 18%, and 24% and 21% higher MOR at -10° C. For 4 and 8 d aging, TSR was 11% and 7%, and 4%, and 3% higher, MR 52% and 38%, and 38% and 24% higher, cohesion 73% and 58%, and 58% and 44% higher, and AI 1.74 and 1.58, and 1.56 and 1.44 times higher, respectively.

May, 2021

[DETERMINATION EXTENSIONAL VISCOSITY AND CRACKING INDEX OF SULFURE WASTE MODIFIED ASPHALT CEMENT](#)

Journal of University of Duhok (Volume: 24)

In the northern Iraqi provinces, cracking distress due to the variations in temperatures is occurred in most of paved roads with asphaltic materials. This type of distress results in alligator and longitudinal cracking, spallings due to temperatures variations. This research determined the index of cracking and extensional viscosity of sulfur waste/asphalt cement (SWMAC). Four dosages of sulfur waste were selected and mixed into 40-50 pent. grade asphalt binder.

Physical tests including: penetration, ductility, softening degree, absolute viscosity, elastic moduli, temperature effects, ageing, index of cracking, extensional viscosity, and morphology assays were performed on SWMAC. SWMAC presents higher extensional viscosity, moduli of elasticity and durability traits with superior cracking resistance at low temperature.

Dec, 2020

[Influence of Long-Term Aging on HMA Made with Gel and Sol Asphalt Cements](#)

Materials Science and Engineering

This study evaluated the effect of long term ageing (LTA) on the performance traits of dense graded asphalt mixes (DGAMs) made from gel and sol asphalt cement binders. The LTA was adopted at 85 °C and between four and eight days using forced draft oven to reproduce the in-service aging that occurs over many years in the field. The performance assays contains: Marshall traits, tensile and compressive strength under wetting and drying conditions, bending strength at zero and -10°C, cohesion at 60°C, tensile strength ratio, and recovered strength index were adopted on DGAMs. A mechanistically-design tool was explored for estimating the enhancement in paving life or thickness reduction of DGAMs and base course for similar service life caused from LTA of DGAMs. Assays results notified that the LTA increases DGAMs strength towards: (1) rutting; (2) moisture sensitivity; (3) cracking; and (4) cohesion failure. In addition, it was found that sol asphalt cement performs slightly better than gel asphalt cement, especially in the case of moisture susceptibility and flexural strength properties.

Dec, 2018

[Effect of Oxidative Aging on the Engineering Properties of DGAMs](#)

Academic Journal of Nawroz University (AJNU) (Volume: 7)

Short and long term aging were conducted on the dense graded asphalt mixtures (DGAMs) containing 40-50 penetration grade asphalt cement binders. The short term oven aging (STOA) was conducted on loose mixtures at temperature of 135 °C for four hours and at temperature of 154 °C for two hours, whereas, the long term oven aging (LTOA) was conducted at temperature of 85 °C and at two periods of time between four and eight days. Marshall properties, tensile and compressive strength at 25 and 60°C, flexural strength at 0 and -10°C, cohesion at 60°C, tensile strength ratio, and index of retained strength were carried out on unaged and aged DGAM. A mechanistic-empirical design approach using BISAR program was adopted for estimating the improvement in service life of the pavement or reduction in thickness of DGAM and base layer for the same service life due to the aging of DGAM. The results showed that the STOA and LTOA: (1) increases resistance of DGAM against permanent deformation, stripping, and flexural strength; (2) increases traffic benefit ratio between 10 and 20%; (3) reduces the thickness of the surface layer between 8 and 14%; and (4) the base thickness reduces between 35% and 57%.

Dec, 2014

[Mechanistic properties of the unaged and aged DGAMs](#)

Al-Rafidain Engineering (Volume: 22)

Short and long term aging were conducted on the dense graded asphalt mixtures (DGAMs) containing 40-50 penetration grade asphalt cement binders. The short term oven aging (STOA) was conducted on loose mixtures at temperature of 135 °C for four hours and at temperature of 154 °C for two hours, whereas, the long term oven aging (LTOA) was conducted at temperature of 85 °C and at two periods of time between four and eight days. The performance tests includes: Marshall properties, indirect tensile strength at 25 and 60°C, compressive strength at 25 and 60°C, flexural strength at 0 and -10°C, cohesion at 60°C, tensile strength ratio, and index of retained strength were carried out on unaged and aged DGAM. A mechanistic-empirical design approach using BISAR program was adopted for estimating the improvement in service life of the pavement or reduction in thickness of DGAM and base layer for the same service life due to the aging of DGAM. The results showed that the STOA and LTOA increases: (1) resistance of DGAM against permanent deformation at high temperatures; (2) resistance to stripping phenomenon; (3) flexural strength at low temperatures; (4) traffic benefit ratio between 10 and 20%; and (5) reduces the thickness of the surface layer between 8 and 14%; and (6) the base thickness reduces between 35% and 55%.