

Warm Mix and Reclaimed Asphalt Pavement: A Greener Road Approach

Authors : Lillian Gungat, Meor Othman Hamzah, Mohd Rosli Mohd Hasan, Jan Valentin

Abstract : Utilization of a high percentage of reclaimed asphalt pavement (RAP) requires higher production temperatures and consumes more energy. High production temperature expedites the aging of bitumen in RAP, which could affect the mixture performance. Warm mix asphalt (WMA) additive enables reduced production temperatures as a result of viscosity reduction. This paper evaluates the integration of a high percentage of RAP with a WMA additive known as RH-WMA. The optimum dosage of RH-WMA was determined from basic properties tests. A total of 0%, 30% and 50% RAP contents from two roads sources were modified with RH-WMA. The modified RAP bitumen were examined for viscosity, stiffness, rutting resistance and greenhouse gas emissions. The addition of RH-WMA improved the flow of bitumen by reducing the viscosity, and thus, decreased the construction temperature. The stiffness of the RAP modified bitumen reduced with the incorporation of RH-WMA. The positive improvement in rutting resistance was observed on bitumen with the addition of RAP and RH-WMA in comparison with control. It was estimated that the addition of RH-WMA could potentially reduce fuel usage and GHG emissions by 22 %. Hence, the synergy of RAP and WMA technology can be an alternative in green road construction.

Keywords : reclaimed asphalt pavement, WMA additive, viscosity, stiffness, emissions

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