

ASSESSMENT OF LINEAR AND NONLINEAR VISCOELASTIC RESPONSES OF WARM-MIX ASPHALT BINDERS

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ABSTRACT

Warm-Mix Asphalt (WMA) technology is widely used in the paving industry due to its impact on reduction of asphalt mixing and compaction temperatures. Characterisation of WMA in the past had focused on evaluating the linear viscoelastic properties and associated Superpave specifications. In this study, evaluating the nonlinear viscoelastic responses of different WMA technologies is introduced. A comparison was made to show the difference in permanent deformation resistance of each binder type. Two WMA additives were tested after mixing them with modified and unmodified binders. The tests were conducted using a Dynamic Shear Rheometer to perform oscillatory and multiple stress creep recovery (MSCR) tests. Resistance to permanent deformation was evaluated using the rutting factor and irrecoverable creep compliance. The results showed that Sasobit stiffened the asphalt binder and increased its resistance against permanent deformation. On the other hand, Advera’s effect was almost negligible on both binder types.