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Study on the Application of Lime to Improve the Rheological Properties of Polymer Modified Bitumen

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Abstract : Bitumen is one of the most applicable materials in pavement engineering. It is a binding material with unique viscoelastic properties, especially when it mixes with polymer. In this study, to figure out the viscoelastic behaviour of the polymer modified with bitumen (PMB), a series of dynamic shearing rheological (DSR) tests were conducted. Four percentages of lime (i.e. 1%, 2%, 4% and 5%) were mixed with PMB and tested under four different temperatures including 64ºC, 70ºC, 76ºC and 82ºC. The results indicated that complex shearing modulus (G*) increased by increasing the frequency due to raised resistance against deformation. The phase angle (δ) showed a decreasing trend by incrementing the frequency. The addition of lime percentages increased the complex modulus value and declined phase angle parameter. Increasing the temperature decreased the complex modulus and increased the phase angle until 70ºC. The decreasing trend of rutting factor with increasing temperature revealed that rutting factor improved by the addition of the lime to the PMB.

Keywords : rheological properties, DSR test, polymer mixed with bitumen (PMB), complex modulus, lime
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