

# **INFLUENCE OF CRUMB RUBBER MODIFIER (CRM) FROM TYRE WASTE ON THE RHEOLOGICAL PROPERTIES OF BITUMINOUS BINDERS**

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## *ABSTRACT*

As part of a programme to examine the viability of incorporating crumb tyre rubbers into asphalts, we have investigated interactions between bitumen and both car- and truck-tyre rubbers. Solvent swelling of rubbers was studied to determine their solubility parameters and to predict which components of bitumen will be absorbed. The diffusion of bitumen into tyre rubber monoliths was studied at 180 °C; equilibrium absorptions, achieved after about 1 day, were determined and diffusion coefficients for diffusion of bitumen components into rubbers were estimated. A method was developed to isolate rubber crumb after interaction with bitumen and to isolate the modified bitumen after depletion of the diffusing components. Rheological studies on neat bitumen, crumb rubber – bitumen mixtures and isolated bitumen were determined after various times of heating at 180 °C. Complex moduli were determined at 10 Hz and 45 °C. The normal hardening of bitumen was observed and this was also seen in residual bitumen and mixtures with rubber. Interpretations of the variations in complex moduli for bitumen-rubber mixtures based on modification of the swollen rubber network were developed.

**KEYWORDS:** rubber, bitumen, diffusion swelling, rheology