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A study of crumb rubber modified bitumen used in South Africa

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In South Africa, an empirical characterisation of crumb rubber modified (CRM) bituminous binders has historically been the only means of predicting their performance in pavement *layers*, short of constructing pavement test sections. An improved characterisation is provided by means of rheological analysis using a dynamic shear rheometer (DSR). However, the heterogeneous morphology of CRM bitumen makes it a challenge to test using current methods and equipment. DSR testing of CRM bitumen requires a plate gap adjustment to avoid any influence by the rubber particles. This has been done by monitoring the effect of changing the DSR plate gap setting on the measured linear visco-elastic properties of the binder. An adjusted gap was adopted for rheological measurements so as to characterise CRM bitumen properties with ageing. But, the incomplete recovery of CRM binder from asphalt/seals makes it impossible to monitor the rheological properties of the *in situ* binder within a pavement layer. This has led to indirect methods of investigating relationships between tested properties of the pure CRM bitumen to those of the *in situ* binder.

Keywords: crumb rubber modified binder; dynamic shear rheometer; rheological performance; *in situ* binder properties