

## DEVELOPMENT OF DURABLE STRUCTURAL ASPHALT MIXTURES FOR THE UK TRUNK ROAD NETWORK

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### *ABSTRACT*

This study evaluates the properties of high modulus asphalt mixtures and assesses their potential for use as high quality structural layers on the UK trunk road network. High modulus mixtures, first developed in France and used now in the UK, are considered long life and durable structural materials. These mixtures are, however, susceptible to thermal damage, particularly under extreme weather conditions. In order to minimise the risk of thermal damage in high modulus mixtures, the use of softer binders has been investigated. Material properties evaluated included, workability, water sensitivity, deformation resistance, stiffness, and fatigue and fracture resistance. Analytical pavement design for a typical pavement structure incorporating these materials was also carried out. Design stiffness values were determined at the standard conditions for UK pavement design, i.e. 20 °C and loading frequency of 5 Hz. Fatigue properties of the mixtures obtained experimentally using the four-point bending test were also incorporated in the analysis. It was found that the use of softer binders in high modulus mixtures have some of the benefits associated to these type of mixtures in terms of deformation and fatigue resistance. Also, pavement thickness can be considerably reduced when these mixtures are used instead of a conventional material. Alternatively, for a typical pavement thickness the used of these materials can extend the life of the pavement beyond that of a standard material.