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THE USE OF STONE MASTIC ASPHALT IN HIGH STRESS SITES

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ABSTRACT

All modern bituminous surfacings whether they are laid on an airfield runway, a Formula 1 racing circuit or an urban motorway are all expected to perform. This expectation is affected by the cumulative effect of in-service stressing conditions such as increasing axle loads and tyre pressures or sideways movement. For the last 50 years the most common type of surfacing mixture for motorways and other main roads in the United Kingdom has been Hot Rolled Asphalt (HRA)(BSI, 1992). However, in recent years its expectation to perform has been severely tested due to successive hot summers and ever-increasing volumes of heavy trafficking. Permanent deformation is now a serious problem in the UK. Elsewhere in Europe, the problem of permanent deformation at high stress sites has existed for many years. In Germany, the use of studded tyres and high binder content surfacing mixes resulted in unacceptable levels of rutting. This resulted in the development of Stone Mastic Asphalt (SMA) in 1968. SMA was found to be resistant to permanent deformation because of a stable gap-graded aggregate skeleton structure with voids filled with a mastic mortar of bitumen / crushed sand and filler.

This paper considers the effect of stress on the performance of differing types of mixes highlighting how SMA with cellulose fibre can be designed to meet the requirements of modern traffic in any high stress location.

KEYWORDS: Bituminous mixtures, SMA, Cantabro test, Schellenberg test