

CHARACTERIZATION OF THE RESISTANCE TO DEFORMATION OF ASPHALT MIXES WITH SBS-MODIFIED BINDERS

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Summary

Modification of bitumens with thermoplastic rubbers of the styrene-butadiene-styrene (SBS) type increases the resistance to rutting of asphalt mixes markedly.

Standard properties for road binders are reported for modified systems with different polymer contents.

The effect of these binders in dense asphalt on rut formation under moving wheel loadings has been quantified in Laboratory Test Track (LTT) experiments giving a close simulation of practice at higher service temperatures. Even at polymer concentrations as low as 3% there is a considerable improvement of the resistance to deformation of the mix.

For assessing the stability of mixes with modified binders in relation to those with conventional binders, a creep test with dynamic loadings is recommended. This test proves to give a good indication of the rut development in the LTT tests.

Static creep tests and Marshall tests do not give a correct rating for the stability of mixes with these binders.

The increased stability of the mixes is ascribed to the elastic nature of SBS-modified binders, detected as an elastic plateau in measurements of the shear modulus at low loading frequencies and as recovery in ductility tests. In the dynamic creep test, the elastic behaviour of the binder is reflected in the increased recovery of the mix between loadings.