

INVESTIGATION ON USE OF SIMPLE SHEAR TESTER FOR EVALUATING MOISTURE DAMAGE OF ASPHALT MIXTURES

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ABSTRACT

The presence of water (or moisture) often results in premature failure of asphalt pavements in the form of isolated distress caused by debonding of the asphalt film from the aggregate surface or early rutting/fatigue cracking due to reduced mix strength. Moisture sensitivity has long been recognized as an important mix design consideration. Evaluation of a mixture's moisture sensitivity is currently the final step in the Superpave™ volumetric mix design process. The Superpave™ mix design system has adopted AASHTO T-283 (Resistance of Compacted Bituminous Mixtures to Moisture Induced Damage) as the basis for assessing moisture susceptibility in a proposed mix. However, it is believed by many asphalt pavement technologists that AASHTO T-283, the most common test specified for evaluating moisture damage potential of hot mix asphalt (HMA), is poorly correlated to actual field performance. This research study was designed to evaluate use of Superpave Shear Tester (SST) to assess the moisture damage potential of HMA mixtures. Shear test results showed that shear modulus reduced when specimens were subjected to conditioning, which signified the extent of moisture susceptibility of the aggregate. In addition, the results showed that phase angle (time differential between applied load and measured strain response) increased when mixtures were subjected to moisture damage, indicating loss in elastic component of stiffness. Results shows that simple shear test (SST) is very effective in differentiating the performance of mixtures against moisture damage and can be used as moisture susceptibility test for HMA mixtures.

KEY WORDS: Superpave, Moisture damage, Shear test, Fatigue, Asphalt