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16. Abstract

The objectives of this study were to evaluate the effects of aggregate gradation and polymer modification on rutting and fatigue resistance of Superpave mixes. Asphalt mixes were prepared using three different gradations (above, through, and below the restricted zone) and three PG 70-22 binders (unmodified, SBS and SBR modified), and were evaluated using a triaxial repeated load test, a static creep, the Asphalt Pavement Analyzer, and the flexural beam fatigue test. When aggregates meeting Superpave angularity requirements was used, the effects of gradation on the rut and fatigue resistance of Superpave mixes were relatively small and the effects of the restricted zone was not significant. Even though binders used in this study had similar dynamic shear moduli, mixes containing polymer modified binders showed significantly lower resilient moduli than the unmodified mixes when measured in the indirect tensile and triaxial compressive modes. All laboratory test results indicated that the polymer modified mixes were significantly more rut resistant and fatigue resistant than the unmodified mixes with the same PG grading. Improvement in rut resistance due to polymer modification was shown to be most significant in the triaxial repeated load test, especially at a higher temperature. Accelerated Pavement Load test results showed the similar trends regarding rutting performance. At higher test temperature or at a fast wheel speed, mixes with polymer modified binder performed better than mixes with an unmodified binder.

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Superpave, restricted zone, polymer modified, gradation, rutting, fatigue, accelerated load test, triaxial repeated load test, creep, flexural beam fatigue test, APA	No Restrictions. This document is available to the public through the National Technical Information Service, Springfield, Virginia 22161

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