CHARACTERIZATION AND IMPROVED DESIGN OF MODIFIED ASPHALT PAVEMENT MIXTURES

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ABSTRACT
Due to the provisions of federal and state mandates on the use of recycled materials in highway construction several experimental projects were undertaken with rubber-modified binders and mixtures. The use of natural and synthetic rubber for improving the properties of conventional asphalt materials has been investigated since the 1960s. However, the development of these mixtures has been limited due to their high production cost, concerns regarding their recycle-ability, and conflicting reports regarding their performance. Furthermore, the behavior, design and performance evaluation of modified asphalt mixtures presents an additional degree of complexity, in most of the cases, when compared to conventional asphalt mixtures.

This paper presents the experimental results from an extensive multi-year laboratory investigation on asphalt-rubber binder and mixtures. The experimental results were used for developing an "integrated performance-based" mix design methodology. This integrated mix design methodology is based on criteria related to mixture performance (permanent deformation, low temperature cracking, fatigue, and moisture susceptibility), and considers input from pavement design analysis for incorporating criteria related to subgrade protection. The methodology incorporates Strategic Highway Research Program (SHRP) recommendations for dynamic resilient modulus testing. The modified mixtures were designed according to Federal Highway Administration (FHWA) recommendations and were compared to conventional asphalt mixtures. The results of this study were used for constructing several experimental pavement sections in interstates highways and principal arteries.

KEYWORDS: Rubber, Asphalt, Integrated Mix Design, Durability, Performance.