



Florida Department of Transportation Research

Evaluation of Florida Asphalt Mixes for Crack Resistance Properties Using the Laboratory Overlay Test Procedure

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Current Situation

Significant improvements in Florida's asphalt pavement have been achieved over the past decade as a result of continued research. Asphalt roads have benefitted from the introduction of the Superpave mix design system and polymer-modified binders, among other improvements. However, cracking remains the top form of damage exhibited by asphalt pavements in Florida. Cracking can occur over time as result of heavy traffic or when asphalt paving is placed over cracked or jointed roadways. Cracks reduce the structural strength of asphalt and also allow water to penetrate into the layers underneath the paving, where additional damage can be done. This can lead to deterioration of the roadway, presenting drivers with bumpy roads and potholes and requiring increased maintenance.



Note the extensive cracking in this roadway, both along and across its length. On the right, cracking has resulted in spalling and a significant loss of pavement integrity.

Research Objectives

In this project, Florida State University researchers determined the usefulness of overlay testing as means of characterizing the crack resistance of a number of asphalt mixes used by the Florida Department of Transportation (FDOT).

Project Activities

The researchers conducted overlay testing on several Superpave mixtures. Nine mix designs were selected, and the components were varied to create a range of test samples. Granite aggregate was used from two sources: Georgia and Nova Scotia. Two different asphalt binder types (polymer modified PG 76-22 and unmodified PG 67-22) were used to study their effects on the crack resistance of asphalt mixtures. The effect of reclaimed asphalt pavement, RAP, was also studied by including 20% RAP in some asphalt mixtures. Prepared asphalt samples were tested in a commercial overlay tester, commonly referred to as the Texas Overlay Tester. This is a device which repeatedly applies mechanical tensile stress to the sample while measuring its response.

Statistical analysis conducted on the overlay testing results revealed a complex pattern of improvement among the mixes. Generally, RAP reduced the crack resistance of the mixtures. Conversely, the use of SBS polymers improved the crack resistance of asphalt mixtures. SP-9.5 mixture types performed better than SP-12.5 or SP-4.75 mixture types with respect to crack resistance.

Project Benefits

Improving the crack resistance of Florida pavements can significantly increase the durability and service life of roadways while reducing maintenance and replacement costs.

For more information, please see dot.state.fl.us/research-center