



Florida Department of Transportation Research

Develop Methodologies/Protocols to Assess Cracking Potential of Asphalt Mixtures Using Accelerated Pavement Testing
BD545-49 (11/07)

Evaluating the durability of new asphalt pavement mixtures in the field is difficult, expensive, and time consuming. The Florida Department of Transportation State Materials Office (SMO) created an accelerated pavement testing (APT) facility for the study of pavement performance and asphalt distress during relatively short testing periods.

Top-down pavement cracking occurs as asphalt hardens over time, affecting pavement durability and service life. In this study, University of Florida researchers developed protocols for conducting APT studies of top-down cracking. Effectively addressing cracking can produce economic benefit by reducing maintenance and resurfacing activities.

The researchers simulated aged pavement, consistent with pavement found on Florida roadways, by using the accelerated pavement aging system (APAS) at the APT facility. APAS uses high-heat cycles to simulate the oxidation



Tests on aged pavement produced lateral top-down cracks.

and stiffening that pavement experiences with wear and age. The aged pavement was then subjected to loading using the heavy vehicle simulator (HVS).

This study confirmed that theoretical pavement models based on the test protocols could accurately predict the stresses and strains the pavement would experience under loading. The theoretical cracking models developed in prior FDOT research could also predict the time to cracking with reasonable accuracy. However, the HVS loading created transverse cracks in the test pavement, whereas longitudinal cracks occur in the field. The researchers concluded that this difference partially was due to the fact that the HVS loading is applied at slower speeds than loading that occurs under actual field traffic conditions. Longitudinal cracking similar to that found in the field could be produced by making the test pavement more uneven and reorienting the heavy vehicle loading as pavement cracking progresses.



The heavy vehicle simulator was used to test artificially aged pavement.

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