

Improved Ability to Locate Delamination in Asphalt Pavements Using Non-Destructive Testing System

Identify delamination between asphalt pavement layers in single pass with full-lane coverage

Delamination between layers of asphalt is a key pavement failure that can result in multiple pavement distress issues. Asphalt pavement is generally laid in multiple layers of various thicknesses. To act as a single pavement structure, the various layers have to bond together; failure to bond properly creates problems for the roadway pavement.

Guidelines for Using NDT Methods to Identify Delamination in Asphalt Pavements

The Solution

Developed through the second Strategic Highway Research Program (SHRP2), two new technologies make advances in the detection of subsurface delamination of asphalt pavement. **Ground-penetrating radar (GPR) uses a lane-width multi-antenna array with frequency sweep that can be operated at speeds up to 40 miles per hour.** The multiple pairs of hardware reduce the number of passes required to cover the lane width. The GPR also has an automated test frequency (every six inches) which accelerates the ability to acquire data. **The impact echo (IE) and seismic analysis of surface waves (SASW) system completes data collection in less than one percent of the time required by manual point testing.** The software has real-time display to monitor the quality of the data collection. The IE software can provide immediate results to identify suspect pavement conditions. This significantly reduces the time and safety issues associated with current manual testing of a surveyed grid within a lane closure.

The Benefits

Enhanced GPR technology is a significant step forward. This technology, which comes with a lane-width multi-antenna array to provide an accurate full-lane measurement, is an improvement over the current one- and two-antenna systems, which need several passes across a lane to obtain a complete measurement. This translates into time-savings and improved safety. The frequency sweep feature permits radar signal penetration into the pavement to examine the

Two new tools detect subsurface delamination in asphalt pavements

FOCUS AREA: Renewal (R06D)

Non-destructive testing (NDT) prototype equipment, automated measurement system, and guidelines contribute to delamination detection.

Save Lives

- Single-pass and full-lane coverage improve safety by minimizing the time technicians are exposed to traffic.

Save Money

- Single-pass operation minimizes data collection costs.
- Full-lane coverage increases testing efficiency and reduces data collection costs.

Save Time

- Full-lane coverage and single-pass operations reduce the time to collect the field data.

entire surface, base, and sub-grade in the same pass. Current GPR antennas are built for single-frequency operation that limits the antenna's depth of field. Low-frequency antennas penetrate into the sub-grade, while high-frequency antennas identify more detail near the pavement surface. The improved technology allows the engineer or technician to narrow the manual analysis to identified locations where the GPR signal changed.

Who can use these tools?

This NDT equipment can be used by transportation agencies and pavement condition consultants to measure near-surface material and distress conditions. Two prototypes are still under development and guidelines for their use being determined. Pilot states will be needed to test the results.

How can you learn more?

The final report will be available in 2013 at www.TRB.org/SHRP2/publications. It is anticipated that the prototype equipment will be available for commercial use in 2014. For more information, contact Steve Cooper at FHWA, Stephen.J.Cooper@dot.gov or Greta Smith at AASHTO, gsmith@aashto.org.



About SHRP2 Implementation

The second Strategic Highway Research Program is a national partnership of key transportation organizations: the Federal Highway Administration, the American Association of State Highway and Transportation Officials, and the Transportation Research Board. Together, these partners conduct research and deploy products that will help the transportation community enhance the productivity, boost the efficiency, increase the safety, and improve the reliability of the Nation's highway system.

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