SHRP2 SOLUTIONS
TOOLS FOR THE ROAD AHEAD

Advanced Methods to Identify Pavement Delamination

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

Delamination between layers of asphalt can contribute to several types of pavement surface distresses, such as cracking in the wheel paths and tearing the surface, which are detrimental to the longevity of pavement performance.

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. Agencies need a method of detecting the location and severity of delamination before the pavement deficiency causes visible pavement distress.

Using Nondestructive Testing Methods to Identify Delamination in Asphalt Pavements

The Solution

Developed through the second Strategic Highway Research Program (SHRP2), new technologies are making 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. GPR also has an automated test frequency (every six inches) that 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 uses real-time displays 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

Although these technologies are currently available, the enhancements are a significant step forward in detecting pavement weaknesses. Lane-width multi-antenna arrays provide more accurate full-lane measurement, an improvement over the current one- and two-antenna

New tools detect subsurface delamination in asphalt pavements

FOCUS AREA:
Renewal (R06D)

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

Save Lives

- Single-pass and full-lane coverage improves 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.

systems that 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 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. California, Florida, Minnesota, New Mexico, and Texas are currently using this product through the FHWA/AASHTO Implementation Assistance Program.

How can you learn more?

For more information, contact Steve Cooper at FHWA, Stephen.J.Cooper@dot.gov, or Kate Kurgan at AASHTO, kkurgan@aashto.org. Updates on current implementation efforts can be found at www.fhwa.dot.gov/GoSHRP2 or http://SHRP2.transportation.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.