

Infrared and Radar Technologies Test Temperature and Density of Asphalt Pavement Area

Real-time asphalt pavement testing technologies offer greater testing coverage and immediate feedback

The quality of an asphalt product is determined by the density of the asphalt pavement and the temperature of the mix at application. Specifications for both are very precise and testing of asphalt pavements is required to measure the temperature of the mix and the density achieved in the construction process. In contrast to current specified methods for detecting defects, new infrared and radar technologies offer a system of real-time testing of almost 100 percent of the pavement area. These new technologies improve the state of the practice for obtaining quality control data in hot- or warm-mix construction.

Specifications for Using Rapid Infrared and Radar Technologies for Quality Control of Asphalt Pavements During Construction

The Solution

Developed through the second Strategic Highway Research Program (SHRP2), this project is demonstrating **two nondestructive techniques for detecting defect areas in asphalt pavements during construction**. Both technologies (infrared and radar) test essentially 100 percent of the pavement area, **providing much more inspection coverage than existing quality control methods**.

The infrared technology focuses on the PAVE-IR equipment, which allows inspectors and paving crews to measure the real-time mat temperature and make adjustments. The ground-penetrating radar (GPR) technology measures pavement density after rolling, allowing for quicker turnaround and avoiding costly and time-sensitive nuclear testing.

A training video explaining how to use the technologies and interpret the data has been produced and model quality control specifications are currently under development and piloting. Products also include recommendations for equipment and testing protocols for using infrared and GPR for testing the entire surface area during new hot-mix asphalt construction.

New technologies provide almost 100 percent testing coverage for asphalt density

**FOCUS AREA:
Renewal (R06C)**

Model quality control specifications and training video show how to use the technologies and interpret the data.

Save Money

- More inspection coverage helps avoid noncompliance penalties.
- Better quality control leads to smoother pavement for travelers and longer-lasting pavement for owners.
- Real-time density testing allows for quick and efficient field modification.
- Real-time temperature quality assurance and quality control allow for prompt adjustments to avoid costly corrections later.

Save Time

- Real-time testing results in time-savings during construction operations.
- Increased testing coverage area lessens need for corrective action due to low-density asphalt pavements.

The Benefits

Real-time temperature quality assurance and quality control allows for prompt adjustments by the paving crew, thereby minimizing segregation problems that can occur when the temperature is too low. Using GPR technology reduces the reliance on single-point density gauges and instead provides almost 100 percent pavement coverage. In addition to savings resulting from these innovations, near-term benefits include:

- More uniformly constructed hot-mix asphalt and warm-mix asphalt layers
- Better in-place field density
- Improved communication among paving crews, their supervisors, and transportation agency personnel
- Improved ride
- Reduced discrepancies between contractor and agency test data

In the long term, implementation of these commercially available products could result in longer-lived pavements, allowing agencies to stretch their funding further and decrease user costs.

Who is using these tools?

Two state departments of transportation (DOTs) will pilot the specifications. For maximum impact, these tools will require involvement and expertise from the U.S. Department of Transportation, state DOT pavement and material engineers, the state Associations of General Contractors, state asphalt pavement associations, local DOT project engineers and inspectors, and contractors and their quality assurance managers.

How can you learn more?

The final report, training material, and specifications for testing procedures will be available in 2013 at www.TRB.org/SHRP2/publications. For more information, contact Steve Cooper at FHWA, Stephen.J.Cooper@dot.gov or Kate Kurgan at AASHTO, kkurgan@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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