

Techniques to Fingerprint Construction Materials

Materials verification without sampling delays

Verifying that construction materials meet project specifications can be a time-consuming and expensive operation. Quality control operations during construction are an important aspect of ensuring that all contract requirements are met and the project is built to last. Current procedures require extensive sampling and testing in a laboratory to ensure that the material used in construction will meet contract specifications. These procedures can be both time-consuming and expensive.

New Techniques to Fingerprint Commonly Used Construction Materials

The Solution

Through the second Strategic Highway Research Program (SHRP2), two new technologies were identified that can verify specific construction materials in real time and at the project site to determine if contract specifications are being met.

Techniques to Fingerprint Construction Materials (R06B) offers two market-ready technologies—X-ray Fluorescent Spectroscopy (XRF) and Fourier-Transform Infrared Spectroscopy (FTIR)—that have been identified in field trials with potential success. These technologies identify different and very specific materials using portable equipment; for example, asphalt binders, polymers, epoxies, cement, emulsions, structural steel, aggregate minerals, paints, and organic materials.

The Benefits

Using these techniques, inspectors will be able to compare the materials' signature in the field, rather than in the laboratory. The ability to field-verify construction materials through matching their signatures to those on file using new portable equipment provides cost- and time-saving advantages. The ability to confirm that the material being used onsite meets contract specifications **will allow real-time verification of construction operations and prevent costly rework to replace noncompliant material.** Field verification will also allow contractors to proceed quickly to the next project operation without having to wait for results of laboratory analysis to verify the type and quality of the material used during construction.

Portable quality control technology verifies the unique fingerprint of common construction materials

FOCUS AREA: Renewal (R06B)

Practical recommendations for construction specifications and techniques, life-cycle costs, quality management procedures, and training materials.

Save Lives

- Minimizes the likelihood of failure due to poor material, thus avoiding potential safety risks to the driving public.

Save Money

- Avoids costly transportation and laboratory testing of common highway materials.

Save Time

- Eliminates the time-consuming process of transporting samples to a laboratory for testing to verify the material meets contract specifications.

State and local transportation departments, contractors, materials suppliers, and the public will benefit from these technological advancements. Identifying the quality of the materials used on highway projects in the field can lead to savings in both time and money. Field verification avoids costly sampling and laboratory analysis, which have been necessary until now to ensure material specifications are met. The portable equipment will be easy to use and affordable to purchase.

Who can use these tools?

Likely users of this new technology include materials suppliers, transportation contractors, and state and local agency construction staff. The project is currently developing agency-based specifications for using portable spectroscopy equipment in the field. Through the FHWA/AASHTO Implementation Assistance Program, Alabama, Maine, and Tennessee will assess these technologies, using different methodologies on different materials under different field experiences.

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>. The report titled *Evaluating Applications of Field Spectroscopy Devices to Fingerprint Commonly Used Construction Materials* can be found at <http://www.trb.org/Main/Blurbs/167279.aspx>



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.

Strategic Highway Research Program
