U.S. Department of Transportation
Federal Highway Administration

Spotlight on Pavement Density: Ohio Department of Transportation

MATC
MOBILE ASPHALT TECHNOLOGY CENTER

Status of Dielectric Profiling Systems in Ohio

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For more information on DPS and related technology, contact Monica Jurado, Pavements & Materials Engineer, FHWA Resource Center, monica.jurado@dot.gov

This equipment and more are available on loan at the MATC. https://www.fhwa.dot.gov/pavement/asphalt/matc/equipment-loan-program.cfm

The dielectric profiling system series shares information on pavement testing programs.

To access the full series, visit https://www.fhwa.dot.gov/pavement/asphalt/matc/technical-documents.cfm

Overview

Encouraged by strong results from field-testing its two dielectric profiling systems (DPS), the Ohio Department of Transportation (ODOT) began exploring ways to incorporate the technology further into its pavement program workflow and quality assurance specifications. DPS use a ground-penetrating radar (GPR) to determine the density of hot-mix asphalt, a key indicator for pavement quality.

"We think this equipment has a lot of potential," says Craig Landefeld, Administrator, ODOT Office of Pavement Engineering. "We think we're doing well with it and ironing out some of the details."

Findings and Next Steps for DPS

ODOT tracked use of its two DPS units on at least 10 projects since delivery of its first unit in late 2018. Through testing, ODOT found that the DPS data yielded a broader and more accurate picture of pavement quality than by analyzing random, sample cores. For example, the current sampling rate of 10 cores per day covers 0.004 percent of the sample area. A DPS unit provides the equivalent of 54,000 samples, or 17 percent of the same sample area, according to ODOT.

The improved testing coverage and cost savings are significant, Landefeld says. Recognizing and removing built-in defects earlier in a pavement's service life can avoid premature distress, such as potholes or raveling. In a State with an annual pavement preservation budget of roughly $650 million, “if we can get one more year out of our pavement treatments, ODOT’s just capitalized $50–$65 million,” Landefeld says. “That’s the magnitude.”

ODOT plans these next steps with DPS:

- Continue to develop standard procedures for DPS use.
- Collect more data, such as on various asphalt mixes, especially those with a significant amount of slag.
- Conduct a pilot project where the contractor agrees to run the DPS test along with traditional testing.
- Work with the industry and State partners through the national pooled study on DPS technology to evaluate precision and bias, and other acceptance specifications for DPS results.

Continuing Challenges

Technical and staffing challenges with interpreting and managing the large volume of data remain obstacles to implementing the technology statewide, Landefeld says.

ODOT Suggestions for Other Agencies

- As with any major change, introduce DPS technology slowly. Experience, as well as working through equipment and user errors, have allowed ODOT staff to become better trained to use the equipment, according to Landefeld. Comparing data from DPS with traditional methods like cores helped prove the DPS unit's value to stakeholders.
- Engage early with the local asphalt industry. Local industry peers "see value to it," Landefeld says. "What eases their minds is that we kept them in the loop and we've taken a cautious approach."
- Don’t try to reinvent the wheel. Take advantage of FHWA resources and technical assistance available through the Mobile Asphalt Technology Center (MATC) and regional FHWA offices, as well as from the vendor. The MATC loan program “is an easy way to test out equipment with almost no cost," Landefeld says. "The only cost you have is your time."
- Watch for advances in the technology, especially those that will resolve current pain points of handling the data.