



Spotlight on Pavement Density: New York State Department of Transportation

Working with the Dielectric Profiling System

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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/technicaldocuments.cfm#sec2>

Background

Dielectric profiling systems (DPS) use ground penetrating radar to continuously assess asphalt compaction, generating a heat map of the entire pavement area. The New York State Department of Transportation (NYSDOT) first started using a three-antenna pushcart DPS in 2020. Since then, NYSDOT each year conducted several shadow projects across the State, facilitated by a special provision placed in contracts.

“This technology has a lot of promise,” says Brendan Rock, NYSDOT Materials Engineering Bureau. “Density profiling has potential to improve both the QC and QA operations for asphalt paving, so developing a program that makes use of that potential is a win-win.”

NYSDOT designates levels of service for its roadways, with different specifications and acceptance testing requirements depending on the series. The series differentiates projects based on factors including tonnage of asphalt, control of access to the roadway, and location. Acceptance of a 50 series asphalt paving project is generally based on four cores per day. A 60 series project acceptance is based on daily nuclear gauge measurements and cores taken every third day. NYSDOT sees the potential of DPS to reduce or eliminate coring for acceptance of pavement density. NYSDOT anticipates a new series of evaluation using DPS results as a primary metric of acceptance for density.

DPS in Use

NYSDOT implemented the DPS in stages, shown below.

Year	Activities
2020	DPS conducted on 2 paving projects as shadow process. Goal was visibility of technology and to determine capabilities. Other program features: full assessment coverage, only basic instruction provided, no data manipulation.
2021	DPS conducted on 6 paving projects, over wider geographic area. Revised coverage expectations to 50%; added new reporting for static testing at core locations.
2022 / 2023	DPS conducted on 7 paving jobs. Reduced number of requested sample calibration specimens, from 12 to 8. Increased reporting requirements. Focused on 50 and 60 series projects whenever possible. Began putting resources into developing a program around DPS technology, such as through a broader presence at paving jobs, developing reporting requirements, and establishing data collection procedures.

Through these activities, NYSDOT researchers reported these observations:

- Achieving 100 percent coverage was unmanageable in early stages.
- Operators benefit from training and standardized NYSDOT documents for data submission.
- Priorities should be made in selecting jobs for DPS assessment.
- The DPS sensor array should have multiple sensors to ensure redundancy.

Example Research Project

In August 2023, an FHWA team visited an active paving project on State Route NY23 in Harpersfield, NY. Collection of DPS data was a condition of the NYSDOT project, and a crew member was pushing the DPS along the finished pavement. The DPS operator—who was relatively new to the equipment—had no issues keeping up with the paving train and found the tool easy to run, according to the FHWA team.

Below: DPS on NY23, Harpersfield, NY. August 2023. Source: FHWA



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