



Spotlight on Pavement Safety: North Carolina Department of Transportation Experience with the Laser Texture Scanner (LTS)

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For more information on macrotexture and related technology, contact Andy Mergenmeier, Senior Pavements & Materials Engineer, FHWA Resource Center, andy.mergenmeier@dot.gov

Texture scanning equipment is available for loan by the MATC. Learn more at <https://www.fhwa.dot.gov/pavement/asphalt/matc/equipment-loanprogram.cfm>

The Nondestructive Field Technologies for Asphalt Pavements series shares information on experiences with various nondestructive pavement technologies. To access the full series, visit <https://www.fhwa.dot.gov/pavement/asphalt/matc/technical-documents.cfm>

Overview

The North Carolina Department of Transportation (NCDOT) borrowed a Laser Texture Scanner (LTS) from the Federal Highway Administration (FHWA) Mobile Asphalt Technology Center (MATC) Equipment Loan Program in late 2021. The NCDOT Materials and Tests Unit's Data Collection and Investigations section had initially planned simply to practice with the technology and explore its potential on their many routine pavement investigations. However, the team quickly saw that the device had immediate applicability for studies* they were conducting at the time on the evolution of pavement friction and macrotexture in dense-graded asphalt overlays. Those studies included identifying pavement characteristics that potentially influence crash rates on North Carolina roadways after pavement construction.

NCDOT researchers applied the LTS on field pavement within work zones and on field cores extracted from a number of pavement resurfacing projects around North Carolina, and observed good correlation between the two types of measurements. The LTS scans were also compared to data collected via highway speed macrotexture profilers and sand patch test results, as per NCDOT's existing practice for measuring pavement surface macrotexture characteristics. "The biggest finding in those few months was discovering the value that the LTS would bring to the department and in our research," says Joseph Barbour, Data Collection and Investigations Engineer for NCDOT. "We see a lot of promise in this technology."

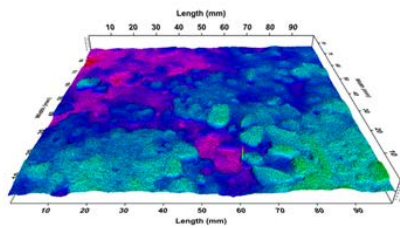


Figure 1. An LTS scan of a field core with microsurfacing treatment and an image of the original core. Source: NCDOT.

Observations from LTS Use

NCDOT researchers described how the LTS presented some implementation benefits, as a result of the MATC loan:

- Improved accuracy and repeatability of static texture measurements when compared with the sand patch test.
- Portability and stability. Weighing less than 10 pounds, the device was convenient to move between the field and the lab.
- Quicker tests, especially compared with an earlier device the researchers had tried several years before. The LTS took about 1 minute to test a 4-by-4 inch area, instead of 30 minutes to test a 6-by-6 inch area on older static texture test equipment used in research initiatives.
- Safer data collection in the field, by avoiding long work zones near moving traffic.
- "Unrivaled 3-D imagery" versus only using high-definition photographs, says Barbour. The 3-D images also have been useful in training staff members on a variety of pavement treatments, such as chip seals, microsurfacing, and slurry seals. The characteristics of each show up clearly in an LTS scan (see Figure 1).

Barbour says the LTS "broadens our understanding of what's taking place on the surface of our pavements."

*NCDOT/North Carolina State University Research Projects 2020-11 and 2022-05.

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