

PRESERVATION TAKES AIM AT INTERSTATES



Preservation of interstate: on Georgia's busy I-475 south of Atlanta, center lane open graded friction courses receive a rejuvenating fog seal while traffic continues in adjacent lane.

Photo: Ergon Asphalt & Emulsions, Inc.

Interest is expanding from preservation of low- and medium-volume roads to that of high-volume, interstate-type pavements.

"Preservation of high-traffic volume roadways is just as important as for low traffic volume roadways," says Jim Moulthrop, executive director of FP², formerly the Foundation for Pavement Preservation. "States have limited resources, and

preservation makes those resources go farther."

Pavement preservation methods prolong pavement life, avoiding high future costs of reconstruction or rehabilitation by spending less money at critical points in a pavement's life.

There are a variety of methods in the pavement preservation arsenal, including slurry surfacings, crack sealing, chip sealing, micro surfac-

ing, rejuvenation, hot and cold in-place recycling and thin-lift hot-mix asphalt paving; and preservation techniques used in concrete pavement restoration (CPR).

According to the National Center for Pavement Preservation at Michigan State University, spending a dollar on pavement preservation can eliminate or delay spending \$6 to \$10 on future rehabilitation or reconstruction costs.



At the MnROAD pavement test facility, field trip delegates examine performance of thin surfacing placed on I-94 and exposed to high-volume traffic. MnROAD was first constructed in 1994 and consists of a 3.5-mile portion of mainline interstate, 3.5-mile bypass roadway, and a 2.5-mile closed loop low-volume roadway.

Photo: Tom Kuennen

Federal Focus

Typically, highway agencies have allowed a pavement's ride quality and structural condition to deteriorate to fair-to-poor condition before taking steps to rehabilitate. The aim of the rehabilitation is to repair structural damage and restore pavement conditions, a costly, time-consuming activity.

The reasons behind this "worst-first" scenario, include federal-aid funding requirements and maximizing capital growth, notes the

Federal Highway Administration (FHWA). If instead, the FHWA argues, agencies use low-cost preventive maintenance treatments, each lasting a few years, they can extend the pavement's service life, resulting in a better investment and ride quality.

Current federal highway legislation specifically contains language detailing the significance of preservation practices, language continued in proposed U.S. House and Senate six-year

surface transportation legislation this fall.

SHRP2: Focus on High-Volume

Federal research is focusing on testing and implementing high-volume road preservation treatments, including an ongoing SHRP2 project, *R26: Preservation of High-Traffic-Volume Roadways*, a nine-year program now 90 percent complete, according to Thomas Van, FHWA pavement management engineer. Currently 13 states have R26 proj-



At the NCAT Test Track, test sections are rebuilt every three years to provide experimental pavements for the next research cycle; preservation research began there in 2012 and is continuing in the 2015 cycle.



Photo: NCAT



A bituminous test section is placed at the NCAT Test Track in January 2015, for the new test cycle.

Photo: NCAT



Photo: NCAT



For the 2015 NCAT preservation test cycle, sections are placed on U.S. 280 in Alabama, permitting real-world high-volume traffic testing of preservation treatments.

ects. Ultimately 135 projects in 38 states will be included in the \$130 million budget.

Recently, two publications from the R26 project detailed preservation approaches and guidelines, and provided a template for state DOTs and others to justify and execute preservation techniques for high-volume roadways. The two publications* represent the first methodical and wide-ranging study of this topic, and provide technical details and a structure for implementation.

The publications detail treatments

* *Preservation Approaches for High-Traffic Volume Roadways, and Guidelines for the Preservation of High-Traffic-Volume Roadways.*

suitable for high-level roadways, comparing them with low-volume treatments. General guidelines for using preservation treatments on high-volume roadways consider traffic volume, pavement condition, work-zone requirements, environmental conditions and expected performance.

Preservation perception problems

Why are preservation treatments not used as often on high-volume versus low-volume pavements? The reports say agencies may associate the use of specific treatments solely with low-volume roads, thereby assume they are not appropriate for other uses,

and may have concerns over the liability and risk associated with failure.

The benefits of preservation on higher-traffic-volume roadways might not be as readily recognized or as well-documented. And preservation treatments may not be as effective on higher-traffic-volume roadways; they may deteriorate in different ways from those applied on low-volume roadways because of the higher standards used in design and construction of higher-traffic-volume roadways.

Nonetheless many conditions hold true for both high-volume and low-volume roads, say the reports. Pavement preservation saves money

in the long run and provides safer and smoother roads. In addition, preservation can be done faster than rehabilitation.

Preservation partnership takes on future research

The original SHRP program, which ended in 1993, clearly demonstrated that preservation treatments were fully viable for any volume of road. This went against conventional practices that did not use chip seals or other surface treatments for high-volume roads. Instead most regions preferred to use an asphalt overlay after years of minimal care.

Such chip seals, however, had to be properly designed with a higher quality aggregate, giving them a higher durability than chip seals used on lower volume roads. And they could not be expected to carry the load nor provide structural value, but used rather to counter

aging and oxidation.

Beginning this year, actual preservation treatments for high-volume pavements are being tested in real-life conditions at both the National Center for Asphalt Technology (NCAT) in Auburn, Alabama, and next year at the Minnesota DOT's Road Research Facility (MnROAD) north of Minneapolis.

Using real-world accelerated pavement preservation performance testing, this research will advance preservation techniques for both high-volume asphalt and concrete roadways in cold and warm weather climates. Administered by the Alabama DOT, this effort is being funded by several entities, including FP² and state DOTs.

Because the partnership has the ability to deliver research products at lower cost for a larger base of supportive agencies and private sector clients, it has the potential

to play a much larger role in the national effort to validate pavement performance.

MnROAD is composed of a 3.5-mile mainline interstate highway (I-94) that carries 29,000 vehicles per day with 13 percent trucks; a 3.5-mile bypass interstate for live traffic diverted off the main line when it is undergoing construction and analysis; and a 2.5-mile closed-loop, low volume roadway that uses an 80,000-pound, five-axle tractor-trailer for live loadings.

"Working together will help validate what's done at our facilities both north and south," said Benjamin Worel, MnROAD operations engineer. "MnROAD has built test pavements in the north and obtained results which southern states sometimes say do not pertain to them, because we're in a northern climate. The same thing goes for the northern states utiliz-

ing results from NCAT. But working together will allow more states to accept and use our combined research results and get more involved with both facilities."

Unlike MnROAD, NCAT only studies asphalt pavements. NCAT has 46 different test sections on its 1.7-mile oval track. Sections are sponsored on three-year cycles by state DOTs, FHWA, and private industry. Sponsors have specific research objectives for their sections, and shared objectives for the whole track. NCAT has expanded its mission from just mix performance when it started in 2000 to both structural performance and pavement preservation in its just-ended fifth research cycle.

"The partnership with MnROAD can provide us the two things that we don't have at NCAT: climate and concrete," says Dr. Buzz Pow-

ell, assistant director, NCAT Test Track. The MnROAD partnership "lets us leverage their cold weather conditions and concrete pavements that constitute a big part of the preservation picture," he says.

Test sections are rebuilt every three years to provide experimental pavements for the next research cycle. The 2012 cycle included the formal pavement preservation study; that work is continued in the sixth research cycle beginning in 2015, but with a twist: in addition to track sections at NCAT, preservation treatments are being applied to a four-lane, high-volume, divided highway just three miles from the NCAT facility.

In the new 2015 cycle, the Preservation Group (PG15) Study will continue monitoring preservation treatment sections, on the track and an adjacent local road, Lee Road 159. But in fall 2015,

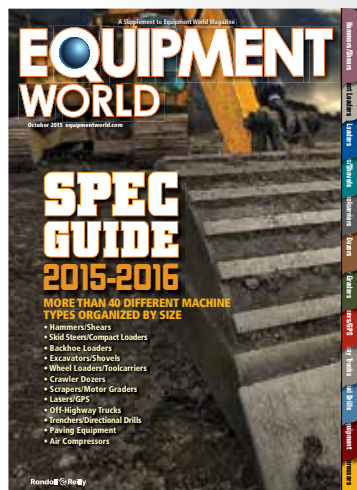
it placed new test sections on a higher average daily traffic (ADT) roadway, U.S. 280. Those sections carry 17,000 ADT and are greater than 10 years old. They were placed in the westbound outside lane, in 1/10-mile sections, and duplicate the work on Lee Road 159, in addition to cold in-place and hot in-place recycling placements, and also thin asphalt overlays.

MnROAD already has evaluated performance of preservation treatments, including chip sealing, micro surfacing, crack sealing and thin overlays. Test sections similar to Alabama are being implemented for Minnesota. MnROAD is also pursuing off-site test locations on existing low- and higher-volume roads and highways that can be easily monitored. Off-site concrete test sections in Minnesota may also be incorporated. **EW**

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