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## Pavement Preservation Codified in MAP-21

**F**or the first time, pavement preservation is part of national surface transportation reauthorization legislation, which now explicitly supports preservation and asset management.

Pavement preservation techniques are promoted as cost-effective and environmentally sustainable strategies designed to extend the life of existing pavements before they deteriorate substantially.

These techniques include nonstructural preventive maintenance surface treatments such as **slurry surfacings, crack sealing, chip sealing, micro surfacing, rejuvenation, hot and cold in-place recycling** and **thin-lift hot-mix asphalt paving**; and structural preservation techniques used in **concrete pavement restoration (CPR)**.

Pavement preservation methods, proponents say, prolong pavement life, avoiding high future costs of reconstruction or rehabilitation through the expenditure of lesser

amounts of money at critical points in a pavement's life. Pavement preservation pays off in both the short and long term. Experience shows that spending a dollar on pavement preservation can eliminate or delay spending \$6 to \$10 on future rehabilitation or reconstruction costs, reports the National Center for Pavement Preservation at Michigan State University.

At the end of June, 2012, the *Moving Ahead for Progress in the 21st Century* bill (MAP-21) became law, and the concepts of asset management and preservation are widely used in MAP-21. In the long run this will bring major benefits via needed federal funding to state and local government agencies trying to implement pavement preservation principles.

Pavement preservation also took a big leap forward in fall 2012 when, for the first time, preservation techniques began study at the Pavement Test Track at the National Center for Asphalt Technology (NCAT) near Auburn, Ala.



Under new federal surface transportation law MAP-21, pavement preservation treatments like slurry surfacing (shown) and state and local policy elements like asset management are supported with federal funds

Photo courtesy of Colas, Inc.

As the track began a new three-year cycle of tests, a variety of preservation techniques were placed on the track and a nearby local road. This work will provide, for the first time, quantifiable data to better understand how preservation treatments relate to a pavement's life cycle.

In August, 2012, came the National Pavement Preservation Conference – held Aug. 27-30 in Nashville – giving even more momentum to the pavement preservation movement.

At the conference attendance exceeded expectations, exhibit space sold out, and a field demonstration of multiple pavement preservation treatments raised awareness of the potential for expansion of preservation activities in North America and in foreign countries.

## Preservation in MAP-21

As a matter of policy, for years the Federal Highway Administration and the American Association of State Highway and Transportation Officials have supported pavement preservation as a means of optimizing scarce pavement dollars, but now preservation and asset man-

agement are underscored in federal legislation. MAP-21 specifically contains language that indicates the significance of preservation practice.

For example, the term **asset management** is included in the language and is defined to include “a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair over the lifecycle of the assets at minimum practicable cost.”

The Maintenance Section of the law has been expanded to specifically define pavement preservation programs and activities. The final bill explicitly states that preservation activities are eligible for projects under the national highway and surface transportation programs.

“The new MAP-21 surface transportation legislation enacted July 6, 2012 contains language both specifically, and more generally, helpful to pavement preservation,” says Mike Buckingham, president, FP<sup>2</sup> Inc., and director of pave-

ment preservation for Colas.

FP<sup>2</sup> began as the Foundation for Pavement Rehabilitation and Maintenance Research in 1992, as a nonprofit public charity to pursue and encourage research in pavement maintenance. In 2000 it changed its name to the Foundation for Pavement Preservation, which was dissolved in 2009 to form FP<sup>2</sup> Inc., a nonprofit trade association that conducts political lobbying, among many other duties.

“Thanks to the strong support of members of the U.S. House Transportation and Infrastructure Committee, pavement preservation in the final bill was stronger than it was in either the House or Senate versions,” Buckingham says.

But even as the benefits of having preservation and asset management included in MAP-21 have become manifest, supporters say they have learned working at the federal level is never as simple as it seems. The preservation community says it now must make sure the “metrics” by which success of pavement preservation will be measured under MAP-21 are applicable to pavement preservation practice.

“We know now that an important theme of the new law is accountability for work undertaken under the legislation,” FP<sup>2</sup>'s Buckingham says. “The operative word here is ‘metrics’ or measurement of progress toward established goals. Our work now is shifting from getting pavement preservation included in federal law, to making sure the metrics by which progress in preservation will be measured are appropriate for the techniques.”

Right now, the most widely used metric for performance at the federal level is pavement smoothness as measured by the International Roughness Index (IRI). While this is appropriate for new construction or standard overlays – nearly every survey shows ride quality is the No. 1 criterion of the public in judging consumer satisfaction – the preservation community would like an additional metric such as a health index or remaining service life for preservation treatments. FP<sup>2</sup> and its allies are working to make that happen.

## Preservation at the NCAT Track

New quantitative research on pavement life cycle effects of pavement preservation started in late 2012, as the new National Center for Asphalt Technology (NCAT) Pavement Preservation Effectiveness Study will bring the prestige of NCAT's research facility to pavement preservation practice.

NCAT's Pavement Test Track is funded and directed by a multi-state research cooperative program in which the construction, trafficking, and performance evaluations are carried out on 46 different 200-foot test sections around a 1.7-mile oval test track.

Each of the test sections is constructed using the asphalt





Photo courtesy of FPI Inc.

The new NCAT Pavement Test Track life cycle pavement preservation performance study also will include data from an instrumented local road near the track, the traffic of which is almost entirely truck traffic to and from a quarry; here in late summer, micro surfacing is placed as part of NCAT study

materials and design methods used by individual sponsors. A fleet of heavy trucks is operated on the track in a highly controlled manner in order to apply a design lifetime of truck traffic (10 million equivalent single axle loads, or ESALs) in two years.

Test sections are rebuilt every three years to provide experimental pavements for the next research cycle. The 2012 NCAT Pavement Test Track, which represents the fifth research cycle, is the first experiment that will include a formal pavement preservation study.

Referred to as the Preservation Group (PG) experiment, the study is designed to encompass multiple timely issues that are important to the entire pavement community.

“State departments of transportation – beset by dwindling tax revenues and rising material costs – are being forced to do more with less like never before,” says NCAT assistant director Buzz Powell, P.E., Ph.D. “Many DOTs either have a mandate to invest infrastructure dollars in pavement preservation, or have a strong interest to do so.” In the long term the NCAT research should help supporters of pavement preservation make their case for increased funding.

Preservation treatments often are applied to roadways as a reaction to badly deteriorated conditions, which amounts to throwing good money after bad. Instead, as pavement preservation is defined by the mantra “the right treatment to the right pavement at the right time,” by definition pres-

ervation has to be placed in a proactive manner at the right point in a pavement’s life cycle.

“A great need exists to quantify the relationship between pretreatment condition and lifecycle for all preservation alternatives, so that DOTs can select those that provide the lowest possible lifecycle cost,” Powell says.

Therefore the goal of the Preservation Group study on the 2012 NCAT Pavement Test Track is to provide sponsoring state DOTs with that relationship (i.e., the unique curve that defines the relationship between pretreatment condition, and life cycle performance for each preservation treatment), Powell says, which can then be programmed into decision trees that objectively select alternatives as a function of pretreatment condition.

“Over time, feedback from pavement

management systems will precisely calibrate these relationships to local materials, contractors and environmental conditions,” he says.

The Preservation Group study will include select test sections on the NCAT Pavement Test Track that have survived from previous research cycles. All track PG sections are supported by the same subgrade and base, and the total thickness of all bituminous lifts is 7 inches. “This thickness was chosen when these sections were originally constructed at the beginning of the 2009 research cycle,” Powell says, “because in past studies 7-inch sections exhibited significant performance differences within the standard 10 million ESAL traffic cycle as a function of the differences in mix designs and materials.”

## Off-Track Applications

The new Preservation Group experiment is unique in that – again, for the first time – pavement preservation treatments are not only being studied at the test track, but also off-track on a 1/2-mile stretch of a local county road, Lee Road, that supports traffic to an aggregate quarry with a high percentage of truck traffic.

On Lee Road, relatively good condition pavement supports lighter traffic in the inbound lane, while generally distressed pavement supports heavier traffic in the outbound lane. In both lanes, performance will be differentiated between the wheelpaths because widening in the past

history of the road has produced distinctly lower levels of pavement condition in the right (widened) wheelpaths.

In late summer 2012, pavement preservation treatments were applied full lane width in 100-foot test sections, producing 200 wheelpath-feet of experimental pavement surface. Each section was further differentiated into 10-ft.-long test cells, producing 20 data points per treatment.

Pavement preservation techniques placed were

- **Fog seals** (with and without rejuvenators),
- **Crack seals** (routing/filling, hot air lance, go-type),
- **Chip seals** (single, double, triple, scrub, FiberMat),
- **Cape seals** (on chip/scrub seals, FiberMat),
- **Micro surfacing** (single, double, Capes),
- **Plant mix overlays** (4.75 screening mix variations), and
- **Ultra-thin bonded wearing courses, and lightweight aggregates for surface treatments.**

Experiment contractors were Vance Brothers, Colas and E.D. Etnyre and Co. Instrumentation will document multi-depth pavement temperatures in each section, and records from the quarry will provide a comprehensive load history over the life of the experiment.

Pavement condition will be monitored on a weekly basis in order to determine the time and traffic needed to reduce pavement condition back to the pretreatment level. Because a distinct value will be produced for each test cell, 20 data points will define the shape of the life cycle curve for each preservation treatment.

## Pavement Preservation Conference

At the August National Pavement Preservation Conference, 48 exhibitors and over 500 delegates from across the continent and around the world came together for a seminal event in the growing field of pavement preservation.

“For two years, your leadership at FP<sup>2</sup> has been engaged with the staff of the National Center for Pavement Preservation to plan and develop this most important event in 2012 in pavement preservation,” said FP<sup>2</sup> President Buckingham.

*Better Roads'* editor-in-chief John Latta and contributing editor Tom Kuennen both participated in a panel on pave-



At the August National Pavement Preservation Conference in Nashville, all presentations were video-recorded, and can be streamed and materials downloaded at <http://nationalpavement2012.org/presentation-multimedia/>

ment preservation and public relations at the event.

Major pavement preservation partnerships uniting state and provincial road agencies held concurrent meetings. These included the Midwestern, Northeast, Rocky Mountain West, and Southeast Pavement Preservation Partnerships.

Plenary sessions set the stage for the conference to come. Then, seven topical “tracks” relevant to pavement preservation, asset management and pavement management featured 24 sessions spread over four days.

A hectic field demonstration held on the grounds of the Old Tennessee State Prison outside Nashville featured asphalt and concrete pavement preservation techniques such as chip seals, microsurfacing, scrub seals, surface re-texturizing, pavement rejuvenation, dowel bar load transfer retrofits, diamond grinding, and other innovative treatments.

Video of all presentations may be streamed, and materials downloaded, at <http://nationalpavement2012.org/presentation-multimedia/>.

Also, Bexar County, Tex., and the Tennessee DOT were honored for their pavement preservation programs with FP<sup>2</sup>'s *James B. Sorenson Award for Excellence in Pavement Preservation*. The Bexar County Public Works Department was honored with the Sorenson Award for 2012, and Tennessee DOT for 2011.

Receiving the award for Bexar County was Tony Vasquez, public works operations manager, for his work instituting asset management of county roads beginning in 2004, and subsequent pro-active pavement preservation practices to economically prolong the life of county roads.

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**At the National Pavement Preservation Conference in Nashville, different surface treatments are placed and compared at an outdoor setting**

pavements, as the City of San Antonio is located there.

Accepting the award for the state of Tennessee was Tennessee DOT Commissioner John Schroer. The DOT was honored for its outstanding advocacy for, and implementation

of, its statewide pavement preservation program. In only four years – between 2007 and 2011 – Tennessee DOT transitioned from an almost exclusively hot mix asphalt resurfacing program to one that incorporates pavement preservation principles. The result has been a significant improvement in pavement condition.

The department provided detailed pavement management systems data to prove the case for future network condition, and worked with the local hot mix industry to develop new specifications for thin hot mix overlays to gain its buy-in to the program. These thin hot-mix overlays now have become another routine pavement preservation treatment used in Tennessee.

Also recognized at the awards ceremony for his leadership and long service to the pavement preservation community was FP<sup>2</sup> executive director James Moulthrop, inducted into the FP<sup>2</sup> Pavement Preservation Hall of Fame. ❖