Tools for the Pavement Preservation Industry

By Tom Deddens, P.E.

Over the years, the Federal Highway Administration (FHWA) has changed its emphasis from construction to preservation of the National Highway System (NHS). FHWA is now providing assistance to the state DOTs and the highway industry through a number of new programs.

History

Historically, preventive maintenance activities have been excluded from federal-aid funding. When President Eisenhower initiated the construction of the Interstate System in 1956, he left the maintenance responsibility of the newly constructed roadway system squarely on the shoulders of the individual state transportation agencies. As the interstate system aged, Congress initiated the 4R Program (resurfacing, restoration, rehabilitation and reconstruction) which funded the activities to maintain the serviceability of the Interstate system. The passage of the Intermodal Surface Transportation Efficiency Act of 1991 created the Interstate Maintenance program and provided funds using the existing 4R equation. A 1993 FHWA memorandum identified any work which provided additional structural capacity, prevented the intrusion of water into the pavement, or any other work that extended the life of the highway, as being eligible for federal funding.

A 1998 memorandum gave state DOTs more flexibility in managing their federal-aid highway program. This memorandum permitted the use of "planned staged construction" for the completion of surface paving independent of other required project modifications. The memorandum simultaneously placed added emphasis on transportation systems preservation and encouraged the state DOTs to properly fund preservation programs without any additional federal assistance.

New Definition

In October of 2004, a memorandum issued by the Office of Infrastructure now makes preventive maintenance activities eligible for federal-aid funding based on a definition of pavement preservation which was consistent with the AASHTO definition: "… The planned strategy of cost effective treatments to an existing roadway system and its appurtances that preserves the system, retards future deterioration, and maintains or improves the functional condition of the system without increasing structural capacity."

The memorandum explains that "… projects that address deficiencies in the pavement structure or increase the capacity of the facility are not considered preventive maintenance and should be designed using appropriate 3R standards. Functionally, federal-aid eligibility preventive maintenance activities are those that address aging, oxidation, surface deterioration and normal wear and tear from day-to-day performance and environmental conditions."

FHWA now accepts that pavement preservation is a proactive, long-term strategy to improve pavement performance through a variety of cost effective,

thin surface treatments that extend the life of a road, such as crack and joint sealing, chip seals, slurry seals, microsurfacing and thin and ultrathin hot mix asphalt overlays for flexible pavements, and partial and full depth repairs, dowel bar retrofits, and surface grinding of rigid pavements. To be effective, these treatments must be selected carefully and applied before the pavement sustains any structural damage.

Available Resources

The FHWA's shift to an emphasis on preservation motivated the Office of Asset Management to reach out to the state DOTs and the highway industry through a number of activities. The available research and "conventional wisdom" was previously collected and assembled in a "toolbox" by the Foundation for Pavement Preservation (FP^2). The Foundation collected its industry members' technical manuals, brochures, and pamphlets that described the "best practices" for the various preservation techniques. About this time, FHWA and FP^2 produced two videos addressing pavement preservation entitled: *Protecting Our Pavement: Preventive Maintenance* and *Preventive Maintenance: Project Selection*. The content of these videos were consolidated later onto a single DVD.

Next, a *Compendium on Pavement Preservation* was compiled and is presently available on the FHWA's Pavement Preservation website, www.fhwa.dot.gov/preservation/. In 2003, a sequel to the toolbox entitled *Pavement Preservation State of the Practice Volume 2* was produced and distributed on CD by FP^2.

Due to the popularity of these resources, all the information was compiled on a CD, which is now available from the Foundation for Pavement Preservation.

Training Efforts

Training is another significant part of this transition. Four courses specifically addressing pavement preservation issues have been developed and are available through the National Highway Institute (NHI).

131054A *Pavement Preservation: The Preventive Maintenance Concept*

131058A *Pavement Preservation: Selecting Pavements for Preventive Maintenance*

131103A *Pavement Preservation: Design & Construction of Quality Preventive Maintenance Treatments*

131104A *Pavement Preservation: Integrating Pavement Preservation Practices & Pavement Management*

A listing of these courses can be found on the NHI's website, www.nhi.fhwa.dot.gov/coursec.asp, under Pavements and Materials.

Interactive Manual

The FHWA's Office of Asset Management and the Pavement Preservation Expert Task Group are in the process of developing an interactive, online version of a manual originally developed by the California Department of Transportation entitled *Maintenance Technical Advisory Guide* (MTAG). The training will include modules on crack sealing, patching and edge repairs, chip seals, slurry seals, microseals, ultrathin bonded asphalt overlays, and thin overlays. When this project is complete in January 2006, an individual requiring training will be able to access the specific technique at his convenience.

Modules will be taught by referring the students to the corresponding section of

the MTAG. Upon completing a module, the student will be tested on his understanding of the subject material. A pass or fail grade will be issued based on the test scores. If the student passes, a verification notice will be issued to his employer. If the student fails, he will be instructed to retake the module and repeat the test.

National Center for Pavement Preservation

In August of 2004, the National Center for Pavement Preservation (NCPP) was created through the partnership of the FHWA, private industry and Michigan State University. The purposes of the NCPP are to:

- Provide technical training related to pavement preservation and management
- Reach out to state agencies and provide assistance in development of specifications and be a repository for technical research related to pavement preservation issues
- Coordinate the research activities of regional or national pooled-fund studies and those research activities undertaken by other regional pavement preservation centers as they develop.

The website of the NCPP is www.pavementpreservation.org. Presently the NCPP is available to teach two courses, *Chip Seal Design* and *Pavement Preservation: Applied Asset Management.*

Voluntary Assessment Program

The most recent FHWA activity is directed toward assisting the states by providing a voluntary assessment of an agency's pavement preservation program. This assessment program is being implemented through a contract between the FHWA Office of Asset Management and the NCPP. Representatives from NCPP and/or FHWA will meet with the various components of a highway agency—upper management, contract administration, asset management, maintenance, materials and construction—involved with implementation of maintenance of the roadway system.

The assessments will be guided by a set of standard questions regarding the implementation of pavement preservation practices and policies within that state. A report will then be prepared based on the responses to these standard questions. The report will also include general suggestions for improvement, in particular, noting the best practices effectively used in other states. The information obtained from this study will be compiled and placed in a large database that can be accessed by the agencies. Each agency will be assigned a unique identifier that will permit anonymous viewing of the data for purposes of comparison with their peer agencies.

Conclusion

Interpretations of the various FHWA memorandums can lead to significant differences in the manner in which programs are administered among the various agencies. In order to mitigate some confusion, the FHWA has just finalized a document standardizing the use of the various categories of roadway maintenance. It is FHWA's intent to have this "Definitions Statement" endorsed by the AASHTO's Standing Committee on Construction.

The intent of all this activity is to firmly establish pavement preservation as those activities focusing on maintenance of functional surface characteristics of a pavement. The preventive maintenance program is intended to complement expenditures made for capital improvements by providing a strategy to cost effectively prolong the life of pavement systems of the National Highway System. As the mantra says, pavement preservation is about placing the right treatment on the right pavement at the right time.

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PAVEMENT PRESERVATION CONCEPT

The pavement preservation concept is that an agency can apply a relatively low cost treatment to a pavement surface while it is still "good." After treatment, the pavement will be improved and its life extended for some period of time. Pavement preservation requires a commitment by the agency to apply the preservation activities before significant pavement failure occurs.