



TECHNICAL SUMMARY

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\$94,984



Chip seals provide a new wearing surface on roadways and typically last five to 10 years.



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A Guide to Preservation Techniques to Extend Pavement Life and Improve Pavement Condition

What Was the Need?

Pavement preservation programs have gained popularity in the past decade as a way to extend pavement life and use resources more efficiently. These programs encompass a variety of routine maintenance, preventive maintenance and pavement rehabilitation techniques, coupled with a data collection and management system. Effective pavement preservation can help local agencies save money while improving the overall condition of the road network.

While information about these practices is widely available, it is also widely dispersed. Local agencies needed a clearinghouse of information that engineers could easily access as they learn about pavement preservation and implement their own programs.

What Was Our Goal?

The goal of this project was to synthesize available knowledge about pavement preservation techniques used in Minnesota and to develop a tool that could help local agencies select and schedule appropriate, cost-effective options.

What Did We Do?

First, researchers conducted a literature review on pavement preservation definitions, preservation activity selection, pavement management systems, cost-effectiveness evaluation, activity timing and prioritization, and general preservation program guidelines. They also collected data on local agency pavement management systems through contacts with Minnesota cities and counties, from an infrastructure management consultant and from in-depth interviews with selected agencies.

Next, researchers analyzed the data to identify pavement rehabilitation, maintenance and preservation activities conducted by agencies in the previous decade. They evaluated the average increase in life span that treatment methods produced and the impact of the original condition of the pavement on treatment effectiveness. Using this information, they developed guidelines for pavement preservation treatment decision-making.

What Did We Learn?

Researchers developed a guide that city and county engineers can use as an all-in-one reference source for pavement preservation treatments. The guide is an interactive PDF with internal links that allow users to navigate between sections as needed.

Included in the guide are:

- Guidelines and definitions for various pavement preservation activities, such as crack sealing, chip sealing, microsurfacing, joint sealing and diamond grinding. The guidelines include the dos and don'ts for successful crack sealing, chip sealing and microsurfacing.

Pavement preservation can save money for local agencies while improving the overall condition of road networks by extending the life of pavements.

This project created a clearinghouse of pavement preservation information that local engineers can use as they develop and implement pavement preservation programs.

“With preservation activities, it’s important to take action before you see major problems. Once you see cracks in the road, it’s too late for preservation activities, and you need to take bigger actions.”

—W. James Wilde,
Professor, Minnesota
State University,
Mankato, Department
of Mechanical & Civil
Engineering

“It’s important for local agencies to have this information available whenever they’re making pavement preservation decisions. They need to know the pros and cons of each of the available treatment options.”

—Malaki Ruranika,
Research Project
Engineer, MnDOT
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Pavement preservation activities should be undertaken before significant distress is visible. Distress in the pavement on the left is too significant for preservation to be beneficial, while the pavement on the right is a good candidate for preservation.

- Realistic expectations for pavement preservation activities. For example, survey and interview respondents reported that chip seals typically last five to 10 years, while 1.5-inch overlays last about seven years and full depth reclamation lasts about 15 years.
- Timing of pavement preservation activities. Timing is critical because once the distress is visible, it may be too late for preservation activities to be effective. In particular, the first treatment allows pavement systems to wear as they are designed and should often be applied in the first year after construction. The guide also includes sample decision trees that engineers can adapt to make treatment decisions based on pavement conditions.
- Data collection guidance. In addition to basic identification and construction information about road segments, a pavement management system needs details about road conditions, distresses present and traffic levels.
- Contracting methods. For example, if engineers consider in advance the difference in purchasing seal coat by the square yard and by the ton, they may be able to save funds.
- Sources of additional information.

While many agencies focus their treatments on the roads in the worst condition with the most traffic, this approach is usually not the most efficient because severely deteriorated pavements require more aggressive and expensive treatments. A better strategy for identifying candidates for maintenance is the Remaining Service Life approach, which focuses on improving the overall condition of the road network. Using this approach, agencies estimate the number of years until the end of each road segment’s service life, as measured in lane-mile-years, and use a life-cycle cost analysis to select the treatments that can improve the number of lane-mile-years most cost-effectively.

What’s Next?

Local agencies should be able to use this information to establish and optimize their pavement preservation programs. The guidelines will allow agencies to select preservation treatments that will maintain and improve the quality of their road network more cost-effectively.

Researchers plan to publicize the guide by email and through presentations and training sessions, although specific plans have not yet been made. The materials will also be available on several websites, including Local Road Research Board, MnDOT and State Aid for Local Transportation.

The guide is intended to be a living document that can be updated as new techniques and knowledge become available. For example, research from the Asphalt Institute about the aging of binders in asphalt and optimal timing for treatment will be incorporated into the guide when a final report is released later this year.

This Technical Summary pertains to the LRRB-produced Report 2014-33, “Cost-Effective Pavement Preservation Solutions for the Real World,” published September 2014. The full report can be accessed at <http://www.lrrb.org/PDF/201433.pdf>. The project produced an interactive guide for local engineers, “Real World Pavement Preservation Solutions,” available at <http://www.mnsu.edu/ctri/PavementPreservation>.