



Renewal Project R26

Preservation Approaches for High-Traffic-Volume Roadways

MAY 2011

“As the results of the SHRP 2 research program are deployed, we will see more ‘rapid renewal’ tools developed for owners of the transportation system. The tools will lead to a fundamental change in how we approach rehabilitating our transportation system. We will be able to develop projects that are completed quickly, with minimal disruption to communities, and to produce facilities that are long-lasting.”

— **RANDELL IWASAKI**

Executive Director, Contra Costa Transportation Authority and
Chair, Renewal Technical Coordinating Committee

This document highlights a new tool to help highway agency managers and engineers preserve high-volume roadways in serviceable condition for longer periods of time, at a lower cost, in a safer manner, and with limited disruption to the traveling public. It describes two products available in both print and electronic formats: Guidelines for the Preservation of High-Traffic-Volume Roadways and a final report of the research conducted in Renewal Project R26: Preservation Approaches for High-Traffic-Volume Roadways. The research was also presented in a webinar, which is available through the SHRP 2 website. The Responsible Staff Officer for this project is Dr. James Bryant, Jr., who can be contacted at jbryant@nas.edu.

As transportation agencies grapple with decreased capital budgets, pavement preservation will continue to be an important strategy to extend the life of roadways. Relatively small investments for preservation activities, if properly timed and applied, can increase infrastructure life significantly. Several transportation agencies apply preservation strategies on lower-volume roadways; however, application of these strategies on high-volume roadways has lagged behind.

The application of preservation strategies to high-traffic volume roadways presents a complicated set of challenges. Many of the products and approaches that have been accepted for use on lower-traffic-volume roadways have not made the transition to high-traffic-volume roadways. Often, the use of a particular product or application has too great an impact on traffic, or the treatment has not been successfully applied under high-traffic conditions. The purpose of the research project reported on here is to provide guidance for matching the pavement condition and other considerations more effectively with suitable treatments to preserve high-traffic-volume roadways.

Pavement preservation includes preventive maintenance and some forms of minor rehabilitation and corrective maintenance. The practice of pavement preservation is a growing trend

among transportation agencies around the United States: In the early 1990s it was an obscure term, but it has since become standard practice at most highway agencies. The practice, however, is applied more to lower-volume roadways than to higher-volume roadways.

Practicing preservation on high-traffic-volume roadways is just as important as on low-volume roadways and for the same reasons: Pavement preservation

- Saves money;
- Provides the traveling public with safer, smoother roads; and
- Can be performed more rapidly than rehabilitation.

It is worthwhile to increase and improve the practice of pavement preservation on high-traffic-volume roadways.

Guidelines for the Preservation of High-Traffic-Volume-Roadways

Based in large part on agency experience and practice, the guidelines developed in this project provide direction on the selection and use of preservation treatments for high-traffic-volume roadways. The researchers expect that agencies will be able to extend their use of pavement preservation on high-traffic-volume roadways through a greater familiarity with the described treatments.

Key factors that affect selection of both pavement preservation projects and treatments include traffic level, existing pavement condition, climatic condition, available work

hours, and treatment performance and cost. Traffic level is an important consideration because it is a direct measure of the loadings applied to a roadway and it affects access to a roadway to perform preservation activities. Because pavements typically have more than one distress type, the guidelines are structured to treat combinations of conditions. Climate conditions determine construction timing and affect treatment performance. Typical unit-cost ranges and corresponding relative costs of preservation treatments applied to hot mix asphalt- and portland cement concrete-surfaced roadways are shown in the guide. Figure 1 shows distress factors and treatment types.

Preservation Treatment Selection

Selecting an appropriate preservation treatment for a given pavement at a given time is not a simple process. It requires a significant amount of information about the existing pavement, as well as the needs and constraints of the treatment to be performed. In addition, usually several possible solutions can be considered, each with unique advantages and disadvantages. The process is further complicated when costs and cost-effectiveness are factored in.

The Guidelines present a sequential approach for evaluating possible preservation treatments and identifying the preferred one. The approach was developed specifically to address factors that are commonly considered for high-traffic-volume roadways. Figures, tables, and matrices are provided to help identify the best treatment for each situation. Figure 2 illustrates the pavement selection process described in the documents.

FIGURE 1 Causes of Distress and Treatment Types

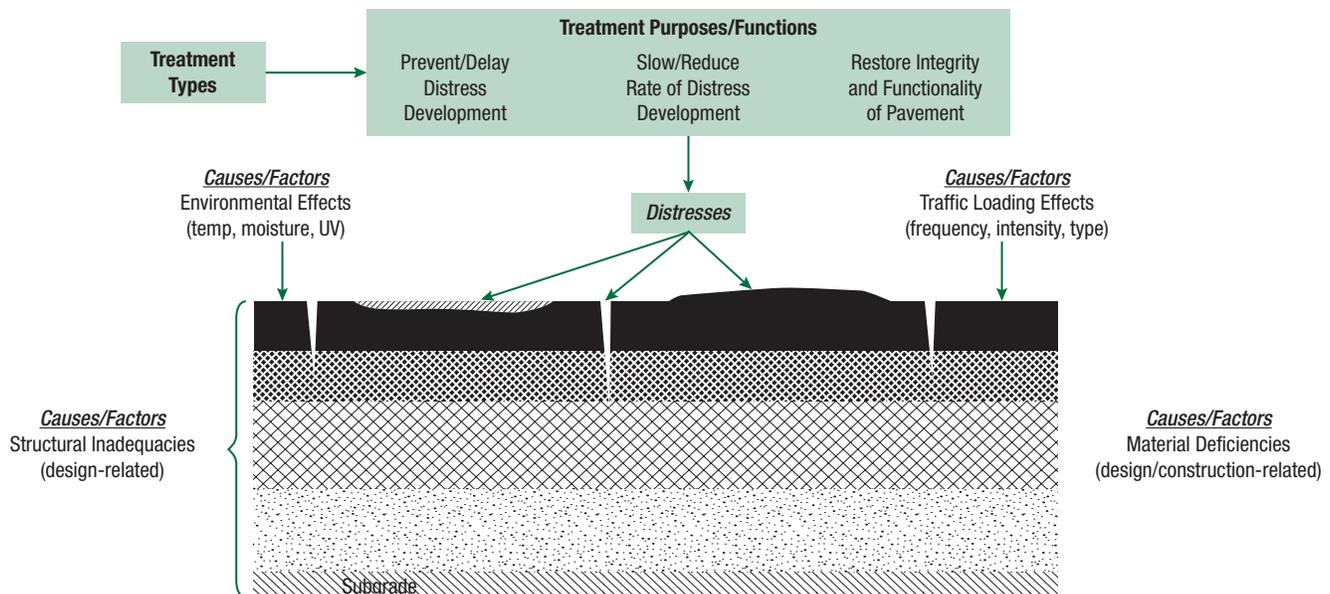
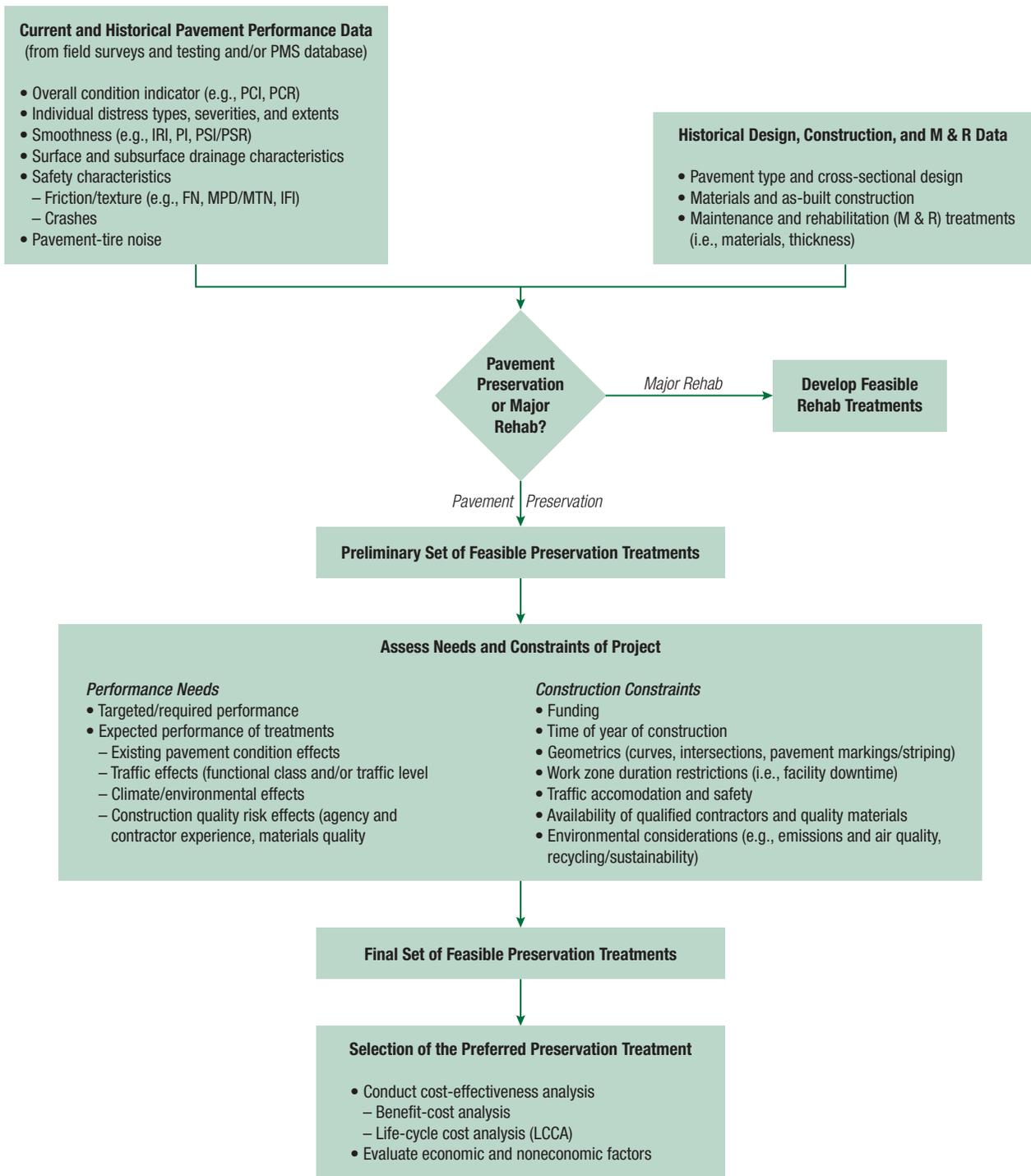


FIGURE 2 Preservation Treatment Selection Process for High-Traffic-Volume Roadways



Appendix A to the Guidelines document provides technical summaries for each of the 14 preservation treatments covered in the document. The summaries include treatment descriptions, the key pavement conditions they address, and construction and other considerations, including expected performance, estimated costs, and references. Appendix B

provides two example exercises that illustrate how to use the guide to identify feasible preservation treatments for a particular project.

The final report includes an annotated bibliography, the survey questions that were distributed to highway agencies and analyses of the survey responses, a discussion

of new and/or infrequently-used pavement preservation treatments, and a glossary. The survey found wide variation in the definition of high-traffic-volume roadways among responding transportation agencies. The definition used in the research project was rural roads with an average daily traffic volume of at least 5,000 vehicles per day and urban roads with at least 10,000.

The research team included D. Peshkin, K. L. Smith, A. Wolters, and J. Krstulovich of Applied Pavement Technology, Inc., Urbana, Illinois and J. Moulthrop and C. Alvarado

of Fugro Consultants, Inc., Austin, Texas; and Gerry Eller, Dr. R. Gary Hicks, and Dean Testa. David Peshkin, Vice President of Applied Pavement Technology, was the Principal Investigator of this research project.

Guidelines for Preservation of High-Traffic-Volume Roadways can be ordered online through the TRB bookstore: <http://books.trbbookstore.org/> or by calling 202-334-3213 8:30 am to 5:00 pm EST Monday–Friday. A PDF version is available on the SRHP 2 website at: www.TRB.org/SHRP2. The final report will be available later this year.

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