



TECHSUMMARY *September 2014*

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Asphalt Surface Treatment Practice in Southeastern United States

INTRODUCTION

Pavement preservation is an approach in enhancing pavement performance using a set of practices that extends the life of the pavement and improves safety and ride quality. According to the World Bank's Pavement Deterioration Model, the cost of returning a pavement to good condition after deterioration may be four times the cost of maintaining it in good condition (Shahin, 2005). The results of a Utah Department of Transportation (UDOT) research study showed that it costs less to maintain roads in good condition than in poor condition (Zavitski, et al.). According to the National Cooperative Highway Research Program (NCHRP) Synthesis 223, every dollar spent on preventative maintenance at the correct time in a pavement's life cycle saves \$3-4 in future rehabilitation costs (Geoffroy, 1996). Later work by Galehouse, Moulthrop, and Hicks (2003) showed that future rehabilitation cost savings are \$6-10 for every \$1 spent on preventative maintenance. Some surface treatments are effective for maintaining pavements in good condition. They are applied to the entire surface of the pavement and are usually used for pavements with no major structural deterioration. The relatively low cost and simplicity of these techniques, besides their effectiveness in extending the life of the pavement and improving performance, has attracted many agencies into using them. Chip seal, slurry seal, microsurfacing, surface rejuvenation, fog seal, scrub seal, and thin overlays are among popular surface treatments.

SCOPE AND OBJECTIVE

This report aimed at researching asphalt surface treatments' state of practice in the United States, particularly Southeastern Association of State Highway and Transportation Officials (SASHTO). The synthesis was designed to provide a reliable reference for those who are involved in surface treatment projects. Surface treatment techniques were described and recent research projects on this field were summarized. Best practices and implementation status were also addressed through a survey sent to SASHTO agencies.

METHODOLOGY

The general methodology of this research was two tiered: first, conduct a comprehensive literature review on asphalt surface treatments; second, send a survey to state and local agencies. The results from the survey were analyzed and presented in this report.

Survey questionnaires were developed to investigate actual surface treatment practices in southwestern states; three electronic questionnaires were prepared. The questionnaires were sent to southeastern state agencies as well as the local highway agencies involved in surface treatment projects.

The survey consisted of three electronic questionnaires as follows:

- Questionnaire 1, Administrative
- Questionnaire 2, Technical
- Questionnaire 3, Research Status

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Questionnaire 1 asked general questions regarding implementation status of surface treatment techniques, level of proficiency, specifications, and other administrative issues. The participant was first asked to determine what surface treatments were being implemented or have been completed before by that agency. Based on the answer of this question, survey participants were directed to the pages related to chosen techniques. The number of projects for each technique, proficiency of the agency, specifications, quality control, performance, life extension, cost, purpose, and obstacles were questions asked in Questionnaire 1.

Questionnaire 2 was more technical and designed for people who have detailed technical information of surface treatments state of practice. For each technique, general information related to the condition of pavement before applying surface treatment was asked. The next section of the questionnaire was related to the specification of material used in surface treatment. "Design and Construction" issues and "Cost and Performance" were discussed in the last two sections of the questionnaire.

Questionnaire 3 investigated surface treatment related research projects conducted by the agency. Completed, ongoing, and planned research projects were asked to be listed and uploaded if possible.

After filling out the first questionnaires, the participant was directed to the next sections of the survey. Those sections could be answered by the same participant or be sent to other people at the agency with appropriate knowledge for each questionnaire.

CONCLUSIONS

Preventive maintenance techniques delay deterioration of the pavements. Proper maintenance of pavements results in decreasing their life-cycle cost. Surface treatments are preventive maintenance techniques, which are applied on the whole surface of the road. This synthesis describes each technique, recent research work, and their implementation status in southeastern United States.

Ten surface treatment techniques including fog seal, rejuvenator seal, chip seal, sandwich seal, scrub seal, slurry seal, microsurfacing, cape seal, thin overlays, ultrathin bonded wearing course (Novachip), and

crack sealing/filling have been described briefly. The mechanism of each treatment as well as its application and general procedure were summarized. This was followed by a summary of recent research work. This literature review can help surface treatment practitioners be aware of recent finding in the practice in which they are involved in. Some techniques such as rejuvenator seal, sandwich seal, scrub seal, and cape seal are variation of major techniques like fog seal, chip seal or slurry seal.

Nineteen participants from Florida, Georgia, Louisiana, North Carolina, Virginia, West Virginia, and Arkansas participated in a survey designed to investigate state of practice. Crack sealing/filling, thin overlays, microsurfacing, chip seal, fog seal, and ultrathin bonded wearing course were found to be the most popular practices. There were not enough data from the survey to address state of practice for other techniques.

Delaying deterioration of the pavement and improving water infiltration are considered the main objectives for all treatments. In addition, practitioners often perform chip seals and ultrathin bonded wearing course (UBWC) to improve surface friction, microsurfacing and thin overlays to improve ride quality and fog seals to improve appearance of the pavement.

Social, legal, and political obstacles, as well as lack of skilled contractors, seem to be common problems of surface treatment constructions. In addition to these, some agencies reported suffering inefficient or inconsistent standard specifications and lack of knowledge and experience to perform surface treatments.



Figure 1
Application of scrub seal (Howard, 2009)