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Asphalt Pavement Seal-Coats: Best Practices and Experience

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Background

 Pavement preservation can be very effective in extending pavement life at lower investment
 → Timing of application



- Current seal-coat performances vary greatly due to project selection, materials used, timing, and the quality of the construction.
- Many factors influence the performance, this study focusses to provide recommendations, (<u>'do's and don'ts'</u>) based on past applications, performances, and methods







Study Goals and Objectives

- The primary goal of this study was to develop a <u>seal-coating best</u> practices recommendation
- Objectives:
 - Compare PennDOT pavement preservation specifications with those of other local agencies, entities, associations, or etc.
 - Determine current pavement preservation practices and methods by way of a survey to PennDOT districts and other local agencies
 - Examine the performances of past seal-coating applications in Pennsylvania by interviewing transportation agencies, contractors, and consultants
- Approach: Literature review, surveys and interviews



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Survey

- Purpose: Gather state of the practice information on seal coats and other asphalt pavement preservation treatments.
- Participants: 63 respondents from PennDOT districts, counties, and municipalities in Pennsylvania.
- Focus: Current practices and guidelines for pavement preservation
 treatments
 - Usage
 - Treatment Selection
 - Application Timing

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- Material Specifications
- Construction QA Process
- Longevity

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Knowledge gaps and roadblocks





Use of Pavement Preservation Treatments in PA

 Common Treatments: Asphalt seal coats, asphalt surface treatments, fog seals, micro-surfacing, UTBWC, slurry seals.



How are preservation treatment selected?



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State of the Practice for Seal Coating Practices

- Usage: Most common on rural local roads.
- Primary Distresses Targeted: Fatigue cracking, longitudinal cracking, transverse cracking, block cracking.

Number of seal coating projects per year?



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Sealcoating Application Timing



Agency determined and are kept constant for all applications

Agency determined on a projectby-project basis

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Contractor determined



Life Expectancy of Sealcoats and Causes for Failure





Roadblocks to Using Preservation Treatments

Lack of agency experience

Lack of funding

Lack of contractor expertise in performing treatments Lack of mix design methods and engineering-based design procedures Lack of tests and criteria to determine which treatment to implement Poor performance of past pavements that received a treatment

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Interviews with PA Entities

- Purpose: To gain a deeper understanding of current best practices in seal coating and other pavement preservation treatments through interviews with selected Pennsylvania transportation entities and contractor.
- Interviewed Entities:
 - PennDOT District 9
 - PennDOT District 10
 - Pennsylvania Turnpike Commission
 - Big Beaver Borough
 - Cranberry Township
 - Potter Township

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• Midland Asphalt Materials Inc.





Example of Interview Outcome: PennDOT District 9

- Practices:
 - Asphalt seal coats, fog seals, and surface treatments
 - Preference for in-house work
 - Cyclic maintenance every 6 years
 - Use of CRS-2PM emulsion and virgin aggregate is standard practice but have experimented with RAP (1/3rd the cost) and thin lifts
- Challenges:
 - Shoving with thin lifts and, flushing and bleeding with RAP on high ADT roads.
 - Staff shortages and loss of institutional knowledge
- QA: Internal checklists and "Calibration Days".
- Lessons Learned: Calibration days are held to ensure quality and knowledge transfer.

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Key Best Practices Recommendations

- Project Selection and Application Timing: Majority of current PA entities apply seal coating on fixed intervals. Utilizing pavement management systems may be a better approach. Also, seal coating is often used as a "band-aid" or "quasi-structural layer" instead of preservation treatment.
- Calibration Days: Conduct annual calibration days to ensure equipment is in good working order and to transfer knowledge among crew members.
- Checklists: Create and use pre-construction, equipment, crew procedures, and post-construction checklists to ensure consistent quality. PennDOT has provided these.
- Contracting Out: Contract out seal coating projects may be beneficial for local entities to utilize contractors' experience and equipment.
- Tracking Performance: Track the performance of treatments and road conditions using a pavement management software.





Other Best Practices

- Continue with CRS-2PM emulsion
- Precoated aggregates could help keep aggregates dust-free
- #4 stone on first lift with #8 on second lift
- Slag has shown very good potential when it is kept dry
- Consider Full Depth Reclamation on pavements already treated with multiple applications of seal coating
- Prioritize drainage repairs/installation to improve seal coating longevity
- Consider conducting crack sealing in-house to gain a deeper understanding of road conditions





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Thank you

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FINAL REPORT