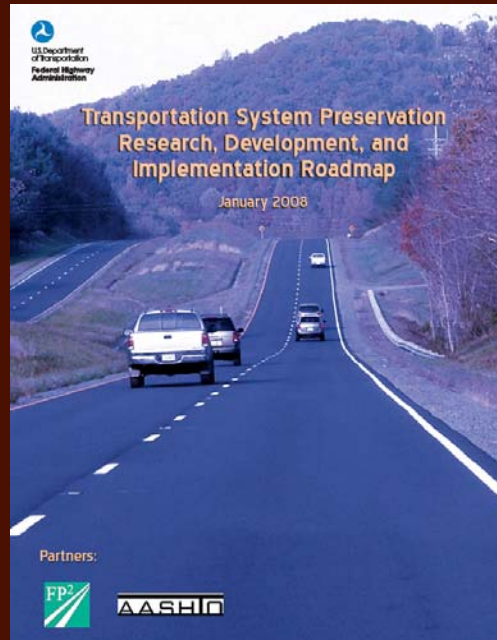


# Transportation System Preservation Research Roadmap

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# Need

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- Preservation research identified as a need during program appraisals
- Individual projects have been sought in the past
- No coordinated approach to address preservation research needs

# Process

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- Technical Panel
- Pavements and Bridges
- White Paper Development and Review
- 3 Workshops
  - 2 Pavements
  - 1 Bridge
  - 6 Teams

# Pavements Whitepapers/ Breakouts

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- Asset Management
- Design
- Materials
- Construction
- Contracting Methods
- Performance

# Bridge Whitepapers/ Breakouts

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- Asset Management
- Decks and Joints
- Superstructure
- Substructure
- Selection of Preservation Actions
- Performance

# Process (continued)

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- Research Needs Statements
  - Background
  - Scope
  - Tasks
  - Estimated Time and Cost
  - Implementations
- Balloting and Ranking
- Overall Joint Roadmap

## **Design # 02**

**Title: Determining Pavement Preservation Treatment Lives and Related Pavement Life Extension**

**Background:** Success of a pavement preservation technique is heavily dependent on its optimal application in terms of timing and existing pavement conditions. Performance of different treatments and life extension of existing pavements due to these treatments is a function of existing pavement conditions (e.g., type, severity, and extent of distresses) and prevailing site conditions (pavement type, pavement age at the time of application, traffic, climate, etc.). There is an urgent need to develop methodologies to predict treatment performance, life extension of existing pavements and its related cost savings.

**Scope/Objectives:** The objective of this project is to develop methodologies to estimate treatment lives and life extension of both flexible and rigid pavements as a function of treatment type, existing pavement conditions, and environmental and traffic conditions. It is anticipated that existing databases and PMS data will be used to develop these methodologies and estimates.

### **Research Proposed:**

The following tasks have been identified to complete the work for this project:

Task 1. Conduct a literature search and survey of transportation agencies nationally and internationally on: (1) pavement preservation techniques used for various existing pavement conditions; (2) performance curves of different pavement preservation techniques; and (3) methodologies to determine the life extension of existing pavements due to the application of pavement preservation treatments.

Task 2. Develop a family of performance curves for each pavement functional category for different pavement preservation treatment techniques used, as a function of the existing pavement, environment and traffic conditions based on findings from Task 1.

Task 3. Develop a methodology to determine the life extension of existing pavements as a function of existing pavement, environment and traffic conditions for selected treatment types.

Task 4. Develop a methodology for estimating the potential cost savings associated with selected preservation treatments given existing pavement, environment and traffic conditions on a per mile basis.

Task 5. Prepare final report.

**Proposed Deliverables:**

1. Performance curves of various pavement preservation techniques for each pavement functional category, environmental and traffic condition.



2. Recommend optimal timing and expected treatment life for maximum benefit for each treatment
3. Methodology to predict the life extension of existing pavements.
4. Methodology to estimate cost savings associated with various treatments.

**Potential Partners:** FHWA, AASHTO, APWA, FP2, Contractors

**Estimated Cost and Duration:** \$350,000 30 months

**User Community:** State and local agencies, AASHTO, APWA, Contractors, Academia

**Implementation:** Prepare a marketing plan for the products that are developed as a result of this research project. The marketing plan should refine the target market and provide a systematic approach to making sure that key decision makers become aware of the features advantages and benefits. The plan should also facilitate distribution of the products to early adopters with sufficient support for timely implementation.

# Results

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- Pavements – 38 statements
- Bridge – 25 statements
- Estimated Cost > \$40M

# Pavements

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<b>Category</b>	<b># of Problem Statements</b>
Asset Management	8
Design	7
Materials	7
Construction	7
Contracting Methods	3
Performance	6

# Bridge

<b>Category</b>	<b># of Problem Statements</b>
Asset Management	7
Decks and Joints	4
Superstructure	5
Substructure	5
Selection of Preservation Actions	2
Performance	2

# Top 5 Pavement Statements by Importance

Table B-3 - Top Pavement Preservation Priorities Rated Solely by Importance

<u>Pavement Preservation Needs Statements</u>			
<u>Rank</u>	<u>Needs Statement #</u>	<u>Title</u>	<u>Weighted Importance + Priority</u>
1	Design 02	Determining Pavement Preservation Treatment Lives and Related Pavement Life Extension	2.79
2	Design 01	Determine the Economic Benefits of Pavement Preservation Strategies	2.71
3	Construction 02	Performance Related Specifications (PRS) for Pavement Preservation treatments	2.63
4	Performance 03	Quantify Performance and Benefits of Various Pavement Preservation Treatments and Develop Pavement Preservation Treatment Performance Models	2.63
5	Performance 04	Quantifying the Benefits of Pavement Preservation Treatments	2.58

# Top 5 Pavement Statements by Importance AND Priority

Table B-1 - Top Pavement Preservation Priorities Rated by Combined Importance & Priority

		<u>Pavement Preservation Needs Statements</u>		Weighted Importance + Priority
<u>Rank</u>	<u>Needs Statement #</u>	<u>Title</u>		
1	Construction 02	Performance Related Specifications (PRS) for Pavement Preservation treatments		2.24
2	Design 02	Determine Present Design Treatments of High Priority Roadways and Develop Alternative Treatments		2.13
3	Design 01	Determine the Economic Benefits of Pavement Preservation Strategies		1.86
4	Contracting Methods 03	Development of Model Specifications and Testing Require for Pavement Preservation Contracting Methods		1.85
5	Performance 03	Quantify Performance and Benefits of Various Pavement Preservation Treatments and Develop Pavement Preservation Treatment Performance Models		

# Top 5 Bridge Statements by Importance

Table B-4 - Top Bridge Preservation Priorities Rated Solely by Importance

<u>Bridge Preservation Needs Statements</u>			
<u>Rank</u>	<u>Needs Statement #</u>	<u>Title</u>	<u>Weighted Importance + Priority</u>
1	Superstructures 04	Improved Inspection Techniques for Steel Prestressing Strand, Cables, and Ropes	2.84
2	Decks & Joints 01	Best Practices for Preserving Bridge decks	2.69
3	Performance 01	Quantify the Information Necessary to Guide Bridge Preservation Decisions	2.59
4	Selection 01	Implementation of Preservation Practices on Highway Bridges by State DOTs	2.47
5	Selection 02	Develop Bridge Design Guidelines to Enhance Constructability and Maintainability	2.47

# Top 5 Bridge Statements by Importance AND Priority

Table B-2 - Top Bridge Preservation Priorities Rated by Combined Importance & Priority

<u>Rank</u>	<u>Needs Statement #</u>	<u>Bridge Preservation Needs Statements</u>	<u>Weighted Importance + Priority</u>
		<u>Title</u>	
1	Superstructures 04	Improved Inspection Techniques for Steel Prestressing Strand, Cables, and Ropes	2.54
2	Performance 01	Quantify the Information Necessary to Guide Bridge Preservation Decisions	2.11
3	Decks & Joints 01	Best Practices for Preserving Bridge decks	2.06
4	Selection 01	Implementation of Preservation Practices on Highway Bridges by State DOTs	2.04
5	Substructures 01	Preservation of Concrete Highway Bridge Substructure Units by Preventing or Delaying the Initiation of Active Corrosion of the Steel Reinforcement	1.87



# Next Steps/ Implementation

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- Short-and long-term research needs for pavement preservation and bridge preservation
- Presented for AASHTO Subcommittee on Maintenance
- Develop tracking mechanism on TSP2

# Transportation System Preservation Technical Services Program (TSP2)

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<http://www.tsp2.org/roadmap/index.php>

# Questions?



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