A Road Map for Transportation System Preservation R&D (Bridges)
TSP R&D Road Map Project

- Sponsored by the FHWA Office of Asset Management
- In cooperation with AASHTO & TRB
- Coordination and Report by John Hooks
Project Objective

To develop a road map for Research, Development and Implementation related to bridge and pavement preservation by

- Identifying gaps in knowledge and practice of preservation
- Identifying critical R&D needs to fill those gaps
- Writing R&D needs statements
- Creating a road map for an R&D program
Why Preservation?

- Traditional strategies are no longer effective
  - Fixing “the worst first”
  - Benign neglect of bridges in good condition
  - Delaying action until rehab or rebuild is necessary

- New strategies are needed for bridges in good condition
  - Intervene early in life cycle
  - Apply preservative treatments before deterioration begins
  - Goal - extend service life at minimum cost
Why R&D?

- Data necessary to resolve uncertainties about effectiveness is not systematically recorded
  - Condition of element before preservation actions
  - Type & specifics of preservation actions
  - Treatment costs
  - Condition over long term – Service life extension

As a result,

- Useful deterioration and cost models not available, and
- It is difficult to account for preserved elements in decision making processes, e.g., BMS, PMS
**Project Scope**

- **Technical Panel** – FHWA, DOTs, TRB, Private Sector
- Literature search on *existing knowledge* of bridge preservation and pavement preservation
- Identification of *key topic areas* related to bridge preservation and pavement preservation
- Brief *white papers* on the key topic areas
- *Workshops* to identify critical R&D needs and draft R&D needs statements
- Review & *prioritization* of R&D needs statements
- Development of *roadmaps*
Preservation White Papers

**Bridge**
- Asset Management & Preservation
- Bridge Decks
- Bridge Deck Joints
- Concrete Superstructures & Substructures
- Steel Superstructures & Substructures
- Selection of Preservation Actions
- Performance of Preservation Actions
May 22-23, 2007 Workshop
Participants

- State & local DOTs 16
- FHWA 11
- Academia 5
- TRB & AASHTO 3
- Industry & Consultant 11

TOTALS 46
Workshop Format

- Presentation of White Papers
- Breakout groups for six topic areas
- Identification of critical R&D needs
- Development of needs statements
- Reports from breakout groups
## Needs Statements Developed

<table>
<thead>
<tr>
<th>BRIDGES</th>
<th>Final</th>
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<tbody>
<tr>
<td>Asset Management</td>
<td>7</td>
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<tr>
<td>Decks &amp; Joints</td>
<td>4</td>
</tr>
<tr>
<td>Superstructures</td>
<td>5</td>
</tr>
<tr>
<td>Substructures</td>
<td>5</td>
</tr>
<tr>
<td>Selection</td>
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<tr>
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<td>2</td>
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<tr>
<td><strong>TOTAL #</strong></td>
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## Estimated Funding Required

<table>
<thead>
<tr>
<th>Topic Area – Bridges</th>
<th>Estimated $$</th>
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<tr>
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<td>Decks &amp; Joints</td>
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<tr>
<td>TOTAL</td>
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</table>
Key System Preservation Issues

Overarching Issues

- Lack of standard terminology & definitions for preservation
- Lack of reliable, useable data on:
  - Degree of preservation achieved by treatment
  - Costs of treatments
- What factors and what values of these factors should trigger application of preservation treatments
- Effectiveness of preservation treatments
Key System Preservation Issues

Overarching Issues

- How to account for preservation in decision-making processes, e.g., management systems
- Proof of benefits to present to upper management and legislatures
- Securing funding for dedicated preservation programs
Key Bridge Preservation Issues

- **Concrete Decks & Joints**
  - Effectiveness of thin overlays & sealers
  - Overall best practices
  - Recommended practice for waterproof joints

- **Superstructures**
  - Evaluation & Cleaning of Weathering Steel
  - Long term performance of corrosion protection strategies
  - Steel prestressing strands, cables and ropes - improved inspection methodologies
  - Durability of concrete bridge elements
Key Bridge Preservation Issues

- **Substructures**
  - Delaying onset of corrosion of steel reinforcing:
  - Controlling corrosion rates
  - High performance galvanic anodes
  - Preservation of steel piles by preventing corrosion
Key Bridge Preservation Issues

- **Asset Management**
  - Uniform terminology & definitions
  - Standard method for computing RSL
  - New CoRe elements reflecting preservation treatments
  - Better models for direct & indirect costs
  - Models for early stage deterioration & preservation

- **Selection & Performance**
  - Uniform terminology & definitions
  - Lessons learned from performance evaluations applied to design and construction processes
  - Documenting performance of preservation actions
Developing the Roadmap

Prioritization Process

- Statements reviewed by all workshop participants
- Rated A, B, or C
  - A = Very important
  - B = Important
  - C = Of little importance
- Ranked within each category, 1 thru n (1 = the proposal the participant would fund as the highest priority within the category; 2 = second highest priority, etc.)
- Ranked highest priority statement from each of the six categories 1 to 6,
The Roadmap

- Introduction
- Background
- Project Process
- White Papers
- Needs Statements
- Results of Ranking
- Conclusions
Next Steps

- FHWA Publish Transportation System Preservation Roadmap
  DONE
- Present to Appropriate Groups at
  - FHWA
  - AASHTO – SCOBS vote on ballot resolution
  - NCHRP
  - State DOTs
  - Industry
- Get Support and $$$