Bridge & Pavement Preservation Research Roadmap

National Center for Pavement Preservation
Michigan State University

Briefing for AASHTO SCOM
July 2015
2008 TSP2 Research Roadmap

2008 Research Needs Statements

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Bridge</td>
<td>25</td>
</tr>
<tr>
<td>Pavements</td>
<td>43</td>
</tr>
</tbody>
</table>
## Bridge Problem Statements

<table>
<thead>
<tr>
<th>Bridge Topic Areas</th>
<th># of Needs Statements</th>
<th>Statement Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset Management</td>
<td>7</td>
<td>Title</td>
</tr>
<tr>
<td>Decks &amp; Joints</td>
<td>4</td>
<td>Background</td>
</tr>
<tr>
<td>Superstructures</td>
<td>5</td>
<td>Objective</td>
</tr>
<tr>
<td>Substructures</td>
<td>5</td>
<td>Tasks</td>
</tr>
<tr>
<td>Performance of Strategies &amp; Treatments</td>
<td>2</td>
<td>Deliverables</td>
</tr>
<tr>
<td>Project Selection</td>
<td>2</td>
<td>Estimated Cost</td>
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<td></td>
<td></td>
<td>Expected Duration</td>
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</tbody>
</table>

[Image of the table]
TSP Research Roadmap

The FHWA in partnership with the American Association of State Highway Transportation Officials (AASHTO) and the preservation industry, have sponsored a study to delineate the most critical knowledge gaps in pavement and bridge preservation and the research which is necessary to fill those gaps. This Transportation System Preservation (TSP) Research, Development, and Implementation Roadmap is the output of that partnership effort, and was compiled using input received during three (3) regional workshops conducted in 2007.

Working together with preservation practitioners from state, provincial, and local transportation agencies; industry, academia, and the FHWA, this effort has resulted in the development of a broad array of pavement and bridge preservation research needs statements which comprise the "TSP Research Roadmap," now available for download below.

(Note: For detailed research needs statements, please refer to the Roadmap report's appendices.)

The TSP Research Roadmap - Updated January 2008

- TSP Research Roadmap - Brochure
- Cover Letter from the FHWA Associate Administrator for Infrastructure
- TSP Research Roadmap - Executive Summary
- TSP Research Roadmap Report
  - Complete Report
  - Report Only (without appendices)
  - Appendices Only
Fast Forward a Few years

• More people get actively involved
  – AASHTO SCOM Bridge TWG
  – TRB AHD 37 Bridge Preservation Committee
  – The 4 Bridge Preservation Partnerships
  – The BPETG
  – Industry assumes a strong role

• New issues arise
• New materials, methods, etc. are developed, and of course,
• Research continues to be pursued.
Objectives

• Identify and document the details of ongoing and recently completed research in bridge and pavement preservation
• Create an online database that contains the key information as well as links to any completed reports
• Allow users to search as well as contribute updates to the database; then with all that information in hand,
Objectives

- Examine to what degree, if any, that current research efforts are helping meet the objectives included in the 2008 roadmap problem statements, and having done this,

- Gain a fresh perspective on preservation research needs
The National Center for Pavement Preservation (NCPP) was established by Michigan State University and FP2, Inc. to lead collaborative efforts among government, industry, and academia in the advancement of pavement preservation by advancing and improving pavement preservation practices through education, research and outreach.
In 2008, the FHWA, AASHTO, and the highway preservation industries, documented a study delineating the most critical knowledge gaps in pavement and bridge preservation and the research necessary to fill those gaps. This Research Roadmap database identifies and documents completed and ongoing R&D projects in the area of bridge and pavement preservation. It will allow researchers and practitioners to (a) share research findings across the nation, (b) avoid duplicate efforts, (c) integrate separate research studies to address an overall research gap, and (d) build on the existing knowledge base.

https://www.pavementpreservation.org/
TSP2 Preservation Research Database

Bridge Categories

- Asset Management
- Construction Methods
- Design
- Performance
- Substructures
- Construction
- Decks and Joints
- Materials
- Project Selection
- Superstructures

446 R&D Projects with Possible Relevance to Bridge Preservation
| SHA - MO | Project 1a: Structural Steel Coatings for Corrosion Mitigation - MS&T | In-Progress | http://utc.mst.edu/research/R233.html | Missouri Department of Transportation | 2012-04-10 | Bridge maintenance; Bridge members; Chlorides; Corrosion protection; Corrosion resistant steel; Research projects; Structural analysis; Structural steel

| SHA - MO | Project 1b: Spalling Solution of Precast - Prestressed Bridge Deck Panels | In-Progress | http://utc.mst.edu/research/R234.html | Missouri Department of Transportation | 2010-08-31 | Bridge decks; Cast in place concrete; Corrosion protection; Decoding chemicals; Fibre reinforced polymers; Missouri Precast concrete; Prestressed concrete bridges; Research projects; Spalling

| SHA - IL | Monitoring of the I-39 Kishwaukee Bridge | Complete | http://oil.illinois.edu/publications/report_files/hwsc-id-10-081.pdf | Wang, Ming | Illinois Department of Transportation | 2012-01-01 | Bridge management systems; Bridges; Maintenance; Retrofitting; Structural health monitoring

| SHA - VA | Repairs with Self Consolidating Concrete and Galvanic | In-Progress | | Virginia Department of Transportation | 2015-02-01 | Aesthetics; Bridge maintenance; Bridges; Galvanic
Comparing 2008 Problem Statements w/ Identified Studies

Of the 25 needs statements from 2008, we found:

1. Four (4) with several matching studies that make a significant contribution to meeting the objectives
2. Three (3) with several studies that made some contribution to meeting the objectives
3. Eighteen (18) with few or no studies that make any contribution to meeting the objectives
Understanding the Findings

Depending on your perspective, you could draw different conclusions about this result:

1. The problem statements did not really address high priority needs
2. The needs have not gotten to the table for further consideration and funding
3. The statements need to be rewritten and/or more tightly focused.
Adding Studies to the Roadmap Database

1. George Hearn started with Western states – identified some 50 projects from DOT websites
2. Review of database indicated that 37 were not then included
3. Currently repeating the website search in NE, MW, SE states
4. With 6 states left to search, I expect to find well over 300 studies
5. Will add non-duplicate studies to database
6. Updating the comparison 2008 problems vs. database projects
Part 1A

5 breakout groups by topic (tentative)

Decks        Joints       Super      Sub     Asset Management

Review, discuss, evaluate/score the 2008 statements* for:

• Importance

• Urgency

• Quality, clarity, completeness of statement

* Relevant to group topic
Part 1B

Identify key research needs important to the NEBPP states and define (at least)

• Title
• Objective
• Deliverables
Part 2

Convene in general session and share findings
Consensus on high priority needs for NE states?
Consider setting up an NEBPP research working group

Post-Meeting

Share findings with other partnerships
Conduct similar sessions in other regions
Input to research gaps
www.pavementpreservation.org/

Questions?
Search Tutorial

This is a tutorial on how to use the full featured search engine on the Research Roadmap Database.

After opening the database view as shown below there are two main features that will be covered. The search and filter options.

Search

After clicking on the search button there will be a two new rows added to each column. These are the search parameters that a user can use to find a desired document.
Matching Research Studies & Assessing Contribution

1. Used selected key words to match 2008 needs statements with study abstracts and key words
2. Created one or more criteria to assess level of contribution by each study to the needs statement objectives
3. Scored each study for each relevant criteria

<table>
<thead>
<tr>
<th>Criterion Compliance</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>Some</td>
<td>1</td>
</tr>
<tr>
<td>Moderate</td>
<td>2</td>
</tr>
<tr>
<td>Substantial</td>
<td>3</td>
</tr>
<tr>
<td>Virtual</td>
<td>4</td>
</tr>
<tr>
<td>Full</td>
<td>5</td>
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</table>
Current Activity

1. Matching research studies with 2008 needs statements
2. Assessing the contribution of matching studies to the 2008 research objectives
3. Assessing the degree to which the 2008 research objectives have been met
Literature Search

• Literature Review Sources
  – TRID Database
  – TRB Research in Progress (RIP) Database
  – Transportation Research Record (TRR) Journals
  – NCHRP/TCRP Reports

• Findings – 446 R&D projects with some possible relevance to bridge preservation topics

• Breaking News – 300 +/- projects added from State DOT websites
Preliminary Findings

1. Best Practices for Preserving Bridge Decks
2. Determine the Recommended Practice and the Life-Cycle Cost Savings for Using Thin Overlays to Preserve Concrete Bridge Decks
3. Determine the Recommended Practice and the Life-Cycle Cost Savings for Using Sealers to Preserve Concrete Bridge Decks
4. Performance Assessment of Existing Concrete Structure Corrosion Prevention/Mitigation