Long-Term Bridge Performance (LTBP) Program Update

LTBP Workshop
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2014 TRB Annual Meeting, Washington, DC

Sue Lane, P.E.
Development and Outreach Engineer
Long-Term Bridge Performance Program
Federal Highway Administration

Hamid Ghasemi, Ph.D.
Team Leader & Program Manager
Federal Highway Administration

Robert Zobel, Ph.D., P.E.
Technical and Development Engineer
Federal Highway Administration

Tom Saad, P.E.
Federal Highway Administration
Presentation Outline

• News and Milestones
• Meetings with the States
• Publications
• Timelines of Bridge Practices
Presentation Outline

- News and Milestones
  - Data Collection in Mid-Atlantic Clusters
  - IDIQ Contract
  - LTBP Strategic Bridge Performance Matrix
LTBP Cluster States

Mid-Atlantic Data Collection

Northeast: CT, MA, ME, NH, NY, RI, VT
Mid-Atlantic: DC, DE, MD, NJ, PA, VA, WV
Mixed Humid (Country Music): IN, KY, OH, TN, NC
Mid West (Central): IA, IL, MI, MN, WI
Gulf Coast: AL, AR, FL, LA, MS, TX
Rocky Mountains: CO, ID, MT, NE, SD, UT, WY
NW-SW: AZ, CA, NV, OR, WA
Corridor: GA, KS, OK, MO, ND, NM, SC (states not included in other clusters)
## Mid-Atlantic Cluster Bridges

### Untreated/Bare Cast-In-Place Concrete Deck

<table>
<thead>
<tr>
<th>State</th>
<th>Steel Multi-Girder, Bare Deck</th>
<th>PS Concrete, Bare Deck</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delaware</td>
<td>3</td>
<td>2*</td>
<td>5</td>
</tr>
<tr>
<td>Maryland</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>New Jersey</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>2</td>
<td>3*</td>
<td>5</td>
</tr>
<tr>
<td>Virginia</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>West Virginia</td>
<td>1</td>
<td>1*</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12</strong></td>
<td><strong>12</strong>*</td>
<td><strong>24</strong></td>
</tr>
</tbody>
</table>

*Several factors require the new selection of 3 Prestressed Concrete Multi-girder bridges:

- Construction on I-95 prevented access (DE)
- Current rehab includes LMC overlay (PA)
- Original construction included an LMC overlay (WV)
Long-Term Data Collection

Mid-Atlantic States:

- Steel Multi-Girder with Untreated Deck Bridge Cluster
- Prestressed Concrete MG with Untreated Deck Cluster
- Conducted by Rutgers University with Assistance from DE, MD, NJ, PA, VA, and WV DOTs/SHA.
- Visual Inspection of Decks, Bearings, Joints; NDE for Decks
- 24 Bridges Total to Date
  - 12 From Steel Bridge Cluster
  - 9 From Prestressed Concrete Cluster
  - 3 Prestressed Concrete Not Suitable Due to Unknown Conditions at Time of Selection—Selection of 3 Replacement Bridges is Ongoing
- Status: Began March 2013—21 Completed to Date
FHWA in collaboration with Rutgers University envisioned, planned, designed, and constructed a novel (robotic) system, by integrating multiple non-destructive evaluation (NDE) technologies, for condition assessment of concrete bridge decks. RABIT™ – Robotic Assisted Bridge Inspection Tool.
RABIT™ COMPONENTS

- Two GPS Antennas
- High-Resolution Imaging
- Two Cameras
- Two GPR Arrays
- Two Acoustic Arrays
- USW (Modulus)
- IE (Delamination)
- Four Resistivity (Wenner) Probes
- Panoramic (360 degree) Camera with Mirror
- Laser Scanners for Obstacle Avoidance
- Water Tanks for Resistivity
IDIQ Contract

• Performance Management of Bridges Indefinite Delivery Indefinite Quantity (IDIQ) Contract
• Used in Support of the LTBP Program
• 4 contractors were selected
  ➢ Michael Baker Jr., Inc.
  ➢ Parsons Brinckerhoff, Inc.
  ➢ Pennoni Associates, Inc.
  ➢ Professional Service Industries, Inc. (PSI)
IDIQ Contract - Pennoni Associates

- Onsite Staff for Technical Assistance
  - Outreach/presentations/meetings/publication/webinar/website
- Development, Validation, and Maintenance of Protocols
- Validation of NDE Tools and the RABIT™
- Develop Quantitative Bridge Traffic Database
  - Funds from SAFETEA-LU Earmark
  - Pooled-Funds for Study TPF-5(283)
- Develop Accelerated Testing Database (SAFETEA-LU Earmark)
- Data-Driven Bridge Condition Index (IRT)
- QA/QC
LTBP Strategic Bridge Performance Matrix

- Developing LTBP Strategic Bridge Performance Matrix in Conjunction with Rutgers
- Replaces “Tablecloth”
- Also Developing an “Operational Matrix”
Presentation Outline

• News and Milestones
• Meetings with the States
State Coordinators

- August 28-29, 2013—Held Annual Meeting of LTBP State Coordinators
  - Showcased the RABIT™ Bridge Deck Assessment Tool in the Hotel
Meetings with States - Status Update

- Met with 38 States (incl. DC) to Date; 14 Remaining
- FHWA Division Bridge Engineers Attended
- Two-Way Conversation:
  - LTBP Objectives and Summary
  - What Are State’s Key Bridge Issues?
  - Create DOT’s Bridge Practices Timeline
  - Discuss Specific Candidate Bridges
On-Site Meeting Dates

Northeast: CT, MA, ME, NH, NY, RI, VT
Mid-Atlantic: DC, DE, MD, NJ, PA, VA, WV
East Central: IN, KY, OH, TN, NC
Mid West (Central): IA, IL, MI, MN, WI
Gulf Coast: AL, AR, FL, LA, MS, TX
Rocky Mountains: CO, ID, MT, NE, SD, UT, WY
NW: OR, WA
SW: AZ, CA, NV
Corridor: GA, KS, OK, MO, ND, NM, SC

States on-site meetings to be scheduled

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LTBP Products - Publications

Recently Published Documents:

- Robot Brochure
- Report: *FHWA LTBP Workshop to Identify Bridge Substructure Performance Issues (NTIS Only)*
- TechBrief: *FHWA LTBP Workshop to Identify Bridge Substructure Performance Issues (Web and Print)*
- Newsletter: 2 Issues
LTBP Products - Publications

Documents Due Out In Next 6 Months:

- **Report:** *LTBP Bridge Performance Primer*
- **TechBriefs:**
  - *LTBP Bridge Performance Primer*
  - *FHWA LTBP Industry Day*
  - *LTBP High Priority Bridge Performance Issues*
- **Newsletters:**
  - *Issue #3*
  - *Issue #4*
Protocols—Identification and Publishing

- Needed for Consistent Data Collection
- 115 Identified or Written to Date
- Protocols = Living Documents
- Publish New Report Every 2 Years
- Publish Interim on Web Between Reports
- Encourage State DOTs & Academia to Use
Presentation Outline

• News and Milestones
• Meetings with the States
• Publications
• Timelines of Bridge Practices
Bridge Practices Timeline
(LTBP Low-Hanging Fruit)

Creating National Bridge Practices Timelines:
Standalone Reports (1960 to Present)

- Met with **Steel Industry**
  - Changes in Composition of Steel
  - Changes in Coatings/Paint for Steel Bridges
  - Changes in Steel Bridge Detail
Bridge Practices Timeline
(LTBP Low-Hanging Fruit)

Creating National Bridge Practices Timelines:
Standalone Reports (1960 to Present)

• Met with Concrete Industry
  - Changes in Mix Components—Cement, Cementitous Materials, and Additives
  - Changes in Coatings/Types of Rebar
  - Changes in Concrete Bridge Details—Ex: Curing
Bridge Practices Timeline
(LTBP Low-Hanging Fruit)

Creating National Bridge Practices Timelines:
Standalone Reports (1960 to Present)

• Working with Each State
  ➢ When Did State Adopt/Change Steel and Concrete Bridge Practices?
  ➢ How and When Have Deck Practices Changed?
  ➢ When Did State Use Overlay Types?
  ➢ When Did State Use Different Types of Bearings and Deck Joints?
Georgia DOT Deck Cover

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Cover Thickness</th>
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<tbody>
<tr>
<td>Pre 1970</td>
<td>2”</td>
</tr>
<tr>
<td>1970-1985</td>
<td>2 ½” – Northern Half</td>
</tr>
<tr>
<td></td>
<td>2” – Southern Half</td>
</tr>
<tr>
<td>1985-Present</td>
<td>*2 ¾” – Northern Half</td>
</tr>
<tr>
<td></td>
<td>*2 ¼” – Southern Half</td>
</tr>
</tbody>
</table>

* ¼” added to facilitate deck grinding and grooving
Thank You! Questions?