Guidelines for Historic Bridge Rehabilitation and Replacement

NCHRP Project 25-25/Task 19

May 21, 2008

Historic Bridge Guidelines
Historic Bridge Rehabilitation and Replacement - NCHRP Project

- Prepared by Lichtenstein Consulting Engineers, Inc., and
- Parsons Brinckerhoff Quade & Douglas, Inc.
- March 2007
Project Objective

To develop guidelines for:

- Determining conditions when historic rehabilitation is prudent and feasible
- Using engineering and environmental data and judgments for historic bridges
- Upgrading historic bridges to current design and safety requirements
- Assessing effect of remedial actions on historic significance
Why Preserve Historic Bridges?

- National Historic Preservation Act of 1966
- Section 4f, US DOT Act of 1966
- SCOE Directed This Study be done to attempt to establish nationally applicable guidelines that is balanced and consistent
- Many states have excellent practices, but few have standard written protocols

May 21, 2008

Historic Bridge Guidelines
Preserve or Replace?

4 Step Evaluation

1. Understand what makes it historic
   - Is the bridge of average or high historic value?
   - Can members be changed without adversely affecting historic significance?

2. Applying Structural and Functional Considerations
   - Analysis of structural condition and waterway adequacy to determine potential for rehabilitation
   - Load capacity analysis
   - Analysis of geometry and safety features
Preserve or Replace?
4 Step Evaluation

- 3. Historic and Environmental Considerations
  - Assess common issues.
  - Approaches for addressing issues

- 4. Applying Decision Making Thresholds
  - Define feasible and prudent
  - Apply thresholds based on combinations of the 3 basic types of adequacy: Load capacity, Condition, Geometry
# Rehab/Replacement Thresholds based on Adequacy Types

<table>
<thead>
<tr>
<th>NBI Ratings = 3 or 4</th>
<th>Load-Carrying Capacity</th>
<th>Geometry</th>
<th>Rehabilitation Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity ≥ design requirements <strong>or</strong> Capacity sufficient to meet acceptable lower design requirements</td>
<td>Bridge can be widened <strong>or</strong> Approach deficiencies can be improved without destroying what makes bridge significant</td>
<td>Bridge may have potential</td>
<td></td>
</tr>
<tr>
<td>Bridge roadway width equal to approaches but does not meet design requirements <strong>or</strong> No site specific safety problems</td>
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<tr>
<td>Bridge has no ability to be widened or substandard geometry cannot be improved <strong>or</strong> Bridge is too narrow for current use, has inadequate approach geometry and cannot be improved in cost effective manner <strong>or</strong> Bridge cannot be made adequate without destroying what makes bridge significant</td>
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<tr>
<td>Capacity &lt; design requirements but able to meet a lower capacity requirement in a cost effective manner</td>
<td>Bridge can be widened <strong>or</strong> Approach deficiencies can be improved without destroying what makes bridge significant</td>
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<td>Bridge can be widened <strong>or</strong> Approach deficiencies can be improved without destroying what makes bridge significant</td>
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2b. Rehabilitation potential for structures with NBI Ratings = 3 or 4.
Next Steps

- NCHRP Publish Historic Bridge Guidelines **DONE**
- Present to Appropriate Groups at
  - FHWA
  - AASHTO – SCOBS vote on Ballot Resolution
  - State DOT’s
- States implement Guidelines by incorporating into Design Guidelines