National Historic Covered Bridge Preservation Program

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Federal Highway Administration
Covered Bridges

- Most covered bridges built between 1800 - 1930
- An estimated 14,000 covered bridges existed around 1850
- Locally available wood species
- No wood preservative treatments used
• Only ~880 remain today
• Majority are in 6 states
  • Pennsylvania - 227
  • Indiana – 93
  • Ohio – 143
  • Vermont – 100
  • New Hampshire – 57
  • Oregon 51

Historic Preservation Effort - Legislation

- **All structures**
  - Historic Sites Act of 1935
  - National Historic Preservation Act of 1966
  - Surface Transportation & Uniform Relocation Assistance Act of 1987

- **Covered Bridges**
  - Transportation Equity Act for the 21st Century (TEA-21)
  - Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA-LU)
  - **NHCBP Program**
    - Preservation, rehabilitation, or restoration of historic covered bridges
      - Bridges must be on the National Register of Historic Places or be eligible
    - Research, education & technology transfer
### TEA-21 & SAFETEA-LU Funding Level

#### National Historic Covered Bridge Preservation Program
Funding Levels 1999 thru 2009

<table>
<thead>
<tr>
<th>Year</th>
<th>99</th>
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<th>01</th>
<th>02</th>
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<tr>
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<td>$923K</td>
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* Original appropriation of $10 million per year
Restoration Projects

FHWA website [www.fhwa.dot.gov/bridge/covered.cfm](http://www.fhwa.dot.gov/bridge/covered.cfm)
Clarkson/Legg Covered Bridge – Cullman County, Alabama

- Town Lattice Truss
- Built – 1902
- 270’ – two span
- 2nd longest in the South
- Used as a pedestrian bridge
- Reduce creep with prestressing tendons
Hills Covered Bridge - Washington County, Ohio

- Howe Truss
- Built – 1878
- Spans - 3
  - 30’ approaches
  - 112’ main
- Pedestrian traffic
Overview – RD&T Program

- TEA-21 Program – Emphasis Areas
  - Repair, strengthening, and treatment methods
  - Historic documentation
  - Educational videos and manuals
  - Workshops and seminars
Covered Bridge Manual

- An all inclusive manual on inspection, repair, rehabilitation & restoration
- Engineer’s Manual of Practice
- Online version –
  - www.tfhrc.gov/structur/pubs/04098/index.htm
Strengthening Historic Covered Bridges to Carry Modern Traffic

- Develop means & methodologies to strengthen without compromising historic fabric of the structure
Documentation for the Historic American Engineering Record

- Most historically significant bridges in the US
- Inclusion into the Historic American Engineering Record, Library of Congress
- Level I documentation
  - Interpretive drawings
  - Large-format photographs
  - Written historical reports
- Availability
  - Library of Congress
Covered Bridge

Hansman Bridge Cut-Away

Not to Scale

Eldean Bridge

Pine Bluff Bridge

Pine Grove Bridge

Longitudinal Section A-A

Reflected Deck Plan

Reflected Roof Plan
SAFETEA-LU RD&T Program

- Working with the National Park Service – Historic American Engineering Record
- Working with the Forest Service – Forest Products Laboratory
  - Multiple studies over a 5 year period
Overview – RD&T Program

- **Emphasis – (Same)**
  - Repair, strengthening, and treatment methods
  - Historic documentation
  - Educational videos and manuals
  - Workshops and seminars
Project Descriptions

• Research Studies
  – HAER Covered Bridge Documentation
    • 8-10 bridges documented with measured drawings, historical reports and large format photographs.
  – Covered Bridge Rating Through Load Testing
    • Develop and establish procedures by physical testing & analytical evaluation
  – Development of Lightweight Floor Replacement Systems
    • Report on the types of systems commonly used and provide recommendations on a new lightweight replacement system
  – Improved Analytical Techniques for Historic Covered Bridges
    • Based on behavioral information develop analytical techniques to determine load carrying capacity for loading rating these bridges
Project Descriptions

• Research Studies (Cont)
  – Corrosion of Fasteners in Wood Treated with Newer Wood Preservatives
    • Research nonmetallic and/or non corrosive fasteners
  – Covered Bridges – Development of Rehabilitation Techniques to Restore Structural Integrity of Members
    • Develop and test various repair techniques to support rehabilitation, restoration and replacement decisions
  – Howe Truss Bridges Design and Performance
    • Determine behavior through testing and develop calibrated models on design and behavior of Howe truss bridges
Project Descriptions

• Research Studies (Cont)
  – Determination of Residual Capacity of Structural Wood Members in Historic Covered Bridges
    • Relating inspection information to material properties, refine single member and connection analysis procedures to determine capacity for rating covered bridges
  – Use of Laser Scanning Technology to obtain As-Built Records
    • Complement the HAER Level I documentation by assessing the feasibility of using laser scanning technology
  – Species Identification and Field-Grading
    • Field manual for species and grade identification
Project Descriptions

• Research Studies (Cont.)
  – Development of Best Practices Guide on Security of Historic Covered Bridges
    • Guide on cost-effective systems for protection against vandalism
  – Use of Embedded Sensors to Measure In-Situ Wood Moisture of Load-Carrying Members
    • Identification or development of suitable sensors and web-based monitoring to detect decay at critical locations
  – Evaluating Naturally Durable Wood Species for Repair and Rehabilitation of Above Ground Components in Covered Bridges
    • Recommendations for use and application of naturally durable woods as replacement components in covered bridges
Project Descriptions

• Education & Technology Transfer Activities
  – Steering Committee Meeting
    • One time focus group meeting by HAER to redefine goals and discuss projects in the proposal
  – Wood Preservative Treatment Guide for Historic Covered Bridges
    • Review outcomes of previous projects and develop a how-to guide
  – Covered Bridges Context Study/National Historic Landmark (NHL) Nomination
    • Conduct context study to assess national significance as a first step in the development of NHL nominations for the historic properties designation
Project Descriptions

• Education & Technology Transfer Activities (Cont)
  – World Guide to Covered Bridges Database/GIS/Website
    • Update the World Guide and develop an interactive geo-referenced and updatable website
  – Preservation Guidelines
    • *Standards for the Treatment of Historic Covered Bridges and Illustrated Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Bridges* similar to the Secretary of Interior’s standards for treatment of historic properties.
Project Descriptions

• Education & Technology Transfer Activities (Cont)
  – 2nd Covered Bridges Best Practices Conference
  – HAER Book on Covered Bridges
    • Illustrated history book on covered bridges for the informed lay person
  – Review and publication of existing reports
    • Spanning Time - America’s Covered Bridges (DVD)
    • Development of an Educational Guide on the History of Covered Bridges in the United States
Summary

• Preservation/Restoration
  – To date, 147 covered bridges in 22 states have been funded for preservation, restoration or rehabilitation

• RD&T
  – A number of projects completed
  – Historic structure documentation work continues
  – Additional research projects being initiated
Thank you