



National Historic Covered Bridge Preservation Program

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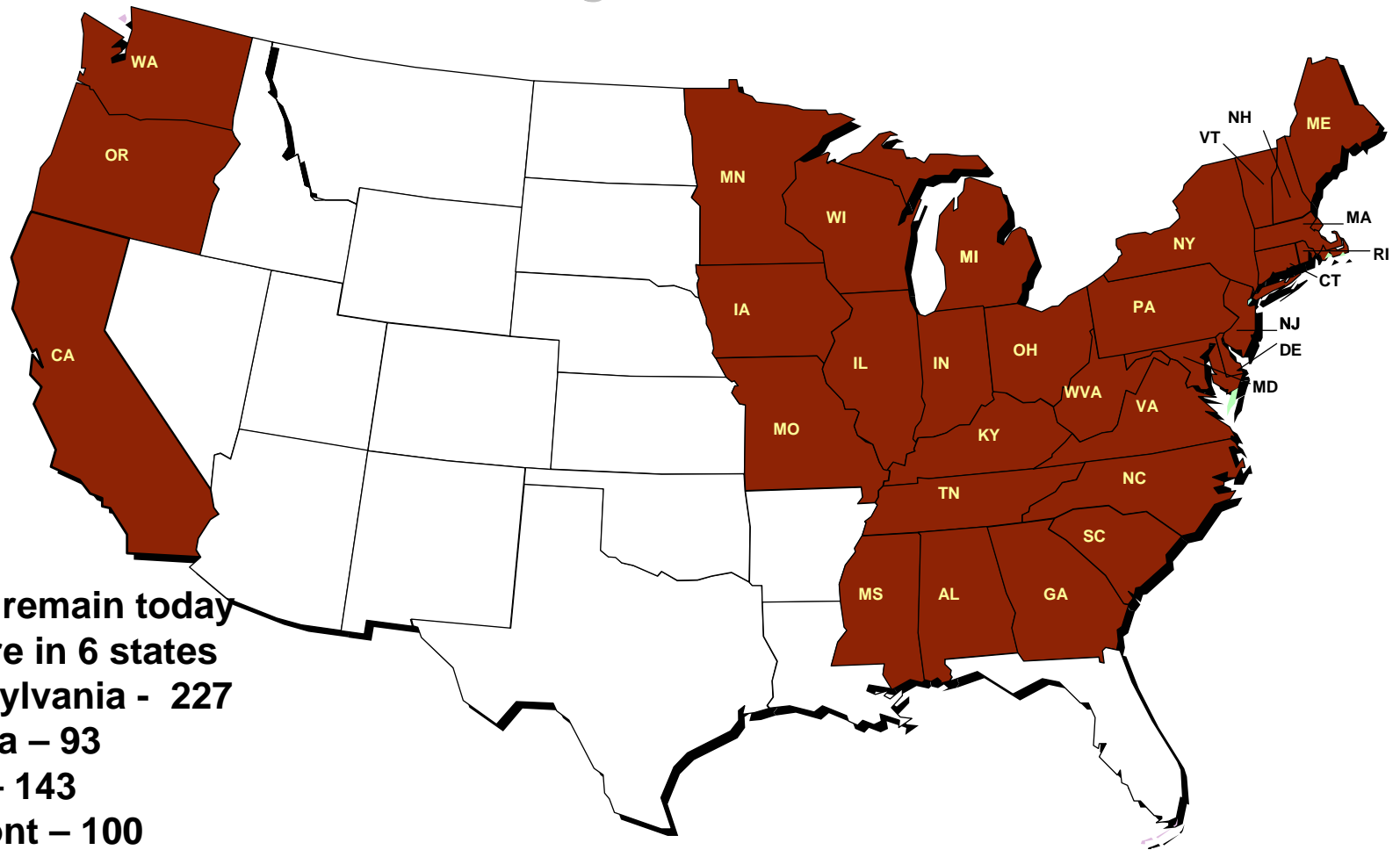
Covered Bridges

- 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





Covered Bridges in the US



- Only ~880 remain today
- Majority are in 6 states
 - Pennsylvania - 227
 - Indiana – 93
 - Ohio – 143
 - Vermont – 100
 - Hew Hampshire – 57
 - Oregon 51

Source: World Guide to Covered Bridges, 1989





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											
Year	99	2000	01	02	03	04	05	06	07	08	09
Available Funds (millions)	0	\$8	\$9.978	\$2.8	\$5.961	0	0	\$8.6	\$9.66	\$9.23	?
Preservation (millions)	0	\$7	\$9.049	\$2.8	\$5.608	0	0	\$8.6	\$8.74	\$8.31	?
RD&T	0	\$1M	\$929K	0	\$352K	0	0	0	\$921K	\$923K	?

* Original appropriation of \$10 million per year





Restoration Projects

FHWA website 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



Historic American Covered Bridges





Hills Covered Bridge - Washington County, Ohio



- Howe Truss
- Built – 1878
- Spans - 3
 - 30' approaches
 - 112' main
- Pedestrian traffic





Overview – RD&T Program

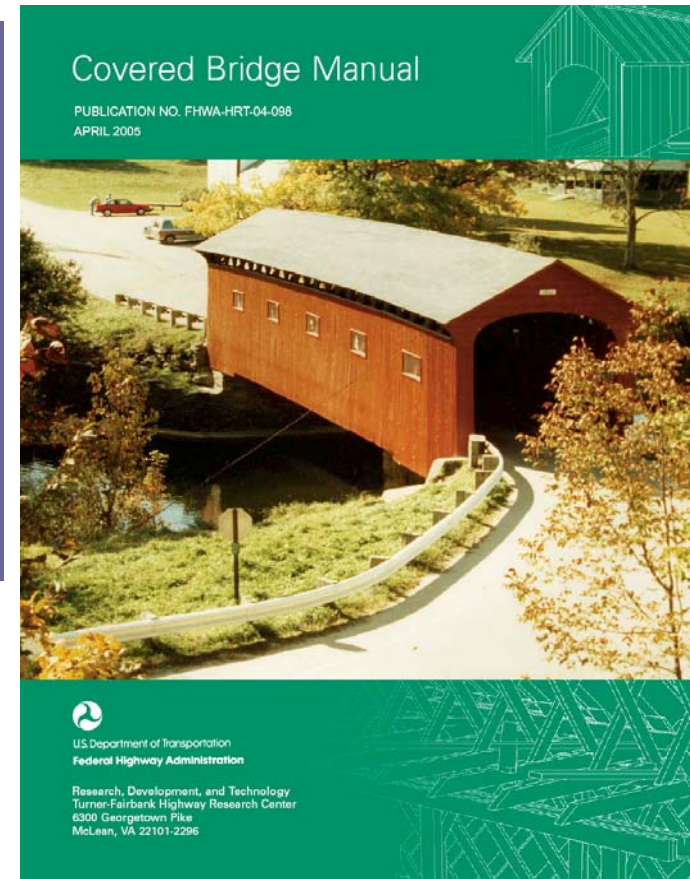
- TEA-21 Program – Emphasis Areas
 - Repair, strengthening, and treatment methods
 - Historic documentation
 - Educational videos and manuals
 - Workshops and seminars





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



Medora Covered Bridge, Indiana



State Sanatorium CB, Indiana

- Develop means & methodologies to strengthen without compromising historic fabric of the structure
- Online version – www.tfhrc.gov/structur/pubs/07041/index.htm
- Complete report – www.ntis.gov (NTIS Accession number PB2007-103714)

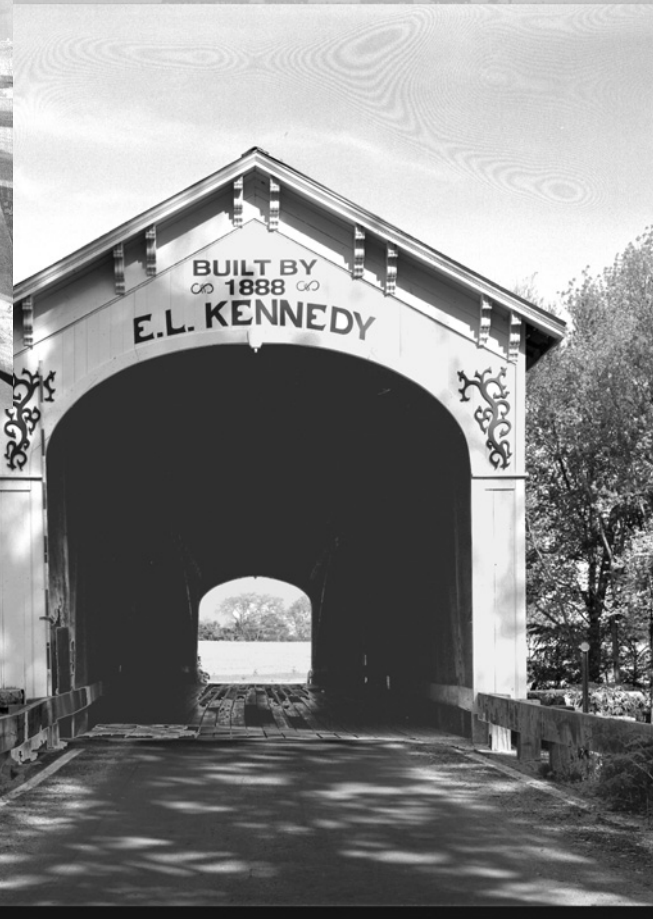
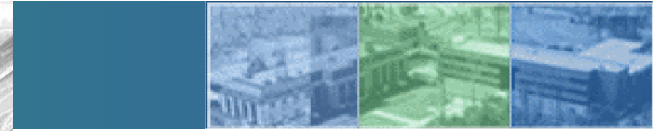




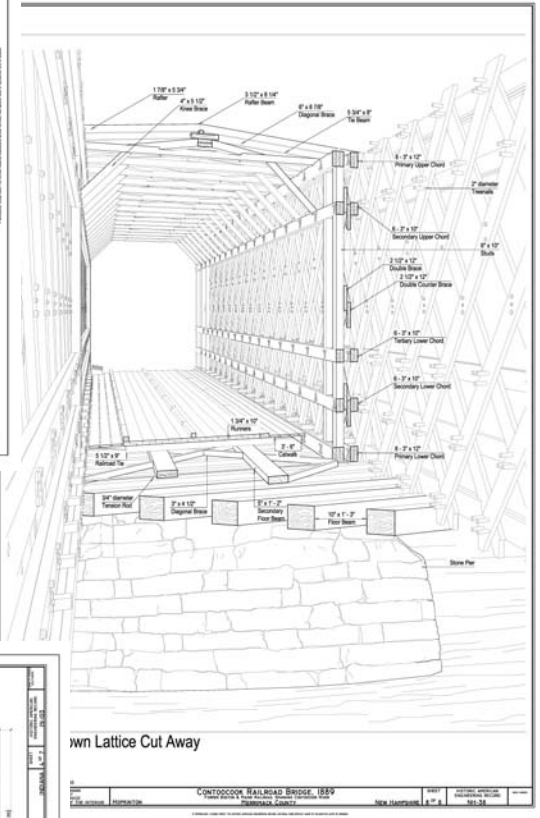
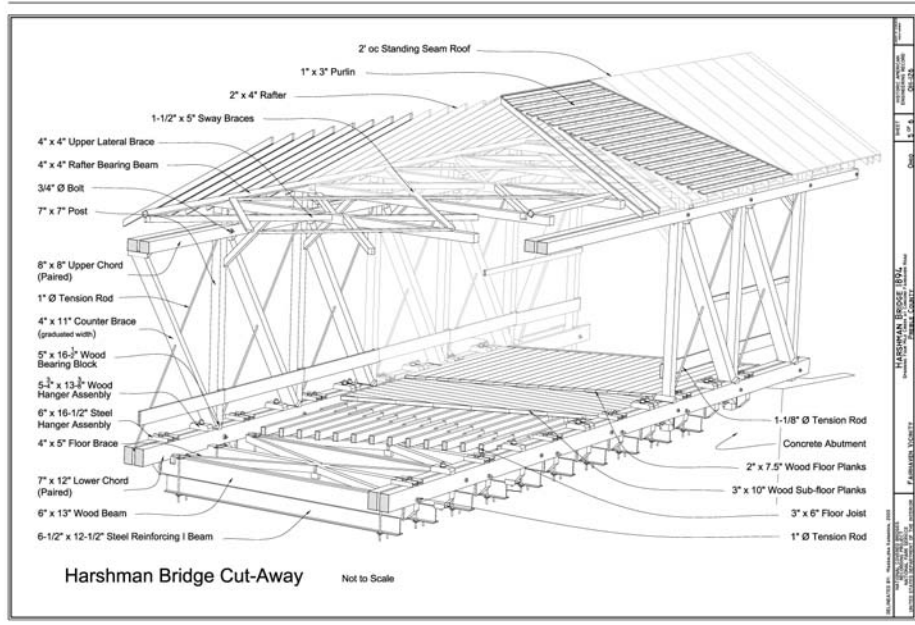
Documentation for the Historic American Engineering Record

- 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





U.S. Department of Transportation
Federal Highway Administration



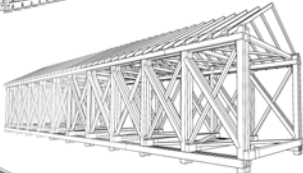
Covered Brid



Upper Cold River Road
Rutland County, Vermont
HAER # VT-28

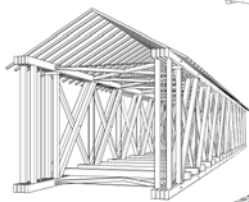
Eldean Bridge

(Allen's Mill Bridge)
Long Truss, 1900
Built by John & William Hamilton
Spanning Great Miami River
Eldean Road
Miami County, Ohio
HAER # OH-122



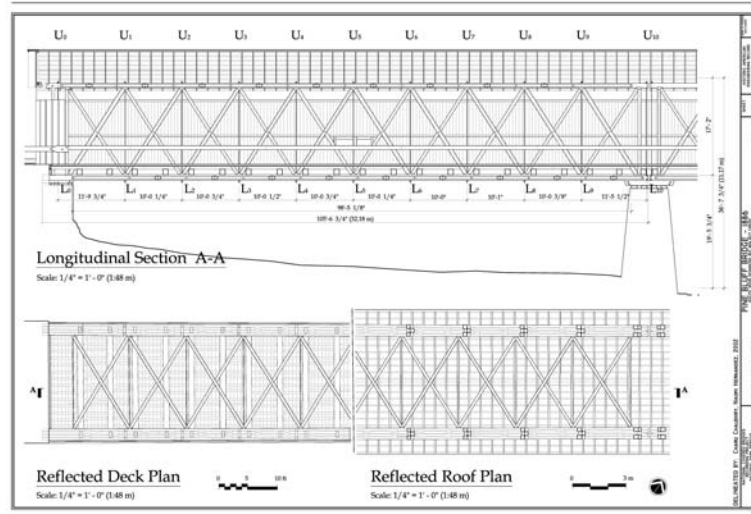
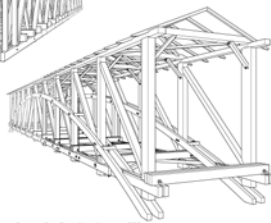
Pine Bluff Bridge

Howe Truss, 1890
Built by Joseph A. Britton
Spanning Big Walnut Creek
Route 9002
Putnam County, Indiana
HAER # IN-103



Pine Grove Bridge

Burr Arch, 1884
Built by Eben McMillen
Spanning Oketoake Creek
Forge Road / Ashville Road
Chester and Lancaster County, VA
HAER # VA-286





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



TURNER-FAIRBANK HIGHWAY RESEARCH CENTER



Thank you



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