TBIRC
Timber Bridge Information Resource Center

CROSSINGS

Editor Tinathan Royce *Issue 1* *August 1990*

The Timber Bridge Initiative

With over 40 percent of the nation's bridges in need of repair or replacement, a significant opportunity exists in the United States to improve and revitalize rural economies by using wood for bridge construction.

Technological advances in the treatment, preservation, and design of wood make the timber bridge an economical, safe and attractive alternative to steel and concrete. To address this opportunity, the United States Congress funded $3.35 million for the Timber Bridge Initiative beginning in fiscal year 1989. The same amount was provided for in 1990.

The primary direction of the Timber Bridge Initiative is to diversify local economies by improving rural transportation networks, expanding the range of markets for wood products, and creating service industries for wood bridge construction.

In 41 states demonstration bridges have proven very effective in creating awareness of viable alternatives to concrete and steel construction while stimulating local industry. In 1989, 80 bridges in 30 states were approved for construction using a combination of Federal and private funds. In 1990, 48 more bridges in 11 additional states have been approved for construction.

In addition to the Demonstration Bridges, timber bridges are also being emphasized on

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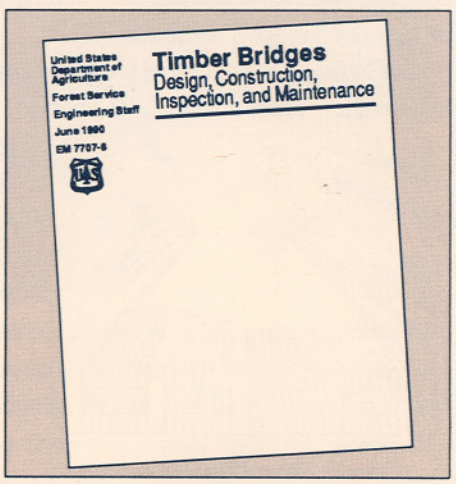
Timber Bridge Manual

Responding to the needs of bridge engineers and governmental decision-makers for up-to-date information on modern timber bridge construction, the USDA Forest Service has prepared and published a manual entitled Timber Bridges—Design, Construction, Inspection and Maintenance. This manual provides a comprehensive central source for timber bridge information, either directly or by reference to other applicable sources of information.

The manual consists of 18 chapters (approximately 1,000 pages) and makes extensive use of illustrations and examples to clearly present concepts and principles involved in using modern timber bridges. Subjects included in the manual are: timber as a bridge material and types of timber bridges; preservation and protection of timber bridges; basic timber design concepts; loads and forces on timber bridges; design of beam superstructures, longitudinal deck superstructures, and longitudinal stress-laminated deck superstructures; rail systems and wearing surfaces for timber decks; timber bridge fabrication and construction; bridge inspection for decay and other deterioration; maintenance; rehabilitation; and replacement



The primary audience for the manual is engineers. However, several chapters of the manual will be useful for non-engineers as well. To obtain your copy, contact Tinathan Royce, USDA Forest Service, P.O. Box 4360, 180 Canfield Street, Morgantown, WV, 26505 (Phone: 304-291-4905 or FTS: 923-4905)

—Michael A. Ritter
Research Engineer
Forest Products Laboratory
Madison, Wisconsin

Your University at Work

West Virginia University - The Timber Bridge Initiative of 1989 and 1990 have given West Virginia University - Civil Engineering (WVU-CE) and the Appalachian Hardwood Center (AHC) an unparalleled opportunity to design and develop new timber bridge systems. To develop a finished bridge product, the research requirements range from very basic studies (such as finding timber stiffness values) to solving construction and maintenance problems. Based on designs by WVU, West Virginia Department of Highways will build 33 bridges in 1990 and an additional 11 bridges in 1991.

One of the most rewarding projects has been the development of innovative timber systems. Dr. Hota GangaRao, Barry Dickson, and Ismail Letheef have contributed to the design of stressed timber Tee-Beams (figure 1) and Box Beam (figure 2) bridges. Both types use glued laminated timber or longitudinal veneer lumber (LVL) as the main load carrying members in composite action with solid sawn lumber. These designs are performing well in supporting traffic on West Virginia highways.

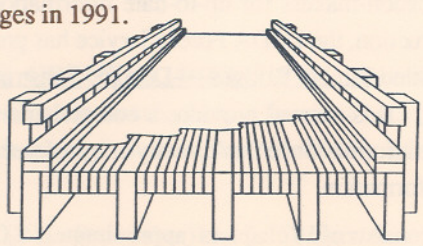


Figure 1: Stressed Timber Tee Section

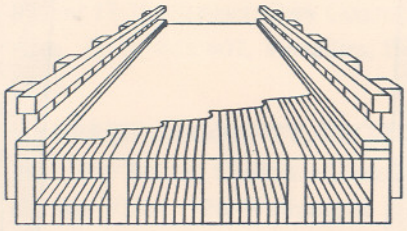


Figure 2: Stressed Timber Box Section

Timber systems development is only one of 15 funded projects in progress or recently completed at WVU. The AHC has projects ongoing in the areas of preservative effects on timber strength and timber bridge costs, to name only two. At WVU-CE, projects include monitoring of in-service bridge performance, developing new timber jointing mechanisms, timber fatigue studies, and the use of various timber species for bridge application.

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New Publication and Future Direction

Welcome to the first issue of Crossings. This quarterly publication is devoted to supplying information on the status and progress of activities related to timber bridges across the nation.

Interest in timber bridges continues to grow. Several groups have been formed to channel this interest into priority activities aimed at overcoming any real or perceived hurdles to the increased acceptance of modern timber bridges by the American Association of State Highway and Transportation Officials (AASHTO). Both the National Forest Products Association's Timber Bridge Taskforce and the Federal Highway Administration's Timber Bridge Research Council have endorsed new or continued activities directed at increased acceptance.

The major directions for research and implementation include optimization of existing designs; development of new designs and use of materials; economics of timber bridge construction, maintenance, and longevity; guard rail crash testing; and performance monitoring to continue to obtain data on innovative bridges for presentation to AASHTO for expanded acceptance of modern designs.

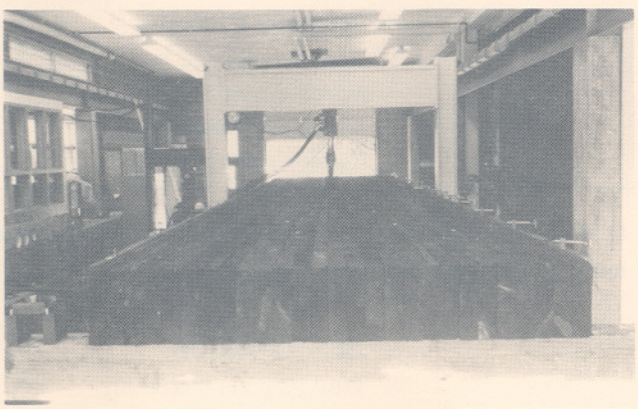
The future is bright! Interest and awareness, the number of cooperators, and the possibility of funding continue to grow. This publication is a new venture to supply information by the Timber Bridge Information Resource Center. We at the Center are continuing to develop and distribute informational and technical brochures, support conferences and workshops, and maintain computer data bases. However, a means to supply timely and ongoing information was apparent, thus the creation of this newsletter. We need your input to make Crossings as effective as possible. If you have suggestions on future articles or an expanded audience, please let us at the TBIRC know.

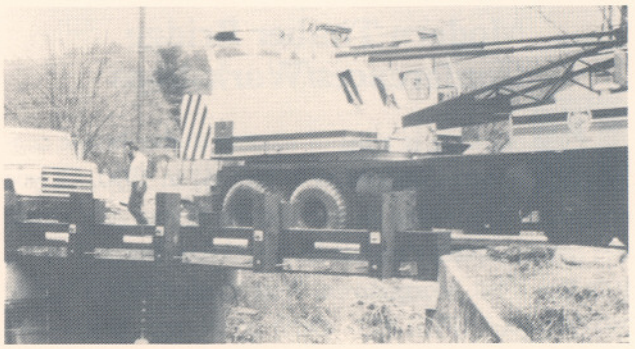
— John B. Crist
Program Manager
TBIRC
Morgantown, WV

AASHTO Status of Stress-Laminated Deck Design Criteria

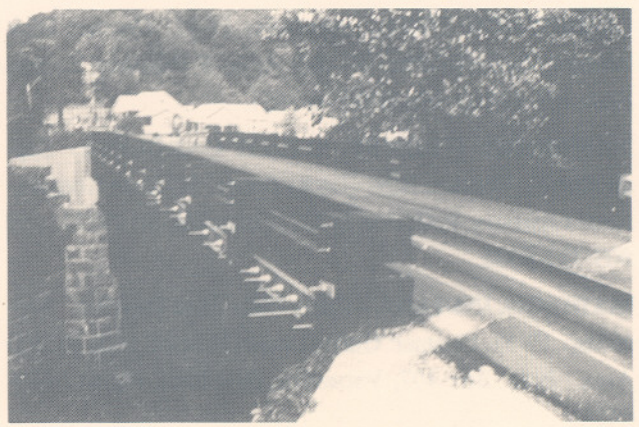
Proposed design criteria for stress-laminated wood decks were presented to the American Association of State Highway and Transportation Officials (AASHTO) Subcommittee on Bridges and Structures in May, 1990. The proposal was based on cooperative research conducted by the University of Wisconsin and the USDA Forest Service, Forest Products Laboratory, and on work previously completed by the Ministry of Transportation in Ontario, Canada. The presentation culminated a multi-year effort to seek AASHTO recognition for stress-laminated wood decks and inclusion of design criteria in the AASHTO Standard Specifications for Highway Bridges. Although numerous stress- laminated wood bridges have been built in the United States and design criteria have been included in the Ontario Highway Bridge Design Code since 1983, the system was not previously recognized in U.S.-based specifications.

The process of developing the stress-laminated wood specifications has been ongoing for several years. The first step was to develop proposed criteria based on laboratory testing, analytic modeling and the evaluation of prototype structures constructed across the United States. The proposed criteria were then submitted for consideration by the approval of the AASHTO Technical Committee for Timber Structures. Based on comments and suggestions obtained from the committee, proposed criteria were revised and presented to the full AASHTO Subcommittee on Bridges and Structures. During the AASHTO meetings, several minor revisions were made to the proposal and it was determined that the design criteria would first be published as an AASHTO Guide Specification. AGuide Specification represents the recommendations of AASHTO, but does not carry the full force of a specification.





The proposed specification has subsequently been revised, rewritten as a Guide Specification, and submitted for distribution to the AASHTO membership. Pending approval through letter balloting, the Guide Specification should be approved and published by AASHTO in the near future. As a Guide Specification, the criteria will be subject to review and revision prior to being included as a specification in the AASHTO Standard Specifications for Highway Bridges.



In addition to working on the proposed specifications for stress- laminated wood, the National Forest Products Association (NFPA) Timber Bridge Task Group, which consists of representatives from the timber industry, academia, government and private consulting firms, is currently preparing proposed revisions to the Timber Structures chapter of the AASHTO Standard Specifications for Highway Bridges. These revisions deal primarily with material requirements and design criteria for timber bridge systems that are currently recognized by AASHTO. In the future, the group will be presenting proposed design criteria for stress-laminated T and box sections, based on research work currently in progress at West Virginia University.

— Michael A. Ritter
Research Engineer
USDA Forest Products Laboratory
Madison, WI

Modern Timber Bridge Conferences/Workshops

Following is a list of modern timber bridge conferences/workshops to be held in 1990. If you need more information on a conference in your area, please feel free to contact Tinathan Royce, USDA-Forest Service, P.O. Box 4360, Morgantown, West Virginia 26505 Phone: 304-291-4905 (FTS: 923- 4905) or the appropriate conference sponsor.

AMES AND HARLAN, IOWA. August 2-3. Contact: Eldo Schornhorst, Box 66, Harlan, IA 51537. Ph: 712-755-5954.

TALLAHATCHIE COUNTY, MISSISSIPPI. August 14-15. Contact: Bob Daniels, Bost Extension Service Center, Mississippi State University, Starkeville, MS 39459. Ph: 601-325-3150.

OLEAN, NEW YORK. September 11-12. Contact: Dick Winnett, Sullivan Trail RC&D Area, 3 Pulteney Square, Bath, NY 14810. Ph: 607-776-9631.

NEWBERRY COUNTY, SOUTH CAROLINA. September 13. Contact: R.M. (Dick) Boyce, SC State Commission of Forestry, P. O. Box 21707, Columbia, SC 29221. Ph: 803-737-8800.

MADISON, INDIANA - Clifty Falls State Park Inn. September 17-18. Contact: Gary Conant, Historic Hills RC&D Area, P. O. Box 407, Versailles, IN 47042. Ph: 812-689-6456.

HABERSHAM COUNTY, GEORGIA. October 24. Contact: Jerry Boling, Chestatee-Chattahoochee RC&D Council, Rm. G-14, 126 Washington Street, Gainesville, GA 30501. Ph: 404-536-1221.

BOONE, NORTH CAROLINA. November 14-15. Contact: Joe Napoleon, Dept. of Planning and Inspection, 635B Blowing Rock Road, Boone, NC 28607. Ph: 704-262-4540.

CHANUTE, KANSAS. Week of September 26. Contact: Leonard K. Gould, Kansas State University, Dept. of Forestry, 2610 Claflin Road, Manhattan, KS 66502-2798. Ph: 913-537-7050.

The Timber Bridge Initiative

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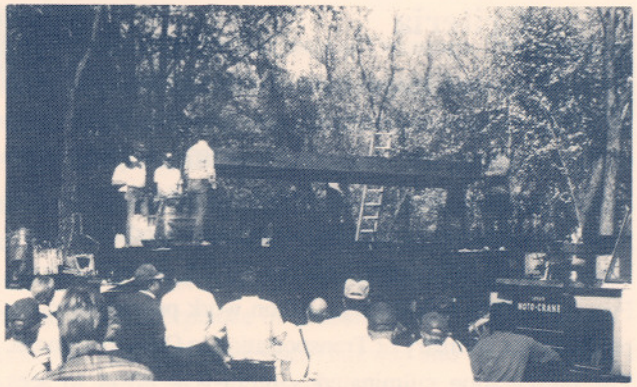

National Forest System (NFS) lands. For example, since 1988, about 116 bridges on the NFS transportation system have been constructed of wood. So far, about $15 million of Federal and private funds have been used to improve rural transportation networks under the direction of the Timber Bridge Initiative.

Major activities focusing on the research component of the Timber Bridge Initiative include improving designs and construction procedures, defining strength properties of selected wood species, crash testing of guardrails, and performance information on timber bridges in use.

The Timber Bridge Initiative combines the perspectives of forest stewardship, rural revitalization and transportation improvements. The initiative offers a tangible forum to market traditionally unused wood, thereby creating an economic incentive for landowners to improve the management of their forest resources.

For more information on the Timber Bridge Initiative contact John Crist, USDA-Forest Service, P.O. Box 4360, Morgantown, WV; Phone: 304-291-4159 or FTS: 923-4159 and request a copy of the Status Report: The Timber Bridge Initiative. Fiscal Year 1990.

— Michael T. Rains
Area Director
Northeastern Area
State and Private Forestry
Radnor, Pennsylvania

University At Work . . .

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The information generated from these projects is not only being used in West Virginia's timber bridges but other states are also adopting West Virginia's plans and specifications for their own use. One of the goals of timber bridge research at WVU is to achieve wide-spread acceptance of timber as a modern, efficient bridge building material.

— Barry Dickson
West Virginia University
Department of Civil Engineering
Morgantown, West Virginia