

CROSSINGS



NEWSLETTER OF THE WOOD IN TRANSPORTATION PROGRAM

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Fourth National Timber Bridge Design Competition

Judges evaluated fourteen "ways to cross the creek" during the recent Fourth National Timber Bridge Design Competition as fourteen student chapters of the American Society of Civil Engineers (ASCE), the American Society of Agricultural Engineers, (ASAE) and the Forest Products Society (FPS) from across the country competed for prizes. This competition was made possible by a grant from the U.S. Forest Service through its Wood In Transportation Program. Southwest Mississippi Resource Conservation and Development (RC&D), Inc., coordinated the competition, with the Civil Engineering Department at Mississippi State University providing technical assistance. Each chapter designed, constructed and tested their bridges on their home campus, then submitted documentation of the activities and results to a panel of judges for review.

When the sawdust and splinters had all cleared, the **first place winner** was the **University of North Carolina at Charlotte, ASCE Chapter**. Their bridge used a double-T design with two

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!!!! ATTENTION READERS !!!!

The last issue (November 1996) of "Crossings" included a "Readership Response Form." The purpose of the card was to update the "Crossings" mailing list and to obtain feedback from our readers on topics of interest you would like to see addressed in the newsletter. For those of you who have responded, thank you. If you have not responded and you would like to revise your mailing address or provide input into how we can improve "Crossings," please complete the Readership Response Form or send us a brief note. We value your input, and we want to provide the most appropriate and useful information possible.



Name Change for the Timber Bridge Information Resource Center

To reflect the broadened activities and information distribution occurring at the Timber Bridge Information Resource Center, we have changed the Center's name to the Wood In Transportation National Information Center (WITNIC). This name change reflects the transition the USDA Forest Service made from the National Timber Bridge Initiative to the Wood In Transportation Program over a year ago.

The Wood In Transportation National Information Center plays a vital role in the successful implementation of the Wood In Transportation Program. Last year, the Center distributed over 40,000 pieces of "Wood In Transportation" information to the public. This figure

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Fourth National Timber Bridge Design Competition ... *Continued from page 1*

prestressed double I-beam sections supporting a deck of 3/4-inch tongue-and-groove plywood.

The **second place winner** was the **ASCE student chapter from Rose-Hulman Institute of Technology**. Their design used two glued plywood-lumber I-beam girders with a 5/8-inch plywood deck. **Third place** was awarded to the entry from the **ASCE chapter (Team B) at Ohio State University**. Their design used two I-beam girders with 3/4-inch plywood web stiffeners/diaphragms supporting a 3/4-inch tongue-and-groove plywood deck.

The award for **Most Adaptable to Real Life Construction** went to the **San Jose State University ASCE chapter (Team D)** for their entry with two I-beam girders supporting transverse floor beams and a 3/4-inch plywood deck.

Ohio State's University ASCE Chapter (Team A) captured the **Most Aesthetic** award with their entry using two laminated-arch box beam girders with plywood webs supporting a stressed-skin plywood deck.

The **Most Economical Design** award went to the **San Jose State University ASCE Chapter (Team C)**. Their design used four I-beam girders with 3/4-inch tongue and groove plywood deck.

Other schools entering the competition were University of Missouri-Kansas City ASCE, Case Western Reserve University ASCE, West Virginia University ASCE/FPS, Mississippi State ASCE, Washington University-St. Louis ASCE, and University of California-Berkeley ASCE.

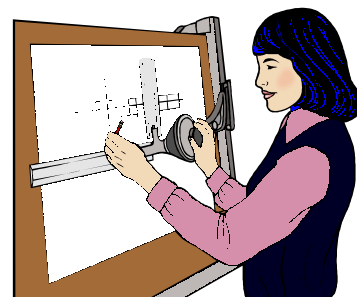
Judges for the competition were Jim Madden, Unit Structures, Magnolia, AR; John Harper, Mississippi Department of Transportation, Jackson, MS; and Bruce Wood, Architect, Jackson, MS.

Forest products suppliers and groups joined in the competition effort with student chapters in several states by donating materials, money, or expertise. In Mississippi, the Mississippi Lumber Manufacturer's Association donated funds to cover all material expenses of Mississippi State University's entry. The competition's objectives were to promote interest in the use of wood as a competitive bridge construction material, to generate innovative and cost-effective timber bridge design techniques, and to develop an appreciation of the engineering capabilities of wood among future transportation and forest products engineers.

The test bridges were approximately 10-feet long and 4-feet wide and were loaded with a test weight of approximately 4,400 pounds. Average weight of the bridge models was 119 kg. At full loading, maximum deflection ranged from 0.93mm to 7.43mm. Percent non-wood materials in the bridges ranged from 0.30 percent to 11.4 percent. Entries were judged with 40 percent of the score based on maximum deflection, 30 percent on bridge weight, 20 percent on final report, and 10 percent on the percentage of non-wood materials in the bridge.

Special thanks to the Department of Civil Engineering, Mississippi State University, for their assistance in preparation of guidelines.

For additional information on the designs referenced above or for information on competition rules and instructions for the 1997 competition, contact Southwest Mississippi RC&D, Inc., 747 Industrial Park Road, N.E., Brookhaven, MS 39601, phone 601-833-5539, FAX 601-835-0054; or Dr. Ralph Sinno, Department of Civil Engineering, Mississippi State University, phone 601-625-3050.



FIELD PERFORMANCE OF TIMBER BRIDGES — 6. Hoffman Run Stress-Laminated Deck Bridge

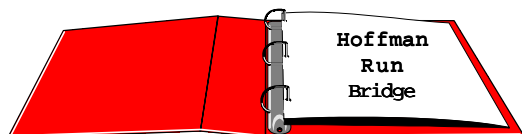
This report is sixth in a series that documents the field performance of timber bridges included in the Forest Products Laboratory national timber bridge monitoring program. It describes the development, design, construction, and field performance of the Hoffman Run Bridge.

The Hoffman Run bridge, located just outside Dahoga, Pennsylvania, was constructed in October 1990. The bridge is a simple-span, single-lane, stress-laminated deck superstructure that is approximately 26 feet long and 16 feet wide. It is the second stress-laminated timber bridge to be constructed of hardwood lumber in Pennsylvania. The performance of the bridge was monitored continually for approximately 32 months, beginning shortly after installation.

Performance monitoring involved gathering and evaluating data pertaining to the moisture content of the wood deck, the force level of stressing bars, the deck vertical creep, and the behavior of the bridge under static-load conditions. Furthermore, comprehensive visual inspections were executed to assess the overall condition of the structure. Based on field evaluations, the bridge is performing properly with no structural deficiencies, although with respect to serviceability, the bridge has developed a slight sag at midspan.

This report was published by the USDA Forest Service, Forest Products Laboratory. The study was a cooperative effort among the Jones Township Road Department, the Iowa State University Civil Engineering Department, and the Forest Products Laboratory Timber Bridge Team.

For a copy of this report, please contact the Wood In Transportation National Information Center at 304-285-1591.



Name Change for the Timber Bridge Information Resouce Center ... *Continued from page 1*

includes the distribution of "Crossings," which is mailed quarterly to about 5,000 recipients. This issue of "Crossings" contains our revised Wood In Transportation Publications List. This document includes over 130 publications that are available to the public upon request. These publications include information on timber bridges and timber bridge designs, as well as publications on other wood in transportation structures and applications.



Wood In Transportation National Information Center Goes Internet

To more fully provide timely service to engineers, highway officials and individuals requesting Wood In Transportation information, we are developing a specific USDA Forest Service site for the Wood In Transportation (WIT) Program. Our address is <http://wit.fsl.wvnet.edu>. The enclosed Publications List is on our page. You can order publications directly from our Internet site. Currently, our page includes an overview of the Program and related items. In the future, we plan to have "Crossings" and various WIT publications available via the Internet. The USDA Forest Service's Forest Products Laboratory also has an Internet site. The address is <http://www.fpl.fs.fed.us/wit/>. Many of the Forest Products Laboratory publications are available over the Internet. If you have suggestions or comments on how we can improve our service to you through the Internet, please let us know.

NEW PUBLICATIONS

FIELD PERFORMANCE OF TIMBER BRIDGES — 9. Big Erick's Stress-Laminated Deck Bridge



This report is ninth in a series that documents the field performance of timber bridges included in the Forest Products Laboratory national timber bridge monitoring program. It describes the development, design, construction, and field performance of the Big Erick's bridge.

The Big Erick's bridge was constructed during September 1992 in Baraga County, Michigan. The bridge is 72 feet long, 16 feet wide, and consists of three simple spans: two stress-laminated deck approach spans and a stress-laminated box center span. The bridge is unique in that it is one of the first known stress-laminated timber bridge applications to use Eastern Hemlock sawn lumber and a combination of stress-laminated decks and a stress-laminated box in a single bridge. Performance of the bridge was monitored for 35 months, beginning at the time of installation. Monitoring involved gathering and evaluating data relative to the moisture content of the wood components, the force level of stressing bars, and the behavior of the bridge under static-load conditions. In addition, comprehensive visual inspections were conducted to assess the overall condition of the structure. Based on field evaluations, the bridge is performing well, with only minor serviceability deficiencies.

For a copy of this report, please contact the Wood In Transportation National Information Center at 304-285-1591.

FIELD PERFORMANCE OF TIMBER BRIDGES — 10. Sanborn Brook Stress-Laminated Deck Bridge

The Sanborn Brook bridge was constructed in August 1991, 10 miles northeast of Concord, New Hampshire, as part of the Wood In Transportation Program of the USDA Forest Service. The bridge is a simple-span, double-lane, stress-laminated deck superstructure constructed from Southern Pine lumber and is approximately 25 feet long and 28 feet wide with a skew of 14 degrees. The performance of the bridge was monitored continuously for approximately 2 years, beginning shortly after installation. Monitoring involved collecting and evaluating data pertaining to the moisture content of the wood deck, the force level of stressing bars, the deck vertical creep, and the behavior of the bridge under static-load conditions. In addition, comprehensive visual inspections were conducted to assess the overall condition of the structure. Based on field evaluations, the bridge is performing well, with no structural or serviceability deficiencies.

This report was published by the USDA Forest Service, Forest Products Laboratory. The New Hampshire Department of Transportation, Bureau of Materials and Research, assisted in the structural monitoring, obtaining field readings, and conducting load tests.

For a copy of this report, please contact the Wood In Transportation National Information Center at 304-285-1591.



Article contributions, questions or comments may be sent to Ed Cesa, Acting Program Manager, Wood In Transportation National Information Center or Ms. Tinathan A. Coger, Information Assistant; USDA Forest Service; 180 Canfield Street; Morgantown, WV 26505; Phone: 304-285-1591 or 304-285-1596; or FAX: 304-285-1505; DG: S24L08A; or E-mail to tcoger@serve.fsl.wvnet.edu.

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