

## Needs Assessment for Advancing Timber Utilization in Mainline and Short-Line Railroad Applications

For decades, timber was the construction material of choice for both mainline and short-line railroads. The use of other materials, such as reinforced concrete and structural steel, has recently become more prevalent. This shift in preference may have resulted from significant advances in concrete and steel that followed a concerted research effort aimed at meeting specific needs of the railroads.

### Background

Timber has been used as a material for railroad bridges for well over 100 years. Most of these bridges have been solid-sawn lumber trestle configurations that consist of a series of relatively short spans supported by timber piling. A large number of timber trestles remain in service on U.S. railroads and have provided excellent service for many years. However, the use of timber has dramatically declined in recent years. Increased loading requirements, an aging infrastructure, and changes in the available timber resource have led railroads to look for other options when replacing or rehabilitating existing timber structures. Although the use of concrete and steel has become more prevalent, one material that has been used as an excellent alternative to solid-sawn lumber is structural glued-laminated (glulam) timber. Because glulam is manufactured by laminating relatively small solid-sawn laminations with waterproof

structural adhesives, it is readily available in virtually any size to meet railroad bridge design and construction requirements. The Southern Pacific Line (now part of the Union Pacific Line) was one of the first railroads to use glulam for bridge replacement and rehabilitation.



Load testing of existing solid-sawn stringer bridge in Texas.

### Objective

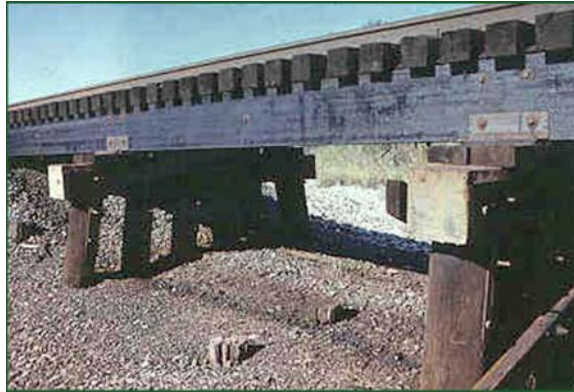
The primary objective of this project is to identify, describe, and prioritize a list of research needs that will serve as a basis for developing and funding research related to the use of timber by both mainline and short-line railroads. This research

needs assessment will be a guide that should significantly influence research related to wood transportation structures over the next six years and re-establish wood as a more significant construction material in the railroad industry.

### Approach

The research team will conduct a detailed literature review, contact experts in the areas of timber engineering and railroad operations and construction, and conduct a survey of interested parties. The same survey respondents and experts will be contacted after a research needs list is initially compiled to prioritize the research needs.





**Rehabilitated bridge using  
glued-laminated stringers.**

### **Expected Outcomes**

The outcome of this study will be a list of proposed research projects that address the research needs identified. Research needs will be grouped into three priority levels so that research resources can be most efficiently allocated.

### **Timeline**

This research will be completed by summer 2007, with information synthesis occurring throughout the research period.

### **Cooperators**

USDA Forest Service, Forest Products Laboratory  
Iowa State University, Bridge Engineering Center

### **Contact Information**

Terry J. Wipf, Director  
Bridge Engineering Center  
Iowa State University  
Ames, Iowa  
(515) 294-6979, [tjwipf@iastate.edu](mailto:tjwipf@iastate.edu)

Brent M. Phares, Associate Director  
Bridge Engineering Center  
Iowa State University  
Ames, Iowa  
(515) 294-5879, [bphares@iastate.edu](mailto:bphares@iastate.edu)