

Development of a Smart Glued-Laminated Timber Bridge

Much attention has recently been focused on development of an intelligent infrastructure—civil systems with integrated sensors that continuously and remotely report condition and performance of the system. Work in this area has so far independently focused on sensor development and performance algorithm development.

Background

Several recent technological advances have resulted in the development of cost-effective sensing and communications systems. Although not yet turnkey systems, the potential exists to develop timber bridges that report their performance and condition using quantitative sensed information.

Objective

The objectives of this work are to develop an initial concept for a smart timber bridge and to develop a 5-year research plan for initial development, beta testing, and deployment of such a system.

Approach

Research will be conducted in three primary work phases. First, information will be synthesized on the



Glued-laminated bridge reinforced with FRP laminations.



Web site for bridge remote sensing project.

desired attributes of a smart timber bridge and on available sensing systems and equipment. Information will be collected from a number of sources, including technical literature and technical experts. Second, a conceptual smart timber bridge will be developed based on the synthesized information. This theoretical bridge will be reviewed and critiqued by experts in the areas of timber, bridge management, and sensing. Finally, a 5-year research work plan will be developed that culminates in the development of a ready-for-implementation smart timber bridge.

Expected Outcomes

The project outcome will be a detailed 5-year research work plan for the development of a smart timber bridge that is ready for implementation. The work plan will provide

timeline estimates, scope-of-work summaries, and expected outcomes for each work phase.

Timeline

Initial information collection and synthesis will be completed by spring 2006. Development of the con-

ceptual smart timber bridge will be completed by fall 2006. The 5-year work plan will be completed by summer 2007.

Cooperators

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

Contact Information

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

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