UTC PROJECT DESCRIPTION

PROJECT NUMBER:
03301

PROJECT TITLE:
Multimedia Technology for Timber Bridge Repair

PRINCIPAL INVESTIGATORS:
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PROJECT OBJECTIVE:
This project is intended to provide guidance for evaluating the extent of structural damage and providing step-by-step details on how to repair the damage. The long-term objective of this type of research is the development of plan modules for all aspects of structural damage repair conducted by the Alabama Department of Transportation (ALDOT), including steel bridges, reinforced/prestressed concrete abridges, and timber bridges. The specific objective of this one-year proposal is to develop the timber module. The final product will be a web page and a CD-ROM based training tool to explain and describe current methodologies in each of these modules.

PROJECT ABSTRACT:
ALDOT and county engineers face, on a daily basis, the need to evaluate bridges that have been hit or damaged by over-height vehicle loads, the extent and consequences of fire damage to bridge members, or damage by environmental exposure for timber bridge members. ALDOT engineers usually have limited time to evaluate the damage and to decide whether to close the bridge, or post the bridge for lower-than-legal loads, or to take some other action. This research is intended to provide engineers with tools and methodologies for evaluating the extent of structural damage and step-by-step details of structural repair. The outcome of this study should significantly improve the repair practices and reduce the overall maintenance costs for the state and local counties.

PROJECT TASK DESCRIPTIONS:
Task 1 - Literature survey of available inspection, repair, and rehabilitation techniques and repair procedures of timber structures.
Task 2 - Determine standard inspection and repair practices.
Task 3 - Determine their repair and assessment standard of practices.
Task 4 - Evaluate the available repair methods and identify most appropriate methods pertaining to Alabama bridge inspection, maintenance, and management program.
Task 5 - Perform a limited test of the preliminary version of the repair tool
Task 6 – Refine the preliminary version and release the refined modules for testing.
Task 7 - Survey senior ALDOT and county engineers and adjust the refined version and release the final version.
Task 8 - Prepare full documentation of the web page and CD-ROM for future upgrade.

MILESTONES AND DATES, (start date is 1/1/2003):

• Task 1 Jan-Mar 2003
• Task 2-3 Mar-Apr
• Task 4 Apr-May
• Task 5 Ma-Oct
• Task 6 Sep-Oct
• Task 7 Oct-Nov
• Task 8 Dec 2003

TOTAL BUDGET:
One year project: $50,000 (UTCA) and $50,000 (matching); total budget $100,000.

STUDENT INVOLVEMENT:
One full time student and one undergraduate student will be working on this project.

RELATIONSHIP TO OTHER RESEARCH PROJECTS:
Dr. Toutanji is currently working on UTCA project 02303 “Evaluating Structural Damage Using Multimedia Technology,” which leads directly into this project. The approach and the information gathered from 02303 can be used in this proposed project. The students trained under 02303 are also available to participate in this project.

TECHNOLOGY TRANSFER ACTIVITIES:
The project has a significant technology transfer component, in which the maintenance and design engineers will be provided with excellent tools and methodology for evaluating the extent of structural damage and details on how to repair the concrete structures using a wide range of multimedia, including hypertext, video, sound and high-resolution graphics. Workshops and seminars will be held to introduce this multimedia resource to professionals involved in bridge repair and rehabilitation.

POTENTIAL BENEFITS OF THE PROJECT:
This research will help streamline ALDOT’s and county’s training procedures in the area of inspection, maintenance, and repair. This multimedia resource will significantly improve the safety of the bridge structures since it will provide a state-of-the-art tools and methodologies to evaluate structural damage and how to repair timber bridge structures. Utilizing the latest methodologies for the assessment and repair of bridge elements will enable the bridge engineers and transportation official to allocate funds for the most needed repair bridges.

TRB KEYWORDS:
Repair, rehabilitation, retrofitting, replacement, bridges, multimedia, bridge, timber