PROJECT NUMBER
04312

PROJECT TITLE
Multimedia Technology for Bridge Repair: Final Phase

PRINCIPAL INVESTIGATOR:
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PROJECT OBJECTIVE:
This project is a continuation of two previously funded projects: UTCA 02303 and UTCA 03301. These two projects focused on providing guidelines for conducting concrete and timber bridge inspections for ALDOT and evaluating and understanding the various maintenance procedures available. The objectives of this project are: 1) to update the multimedia CD-ROMs developed by the previous two projects to address the changes in the inspection and maintenance procedures and 2) to combine the two modules (concrete and timber) into one. The updated multimedia package will incorporate all the suggestions made by the ALDOT and county engineers and will comply with the new Bridge Inspection Manual guidelines. The final CD-ROM will be designed to run on different computers and different operating systems.

PROJECT ABSTRACT:
ALDOT engineers are often asked to evaluate damage to new bridge members that have been damaged in transport or erection and even girders that have been hit and damaged by construction equipment during construction. Some of the issues facing ALDOT engineers on a daily basis are evaluating bridges open to traffic that have been hit or damaged by over-height vehicle loads, making the determination of the extent and consequences of fire damage to concrete bridge members, or assessing damage by environmental exposure to timer bridge members. This research is intended to provide engineers with tools and methodology 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
1. To address all comments and suggestions made by ALDOT Maintenance Bureau engineers in the revision of the steel reinforced/prestressed concrete and timber modules on the CD-ROMs.
2. To update the steel reinforced/prestressed concrete CD-ROM in accordance with the Bridge Inspection Manual.
3. To combine the 2 CD-ROMs (steel reinforced/prestressed concrete and timber bridge) into one.
4. To ensure that the final CD-ROM operates on different computers and different operating systems including Window XP.
5. To perform a limited test of the final version of the repair tool with a group of ALDOT and county engineers.
6. To refine the version and release the refined modules for testing.
7. To survey senior ALDOT and county engineers, adjust the refined version and release the final version.

MILESTONES AND DATES
Task 1: Jan. – Apr., 2004
Tasks 3 & 4: May – Aug.
Task 5: Sep. – Oct.
Task 6: Oct. – Nov.
Task 7: Nov. – Dec., 2004

TOTAL BUDGET:
One year project: $37,803 (UTCA) and $37,894 (matching); total budget $75,697.

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

RELATIONSHIP TO OTHER RESEARCH PROJECTS
UTCA projects 02303 and 03301 are directly related to this project. The approach and information gathered from these projects will be used in this research project. The students trained under UTCA 02303 and 03301 are still available to participate on this project.

TECHNOLOGY TRANSFER ACTIVITIES
This project is primarily focused on technology transfer. It will provide maintenance and design engineers with excellent tools and methodology for evaluating the extent of structural damage and details of structural damage repair of concrete and timber bridge elements 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 counties’ training procedures in bridge 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 concrete and timber structures.

TRB KEYWORDS
Bridges, concrete, multimedia, repair, replacement, retrofit, strengthening, timber.