UTC RESEARCH PROJECT DESCRIPTION

PROJECT NUMBER
04111

PROJECT TITLE
Web-Enabled Bridge Sufficiency Calculator

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PROJECT OBJECTIVE
Effective bridge maintenance management is dependent upon reliable information regarding structural and functional sufficiency of the state’s bridges anytime, anywhere—currently this is not the case. This proposed project will put bridge information at the fingertips of county/city engineers and bridge inspectors by developing a new web enabled tool for bridge data input, bridge sufficiency rating calculation, and accessing existing bridge information parameters.

The proposed project explicitly addresses the 2003-04 UTCA Annual Research/Training Plan with respect to County Issues, Bridge System Projects by (1) investigating management of funding for bridge replacement, and (2) developing a management system for rapid bridge rating.

PROJECT ABSTRACT
Beyond the ability to collect and edit bridge maintenance data and calculate condition ratings, the proposed project will web-enable a sufficiency calculator that allows all county bridge inspectors to gain a greater understanding of the bridge rating calculation. Key features of this web-enabled tool include:
• Web-enablement allows inspectors to perform on-site “what-if” analysis examining the influence of individual variables and their relationship to the overall sufficiency rating.
• The on-site evaluation capability also reduces the total cycle time required to enter the final sufficiency rating details into ABIMS.
• The sufficiency rating explanations provided by this tool also provide bridge inspectors and county engineers a means to communicate why a bridge may or may not be eligible for federal funds relative to the rating and funding guidelines set by the Federal Highway Administration (FHWA).

The web enabled sufficiency calculator will include:
• 39 bridge characteristic variables,
• the algorithms for calculating S1, S2, S3, and S4,
• the rules defining functional obsolescence and structural deficiencies,
• knowledge of maintenance or rehabilitation activities using federal funds, and
• drill-down capabilities to better understand the interaction between rating variables.

The computation of a bridge sufficiency rating ultimately impacts eligibility for federal funding for maintenance, rehabilitation, or replacement. In addition, the statewide access to existing data coupled with the speed by which data can be entered, verified and used in calculations will increase the safety of bridges here in Alabama and may be used as a model for systems throughout the nation.

TASKS, DESCRIPTIONS AND MILESTONES
1. Refine functional requirements, screen design, and develop detailed error checking and test scripts
2. Develop alternative data sources, and connectivity
3. Work with ALDOT I.T. department to create technology plan and deployment schedule
4. Develop, verify and validate the Web-Enabled Sufficiency Calculator
5. Develop training material and conduct informational workshops for bridge engineers / inspectors
6. Develop technology transfer by generalize lessons learned for other states and produce Final Report

BUDGET
UTCA funds $49,999; UA-Cost Share funds: $81,169 Total: $131,168

STUDENT INVOLVEMENT
One full-time graduate student and 60 undergraduate students will help in all stages of the project. The project will also be used as a “show case” to aid in student recruiting, with emphasis on racial minorities and females.

During the fall of 2004, five workshops will be held throughout the state that provide bridge maintenance engineers and inspectors with the knowledge they need to use the web-enabled sufficiency calculator.

In addition the PIs intend to publish articles and present the project results to appropriate transportation-related journals and conferences. Time is allocated as part of the university’s cost-share to do this throughout the year, with specific deliverables during the fall of 2004.

TECHNOLOGY TRANSFER ACTIVITIES
The proposed project will put bridge information at the fingertips of county/city engineers and county bridge inspectors by developing a new web enabled tool for bridge data input, bridge sufficiency rating calculation, and access to existing bridge information parameters. It will raise the quality of bridge element data, communicate the reasons for funding eligibility decisions, and reduce processing time.
Moreover this project supports UTCA’s theme of diversity/inclusion, human resource development, technology transfer, and bridge system projects (specifically in the areas of management and funding, and rapid bridge rating). The project applies research results directly to ALDOT’s bridge management system and funding allocation systems and has the potential to be extended to bridge management practices in other states’ Department of Transportation.

TRB KEYWORDS:
Asset management, bridge management system, decision support, analysis of variance, information systems, sufficiency(statistic), mobile computing, Intranet