SPR PROJECT DESCRIPTION

PROJECT NUMBER:
06401

PROJECT TITLE:
Bridge Health Monitoring Metrics: Updating the Bridge Deficiency Algorithm

PRINCIPAL INVESTIGATOR:
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PROJECT OBJECTIVES:
As part of its bridge management system, the Alabama Department of Transportation (ALDOT) must decide how best to spend its bridge replacement funds. As part of the process, ALDOT managers currently use a deficiency algorithm to rank bridges that are the most deficient and in need of replacement. The current algorithm is outdated and needs to be revised to reflect modern bridge performance criteria. As part of this project, the University of Alabama will establish a new set of performance criteria that reflect modern ALDOT practice, set performance goals for each criterion, and assign importance factors to the criteria. The updated bridge deficiency
algorithm will be tested on data in the ALDOT bridge database and reviewed by ALDOT managers.

PROJECT ABSTRACT:
The ALDOT bridge management system is being enhanced through a series of projects that addressed asset management practices, decision tools, funding, and similar issues. The approach is the think “in the long term,” with current programs and projects. The key to this is accurately defining the rate of deterioration of the bridges. Given the large time span over which the current bridge population was constructed, there is considerable variety in structure types, materials, design criteria, loadings, and other issues. This makes it more difficult to develop a bridge deficiency metric with a holistic view of the major factors affecting bridge maintenance decisions. But such a view is needed to develop standardized budget planning across the range of bridge treatments: preventive maintenance, rehabilitation and replacement. The goals of this project are to develop such a view, to increase security, reliability and integrity of the data collected and used in the process, and to make effective use of FHWA funding in the bridge management process.

PROJECT TASK DESCRIPTIONS:
Task 1) Kickoff Meeting – UA and ALDOT project team members will meet to review the project and fine tune the research plan.
Task 2) Benchmarking – Reviews will be conducted to identify best practices.
Task 3) Metric Definition – This work step will identify basic attributes and appropriate weights for the new prediction model.
Task 4) Metric Utilization – This task will examine how the bridge deficiency metric supports the replacement, rehabilitation and preventative maintenance decision process.
Task 5) Testing and Validation – Performance on past and present data will be examined by experts, and will be refined as necessary.
Task 6) Final Report – Project documentation and a final report will be prepared.

MILESTONES AND DATES:
Task 1: Aug-Sep 06
Task 2: Sep 06-Jan 07
Task 3: Feb-Apr 07
Task 4: May-Oct 07
Task 5: Sep 07-Feb 08
Task 6: Mar-Apr 08

TOTAL BUDGET:
Twenty-one month project: ALDOT State Planning and Research funds; total budget $98,411.

STUDENT INVOLVEMENT:
This project will include on graduate research assistant in Civil Engineering, and multiple undergraduate assistants in the Management Information Science field.

RELATIONSHIP TO OTHER RESEARCH PROJECTS:
This project builds on a series of completed projects that have dealt with asset management and bridge management systems: 02114 – GASB 34 and Asset Management, 02411 – Phase II: GASB-34 Compliance, 03417 – GASB 34 Compliance-Phase III (Bridges), 02114 – GIS Resource Allocation Visualization, 03112 – Management of Bridge Decay/Maintenance Forecasting, 04111 – Web-Enabled Bridge Sufficiency Calculator; and 5109 – Risk-based Bridge Inspect Management. Some of these projects have been funded by ALDOT and some by UTCA.

TECHNOLOGY TRANSFER ACTIVITIES:
This project will include training sessions for ALDOT bridge management managers, and development of system documentation.

POTENTIAL BENEFITS OF THE PROJECT:
This project will provide a state-of-practice bridge deterioration model. It will allow ALDOT managers to select bridge treatments (preventative maintenance, rehabilitation or replacement) that will provide optimum long term use of funds to maintain the condition of an aging bridge population.

TRB KEYWORDS:
Bridge deterioration models, bridge management system, bridge preventative maintenance, bridge rehabilitation, bridge replacement