UTC RESEARCH PROJECT DESCRIPTION

PROJECT NUMBER:
03112

PROJECT TITLE:
Bridge Decay and Maintenance Forecasting: Integration

PRINCIPAL INVESTIGATORS:
Shane Sharpe, Ph.D.
Thomas Faculty Fellow
Dept. of Information Systems, Statistics & Operations Management
The University of Alabama
Voice: 205.348.985, Fax: 205.348.0560
ssharpe@cba.ua.edu

David P. Hale, Ph.D.
McDonald Family Distinguished Faculty Fellow
Dept. of Information Systems, Statistics & Operations Management
The University of Alabama
Voice: 205.348.8909, Fax: 205.348-0560
dhale@cba.ua.edu

PROJECT OBJECTIVE:
The primary goal of this project is to provide a more efficient and reliable means of forecasting
the condition of bridges and maintenance needs. The results of this investigation will provide a
process to integrate temporal data from disparate sources as required for a longitudinal analysis
of the decay patterns of bridges and benefit agencies through their ability to more accurately
determine their maintenance needs.

PROJECT ABSTRACT:
With the aging our nation’s bridges, state transportation departments are required to make the
most effective decisions regarding the allocation of scarce budgetary funds dedicated to bridge
maintenance activities. Gaining insight as to the future condition of the bridges at the state,
district, county or municipality-level can greatly enhance the decision-making process and the
trade-offs involved in allocating bridge maintenance funds.

This project’s researchers will analyze and model the historical data, its sources, and appropriate
format required to adequately depict the historical condition ratings and characteristics of
individual bridges.

PROJECT TASK DESCRIPTIONS:
Task 1 - Benchmarking Current Bridge Decay Forecasting Algorithms and Published Research
Task 2 - Examination of Existing Data, Data Sources and Conventional Decay Algorithms
Task 3 - Analysis of the Decay Patterns of Various Structural Bridge-type Combinations
Task 4 - Multi-criteria Analysis of Traffic, Traffic Types and Environmental Factors on the Decay Patterns of Multiple Structural Bridge Types
Task 5 - Development of Forecasting Model
Task 6 - Model Validation
Task 7 - Preparing Training Materials/Conduct Workshops for ALDOT Staff
Task 8 - Prepare Research Reports

RESEARCH MILESTONES AND DATES:
- Task 1  March 31
- Task 2-3  May 31
- Task 4-6  July 31
- Task 7  December 31
- Task 8  December 31

TOTAL BUDGET:
One-year project: UTCA funds $49,969; total budget $62,507

STUDENT INVOLVEMENT:
This research project will involve a full-time doctoral student who will use this initiative as the basis for his dissertation, two undergraduate students working a total of 30 hours per week for twelve months, and a class of 30 students in the spring semester will be working on the project.

RELATIONSHIP TO OTHER RESEARCH PROJECTS:
This project is a component of a larger set of asset management initiatives covering all of ALDOT. Other projects funded by UTCA include:
- 01459 – GASB 34 and Asset Management;
- 02114, GIS-Resource Allocation Visualization; and
- 02411 Phase II: GASB-34 Compliance.

TECHNOLOGY TRANSFER ACTIVITIES:
Based on the research approach and anticipated results, the Principle Investigators expect to publish articles and/or present the results to appropriate transportation-related conferences and journals.

POTENTIAL BENEFITS:
This project seeks to positively impact bridge management efforts and supports UTCA’s theme of Management and Safety of Transportation Systems and GASB 34 Compliance. Results from this work will enable ALDOT to more accurately forecast the conditions of the state’s bridges to more effectively examine construction alternatives and maintenance resources.

TRB KEYWORDS: