

## Transportation Pooled Fund Program Project

Title: Accelerated Bridge Construction (ABC) Decision Making and Economic Modeling Tool

Project Number: TPF-5(221)

Reporting Period: 7/1/2010 - 9/30/2010

Project Start Date: 12/23/2009 Expected Project End Date: 6/30/2011

Percentage of Work Completed:

Principal Investigator: Dr. Toni Doolen  
Oregon State University  
541-737-5641

Project Manager: Benjamin Tang  
Oregon Department of Transportation  
503-986-3324

### Progress:

As a continuation of Task 2, more resources on Analytical Hierarchy Process (AHP) from the literature were reviewed. Useful approaches and techniques were identified and recorded for deployment in the project. The result of this effort is a comprehensive collection of papers available to the Technical Advisory Committee (TAC). Considering the nature of the decision problems in a typical ABC project, these reviews also confirmed the suitability of the AHP approach for this project.

The synthesis of the AHP literature was deployed in a decision making software tool (Task 3). This tool will help decision makers in early stages of the design process. In parallel to the software development effort, the research team collected data on a series of completed or construction-in-progress bridge projects in Oregon. The data were collected through interviews with ODOT experts using a survey form developed under Task 3. The survey and the software both use the fundamental AHP scale. This survey scale is based on previous research and is well-developed, tested, and validated (Saaty, 1990). The survey form contains a series of pairwise comparisons between criteria located at multiple levels of a decision hierarchy.

The data collection and software development processes were conducted under the supervision of the TAC team. The researchers provided the team with detailed updates on the progress through sharing report documents and a teleconference.

Problems: None noted.

### Work Planned for Next Quarter:

A teleconference with the TAC team will be held on October 18 at which time the researchers will introduce and demonstrate the decision making software tool. The development process is proceeding to its final steps, and the research team is now testing more real-world construction projects, using the developed software tool. The team will finalize the pairwise comparison survey list by conducting more data collection sessions using bridge projects from other participating states. Through this data collection, the research team will test and validate the hierarchy and software. The research team will also begin efforts to create a user's guide and to

develop training materials to use in rolling out software to TAC team members and beyond. Another meeting with the TAC team will be held December 14 - 15 to review decision tool and resolve any outstanding issues.

Funds Obligated: \$120,000.00

Expenditures: As of September 30, 2010, OSU expenditures on this project have totaled approximately \$41,977 which represents approximately 46% of the total budget. These expenditures have been for GRA salary, student wages, fringe benefits, GRA tuition, teleconference fees, travel to the two TAC meetings, PI salary, and F&A. Expenses have been lower due to less travel than anticipated in the data collection phase. However, development of the Decision Tool Software has required additional time to enable flexibility as requested by the TAC team.

Funds Remaining:

As of September 30, 2010, OSU remaining funds for this project total approximately \$49,000 (left at OSU).