HPP PROJECT DESCRIPTION

PROJECT NUMBER:
02306

PROJECT TITLE:
Development of Standardized Bridge Systems

PRINCIPAL INVESTIGATORS:
Vijaya Gopu
The University of Alabama in Huntsville
S-201 Olin B. King Technology Hall
Huntsville, AL 35899
(256) 824-6117
vgopu@cee.uah.edu

PROJECT OBJECTIVES:
The objective of the proposed research effort is to develop standardized bridge components and systems that facilitate rapid design and construction. This effort should provide a significant tool for bridge design bureaus at the state, county and city levels to solve bridge structural deficiency problems in a cost effective and efficient manner. The availability of these tools in an electronic format will further enhance their utility and benefit to the agencies involved with bridge design.

PROJECT ABSTRACT:
More than a quarter of the nearly 600,000 bridges in the United States are either structurally deficient—since they cannot support their design loads—or functionally obsolete because of being overburdened for their current traffic. The billions of dollars spent on repairs by the various state and federal agencies have not alleviated the overall problem. It is not uncommon in parts of Alabama—and other parts of the country—to find school buses being driven extra distances to avoid a bridge which has been declared structurally deficient.

The aforementioned problem is serious both with on and off-system bridges and counties are grappling with issues of safety and aging bridges. Counties need better tools, in particular, to manage their bridge systems. These tools range from better and rapid bridge rating, funding decision methodologies, and methods for rapid design and construction/replacement of bridges.

The focus of this research effort is the development of standardized bridge systems that can be utilized for rapid design and replacement/construction of bridges. The standardized systems will include concrete, pre-stressed-concrete, steel and timber systems that can be utilized for a variety of short to intermediate crossings. The systems will be provided for different load ratings to enable the bridge designer to select the most economical system for a particular application. The standardized bridge systems will be made available in an electronic format to permit quick screening of alternate systems. The availability of these standardized systems will significantly enhance the capabilities of the bridge design professionals at the state, regional and local levels.
PROJECT TASK DESCRIPTIONS:
The proposed effort will entail several tasks. Each of these tasks is discussed below:

- Task 1. Identify key parameters for standardized bridge systems; survey existing standardized systems
- Task 2. Develop standardized bridge systems
- Task 3. Develop electronic media for review of standardized bridge systems
- Task 4. Testing and workshop
- Task 5. Prepare final report

MILESTONES
Jan 1, '02: Initiate survey of existing systems and identification of key parameters.
Mar 1: Initiate development of standardized bridge systems.
Apr 1: Complete survey and initiate development of electronic media.
Sep 1: Begin testing electronic media and hold workshop. Revise electronic media based on feedback.
Dec 31: Submit project final report to UTCA

TOTAL BUDGET:
One year project; UTCA $50,000; total budget $100,319.

STUDENT INVOLVEMENT:
Two graduate research assistants will be involved with this project.

RELATIONSHIP TO OTHER RESEARCH PROJECTS:
The PI is currently working on an UTCA project (01332) entitled “A Multi-media Resource for ALDOT Bridge Engineers”. While this project is not directly connected to the proposed effort, several tools developed in the ongoing project will be utilized in accomplishing the project objectives. One or two students working on the current project will assist the new graduate students in developing skills to prepare the electronic version of the project results.

TECHNOLOGY TRANSFER ACTIVITIES:
Bridge design professionals at various levels will be given exposure to the standardized bridge systems developed from this research effort. Workshops and seminars will be held to introduce these bridge systems to professionals involved with bridge design. Professionals targeted will be from both the public and private sectors. The public sector will include ALDOT, county and city agencies involved with bridge construction. The private sector will include consulting engineering and construction companies. The Bridge Design Bureau of ALDOT is very interested in the proposed project and has provided a letter endorsing the proposed effort. The standardized bridge systems will be of interest to engineers serving state DOTs, counties/parishes, and cities throughout the country and as such the results of this effort can have a national impact.

POTENTIAL BENEFITS OF THE PROJECT:
The availability of standardized bridge systems will significantly enhance ALDOT’s ability to carry out rapid design and construction/replacement of bridges. The presence of a large number
of structurally deficient bridges requires the availability of tools of the nature proposed in this project effort to respond to the growing need to effectively maintain the nation’s infrastructure.

TRB KEYWORDS:
Resource, bridges, bridge structure, bridge superstructure, standardized bridges, components