



RTI Semi-Annual Progress Report

Fiscal Year 2005

Date of This Report: March 1, 2005 Project Number: 0-4569 RMC: 5

Period Covered by This Report: September 1, 2004 – February 28, 2005

Project Title: Design of Bridges for Security

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1. Requested Changes for Possible Project Modification

Project Termination: A new project termination date of August 31, 2005 was requested and approved.

Project Personnel: No change.

Funding Needs: No change in total funding level is needed.

Work Plan: No change.

Deliverables Table: No changes requested.

2. Program Development Information

This project is scheduled to terminate August 31, 2005.

3. Equipment

No equipment was purchased during the time period covered by this report.

4. Progress to Date, by Task

Task 1: Literature Review

This task was completed in a previous reporting period.

Task 2: Example Calculations

This task was completed in a previous reporting period.

Task 3: Develop a Plan to Investigate Cost-Effective Measures to Improve Bridge Security

This task was completed in a previous reporting period.

Task 4: Present Literature Review Results

This task was completed in a previous reporting period.

Task 5: Develop Guidelines to Implement Cost-Effective Measures to Improve Bridge Security

Task 5 broadly addresses the scope of work to be conducted under Phase II of the research. In order to provide more focus to the Phase II research activities, a specific Phase II Work Plan has been developed and approved by TxDOT. This plan consists of five main sub-tasks. These sub-tasks are described below along with the work completed to date on each sub-task.

Task 5a: Identify Five Representative Bridges for Analysis

This sub-task was completed in a previous reporting period.

Task 5b: Perform a Risk Assessment and Vulnerability Analysis for Representative Bridges

This sub-task was completed in a previous reporting period.

Task 5c: Develop Risk Management Strategies

Work on this task is still ongoing. Using the list of design load cases developed in Task 5b for each bridge type, the possible effects of these loads on the five categories of bridges have been identified. Structural retrofits and design approaches which possess the potential to effectively counter each specific load effect were then developed. A chart was created showing the load cases, retrofits, and application by bridge type. Refinements to the developed risk management strategies will continue throughout the duration of the Phase II research.

Task 5d: Investigate Structural Modifications to Improve Bridge Safety

For this task, structural models which can be used to perform computer-based analyses have been formulated. Each model represents a particular structural component under specified load scenarios and failure modes. Load cases involving coupled failure modes are not being considered due to the simplistic nature of the models used and the amount of time available to perform the analyses. To date, all necessary structural analysis calculations have been completed. A draft report is currently being prepared that summarizes the analysis results and design recommendations.

Task 6: Reporting

The final Phase I Research Report has been submitted. The Phase II Research Report will be available at the completion of the project.

5. Progress on Development of “Product” Deliverables

Product #	Product Description	Progress to Date & Implementation Status
P1	International Literature Review of Research Related to Bridge Security	completed
P2	Example Calculations of Typical Texas Overpass Bridge Subjected to Blast Loads	completed
P3	Work Plan to Implement Phase II Research	completed
P4	Cost-Effective Guidelines to Improve Bridge Security	will be submitted at the completion of Phase II of the project

6. Meetings/Conferences

Several meetings and phone conferences with the Advisory Panel took place throughout the reporting period. The PI held project meetings with Mr. Kirk Marchand on three separate occasions. In addition, the PI traveled with Mr. Kirk Marchand to Vicksburg, MS to meet with James Ray on September 2, 2004. Research findings were discussed, and comparisons were made to research results being conducted independently by the Army Corps of Engineers for the Federal Highway Administration.

On November 12, 2004, a breakfast meeting was held with Mark Bloschock (Project Director) to discuss the status of the research. At this meeting, a modification to the project termination date was discussed, and an extension until August 31, 2005 was agreed to be beneficial to the project.

Based on the results of the research completed thus far, the PI was invited to give a presentation at the TRB meeting held January 9-12 in Washington, DC. A summary of analysis results and design recommendations was presented. As a result of this talk, an invitation to speak at the next T-1 Bridge Security Committee of AASHTO was extended. In addition, the PI, along with David Hohmann (Project Coordinator) and former State Bridge Engineer Mary Lou Ralls, participated in a meeting with Washington State DOT and several representatives from the Department of Defense to discuss potential blast testing of prestressed girder bridges in Washington. Currently, funds are being solicited for a pooled-fund project, and Texas has already pledged support for the project. The purpose of the meeting was to solicit advice based on the current TxDOT research on bridge security as well as encourage participation from the federal government and various components of the military.

7. Possible Candidates for Formal Presentations at the Upcoming RMC Meeting

The topic of this investigation is currently of great concern to the engineering community and is likely to be of interest to many of those in attendance at the RMC meeting. In addition, the project will be essentially complete by the time of the next meeting, and research findings could be presented to the audience.

8. Miscellaneous

A paper providing an overview of the research was accepted for publication by TRB in conjunction with the 6th International Bridge Conference to be held in Boston in July. A presentation will be given in the initial plenary session.

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