



RTI Semi-Annual Progress Report

Date of Report: August 22, 2008 **Project Number:** 9-1526 **RMC:** 5

Period Covered: September 1 – February 28/29 March 1 – August 31

Project Title: Investigation of the Fatigue Life of Steel Base Plate to Pole Connections for Traffic Structures

Research Supervisor (name & agency): Karl Frank/CTR

- 1. Progress to Date, by Task** (Provide the following information for each task in the current Work Plan. List **all tasks**, even if no work was done during this reporting period. If a task was not active during this period, state “none” under Work Accomplished. Copy the following table as needed to cover all tasks.)

Task # 1	Task Name / Description Literature Review
% Complete 99	If task is complete, state when Technical Memorandum was submitted to RTI
Work Accomplished this Period (Brief description of work done and any major problems encountered.) The search through the literature continues. We have collected all available test data in the literature and continue to share data with the NCHRP study at Lehigh. We have recently received the latest European thinking on the calculation and application of hot spot stress to fatigue life estimation. We are evaluating these IIW procedures in our analytical study.	
Work Planned for next Reporting Period (Brief description of work planned.) Integrate the latest results from the NCHRP study into our analysis of fatigue performance,	
Task # 2	Task Name / Description Development of Test Plan
% Complete 98	If task is complete, state when Technical Memorandum was submitted to RTI
Work Accomplished this Period (Brief description of work done and any major problems encountered.) Three different test plans were developed in the reporting period. They were based upon the results of a discussion by the sponsoring states at project meeting on May 1 of this year. A revised test matrix of 16 mast arm specimens and 4 high mast specimens are included in the work for next year. 12 of the proposed specimens are donated from Pelco. We have not received confirmation that they will be able to donate all these specimens. We are sending them the drawings for the specimens today and should know before the start of the next fiscal year their ability to supply the requested specimens. The test matrix includes specimens form 3 different manufacturers.	
Work Planned for next Reporting Period (Brief description of work planned.) Revise test plan if Pelco cannot donate the requested specimens.	
Task # 3	Task Name / Description Fatigue Testing
% Complete 85	If task is complete, state when Technical Memorandum was submitted to RTI

Work Accomplished this Period (Brief description of work done and any major problems encountered.)
The testing of the 28 mast arm specimens and 14 high mast specimens was completed. Both the external collar weld and the full penetration weld provide fatigue lives comparable to category C. This is a very large improvement from the standard details employed by some states which had fatigue lives less than category E'. The high mast test setup end fixtures were redesigned for larger swivel eyes retro fit with larger transition radii and peening of the radii. This was necessary to prevent the fatigue failure of the end fixtures. After the last high mast specimen was tested, a crack was found in the mounting box for the specimen. The box was removed and sent to the welder for repair.

Work Planned for next Reporting Period (Brief description of work planned.)
Finish the repairs on the mounting box for the high mast specimens and begin testing as shown as possible. Start date dependent upon the delivery of the specimens.

Task # 4	Task Name / Description Analytical Studies
% Complete 40	If task is complete, state when Technical Memorandum was submitted to RTI

Work Accomplished this Period (Brief description of work done and any major problems encountered.)
We have developed three dimensional elastic finite models of the mast arm and high mast specimens and have begun evaluating hot spot stress calculation schemes.

Work Planned for next Reporting Period (Brief description of work planned.)
Expand the analytical models to evaluate the effect of hole and base plate geometry, diameter of mast, and interior hole size upon fatigue performance.

Task # 5	Task Name / Description Summary of Results
% Complete 0	If task is complete, state when Technical Memorandum was submitted to RTI

Work Accomplished this Period Due at completion of project

Work Planned for next Reporting Period (Brief description of work planned.)
N/A

2. Progress to Date, by Deliverable (Provide the following information for each deliverable on the current Deliverables Table.)

Deliverable #	Deliverable Description	Progress to Date &/or Date Submitted to RTI
R1	Final report with fatigue design guide and a list of recommended changes to the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals for submission to AASHTO T-12 Committee.	The analysis of the test results has begun and the final design recommendations await the results of the tests and analytical studies. Expected delivery date is 10/31/09.
PSR	Summary of work performed, findings, and conclusions	Expected completion is 10/31/09.

3. Equipment Purchases (Provide the following information for all equipment purchased to date on this project. Equipment is defined as items with a unit cost of \$5,000 or more, or components of a system costing \$5,000 or more. For each item over \$5,000, attach evidence that the equipment was added to the university inventory system and a digital photograph of the item.)

Description of Equipment	Date Purchased	Task and / or Deliverable Directly Related to Equipment Purchase

Texas Department of Transportation maintains the information collected through this form. With few exceptions, you are entitled on request to be informed about the information that we collect about you. Under §§552.021 and 552.023 of the Texas Government Code, you also are entitled to receive and review the information. Under §559.004 of the Government Code, you are also entitled to have us correct information about you that is incorrect. For inquiries call 512/465-7403.