TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT

Date: ___June 30, 2013_____

Lead Agency (FHWA or State DOT): _____Indiana DOT_____

INSTRUCTIONS:
Project Managers and/or research project investigators should complete a quarterly progress report for each calendar quarter during which the projects are active. Please provide a project schedule status of the research activities tied to each task that is defined in the proposal; a percentage completion of each task; a concise discussion (2 or 3 sentences) of the current status, including accomplishments and problems encountered, if any. List all tasks, even if no work was done during this period.

Transportation Pooled Fund Program Project # *(i.e, SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX)* ***TPF 5-238***	**Transportation Pooled Fund Program - Report Period:** ☐Quarter 1 (January 1 – March 31) XQuarter 2 (April 1 – June 30) ☐Quarter 3 (July 1 – September 30) ☐Quarter 4 (October 1 – December 31)

Project Title:
Design and Fabrication Standards to Eliminate Fracture Critical Concerns in Steel Members Traditionally Classifi Fracture Critical

Name of Project Manager(s): **Tommy E. Nantung**	**Phone Number:** **765-463-1521 ext. 248**	**E-Mail** tnantung@indot.in.gov
Lead Agency Project ID: **TPF-5(238)**	**Other Project ID (i.e., contract #):**	**Project Start Date:** 8/1/2011
Original Project End Date: **7/31/2014**	**Current Project End Date:** **7/31/2014**	**Number of Extensions:** None

Project schedule status:

X On schedule ☐ On revised schedule ☐ Ahead of schedule ☐ Behind schedule

Overall Project Statistics:

Total Project Budget	Total Cost to Date for Project	Percentage of Work Completed to Date
$790,000	**$314,519**	**35%**

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
$57,709	**7.3%**	**60%**

Project Description:
The objective of this research project is to take advantage of the major advances that have occurred in the past 30 years in the following areas related to fracture control in steel bridges:

1. The very high toughness of high performance steel (HPS), which was not available 30 years ago, can be used to take brittle fracture off the table so to speak. Crack arrest and very large defect tolerance can be ensured in these steels. Similar strategies have been employed by other industries for several years.
2. Modern fatigue design and detailing can ensure fatigue cracking does not occur.
3. Modern fabrication, shop inspection and the AWS FCP, greatly reduces the likelihood that defects are not introduced during. Advancements in NDT techniques along with technologies not regularly used, such as phased array UT have the potential further reduce the chance of a defect being missed.

Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):

- The literature review continues.
- Instrumentation has been calibrated and is ready for use (load and displacement sensors for the actuators as well as external string pots).
- The test setup was evaluated using a preliminary test beam to check the design and functionality. Modifications were made to the setup based on the preliminary test. A photograph from the preliminary test is shown below.
- Bracing was modified to help the test run smoother and quicker.
- Small-scale material testing (CVN, CTOD, pre-cracked CVN) continues.
- Legacy CVN data has begun to be evaluated using Master Curve.
- FE work continues. Rigorous J-Integral FE analysis of plates with cracks was initiated to estimate toughness to be selected for the large-scale tests.

Anticipated work next quarter:

- Continue reviewing relevant literature.
- Research Team meeting scheduled at Virginia Tech for July 8-9.
- Continue to refine the testing plan.
- Begin planning instrumentation layout for large-scale specimen.
- Finalize large-scale test matrix.
- Finalize design of large-scale specimens.
- Complete construction of second load frame including all bracing and hydraulics.
- Continue with small-scale material testing.
- Continue evaluating legacy CVN data with Master Curve.
- Continue to work with DOT's to obtain more "drops".
- Continue FE work. Specifically, begin to focus on the required energy for various crack geometries.
- Begin planning Interim Project Progress Meeting.

Significant Results:

During the past quarter, the major steps forward included:

1. Calibration of all testing instrumentation.
2. Preliminary test of setup leading to slight design modifications.
3. Small scale testing thoroughly underway.
4. FE work continues.

Circumstance affecting project or budget. (Please describe any challenges encountered or anticipated that might affect the completion of the project within the time, scope and fiscal constraints set forth in the agreement, along with recommended solutions to those problems).

Potential Implementation:

None at this time. Too early in the research.


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