

## TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Date: September 30, 2014

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.*

<b>Transportation Pooled Fund Program Project #</b> <i>(i.e., SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX))</i>  <u><b>TPF 5-238</b></u>		<b>Transportation Pooled Fund Program - Report Period:</b> <input type="checkbox"/> Quarter 1 (January 1 – March 31) <input type="checkbox"/> Quarter 2 (April 1 – June 30) <input checked="" type="checkbox"/> Quarter 3 (July 1 – September 30) <input type="checkbox"/> Quarter 4 (October 1 – December 31)	
<b>Project Title:</b> <b>Design and Fabrication Standards to Eliminate Fracture Critical Concerns in Steel Members Traditionally Classified as Fracture Critical</b>			
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<b>Lead Agency Project ID:</b>		<b>Other Project ID (i.e., contract #):</b>	<b>Project Start Date:</b> 8/1/2011
<b>Original Project End Date:</b> 7/31/2014		<b>Current Project End Date:</b> 7/31/2014	<b>Number of Extensions:</b> None

Project schedule status:

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
<b>\$790,000</b>	<b>\$430,763*</b>	<b>60%</b>

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
<b>\$15,000*</b>	<b>2%*</b>	<b>100%</b>

\*Due to a Purdue accounting error, total costs to date for the project were overestimated by about \$40,000. The total cost to date has been updated as of this report. The estimate of funds spend this quarter (\$15,000) is a best estimate at this time.

**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 fabrication. Advancements in NDT techniques along with technologies not regularly used, such as phased array UT have the potential to further reduce the chance of a defect being missed.

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

- Continued literature review.
- Continued to work with steel producers to find plates with appropriate toughness for large-scale testing. A meeting was held at Purdue University with SSAB to discuss plate needs.
- Began work with steel bridge fabricators to find plates with appropriate toughness.
- Completed crack arrest specimen testing.
- Completed data analysis of small-scale testing.
- Completed final design for tensile testing frame capable of 2,000 kips.
- Received quotes for tensile testing frame.

**Anticipated work next quarter:**

- Continue reviewing relevant literature.
- Locate appropriate material from steel producer or steel bridge fabricator for the first round of large-scale test specimens.
- Order the first round of large-scale specimens.
- Plan instrumentation layout for large-scale specimens.
- Complete summary report for small-scale testing portion of project.
- Begin FE modeling of large-scale specimens.
- Begin fabrication of tensile testing frame.

**Significant Results:**

During the past quarter, the major steps forward included:

1. Completion of all small-scale testing.
2. Completion of tensile testing frame design.
3. Continued dialog with steel producers and steel bridge fabricators.

**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).**

Similar to last quarter, a great deal of time this quarter has been spent working with steel producers and fabricators to obtain plate donations for the large-scale test specimens. This process continues to take longer than anticipated; however, the Research Team is hopeful plate donations will be provided early in the next quarter and specimen fabrication will commence.

**Potential Implementation:**

A no-cost time extension has been requested due to unforeseen project delays.