

**TRANSPORTATION POOLED FUND PROGRAM  
QUARTERLY PROGRESS REPORT**

Date: June 30, 2015

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 checked="" type="checkbox"/> Quarter 2 (April 1 – June 30) <input 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>			
<b>Name of Project Manager(s):</b> Tommy E. Nantung		<b>Phone Number:</b> (765) 463-1521 ext. 248	<b>E-Mail</b> <a href="mailto:tnantung@indot.in.gov">tnantung@indot.in.gov</a>
<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>\$643,000</b>	<b>78%</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>\$21,622</b>	<b>2.8%</b>	<b>100%</b>

**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 preliminary CVN material testing and identified a second plate for large-scale testing.
- Secured plate donations from steel mills for top flange, web, and splice material of bending test specimens.
- Secure plate donation from fabricator for Grade 70 large-scale test specimens.
- Ordered (4) bending test specimens: (2) Grade 50 and (2) Grade 70.
- Completed fabrication of tensile load frame.
- Began erection of tensile load frame (see attached photograph).
- Began small-scale fracture mechanics testing of large-scale test specimen material.
- Reinstalled repaired MTS actuator for West bending test setup.
- Completed draft final report on small-scale material testing (see attached).
- Began FE modeling of large-scale specimens.

**Anticipated work next quarter:**

- Continue reviewing relevant literature.
- Receive Grade 50 bending test specimens.
- Begin large-scale bending and axial tests.
- Complete design of axial test specimens.
- Receive quotes for axial test specimens.
- Complete erection of axial test frame and perform preliminary testing.
- Order the first round of axial test specimens.
- Design, fabricate, and erect fatigue test figure to precrack axial test specimens.
- Continue fracture mechanics testing of small-scale specimens.
- Continue FE modeling of large-scale specimens.

**Significant Results:**

During the past quarter, the major steps forward included:

1. Identified and secured large-scale test plates.
2. Completed fabrication and substantial erection of axial test frame.
3. Completed final report on small-scale specimens.

**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 to date

