

## TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Date: Dec. 31, 2016

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 5-253</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 type="checkbox"/> Quarter 3 (July 1 – September 30) <input checked="" type="checkbox"/> Quarter 4 (October 1 – December 31)	
<b>Project Title:</b> <b>Evaluation of Member Level Redundancy in Built-up Steel Members</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> 9/1/2011
<b>Original Project End Date:</b> 8/31/2014		<b>Current Project End Date:</b> 7/31/2016	<b>Number of Extensions:</b> One

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>\$700,000</b>	<b>\$556,931</b>	<b>96%</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>\$4,565</b>	<b>0.6 %</b>	<b>100%</b>

**Project description:**

The objective of this research project is to quantify the redundancy possessed by built-up members. For example, a riveted built-up member will not typically “fail” if one of the components fractures. However, there is very little experimental data which is available to quantify the remaining fatigue life or strength of a member in which one of the components has failed. Furthermore, if built-up members are located in bridges classified as fracture critical, when significant member redundancy can be shown the bridge may not need to be classified as FC. However, doing so would release these members from the more rigorous arms-length inspection currently required. As a result, should a component fail, it may go undetected for an extended interval. Thus, a portion of the project is devoted to setting rational inspection intervals for these members. Lastly, the advantages of using built-up members fabricated with HPS components fastened using HS bolts in new construction will also be explored.

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

- Participated in T-18 meeting in Boise ID and presented draft of ballot read specifications for evaluation of flexural members to T-18. The committee voted to move forward with a ballot on flexural members.
- Successfully tested second axially loaded member.
- Continued with FEA parametric studies for axially loaded members
- Developed method to account for staging effects associated with composite action in flexural members and incorporated it into the specifications.

**Anticipated work next quarter:**

- Continue working on parametric studies associated with axial members.
- Test additional prototype axial test specimen.
- Prepare ballot for evaluating flexural members for consideration by AASHTO T-14 for the January meeting in Orlando.

**Significant results:**

During the past quarter, the major steps forward included:

1. Gained support from AASHTO T-18 to prepare ballot item related to specifications for evaluating internal redundancy in built up members.
2. Design and testing of the second axially loaded specimen

**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, with recommended solutions to those problems).**

**Potential Implementation:**

Working with T-18 and T-14 to develop specification language for implementation of results into MBE for riveted members subjected to flexure. Draft AASHTO-ready specification language has been prepared and the RT will continue to work with AASHTO to move the research into practice.