

**TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT**

Date: February 9 2012

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>(i.e., SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX))</i> <u>TPF 5(238)</u>		Transportation Pooled Fund Program - Report Period: <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)	
Project Title: Design and Fabrication Standards to Eliminate Fracture Critical Concerns in Steel Members Traditionally Classified as 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:

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
\$810,000	\$18,855.72	8%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
18,855.72 (2.3%)	\$18,855.72	11.1%

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.):

- The project kick-off meeting was held in Indianapolis IN on October 17-19, 2011. Both Pooled fund projects [TPF-5(238) and 5(253) were held at the same time]
- The literature review continues.
- The large-scale experimental program is being refined. The cooling chamber has been designed and has undergone multiple tests. At this time, a full-scale plate girder that is larger than what will be tested, has been successfully cooled to temperature below -60F (Zone III LAST). Some minor refinements will be made but the cooling chamber is essentially complete
- Small-scale material testing (CVN, CTOD) continues.
- The research team is working with various steel fabricators and DOT's to obtain "drops" of HPS from bridge projects around the US. The small pieces of HPS will be used for samples to be used in the small scale testing
- Fixtures for loading have been obtained and are in fabrication. The steel for the fixtures was donated and the fabrication is also being donated.

Anticipated work next quarter:

- Continue to refine the testing plan.
- Finalize the design of the cooling chamber
- Take Delivery of the large-scale testing fixtures
- Continue with small-scale material testing
- Continue to work with DOT's to obtain more "drops"
- Begin initial FE studies to estimate fracture toughness demands on girders and plates with cracks

Significant Results:

During the past quarter, the major steps forward included:

1. Development and design of large cooling chamber to ensure large girders can be tested at temperatures of -60F or less.
2. Final design and detailing of the large-scale fixtures

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).

The issues with the contract delays have been handled and the Research Team is working hard to get back on schedule. We believe we are near to being back on schedule

Potential Implementation:

None at this time. Too early in the research.