

## TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Date: March 31, 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.*

<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 checked="" 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 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> Hca a mBUbñ b[ '		<b>Phone Number:</b> 765-463-1521 ext 248	<b>E-Mail:</b> tnanung@indot.in.gov
<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>\$291,666</b>	<b>30%</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>\$80,560</b>	<b>10%</b>	<b>58%</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. 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.
- The second set of load frames has been erected. (See photograph)
- Actuator mounting plates have been received.
- Actuators have been installed.
- The hydraulic system has been installed for one of the test setups including hoses, manifolds, and valves.
- Bracing has begun to be constructed.
- 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
- FE work continues.

**Anticipated work next quarter:**

- Continue reviewing relevant literature.
- Continue to refine the testing plan.
- Begin planning instrumentation layout for large-scale specimen.
- Calibrate instrumentation.
- Finalize design of large-scale specimens.
- Complete construction of load frames.
- Install test beam to evaluate entire setup design and functionality.
- Continue with small-scale material testing.
- Continue to work with DOT's to obtain more "drops".
- Continue FE work.

**Significant Results:**

During the past quarter, the major steps forward included:

1. Second set of testing fixtures have been erected.
2. Hydraulic components have been received and installation has begun.
3. Actuators have been installed.
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).**

An Actuator was installed and found to be leaking a significant amount of oil. It has been sent to MTS for repair of seals. It will not impact the project schedule.

Virginia Tech has had considerable delay regarding small scale testing of compact fracture specimens due to problems with an MTS controller. The problem required the MTS to provide new equipment after much trouble shooting by VT staff. The problem has been corrected and testing is back on track, but this did cause delays to the VT team

**Potential Implementation:**

None at this time. Too early in the research.

