# TRANSPORTATION POOLED FUND PROGRAM
# QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): IOWA 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 #**<br>*TPF-5(219)* | **Transportation Pooled Fund Program - Report Period:**<br>Quarter 1 (January 1 – March 31)<br>Quarter 2 (April 1 – June 30, 2012)<br>Quarter 3 (July 1 – September 30, 2012)<br>**X**Quarter 4 (October 4 – December 31, 2012) |
|---|---|

**Project Title:** Development of a Structural Health Monitoring System to Evaluate Structural Capacity and Estimate Remaining Service Life for Bridges

| **Project Manager:** | **Phone:** | **E-mail:** |
|---|---|---|
| Ahmad Abu-Hawash | 515-239-1393 | ahmad.abu-hawash@dot.iowa.gov |
| **Project Investigator:** | **Phone:** | **E-mail:** |
| Brent Phares | 515-294-5879 | bphares@iastate.edu |

| **Lead Agency Project ID:** | **Other Project ID (i.e., contract #):** | **Project Start Date:** |
|---|---|---|
| RT 329 | Addendum 367 | 3/01/10 |
| **Original Project End Date:** | **Current Project End Date:** | **Number of Extensions:** |
| 2/28/15 | | |

Project schedule status:

X On schedule ☐ On revised schedule ☐ Ahead of schedule ☐ Behind schedule

Overall Project Statistics:

| Total Project Budget | Total Cost to Date for Project | Total Percentage of Work Completed |
|---|---|---|
| $500,000.00 | $232,654 | 27% |

***Quarterly*** Project Statistics:

| Total Project Expenses This Quarter | Total Amount of Funds Expended This Quarter | Percentage of Work Completed This Quarter |
|---|---|---|
| $102,673 | | 2% |

**Project Description:**

- Literature Review: Damage detection and load rating algorithms
- Literature Review: Techniques for assessing remaining service life
- Interim Report
- Development of real-time, strain-based algorithm(s)
- Development of real-time, vibration-based algorithm(s)
- Development of real-time, fused-data algorithm(s)
- Compare and contrast result(s) from Tasks 4 through 6
- Interim Report
- Development of Statistical Models to Extrapolate Time-dependent Load Ratings
- Development of Structural Models to Quantify Extrapolations
- Final Report

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

During the current quarter, we continued installing the SHM system on the demonstration bridge and finalized the purchase of other important components. Additionally, we have continued working on the development of software that will be used to test the developed algorithms. This has been, on the surface, successful. While waiting for data collection to start so that we may test the algorithms, we have been conducting sensitivity studies to study variables impacting the approaches.

**Anticipated work next quarter:**

We will work on completing the Phase II plan.

**Significant Results:**

We have found that there are relatively few modal-based algorithms that have been field validated. However, those that have been validated show some interesting promise. Also, our technique for determining load ratings from random, unknown vehicles appears to be working well.

**Circumstance affecting project or budget (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).**

None.