

TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): Missouri Department of Transportation

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> <p style="text-align: center;">TPF-5(247)</p>	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 checked="" type="checkbox"/> Quarter 3 (July 1 – September 30) <input type="checkbox"/> Quarter 4 (October 4 – December 31)	
Project Title: <p style="text-align: center;">Field Field Testing Hand-Held Thermographic Inspection Technologies Phase II</p>		
Name of Project Manager(s): <p style="text-align: center;">Jennifer Harper</p>	Phone Number: <p style="text-align: center;">573-526-3636</p>	E-Mail <p style="text-align: center;">Jennifer.Harper@modot.mo.gov</p>
Lead Agency Project ID: <p style="text-align: center;">TRyy1144</p>	Other Project ID (i.e., contract #): <p style="text-align: center;">TRyy1144</p>	Project Start Date: <p style="text-align: center;">10 November 2011</p>
Original Project End Date: <p style="text-align: center;">9 November 2014</p>	Current Project End Date: <p style="text-align: center;">9 November 2014</p>	Number of Extensions: <p style="text-align: center;">none</p>

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
\$460,000	\$172,830	39%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
\$172,830/9%	\$40,660	32%

Project Description:

This research is focused on the development and application of practical Nondestructive Evaluation (NDE) tools for use in the routine inspection and maintenance of highway bridges to ensure safety. Thermal (infrared) imaging is used to detect and image subsurface damage (delaminations) in concrete. The technology works by imaging temperature variations on the surface of the concrete that result from subsurface damage such as delaminations. Images showing damage are observed in real-time by the inspector, such that on-site assessment can be conducted. A significant advantage of the technology is that it is rapid, non-contact and can be utilized from a distance, such that arms-length bridge access and traffic control are not required. As a result, the technology can be used to rapidly scan large areas of a bridge to identify areas of damage.

The previous pooled fund study entitled TPF-5(152) Development of Hand-held Thermographic Inspection Technologies, explored the application of thermal imaging technologies for the NDE of highway bridges. Phase I of the research included experimental testing and field testing by participating states. The outcome of phase I testing included a draft guideline for utilizing thermal imaging to detect deterioration in concrete bridges.

Phase II of the research consists of field testing and evaluation of thermal imaging to evaluate the reliability of the technology, validate previously developed guidelines for field use, and evaluate implementation barriers. Participating states will be provided training and hardware for testing within their existing bridge evaluation programs, to identify implementation challenges, evaluate the effectiveness of guidelines, and assess the utility of the technology for bridge condition assessment. The research team, in cooperation with the states, will conduct a series of focused field tests that include field verification of results. These field tests will seek to quantitatively evaluate the capabilities and reliability of the technology under field conditions to validate and improve the guidelines, and support practical implementations of the technology. The outcome of the research will be a new inspection technique for improving bridge safety and identifying repair and maintenance needs.

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

Training trips were made to Pennsylvania, New York, Michigan, and Georgia which brings the total number of state DOT personnel trained in infrared imaging to 73. One training trip to Wisconsin will be done in the 4th quarter of 2012, which will complete training trips.

An in-progress telecon was held August 30, 2012 to update all participants on project progress and to introduce the verification phase of the project.

Verification trips were made to Iowa and Minnesota to confirm by destructive evaluation (concrete coring), the accuracy of the identification of concrete delaminations using infra red cameras. The results have not yet been fully quantified, but do confirm the ability of DOT operators to find delaminations with the IR cameras.

A purchase request was issued to FLIR corporation for one additional T620 camera to be transferred to Wisconsin DOT next quarter.

Anticipated work next quarter:

A training trip will be made to Wisconsin which will complete the planned training trips. A summary report will be written describing the methodology and results of the training phase of the project.

Verification will continue as bridges become available for destructive evaluation. The shared data site will be populated with infrared images of bridge delaminations from all participating states. Data analysis will begin as verifications are completed. A first revision of the 2009 'guidelines for use of infrared imaging' developed in phase 1 of this project will be drafted.

Significant Results:

There are no significant results at this time.

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).

There are no circumstances affecting the project at this time.

Potential Implementation:

Implementation of thermographic imaging as an NDE method for inspecting bridge concrete is being studied under the research plan. Implementation of the technology will occur during and following the project.