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 # *(i.e, SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX)*	**Transportation Pooled Fund Program - Report Period:**
TPF-5(193) Suppl. #73	☐ Quarter 1 (January 1 – March 31) ☐ Quarter 2 (April 1 – June 30) ☑ Quarter 3 (July 1 – September 30) ☐ Quarter 4 (October 4 – December 31)

Project Title:		
Attachemnt of Combination Rails to Concrete Parapets Utilizing Epoxy Adhesive Anchors - Phase I		
Name of Project Manager(s):	**Phone Number:**	**E-Mail**
Bielenberg, Faller, Reid, Rosenbaugh	(402) 472-9064	rbielenberg2@unl.edu
Lead Agency Project ID:	**Other Project ID (i.e., contract #):**	**Project Start Date:**
2611130087001		2/1/2014
Original Project End Date:	**Current Project End Date:**	**Number of Extensions:**
7/31/2015	10/31/2015	1

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
$50,891.00	$49,208.00	90

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
	$11,409.00	

Project Description:

The research objective is to design and evaluate alternative epoxy adhesive anchorages for use in the IaDOT BR27C combination bridge rail system. The alternative epoxy adhesive anchorages would be developed to have equal or greater capacity than the current cast-in-place anchorage, so that they can be used in new construction or as a retrofit to modify existing bridge railings. The proposed epoxy attachment designs will be evaluated through dynamic component testing.

The research effort will consist of redesign, testing, and evaluation of alternative epoxy adhesive anchorage systems for attaching the beam and post system to the concrete parapet according to the details for the BR27C combination bridge railing. This first task in this effort would be for MwRSF to review the current cast-in-place anchorage design and develop alternative epoxy adhesive anchorage configurations. This effort could include an inline anchor system and/or a four anchor system similar to the cast in place configuration but with spacing more compatible with the clearances required for a drill in system. The alternative epoxy adhesive anchorage systems would be submitted to IaDOT for review and selection of the one or two preferred systems to be tested and evaluated.

Dynamic component testing will be used to evaluate the proposed epoxy adhesive anchorages and to demonstrate that the capacity of the proposed epoxy anchorages was equal to or greater than the existing cast-in-place anchorage system. The capacity of the current cast-in-place anchorage has not been fully quantified with testing. Thus, one dynamic component test would be performed on the post using the current cast-in-place anchorage configuration. Additional dynamic component tests would also be performed on the proposed alternative epoxy adhesive anchorage systems. The target impact conditions for all tests would be identical. The tests would be configured so that the applied impact load would occur at a height on the post/rail in order to produce a bending moment in the post and combined loading on the anchorage system similar to that provided during vehicle crash events. The force versus deflection, energy dissipated versus deflection, and failure modes would be documented for each test and compared to one another. These comparisons would be used to verify that the proposed anchorages provided equal or greater capacity than the current

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

MwRSF sent the updated research costs reflecting the revised project scope to IaDOT on April 14, 2015. At This time, MwRSF is awaiting approval of the revised scope and costs.

MwRSF asked for and received a time extension on the project to allow for completion of the research report and closing of the project using the additional funding requested in April 2015.

As noted in the previous progress report, the testing of the original BR27C attachment and the three proposed epoxy anchorage configurations was analyzed, compared and sent to the sponsors. Force versus deflection curves from all four tests were compared. All of the alternative anchorages exceeded the capacity of the cast-in-place anchorage. Thus, all three of the alternatives should be acceptable.

MwRSF is completed the summary report for this research and submitted it to IaDOT for review. We are currently waiting for comments and edits to the report from the sponsor. It is anticipated that the summary report will be completed in October 2015 to correspond with the revised project end. However, the project funding is currently depleted and the additional funding requested in April will be needed to complete the project.

Anticipated work next quarter:

In the upcoming quarter, MwRSF will address the sponsor comments on the research report and complete the project.

Significant Results:

None.

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).

As noted previously, changes to the project scope have affected the budget of the research to some degree. However, IaDOT agreed to the revised scope and budget changes. MwRSF will work with IaDOT with regards to any changes to the scope and budget.

Currently, MwRSF is awaiting a response from IaDOT on the revised scope and budget. There are insufficient funds to complete the project as it currently stands. A time extension was granted by IaDOT to extend the project close date to October 31, 2015.

Potential Implementation:

The development of alternative epoxy adhesive anchorage systems for use in IaDOT combination bridge rails would provide for simpler and more cost-effective construction of combination bridge rails. The new designs would also provide more effective options for new and retrofit construction.