TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): Wisconsin 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. #113	☐ 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:		
Dynamic Testing & Evaluation of a Culvert-Mounted, Strong-Post MGS to TL-3 Guidelines		
Name of Project Manager(s):	**Phone Number:**	**E-Mail**
Bielenberg, Faller, Reid, Rosenbaugh	(402) 472-9070	rbielenberg2@unl.edu
Lead Agency Project ID:	**Other Project ID (i.e., contract #):**	**Project Start Date:**
2611130103001		10/01/2016
Original Project End Date:	**Current Project End Date:**	**Number of Extensions:**
3/31/2018	3/31/2018	0

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
$233,945	$107,005	45%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
	$53,932	

Project Description:

Based on previous NCHRP Report No. 350 and MASH testing of culvert mounted guardrail systems, the WisDOT desires to evaluate the MGS installed on a culvert with the MwRSF version of the strong-post attachment, half-post spacing, and a 12-in. offset from the back of the post to the culvert headwall. WisDOT also desires evaluation of the culvert mounted posts using an epoxy anchorage rather than the through-bolt system used in the original design. It is believed that if the epoxy anchorage performs adequately, then through-bolted option posts would work equally as well.

The research objective is to conduct full-scale vehicle crash testing on the MGS installed on a culvert with the MwRSF version of the strong-post attachment with epoxy anchorage, half-post spacing, and a 12-in. offset from the back of the post to the culvert headwall. All testing will be performed according to the Test Level 3 (TL-3) impact safety standards found in MASH 2016.

Objectives / Tasks
1. Simulated culvert CAD details
2. Simulated culvert construction
3. System CAD details - test no. 1
4. System construction - test no. 1
5. Full-scale crash testing & data analysis (MASH 3-11) - test no. 1
6. System CAD details - test no. 2
7. System construction - test no. 2
8. Full-scale crash testing & data analysis (MASH 3-10) - test no. 2
9. System removal
10. Transition analysis and guidance
11. Written report documenting design, testing, and conclusions

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

In this quarter, MwRSF conducted the first of the two full-scale crash tests on the MGS system installed on culvert. Test no. CMGS-1 on 12/1/2017. In this test, a 1100C small car vehicle impacted the barrier system at a speed of at 61.3 mph and an angle of 25.1 degrees. During the impact, the vehicle was captured and stably redirected. Occupant risk criteria were within the MASH limits. It should be noted that a partial tear of the rail splice downstream of impact was noted during the test. This type of rail tearing has been observed in other small car tests of increased stiffness MGS systems and is believed to be due to combined loading of the rail splice by the small car. However, the integrity of the rail was not compromised nor did the tear adversely affect the performance of the barrier in the test. This test was deemed unsuccessful under the MASH TL-3 impact conditions.

Work towards the summary report for the research effort and testing was initiated.

Anticipated work next quarter:

In the next quarter, MwRSF plans to run the second full-scale test on the barrier system, test designation 3-11 with the 2270P vehicle. Work will also continue on completion of the summary report.

Significant Results:

None.

Task	% Completed
1. Simulated culvert CAD details	100%
2. Simulated culvert construction	100%
3. System CAD details - test no. 1	100%
4. System construction - test no. 1	100%
5. Full-scale crash testing & data analysis (MASH 3-11) - test no. 1	100%
6. System CAD details - test no. 2	100%
7. System construction - test no. 2	100%
8. Full-scale crash testing & data analysis (MASH 3-10) - test no. 2	0%
9. System removal	0%
10. Transition analysis and guidance	0%
11. Written report documenting design, testing, and conclusions	10%
12. Hardware Guide drawings	0%
13. FHWA eligibility application	0%

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).

None.

Potential Implementation:

A strong-post attachment for mounting the MGS on low-fill culverts will provide a safe, cost effective, non-proprietary option for the placement of guardrail across culverts that are too wide for current long-span guardrail systems. Evaluation of the barrier system to the MASH 2016 criteria will allow state DOTs to continue to use this systems on roadways and ensure that its safety performance will remain adequate with respect to the current vehicle fleet. Full-scale crash testing will also identify the dynamic deflection and working width of the barrier system with respect to the current vehicle fleet.