TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): Nebraska Department of Roads

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. #56	☐ 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:		
Increased Span Length of the MGS Long Span		
Name of Project Manager(s):	**Phone Number:**	**E-Mail**
Reid, Sicking, Faller, Bielenberg, Lechtenberg	402-472-3084	jreid@unl.edu
Lead Agency Project ID:	**Other Project ID (i.e., contract #):**	**Project Start Date:**
RPFP-13-MGS-3	2611211082001	7/1/2012
Original Project End Date:	**Current Project End Date:**	**Number of Extensions:**
6/30/2015	9/30/2017	2

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
$212,730 + suppl $36,605	$249,335	98%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
	$4,658	

Project Description:

The current MGS long-span guardrail system provides the capability to span unsupported lengths up 25 ft. While this span length has many useful applications, many culvert structures exceed the span length of the MGS long-span system. Other solutions for mounting guardrail to culverts exist, but mounting hardware to culverts can also cause difficulties. If the long span can be adjusted to accommodate longer spans, the difficulties associated with mounting hardware to the culvert can be avoided.

The objective of this research effort is to design and evaluate the MGS long-span design for use with unsupported spans greater than 25 ft. The research effort could be focused in one of two directions. The research could focus on determination of the maximum unsupported span length for the current long-span design or it could focus on evaluating potential modifications that may allow for significantly longer unsupported spans. The increased unsupported span design would be designed to meet the TL-3 safety criteria set forth in MASH.

Objectives / Tasks

1. Literature review of previous long-span systems - completed
2. Simulation of both original and any new long-span system designs - completed
3. Design modifications to extend unsupported length - completed
4. Full scale crash testing of new design (two MASH 3-11 tests) - completed
5. Data analysis and evaluation - completed
6. Written reports documenting all design work, simulation, testing, and conclusions - in-progress

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

Task 6.

The test report for this project was published: "Increased Span Length of the MGS Long-Span Guardrail System Part II: Full-Scale Crash Testing," MwRSF Report TRP-03-339-17, April 7, 2017.

The initial failure analysis report associated with analyzing failed test MGSLS-2 in detail was completed and is under internal review.

Anticipated work next quarter:

Task 6.
The failure analysis report will be reviewed, finalized and distributed.

Significant Results:

Simulations of an increased span length indicated possible successful redirection at a span length of 31.25-ft and 37.5-ft. The 43.75-ft and 50-ft span lengths were ruled out as potential span lengths for future full-scale crash testing due to questionable vehicle capture and severe impacts with the downstream wing wall.

Based on Pooled Fund member states preferences, the following was selected for testing: Span length of 31.25-ft and replace the wood CRT posts with universal breakaway steel posts.

Impacting at CIP-1, test no. mgsls-1 successfully crash tested the increased span length MGS system on May 18, 2015.

Impacting at CIP-2, test no. mgsls-2 unsuccessfully crash tested the increased span length MGS system on June 30, 2015. The downstream anchorage disconnected relatively early in the event, allowing for the truck to pass through the system.

The simulation and design phase report for this project was published: "Increased Span Length of the MGS Long-Span Guardrail System," MwRSF Report TRP-03-310-14, December 17, 2014.

The test report for this project was published: "Increased Span Length of the MGS Long-Span Guardrail System Part II: Full-Scale Crash Testing," MwRSF Report TRP-03-339-17, April 7, 2017.

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).

This project has a cost of $249,335. There was insufficient funding in Pool Fund Year 23 to fund this entire amount. Thus, the budget for Year 23 is $212,730, and the remaining is being funded by contingency funds in Pool Fund Year 23.

Due to the higher than normal rainy season, the full-scale testing program was delayed, resulting in an overall project delay. A no-cost time extension was granted.

Potential Implementation:

The MGS long-span system has the ability to perform safely without nested rail and with a minimal barrier offset. These features make the barrier a very functional, efficient, and safe option for protection of low-fill culverts. Development of an increased unsupported span length for the MGS long-span system will add to the flexibility of the design and provide for improved protection of culvert headwalls and vertical dropoffs with a length greater than 25 ft.