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) Supplement #106	☐ 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:		
MGS with Curb		
Name of Project Manager(s):	**Phone Number:**	**E-Mail**
Reid, Faller, Bielenberg, Lechtenberg, Rosenb	402-472-9324	srosenbaugh2@unl.edu
Lead Agency Project ID:	**Other Project ID (i.e., contract #):**	**Project Start Date:**
2611211135001	RPFP-17-MGS-2	10/1/2016
Original Project End Date:	**Current Project End Date:**	**Number of Extensions:**
9/30/2019	9/30/2019	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
$161,926	$59,975	70%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
	$59,383	

Project Description:

Curbs located along roadways can adversely affect the interaction of errant vehicles with roadside barriers. Although the two are commonly used in combination, when curbs are placed near guardrail systems, the propensity for vehicle underride, override, and instability increases. The MGS with a curb offset 6 in. from the front face of the guardrail was successfully crash tested to NCHRP Report No. 350 TL-3 requirements. However, the MGS with curb has not yet been evaluated to MASH TL-3.

Thus, the objective of this research is to evaluate the performance of the MGS installed with the face of the rail offset 6-in. from the face of the 6-in. tall AASHTO Type B curb. The evaluation of the barrier system behind curb will be undertaken according to the MASH TL-3 safety criteria through two full-scale crash tests with both the 1100C and 2270P vehicles.

Objectives / Tasks:

1. CAD Details
2. Construction of test article
3. Full-Scale Testing - MASH 3-10
4. Full-Scale Testing - MASH 3-11
5. Data Analysis
6. System Removal
7. Summary Report
8. TF13 Hardware Guide Drawings
9. FHWA Eligibility Letter

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

Two full-scale crash tests were conducted on the MGS with curb test installation. The first test, test no. MGSC-7, was conducted according to MASH 3-10 with the 1100C small car. During the test, the barrier captured and redirected the vehicle with controlled system deflections. The W-beam rail was partially torn at the location of the critically loaded splice. This is the same location as the complete rail rupture observed during testing of the MGS with curb and an omitted post. Thus, the standard system (i.e., no omitted posts) provides enough support and strength to prevent the tearing previously observed.

The second full-scale test, test no. MGSC-8, was conducted according to MASH 3-11 with the 2270P pickup truck. during the test the vehicle was captured and smoothly redirected. The impact event caused the guardrail to detail from every post downstream of impact, though the cable anchorage was still intact. After the vehicle lost contact with the the system, it steered back toward the system eventually coming to a stop on top of the downstream anchorage. Although the front tires overrode the guardrail, this was not seen as grounds for failure of the system for multiple reasons. 1) the vehicle had already safely exited the system, so the tire rolling over the downstream end would be a secondary impact on a damaged system. 2) the trailing end anchorage utilized during the test is expected to gate for impacts located downstream of the 6th post form the downstream end, and the secondary impact clearly impacted near post 3. Thus, the system is supposed to gate at this location. 3.) rail release from posts all the way through the anchor posts has been observed in other successful tests on versions of the MGS. This was just the first occurrence of a secondary impact. Thus, test MGSC-8 was deemed a PASS to be consistent with previous testing evaluations.

Data from both tests has been analyzed.

Anticipated work next quarter:

Work will begin on the summary report documenting the full-scale testing and the recommended guidelines for installation.

Significant Results:

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Objectives / Tasks:	% Complete
1. CAD Details	100%

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 was waiting for the testing results of a related project - TPF-5(193) suppl. #105: Testing of the MGS Omitted Post with Curb. The omission of a post is thought to increase the risks of vehicle instabilities and possible capture issues. Thus, it was deemed the more critical of the system installations. If the MGS with Omitted post with curb was successfully tested, this project would likely not be necessary as an FHWA eligibility letter may be obtained for standard MGS with curb. However, a failure occurred during the evaluation of the omitted post installation. Thus, this project became active after being delayed to observe the results from the related project, TPF-5(193) suppl. #105: "Testing of the MGS Omitted Post with Curb." However, the full-scale crash testing was conducted in a very timely manner, so the project will be completed on time.

Potential Implementation:

The successful testing and evaluation of the MGS guardrail system offset from a 6-in. tall Type B curb would provide state DOTs with a MASH-tested option to install curb adjacent to the MGS. Evaluation of the MGS with curb will allow state DOTs to continue to use this hardware on their roadways and will ensure that its safety performance remains adequate with respect to the current vehicle fleet.