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)* TPF-5(193) Suppl. #103	**Transportation Pooled Fund Program - Report Period:** ☑ 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: 34" Tall Thrie-Beam Approach Guardrail Transition		
Name of Project Manager(s): Rosenbaugh, Faller, Faller, and Reid	**Phone Number:** 402-472-9327	**E-Mail** srosenbaugh2@unl.edu
Lead Agency Project ID: 2611130101001	**Other Project ID (i.e., contract #):** RHE-17M	**Project Start Date:** 9/7/2016
Original Project End Date: 3/31/18	**Current Project End Date:** 3/31/18	**Number of Extensions:** 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
$179,936	$34,112	35%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
	$26,290	

Project Description:

A taller rail height approach guardrail transition (AGT) is desired to allow for future roadway overlays without modifications or retrofits to the thrie beam AGT. Ideally, a 3" overlay could be placed in front of a 34" tall AGT, thereby making it a standard 31" tall AGT. Thus, the objective of this research is to evaluate the safety performance of NDOR's approach guardrail transition (AGT) with the top mounting height of the thrie beam increased from 31" to 34". The 34" tall AGT will be evaluated according to MASH TL-3 safety performance criteria. The concrete buttress at the downstream end of the the transition will be selected to fit the needs of NDOR and ensure a crashworthy system after a 3" overlay. Finally, connection details for the MGS upstream of the thrie-beam AGT will be developed for both pre- and post-overlay situations.

Major Task List:

1. Project Planning and Correspondence
2. Design/Selection of Concrete Buttress
3. Design of MGS to 34" Transition
4. CAD Details
5. Construction of Test Article
6. Full-Scale Crash Testing - MASH 3-20
7. Full-Scale Crash Testing - MASH 3-21
8. System Removal
9. Data Analysis
10. Summary Report
11. Technical Brief and Presentation for NDOR
12. Submission of FHWA Eligibility Letter

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

Previously, the 34" AGT was designed for both initial installations (at 34") and for after 3" overlays (31"). CAD details were developed for system.

This quarter, the 34" AGT test installation was constructed at the MwRSF test site. The first of 2 full-scale crash tests was conducted, a MASH 3-21 test with the 2270P impacting just upstream of the rigid buttress. The pickup truck was smoothly redirected and remained upright after the test. There was very little snag between the vehicle and the buttress, and all occupant safety values satisfied MASH criteria. Thus, test no 34AGT-1 passed the MASH evaluation criteria.

Following test 34AGT-1, the system was rebuilt and is awaiting the second full-scale test, MASH 3-20.

Anticipated work next quarter:

MASH test 3-20 with the 1100C small car will be conducted on the 34" AGT.

Significant Results:

Through multiple meetings and discussions between MwRSF and NDOR, the concrete buttress design and the upstream transition from 31" MGS to 34" AGT were finalized. The concrete buttress is a taller version of the Standardized Transition Buttress being developed through the Midwest States Pooled Fund (39" instead of 36"). The upstream MGS will connect to a symmetrical W-to-thrie transition segment that will take the top rail height from 31" to 34". Once an overlay is paved, the symmetric segment will be replaced with an asymmetrical W-to-thrie segment, and the W-beam rail and blockouts upstream of the the transition will be raised 3" to match the top rail height of the AGT (was 34" now 31" relative to the top of the roadway). Extra bolt holes were placed in the posts to accommodate the different transition segments and the raising of the W-beam.

CAD details for the system were developed and the 34" AGT system with 39" standardized buttress was constructed at the MwRSF test site. The first full-scale crash test, M34AGT-1, resulted in the 2270P being smoothly redirected with only minor contact between the vehicle and the buttress. All occupant safety criteria was satisfied, so the test passed all saftey performance criteria of MASH 3-21.

Major Task List:	% Completed
1. Project Planning and Correspondence	75%
2. Design/Selection of Concrete Buttress	100%
3. Design of MGS to 34" Transition	100%
4. CAD Details	90%
5. Construction of Test Article	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).

None

Potential Implementation:

The successful testing of the 34" tall AGT will allow NDOR to install both their bridge rails and their adjacent AGTs in anticipation of future overlays. Both of these barrier types will now be crashworhty at the time of initial installation as well as after a 3" roadway overlay. Not having to remove and replace the AGTs after an overlay should result in significant savings in both cost and labor.