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. #101	☐ 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:		
Attachment of Combination Rails to Concrete Parapets Utilizing Epoxy Adhesive Anchors - Phase IB		
Name of Project Manager(s):	**Phone Number:**	**E-Mail**
Faller, Bielenberg, Reid, Rosenbaugh	(402) 472-9064	rbielenberg2@unl.edu
Lead Agency Project ID:	**Other Project ID (i.e., contract #):**	**Project Start Date:**
2611130099001		7/01/2016
Original Project End Date:	**Current Project End Date:**	**Number of Extensions:**
12/31/2018	12/31/2018	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
$254,445.00	$11,277.00	7

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
	$7,864.00	

Project Description:

The objective of this research is to develop a MASH TL-2 crashworthy, low-height, vertical-face traffic barrier with an attached crashworthy bicycle railing. It is desired that the low-height, vertical-face traffic barrier be applicable for standard applications and that the crashworthy bicycle railing attachment can be added as desired. The barrier system should minimize the height of the concrete barrier portion of the system and provide improved visibility and sightlines, including when the bicycle railing attachment is used. In addition, the new railing system should comply with current AASHTO LRFD guidance for bicycle railings with respect to the parapet and/or the parapet and combination railing.

The research effort to develop a MASH TL-2 crashworthy, low-height, vertical-face traffic barrier and attached crashworthy bicycle railing will proceed in two phases. Phase I will consist of the development and analysis of design concepts, and Phase II will consist of evaluation and full-scale crash testing of the proposed design.

Phase I

The Phase I research effort will begin with a literature search to review crash tested vertical parapets and bicycle/pedestrian rails. The information will be reviewed to suggest potential vertical concrete parapet geometries and designs as well as provide background information on existing crashworthy combination railings. Following the literature search, the researchers will estimate the lowest vertical-faced concrete barrier height that is sufficient to meet AASHTO MASH TL-2 crash testing requirements and can also be used with a pedestrian/bicycle railing. A 24-in. minimum height will be the lowest potential parapet height based on the AASHTO LRFD guidance for a pedestrian separation barrier, as noted previously. However, no rigid parapets have been evaluated at that height under the MASH TL-2 criteria.

LS-DYNA simulation with the 2270P vehicle will be used to evaluate potential minimum rail heights for the vertical parapet of 24 in. or greater. A baseline simulation model will be created and validated against the best available relevant crash

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

The literature search that was performed on previous crash testing and development of TL-2 and TL-3 vertical concrete parapets and combination bridge rails as well as low-height TL-2 and TL-1 barriers was continued. The initial literature search was reviewed and additional sources were identified and added. Information on the Zone of Intrusion and occupant head ejection that may be relevant to the project was collected as well. The literature search section of the report has been partially written during this quarter and that effort will continue.

Anticipated work next quarter:

In the upcoming quarter, the researchers will review the collected background data and begin to make estimates for the minimum parapet height required to meet MASH TL-2. If time allows, the researchers will begin the LS-DYNA simulation of the proposed minimum parapet height and begin to evaluate vehicle extent over the barrier for the purpose of guiding the combination rail design and placement.

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).

None.

Potential Implementation:

Investigation and evaluation of a MASH TL-2 crashworthy, low-height, vertical-face traffic barrier and an attached crashworthy bicycle railing will provide IaDOT with a safe option for shielding bicycle facilities and also may be used without a railing for pedestrian separation.