

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>TPF-5(445)</i>		Transportation Pooled Fund Program - Report Period: Quarter 1 (January 1 – March 31) Quarter 2 (April 1 – June 30) Quarter 3 (July 1 – September 30) X Quarter 4 (October 1 – December 31), 2022	
Project Title: Design Guidelines and Mitigation Strategies for Reducing Sedimentation of Multi-barrel Culverts			
Name of Project Manager(s): Marian Muste	Phone Number: 319-384-0624	E-Mail marian-muste@uiowa.edu	
Lead Agency Project ID:	Other Project ID (i.e., contract #):	Project Start Date: May 1, 2020	
Original Project End Date: April 30, 2023	Current Project End Date: April 30, 2023	Number of Extensions:	

Project schedule status:

- On schedule
 X On revised schedule
 Ahead of schedule
 X Behind schedule (see comments)

Overall Project Statistics:

Total Project Budget	Total Cost to Date for Project	Percentage of Work Completed to Date
\$360,000*	\$157,142	44%**
*including the \$60,000 funding from Missouri DOT		** after 2021 and 2022 work plan revisions

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
	\$ 24,847	%

Project Description:

The overall goal of the TPF-5(445) project is to leverage the extensive research conducted in Iowa through a multi-state research effort leading to design guidelines and specifications for mitigation measures for reducing sedimentation at existing and proposed multi-barrel culvert locations. The guiding principles and best practices for mitigating sedimentation will complement the existing hydraulic design guidelines. The project entails laboratory, numerical, and field monitoring and analysis to determine the overall effect of the sedimentation-reduction designs on the hydrology and transport of sediment at culverts. The project outcomes will be assembled in a web-based platform with interactive parameters that can uniquely support the routine activities related to culverts.

The TPF-5(445) project objectives are:

1. Assemblage of data and knowledge on sedimentation at culverts and mitigation measures
2. Synthesis of the practical knowledge in guidelines for design and operations for reducing or eliminating sedimentation at culverts
3. Development of a web-based platform that will embed the formulated guidelines in easy-to-use interactive interfaces that will facilitate to retrieve design and operation information and to guide in the selection of a self-cleaning culvert design fit for the local flow and sediment transport conditions.

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

For the reference period (October 1-December 31, 2022), the research was focused on the following tasks:

- The second in-person meeting of the project TAC was held on November 30-December 1, in Albuquerque, New Mexico. The meeting discussions focused on the test results obtained in the retrofitted model specific for New Mexico and Utah hydro-morphological conditions. During the evaluations, the TAC converged on the realization that the following adjustments have to be made to the experimental program:
 - Given that the tests for “ramping storms” scenario is more realistic for the in-situ conditions in New Mexico and Utah, the “long storms” scenarios will be eliminated from future testing.
 - The SB-S-C configuration can be eliminated as it represents a quasi-equivalent curtain configuration as SB-SS-C, and it is more difficult to construct and install.
 - The streamlined cross-section curtain (CX-SS-C) will be not pursued for further.
 - The woody debris flows are not frequent in the DOT districts located in NM and UT with considerable loads of sediment, therefore will not be considered for testing.
 - The necessity to introduce new scenario alternatives in the testing program of:
 - storms developing on the sediment layers created by previous storms
 - repeated storms (2 and possible more) on the other curtain wall configurations
- Survey #7 was designed and released for getting full input from the TPF team members following the discussions in the second annual meeting

Anticipated work next quarter:

- Synthesis of the Survey #7 input
- Execution of the additional tests suggested in the second annual meeting
- Progression with the modeling tests to the scenarios established in the second annual meeting for the second stream-to-culvert angle of incidence

Significant Results:

Considerable progress was made to illustrate the process of formation and development of the sediment deposits at New Mexico and Utah hydro-morphological conditions. The importance of the results stems in the fact that there is very scarce documentation and field observations on the mechanics of sedimentation in the semi-arid areas such as in New Mexico and Utah landscapes.

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).

- During the second annual meeting it was decided to trigger a no-cost-extension for the project to accomplishing all the tasks of the project as originally planned and successively changed in the first and second annual meetings of the TPF TAC.

Potential Implementation:

The developed self-cleaning solutions are recommended for in-situ implementation following cost-benefit analyses conducted by specialized DOT offices.