

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 # TPF-5(295)	Transportation Pooled Fund Program - Report Period: X Quarter 1 (January 1 – March 31, 2020) Quarter 2 (April 1 – June 30) Quarter 3 (July 1 – September 30) Quarter 4 (October 1 – December 31)	
Project Title: Midwest Smart Work Zone Deployment Initiative		
Name of Project Manager(s): Dan Sprengeler	Phone Number: 515-239-1823	E-Mail Dan.Sprengeler@dot.iowa.gov
Lead Agency Project ID: Keith Knapp	Other Project ID (i.e., contract #): Addendum 535	Project Start Date: July 1, 2014
Original Project End Date: June 30, 2020	Current Project End Date: June 30, 2021	Number of Extensions: None

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
\$1,425,000 committed	\$1,181,007	0

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
\$63,906		100

Project Description:

The Midwest Smart Work Zone Deployment Initiative (MwSWZDI) was initiated in 1999 as a Federal Highway Administration (FHWA) Pooled Fund Study intended to coordinate and promote research among the participating states related to safety and mobility in highway work zones.

The program is an ongoing cooperative effort between State Departments of Transportation, universities, and industry. The studies completed have consisted of evaluations of various work zone related products, various innovative topics, and several synthesis studies. Completed reports and descriptions of ongoing projects can be obtained at the Iowa State University's Institute for Transportation (InTrans) website (www.intrans.iastate.edu/smartwz/) link to the Smart Work Zone Deployment Initiative. InTrans currently operates as the program manager of the pooled fund efforts and completes administrative tasks related to request for ideas and proposals, meetings, project files, quarterly reports, and recommending reimbursement.

Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):**Quarter Ending March 31, 2020 (Overall)**

During this quarter we communicated with principal investigators as needed and resolved progress issues if they occurred. Projects from Program Years 2018 and 2019 contracts progressed (see below). A 2016 project report was edited and posted. The proposals for Program Year 2020 were reviewed and we worked with the states to select 3 projects for contracting (these three projects will be on the new pooled fund account, TPF-5(438)). The administrative contact for 2019 was extended and the administrative contract for 2020 was proposed and accepted. The 2020 program work plan was also created and the SWZDI website updated.

The following is a summary of accomplishments from January to March 2020 for the individual research projects underway with fund account TPF-5(295).

2019 Program Projects

The following projects were selected in September for funding during the 2019 program year.

- An Intelligent Video-Based End of Queue Warning System for Work Zones, Iowa State University, Shauna Hallmark as PI.

Task 1: A Technical Advisory Committee (TAC) was formed which currently consists of Dan Sprengeler, (Dan.Sprengeler@iowadot.us) and Willy Sorenson (Willy.Sorenson@iowadot.us).

A kick-off meeting was held May 8, 2019

The team will continue to provide quarterly progress reports.

Task 2: The literature review is complete. We are in the process of finalizing the information as a chapter in the final report. The literature review contains a summary of crashes in work zones, available commercial queue warning systems, and a summary of what SWZDI states are doing for queue warning systems.

Task 3: Around 300 back of queue work zone events were identified in a related project using the SHRP 2 NDS data. An IRB was completed with Iowa State University and a data sharing agreement was executed with Virginia Tech Transportation Institute (VTTI). The point at which a driver encounters the back of queue was determined and the time stamp noted. VTTI coded driver glance location, cell phone use, and any

accompanying distractions. Several models were developed which assess behavior leading to hard accelerations at the back of queue.

Task 4: The team met with the TAC early in the project and it was decided that it was not efficient or practical for the team to set up video data collection trailers. Instead the TAC suggested we use locations in Iowa where cameras were already in place. A list of work zones was available from the Iowa DOT. Each work zone and camera location within the workzone was reviewed. Locations where cameras were present which could also have some queuing were identified. This resulted in 21 potential work zones. Video data for each camera were further reviewed and feasible sites identified. A total of 16 camera locations are placed in locations where queues are likely to form.

Video data were downloaded for several months for the 16 locations. The team has access to the Iowa DOT work zone camera feed through the InTrans Reactor lab. Code was written to automate download and identify issues.

Code was written which can automatically scroll through each video and will identify locations where vehicles have slowed down. The code was run for all of the 16 locations. The program created a clip of potential slowdowns.

Back of queue events were manually reduced. Data have been reduced for 371 back of queue events. The following information was coded: type of vehicle, type of queue, type of event, time, and vehicles involved. The next step is to analyze the data to identify patterns.

Task 5: SWZDI states were contacted and the QWS they utilize was identified. We are in the process of summarizing the information. Summaries have been completed for 4 states.

Task 6: We are in the process of developing the draft final report.

This project has a start date of 1/1/2019 and an end date of 3/31/2020. A quarterly reports was provided that indicates the progress on each tasks and the percentage complete of each task. It appears that Tasks 1 and 2 are 80% and 90% complete, respectively, and Tasks 3 and 4 are 75% and 65% complete, respectively. Task 5 is 50% complete and Task 6 is 15% complete. The overall project is about 75% complete.

- Field Testing of Non-Motorized Road User Accommodations for Work Zones, Iowa State University, John Shaw as PI.

Task 1: TAC, IRB, Qtr Reports: Recruited TAC members. Conducted project kick-off meeting on July 12, 2019.

Participated in webconference to coordinate with other national efforts.

Task 2: Literature Review: Reviewed MnDOT documents related to previous pedestrian safety demonstration.

Task 3: Develop Test Plan: Currently working with City of Cedar Rapids to develop test plan.

Task 4: Ped Test Track (PTT): No activities

Task 5: Field Evaluations: No activities

Task 6: Final Report: No activities

This work has a contract of 1/1/2019 and an end date of 3/31/2020. It has been extended to December 31, 2020. It has been or soon will be extended again to March 31, 2021. It is 5% complete.

- Investigation of Autonomous/Connected Vehicles in Works Zones, University of Missouri-Columbia, Carlos Sun as PI.

Many details of the simulator trials have been completed. The "storybook" of how each human subject will encounter AV platoons near a work zone was finalized. In other words, once a driver starts from the rest area, all the other vehicles are carefully directed so that each human subject experiences a similar scenario.

This project is contracted to start on 4/15/2019 and end on 7/31/2020. It is 60 percent complete.

2018 Program Projects

- Development of Adjustment Factors for HCM Sixth Edition Freeway Work Zone Capacity Methodology, Iowa State University, Jing Dong as PI.

Calculate capacity and queue discharge rate of all the work zones based on HCM methods
Prepare draft final report

This project was contracted to start on April 1, 2018 and was scheduled to finish on July 31, 2019. This end date has been extended to December 31, 2019. It has been extended again to June 30, 2020. It is 85% complete.

- Guidance on Active Work Zone Data Archival, Iowa State University, Anuj Sharma is PI.

Task 1. Develop and Convene TAC - COMPLETED.

Task 2. Conduct Literature Review - COMPLETED. The research team conducted an analysis of existing technical standards and protocols related to work zone traffic data interchange. These included the Traffic Management Data Dictionary (TMDD), SAE standard J2540 / International Traveler Systems Information (ITIS), the European DATEX2 standard, and the draft work zone data exchange protocols currently being proposed by FHWA. Agency work zone data use cases were also compiled and summarized based on the FHWA draft report and other sources. A TAC meeting was held to review the results of this task.

Task 3. Develop Survey - COMPLETED. The first draft of the survey was completed in March 2019 and major revisions were made in May-June 2019 based on TAC recommendations.

Task 4. Conduct Survey - COMPLETED. Survey distribution began on June 24, 2019 and responses were received from 20+ states. Follow-up interviews have been completed.

Task 5. Analyze Survey Results - COMPLETED. Analysis of survey results has been completed.

Task 6. Meet with TAC - A TAC meeting was held Oct 22, 2019 to review the survey results and next steps.

Task 7. Develop Prototype and Report - COMPLETED. A conceptual work zone data collection and management tool has been developed.

Task 8. Finalize Prototype and Report - Final Report nearly complete.

This project started on January 1, 2018 and was expected to finish on December 31, 2018. A no-cost extension has been provided to extend the project to December 31, 2019. An extension to June 3, 2020 has occurred. The project is 95% complete.

Anticipated work next quarter:

Work will continue to work to finalize the 2018 and 2019 projects listed. The 2020 projects will be administrated on a different contract. It is expected that at least one project will end in the next quarter.

Significant Results:

The 2016 Chitturi project report was finalized.

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, with recommended solutions to those problems).

Currently there are no problems to report with the administrative contract. An extension has been submitted by request of the Iowa DOT and a new administrative contract for the new pooled fund number put into place. The COVID 19 situation will impact the progress of some of the projects currently under contract.

Potential Implementation:

The website for the SWZDI pooled fund is updated on a regular and on an as needed basis for finished reports.