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, 2018) 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, 2019	**Number of Extensions:** None

Project schedule status:

X 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
$1,150,000 (committed)	$727,740.20	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
$193,094.63		0

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 30, 2018 (Overall)
During this quarter we communicated with a number of principal investigators as needed and resolved progress issues if they occurred. Projects from Program Year 2015 to 2017 contracts progressed (see below) and contracts for 2018 were established. The typical meeting for this quarter that is held to select the projects for the next year was done electronically in December 2017. Work this quarter focused on helping the investigators advance and finish projects. One project was finished in 2017 and posted January 2017. Another was also finished in 2017 but is waiting for posting due to some concerns related to the figures used. This issue will be resolved in the near future. Late in the quarter the SWZDI board was contacted for a potential meeting in May 2018 to discuss project advancement and the September face to face meeting.

The following is a summary of accomplishments from January to March 2018 for the Year 2015-2017 individual research projects under fund account TPF-5(295).

2018 Program Projects

- Smart Work Zone App, University of Missouri-Columbia, Yam Adu-Gyamfi as PI.

  Conducted an exhaustive review of the key frameworks for mobile application development. The frameworks included Ember, Aurelia, Angular, Polymer, Unity and React-native. The review evaluated the pros and cons of each development platform based on the following preset performance measures: cross-platform (used for android and iOS development), open-sourced (absolutely free), community driven (a measure of popularity of the application) and speed (how fast does it run). A review of top User Interface (UI) design trends for the mobile applications is currently in progress.

  This project started on January 20, 2018 and is expected to finish on January 19, 2019. It is 12% complete.

- Development of Adjustment Factors for HCM Sixth Edition Freeway Work Zone Capacity Methodology, Iowa State University, Jing Dong as PI.
  This project has not yet started. It is contracted to start on April 1, 2018 and finish on July 31, 2019.

- Guidance on Active Work Zone Data Archival, Iowa State University, Peter Savolainen as PI.

  This project started on January 1, 2018 and was expected to finish on June 30, 2019. The kick-off meeting was held on March 26, 2018 and due to some additional match funding a request for a no-cost extension will be

submitted to extend the end date of the project to June 30, 2019 or December 31, 2019. The project is 2% complete.

2017 Program Projects

- Extension of Safety Assessment Tool for Construction Work Zone Phasing Plans, University of Missouri-Columbia, Henry Brown as PI.

  Work on the literature review has continued. Development of a database for analyzing the safety of work zones at intersections was completed. The database links the work zones, intersections, AADT, road geometry and crashes from the MoDOT Transportation Management System (TMS) data tables. Statistical models to predict work zone crashes for 4-leg signalized intersections, 4-leg unsignalized intersections, ramps, arterials, and multi-lane highways were developed. These models are being added to the previously developed work zone safety assessment tool. Preparation of the draft final report is in progress.

  This project started on March 1, 2017 and is expected to finish on May 31, 2018, but a three month no cost extension was granted to August 31, 2018. It is 65% complete.

- Analytical Methods for Work Zone Travel Time Reliability. University of Wisconsin-Madison Susan Ahn as PI.

  The data collection and modeling efforts have been finished. We collected work-zone, travel time, and ATR data (partially available) for a total of 18 WZs from 11 projects across WI.

  An analytical methodology framework is set up to study the impact of WZs on TTR:

  1. An hour-of-the-day time series of average travel times is generated for each WZ and studied individually to identify oddities. TT are also compared to volumes when available.
  2. TT distribution curves (and TTR measures) are constructed for each WZ. Impact of the WZ on the TTR is measured as a % increase in the measure compared to when WZ was not active.
  3. A statistical model is set up using all WZ data to predict change in TTR measures using AADT, pre-WZ TTR measure, and WZ lane-config as descriptive variables.

  We presented the results from the study to the TAC on March 22nd/23rd, 2018 and are in the process of incorporating some suggestions we solicited from them. We are working on finishing the project report draft to share with the TAC in the coming week.

  This project started on May 15, 2017 and is expected to finish on May 14, 2018. It is 80% complete.

- Testing Non-Proprietary Devices to MASH 2016 Criteria. University of Nebraska-Lincoln, Jennifer Schmidt as PI.

  After the meeting with the TAC, more literature was reviewed on Type III barricades to select a generic design with a reasonable chance of passing MASH that was similar to existing designs that SWZDI states were utilizing. The design was subjected to multiple rounds of engineer review as well as receiving additional input from Matt Neemann (NDOT). System drawings were completed and the system is being obtained from vendors. The first draft of the research report was completed excluding the upcoming full-scale crash test.

  This project started on May 1, 2017 and is expected to finish on April 30, 2018. It is 15% complete.

2016 Program Projects

- Design Optimal and Effective Queue Detection and Notification: Design of a Low-Cost Work Zone Warning System, University of Wisconsin, Madhav Chitturi as PI.

  Project began June 15, 2016. Due to staff turnover, we could not make much progress. The TAC meeting happened in October, 2016 and we obtained their input on the proposed design. Lot of discussion in the TAC meeting about what sign should be used "Be prepared to stop" or "Slow traffic ahead" or "Watch for stopped traffic". Have been in communication with TAPCO about design of the low-cost system. TAPCO has developed a potential design already. We have gone through multiple iterations to make the design MUTCD compatible. Design changes were required to satisfy crashworthiness requirements of roadside hardware without having to go through crash testing requirements. On February 20, 2018, we presented the design changes to TAC. We are communicating with FHWA to ascertain the need for submitting a Request for Experiment to FHWA before proceeding with the field testing.

  Project started on June 15, 2016 and was expected to finish on December 15, 2017. An extension to December 31, 2018 has been requested and granted. The project is 40% complete.

- Understanding the Impact of Work Zone Activities on Traffic Flow Characteristics, University of Missouri-Columbia, Praveen Edara as PI.

  This project is 100% and was posted on the SWZDI website in January 2018.

2015 Program Projects

- Orange Work Zone Pavement Marking Midwest Field Test, University of Wisconsin – Madison, Madhav Chitturi as PI.

  The project was expected to end by September 30, 2016, but it has been extended to March 31, 2017. And extended further to June 30, 2017. It was extended further to September 30, 2017. Another extension was then granted to December 31, 2017. The project and report are essentially complete. The report has not yet been posted because permission to use one or more figures used in the report are being requested by the authors. The report will be posted when the permission is granted or the report adjusted to remove the figures.

Anticipated work next quarter:

Work will continue to work to finalize projects and in the next quarter meet with the TAC and put out a request for proposal for PY 2019. We plan to have a face to face board meeting in September 2018.

Significant Results:

One report was posted this quarter and one report is close to being finalized. All the 2018 PY contracts have been 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, along with recommended solutions to those problems).

Currently there are no problems to report with the administrative contract. Any issues that have come up with the individual projects that may impact schedule or budget are resolved on a case by case basis.

Potential Implementation:

One project was finished and one other is near completion.