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(438)*	**Transportation Pooled Fund Program - Report Period:** X Quarter 1 (January 1 – March 31, 2025) 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 733	**Project Start Date:** January 1, 2020
Original Project End Date: December 31, 2024	**Current Project End Date:** February, 28, 2026	**Number of Extensions:** 6

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**
$1,300,000	$999,973	88%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	**Total Amount of Funds Expended This Quarter**	**Total Percentage of Time Used to Date**
$56,962		

Project Description:
The Smart Work Zone Deployment Initiative (SWZDI) 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, 2025 (Overall)
During this quarter, work continued on three PY 2024 projects and another additional supplemental project for PY 2024. Other work continued under the new SWZDI funding number and that summarized in another quarterly report.

The following is a summary of accomplishments provided by the project principal investigators for the January and March 2025 time period for their individual research projects underway with fund account TPF-5(438).

2024 Program Year Projects

- The Effect of Nighttime Lighting Systems on Workers' Visibility and Safety – University of Nebraska – Lincoln, Chun-Hsing Ho as PI.

  At this stage, the research team has completed the collection and analysis of survey responses. Additionally, a draft of the experimental layout has been developed and was presented at the TAC quarterly meeting on February 27, receiving preliminary approval.

  A total of 116 survey responses were collected, of which 79 were valid. Among these valid responses, 78% originated from state Department of Transportation (DOT) personnel, predominantly from Michigan DOT, with additional participation from Kansas, Wisconsin, Iowa, Illinois, Missouri, and notably Alaska DOT. The remaining 22% comprised construction industry stakeholders, including consultants, contractors, and material suppliers. Survey findings revealed that 68% of respondents expressed overall comfort ("Comfortable" or "Somewhat comfortable") with current nighttime work zone lighting systems. Detailed analysis indicated balloon lights and LED light towers as the most favorable lighting sources, while vehicle headlights were rated least comfortable. Respondents identified coverage and glare as primary issues, emphasizing concerns about lighting uniformity and abrupt brightness transitions. The survey also highlighted that the orientation and angles of lighting fixtures significantly contribute to glare problems. Recommendations primarily suggested adjusting lighting placement, maintaining consistent illumination levels, employing glare shields, and using advanced warning signs.

  Prior to the team meeting on March 28, the research team communicated with Sunbelt Rentals, confirming the rental availability of eight LED and eight halogen light towers. During the team meeting, the experimental setup was finalized, including the determination of three distinct aiming angles paired with corresponding rotation

angles and varying tower heights. Data collection will include both quantitative and qualitative methods to comprehensively evaluate light and glare impacts.

This project has been contracted to start on September 1, 2024 and end on November 30, 2025. The project is 40 percent complete.

- Development of an Analytical Tools for Work Zone Performance – Iowa State University, Guillermo Baulto-Elias as PI.

  Gained access to MO DOT probe data after holding meetings and email communication with them to discuss suitable sites to test analytical tool. We tried to do the same with MN DOT, but we have not hear back from them.

  Started development of reproducible manuals to process connected vehicle data to be included in the analytical tool.

  Defined structure to include INRIX probe data from Iowa and started the implementation.

  Updated literature review to include more recent work zone performance metrics literature and up-to-date dashboards.

  Fixed a few bugs in the tool and added animations to indicate when data are being processed.

  This project was contracted to start on March 1, 2024 and end on May 31, 2025. An extension has been requested to July 31, 2025. This project is 70% complete.

- Improving Work Zone Management and Safety through AI-Powered Connected Vehicle Data Analysis – Iowa State University, Anuj Sharma as PI (Meenakshi Sumeet Arya was the original PI, but has resigned).

  Initial dashboard showing the historical performance measures using CAV data has been built.
  In addition, the dashboard includes incident alerts using CAV data as well as camera data. The dashboard will be tested at scale.

  This project was contracted to start on March 1, 2024 and end on June 30, 2025. However, an extension has been granted to the project until December 31, 2025. This project is 55 percent complete.

- Accommodation of Vulnerable Road Users – Wayne State University, Steven Lavrenz as PI.

  The kickoff meeting with the TAC has been completed, and the amplified work plan has been generated and received by the TAC. The WSU team is preparing to send out the finalized literature review to the TAC, and is in full gear on survey development for Task 3.

  This project was contracted to start on May 1, 2024 and end on April 30, 2025 (note that dates provided last quarter were incorrect). An extension has been requested to October 31, 2025. This project currently 25% complete.

Anticipated work next quarter: Work will continue on the completion of the projects being completed on this SWZDI funding number (other work is starting on the newer SWZDI funding number).

Significant Results:
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).

Potential Implementation: