

## TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): Indiana Department of Transportation

### INSTRUCTIONS:

Lead Agency contacts 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.

<b>Transportation Pooled Fund Program Project #</b> TPF-5(514)	<b>Transportation Pooled Fund Program - Report Period:</b> <input type="checkbox"/> Quarter 1 (January 1 – March 31) <input checked="" type="checkbox"/> Quarter 2 (April 1 – June 30) <input type="checkbox"/> Quarter 3 (July 1 – September 30) <input type="checkbox"/> Quarter 4 (October 1 – December 31)	
<b>TPF Study Number and Title: TPF-5(514) Work Zone Analytics</b>		
<b>Lead Agency Contact:</b> John McGregor	<b>Lead Agency Phone Number</b> 317 899-8617	<b>Lead Agency E-Mail</b> jmcgregor@indot.in.gov
<b>Lead Agency Project ID:</b> TPF-5(514)	<b>Other Project ID (i.e., contract #):</b>	<b>Project Start Date:</b> July 1, 2023
<b>Original Project Start Date:</b> July 1, 2023	<b>Original Project End Date:</b> 6/30/2026	<b>If Extension has been requested, updated project End Date:</b>

Project schedule status:

☒ On schedule    ☐ On revised schedule    ☐ Ahead of schedule    ☐ Behind schedule

Overall Project Statistics:

Total Project Budget	Total Funds Expended This Quarter	Percentage of Work Completed to Date
\$380,000	\$66,194.49	30%

## **Project Description:**

### **Background & Impact**

For the past 3 years, Purdue University and the Indiana Department of transportation have been monitoring congestion and hard braking data across all 2600 miles of Indiana Interstates using connected vehicle data. Hard braking data has been found to be a modern day surrogate for looking for skid marks on the road and predicting potential areas of concern for crashes.

These hard braking events can be used to identify specific locations along a road that should be looked at further by comparing the before construction with the connected vehicle hard braking data during construction.

### **Research Needs**

These reports have evolved over the past 3 years in Indiana and there is a need to develop a multi-state consensus on the most effective reports. This will provide a framework to formalize the reporting models, data reduction processes and decision making process so these techniques can be scaled to other states so they can pro-actively identify emerging safety concerns in their work zones, conduct effective after action reviews of past work zones, and ultimately identify best practices for future work zones that minimize congestion, hard braking and ultimately crashes.

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

### **April 1 – June 30, 2023**

The solicitation for TPF-5(514) was posted in Spring 2023.

The following agencies have committed a total of \$380,000 to TPF-5(514) as of June 30, 2023.

FHWA

Pennsylvania

Texas

The project has a start date of July 1, 2023, and will be funded incrementally by Purdue University as funds from the participating states are transferred.

### **July 1 – September 30, 2023**

Webinar with panel members to obtain feedback on the project scope were held on August 10, 2023, with participation from FHWA, Texas, Pennsylvania, and Purdue.

During the past quarter, Michigan DOT and Wisconsin DOT have indicated their intention to join TPF-5(514).

The Purdue team has adapted some of the Indiana analytics to Interstate routes in PA and TX

To date, \$30,000 in funding for TPF-5(514) has been received by Purdue University. Significant work on the PFS project is pending additional transfer of funds from the partner states.

### **October 1 – December 30, 2023**

Webinars to obtain feedback on the project scope were held on October 3 and October 23, 2023, with participation from FHWA, Indiana, Texas, Pennsylvania, Michigan, Wisconsin, and Purdue. In addition, an update was provided to the Work Zone ITS Subcommittee at the ATSSA Mid-year meeting in Chicago to generate interest among other states.

During the past quarter, Illinois, Michigan, Utah and Wisconsin committed to TPF-5(514). The Work Zone Analytics study team now includes the following:

FHWA

Illinois

Indiana

Michigan

Pennsylvania  
Texas  
Utah  
Wisconsin

During this quarter, the Purdue research team has been seeking to identify an alternative connected vehicle data source other than Wejo (which suspended operations on June 1, 2023) as well as developing a tutorial on how to read heatmaps.

An alternative data source, Solaris, has been identified and is scheduled to begin providing a reasonable trajectory data set on January 15, 2024, that can be used for monitoring work zones.

Scheduling is underway for a webinar with all partners during the first quarter of 2024 in order to further define the scope and prioritize future activities.

#### **January 1 – March 31, 2024**

A webinar with held on February 15, 2024 with representatives from FHWA and partner states (IL, IN, PA, TX, WI). The research team shared examples of weekly heatmaps using Omnitrac's connected truck data. Partner states were requested to submit interstate Workzones of interest for their states, with Sharepoint sites set up for each state to receive the weekly heatmaps.

Subsequent to the meeting, states submitted work zones of interest. Weekly heatmaps are being generated and distributed through the Sharepoint sites. A summary of the number of work zones of interest submitted by each state is shown below.

Partner State	# Work Zones of Interest
Illinois	6
Indiana	7
Michigan	4
Pennsylvania	4
Texas	5
Utah	6
Wisconsin	10
Total	42

The next webinar for partner states is scheduled for May 10, 2024. At that meeting, case studies of work zones of Interest will be shared.

#### **April 1 – June 30, 2024**

The Purdue Research team presented "Work Zone Analytics" at the Midwest Work Zone Roundtable on May 9, 2024, to share activities of TPF-5(514) with a broader audience.

Webinar with TPF-5(514) partners (FHWA, IL, IN, MI, PA, TX, UT, IN) was held on May 10, 2024. Agenda included review of the weekly heatmaps for the partner states and selected case studies for work zones of interest submitted by states.

Weekly heatmaps are generated for all interstates for each state that is part of the PF study along with heatmaps specific to work zones (43 total) submitted by states and are updated every Monday in a shared one-drive folder.

Publication of heatmap monograph entitled "Measuring and Visualizing Freeway Traffic Conditions: Using Connected Vehicle Data" that demonstrates approximately 50 use cases. Citation listed below in Significant Results.

**Anticipated work next quarter:**

- Hold Summer panel webinar.
- Continue distribution of weekly heatmaps for the partner states.
- Prepare high level summary and key snippets weekly for each state and distribute via email for quick access and reference.
- Continue outreach activities to share findings with broader audience and solicit participation in the PFS Work zone analytics.
- Continue to develop and strengthen private sector partnerships for collecting and analyzing connected vehicle data for work zone analysis activities.

**Significant Results:**

Sakhare, R. S., Desai, J., Mathew, J. K., McGregor, J., Kachler, M., & Bullock, D. M. (2024). *Measuring and visualizing freeway traffic conditions: Using connected vehicle data* (Joint Transportation Research Program No. TPF-5(514)). West Lafayette, Purdue University. <https://doi.org/10.5703/1288284317751>

**Potential Implementation:** N/A