

JOINT TRANSPORTATION RESEARCH PROGRAM

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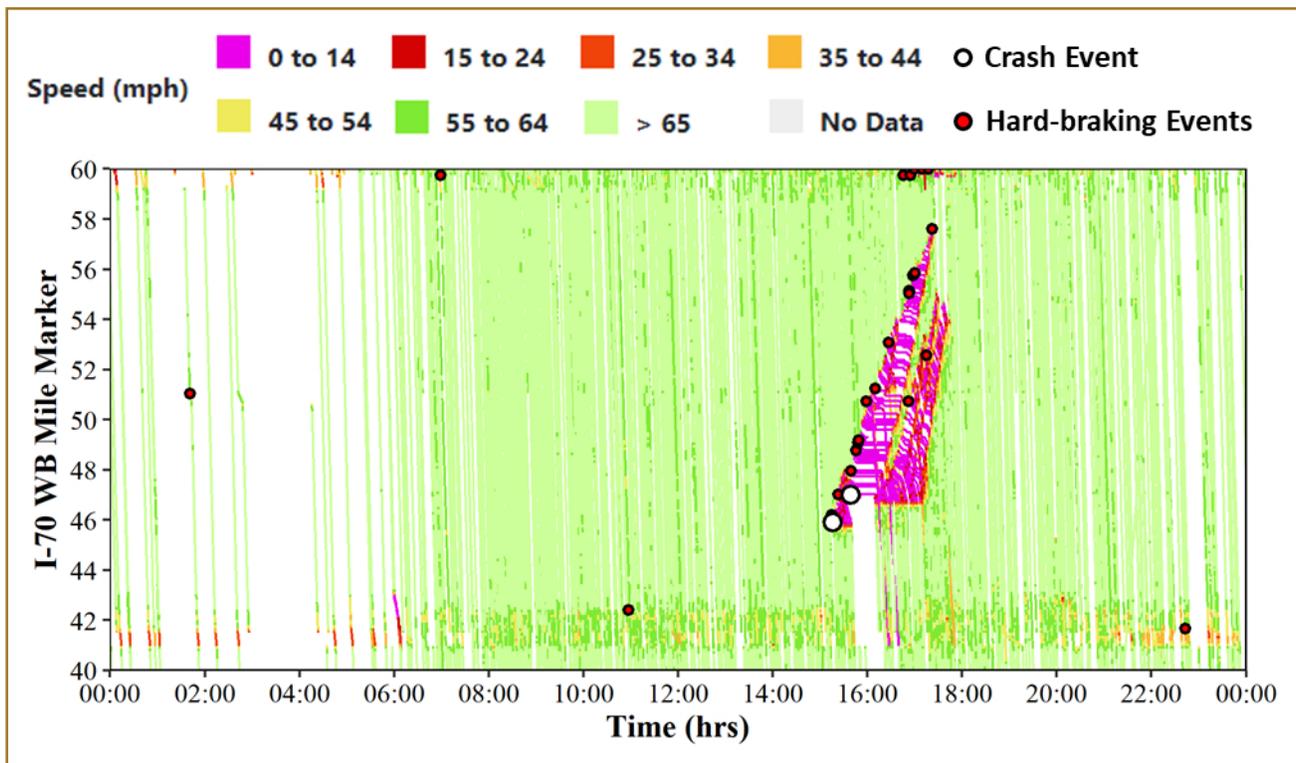
Integration of Probe Data Tools into TMC Operations

Introduction

With the advent of probe data, there is a need to virtualize many of the Traffic Management Center (TMC) tools used to move maintenance operations; provide dashboards that characterize overall system mobility; and analyze work zones, severe crashes, and winter operations. Traditional tools have evolved over the past several years and it is important to develop training material for adopting into agency business practices and to make the tools more accessible to a broad range of

Indiana Department of Transportation (INDOT) users, Indiana State Police (ISP) users and other stakeholders.

Over the past several years, agencies have used probe data—mainly 1-minute aggregated segment-based probe data—to assess and manage roadways. This study extended traditional segment-based probe data concepts to include enhanced trajectory-based connected vehicle (CV) data, which provides anonymous individual vehicle waypoints at a reporting interval of 3 seconds within a 1.5-meter fidelity radius. This study discusses some of the near-term opportunities,



Traffic impact trajectory heatmap for managing roadways.

the nationwide scalability, and some of the limitations of trajectory data for managing roadways and infrastructure assessment. The chapters in this report enumerate some of the significant tools that have been made accessible to INDOT and other stakeholders.

Findings

The tools developed in this study will assist INDOT and other stakeholders with the following.

- Visualizing interstate queues.
- Identifying back-of-queue hard braking events and crashes.
- Identifying alternate diversions during incidents and road closures.
- Agile management of work zones.
- Estimating traffic signal performance measures without infrastructure investment.
- Understanding impact of construction diversions on traffic signals performance.

Workshops, webinars, trainings, and multi-monitor displays installed at INDOT district offices and facilities streamline operations so TMC operators can rapidly identify relevant intelligent transportation systems (ITS) cameras corresponding to an incident and then track the development and recovery of that incident.

The work zone and hard braking reports disseminated weekly provide practitioners and state agencies with the ability to pinpoint hotspots of potential conflict in near real-time, thus providing an opportunity to implement corrective measures to aid the safe flow of traffic.

Lastly, Indiana's work with crowd sourced data

has also been recognized by the Federal Highway Administration (FHWA) Every Day Counts (FHWA, 2021a, 2021b) where these tools and dashboards improve real-time operational decision-making and support training and after-action reviews.

Implementation

The main recommendations from this study include but are not limited to the following.

- Continue webinar dissemination and district engagement on a quarterly basis.
- Continue support of tools (Table 3.1, Figure 6.2, Table 6.1, Figure 7.1, Figure 7.4)
- Transition from segment-based data purchases to trajectory data (Figure 2.5), since it provides higher precision data on agency networks with little to no traditional ITS infrastructure

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