Joint Transportation Research Program

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Continued Deployment of Indiana Work Zone Analytics

Motivation

There is often increased congestion and crash rates in interstate construction zones, particularly in locations that are close to or over capacity. Developing agile monitoring methods to identify emerging challenges provides data to inform design decisions for future projects as well as flag projects that may benefit from modest changes in maintenance of traffic strategies.

Study

This project explored the viability of generating a Weekly Work Zone Report that looks at changes in crash rates, hard braking, and congestion on Indiana interstates. These techniques were focused on using large scale connected vehicle (CV) data for monitoring work zone operations on Indiana interstates.

This study developed techniques to fuse a multitude of data sources including CV speeds, CV hard-braking events, crash reports, digital alerts, and commercial vehicle dash camera images, into a weekly interstate work zone report that gives stakeholders a holistic overview of their work zone operations and allows for easy identification of opportunities for improvement.

Results

Approximately 249 Weekly Work Zone Reports were generated and distributed to approximately 100 stakeholders across the state on an approximately weekly basis. The value of these reports was:

1. Providing an at-a-glance view of statewide, district, and route mobility, crash data, hard braking, and, most recently, dash camera images to contextualize the heatmaps.
2. Building capacity across Indiana Department of Transportation (INDOT) and stakeholders to read heatmaps and hard-braking reports.
3. Developing an archive of mobility impacts that provides factual information on queue lengths, crash data, and hard braking that supplements

Figure 1. ITS Camera Image at the I-465 at Mile Marker 37, I-69, and Binford Boulevard Interchange showing the work zone configuration during the construction of a bridge.

institutional knowledge. This information is routinely used informally for agilely adjusting lane closure exceptions and is currently being assembled into a summary geographic information system (GIS) map to extend the reach of this institutional knowledge.

4. Other states have seen the value of these types of weekly reports, and a Transportation Pooled Fund Study on Work Zone Analytics with participation from the Federal Highway Administration and nine other states has been established.
5. This work has been used by the U.S. Department of Transportation to help shape 23 CFR Part 630 Subpart J that was released on November 1, 2024.

Recommendations

The Weekly Work Zone Reports generated over the course of this project, and the associated data-processing and analysis methodologies, should serve as a framework for agencies, practitioners, and private sector stakeholders looking to use emerging CV data, smart work zone data, among others, to monitor the performance of their work zones on a regular basis. The practice of estimating hard-braking events from raw CV data instead of relying on instantaneous hard-braking events with opaque vendor-defined braking thresholds now allows for greater freedom to tweak acceleration thresholds based on the roadway class being analyzed and opens opportunities for dialogue among practitioners on determining ideal custom thresholds for freeways, arterials, or other facilities.

Recommended Citation for Report

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