Commercial Motor Vehicle Safety in Work Zones



NATIONAL WORKZONE SAFETY INFORMATION CLEARINGHOUSE

Truck Safety in Work Zones

Using data to focus agency safety review

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Texas A&M Transportation Institute

Research supported by FMCSA

FMCSA
Federal Motor Carrier Safety Administration



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Work zone crashes demand attention

2024 NATIONAL WORK ZONE DATA

850

people killed in work zone crashes

31%

of fatal crashes involved a large truck or bus

34%

of fatal crashes had speeding as a factor

Truck safety-aware planning belongs in the safety review.



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Texas evidence

6
Connected data sources
Work-zone, crash, roadway, truck-volume, braking, and travel-time data.

→

1,432
Matched work zones
Represented as 9,507 directional, approximately one-mile sections.

→

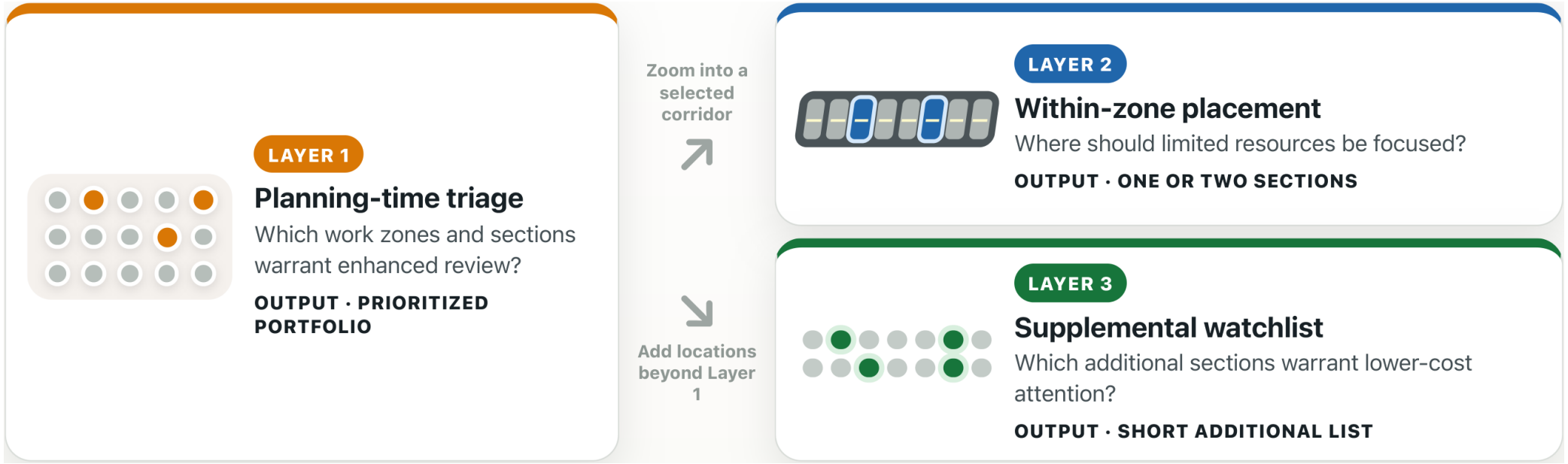
3
Decision products
Project triage, within-zone placement, and a supplemental watchlist.

→

1
Operating workflow
A repeatable path from project intake to agency review, action, and learning.

Texas study: **1,432** work zones and **9,507** one-mile sections.

Three agency decisions

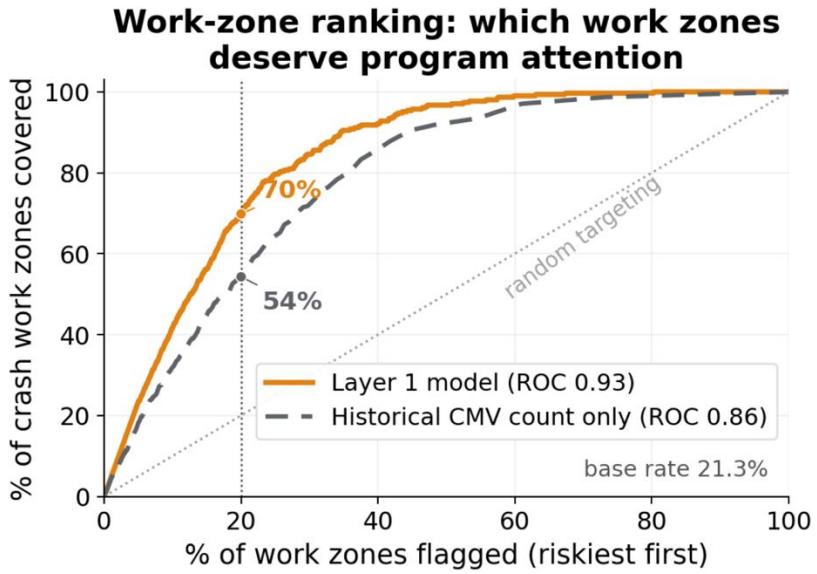


Prioritize **projects**, focus **review**, and add a **watchlist**.

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Review 1 in 5 projects



70%

of **work zones** with a later **CMV crash** included

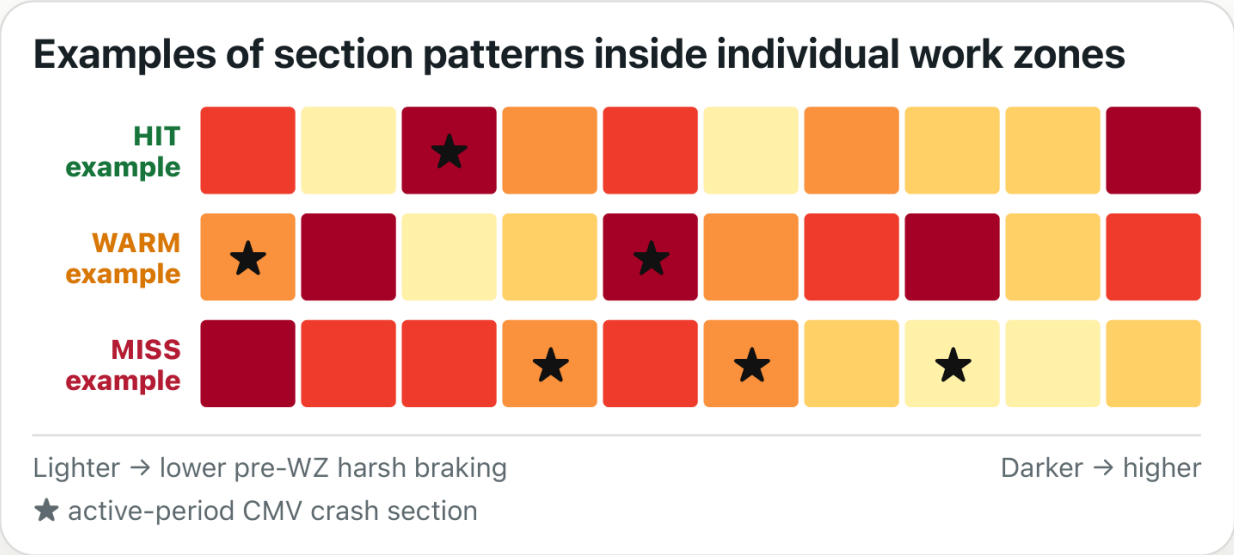
Reviewing the **highest-ranked 20%** focused safety review.

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Layer 2 | Section priorities within a project

Focus within a project



62%

of **277** eligible work zones had a crash in a **top-two** priority section

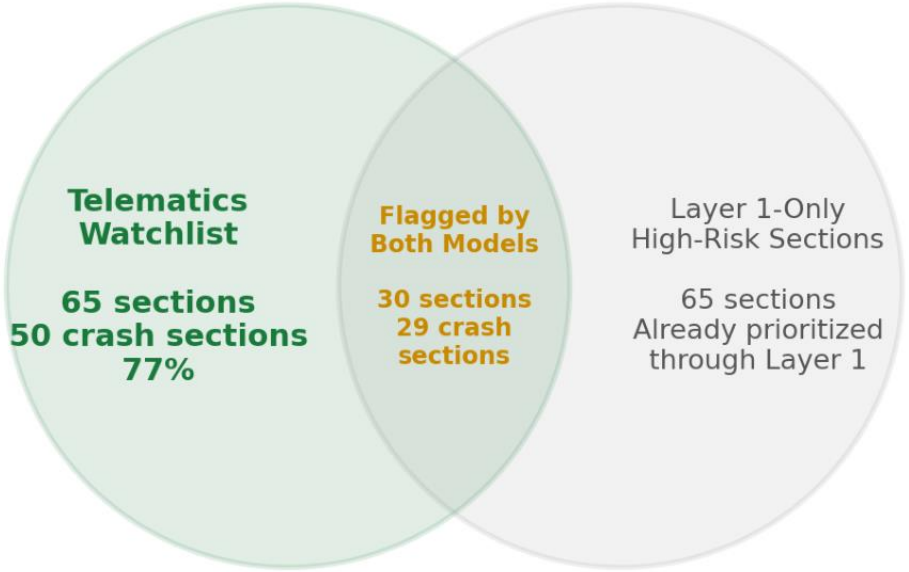
Start field review at **two priority sections**.

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Layer 3 | Supplemental monitoring watchlist

An extra watchlist



77%

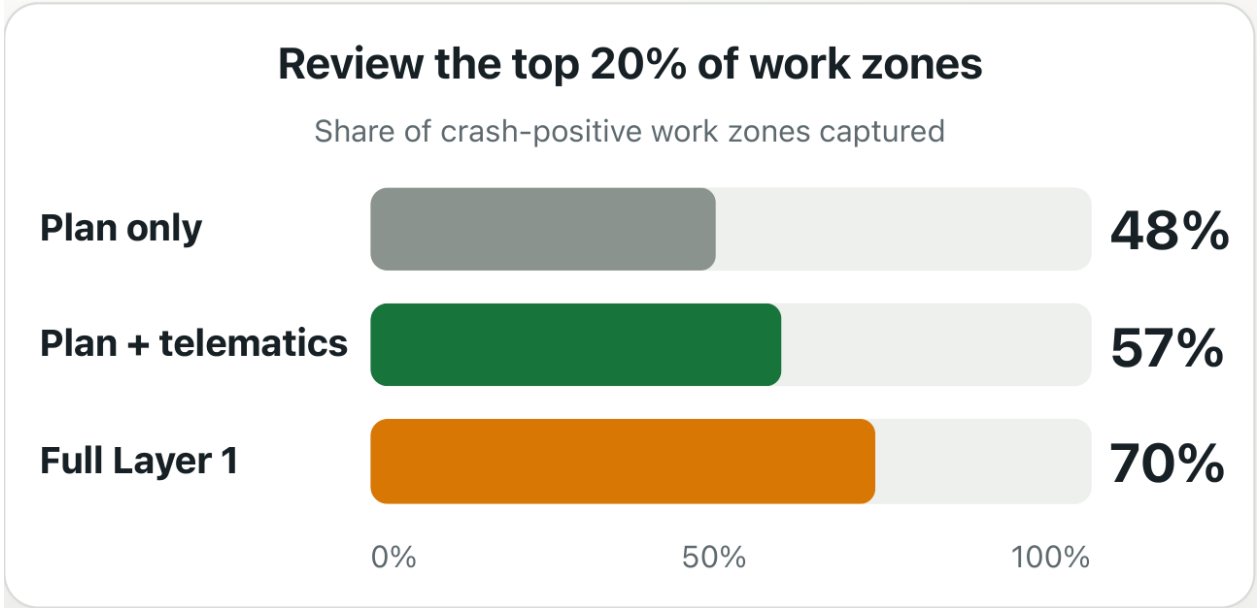
50 of 65 additional sections later had a **CMV crash**

Use the extra watchlist for **monitoring** and **communication**.

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Start with available data



Use vehicle data when **crash history** is limited.

Vehicle data improved the shortlist at the **same review effort**.

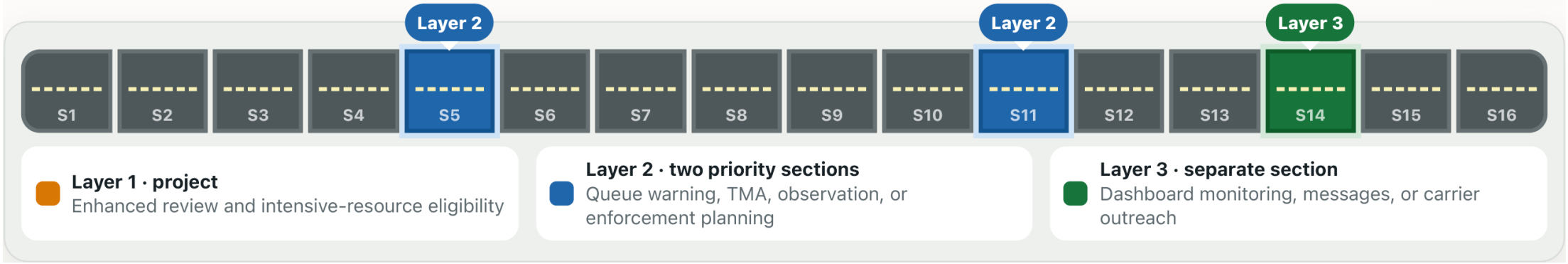
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A project in practice

LAYER 1 **Project enters the highest review tier**

Long duration + high truck volume → enhanced traffic-control-plan review and eligibility for intensive mitigation.



Hypothetical example: inspect **two sections** and monitor another.



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Use the agency workflow

1 · Planning → Score the project

2 · Preconstruction → Prioritize sections

3 · Agency action → Choose and record a response

4 · Refresh / closure → Update, archive, and learn

WHO USES IT	FRAMEWORK OUTPUT	DECISION IT SUPPORTS
Program manager District planner	**Layer 1 · risk tier**	Enhanced safety and traffic-control-plan review
Traffic engineer Construction planner	**Layer 2 · priority sections**	Queue warning, TMA placement, speed feedback, enforcement
Operations staff Carrier-safety staff	**Layer 3 · watchlist**	Monitoring, DMS messages, outreach, in-cab alerts

Use **existing** reviews, inspections, and operations meetings.



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Test on your network

Use screening to decide **where to review**.

1

Test locally

Compare rankings on your own corridors.

2

Check coverage

Verify vehicle data, travel direction, and project limits.

3

Track decisions

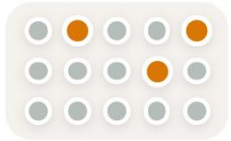
Record inspections, responses, and safety outcomes.

Weekly crash timing remains uncertain.

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Focus the safety review



PROJECTS

Which **projects** need attention?



SECTIONS

Where should **field review** start?



WATCHLIST

What else should we **monitor**?

Pilot the screening in your existing safety review process.



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Thank you

Questions and discussion

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Texas A&M Transportation Institute

FMCSA
Federal Motor Carrier Safety Administration



FMCSA's Our Roads, Our Safety® Work Zone Campaign

America's Roads Rely on Pros

October 26, 2026

U.S. Department of Transportation
Federal Motor Carrier Safety Administration

2026 NWZAW Participation

U.S. Department of Transportation
Federal Motor Carrier Safety Administration

Our Roads, Our Safety® Work Zone Safety Campaign

- The FMCSA's Work Zone Safety Campaign was developed in alignment with our overall mission of reducing crashes, injuries, and fatalities involving large trucks and buses in and around work zones, including work zone employees.
- **Top 10 States** – FMCSA originally identified the top 10 states with the highest work zone crashes and fatalities and designed a strategic state-specific resources to support them in their outreach and crash prevention & reduction efforts.

AR | CA | FL | GA | IL | IN | OH | OK | PA | TX

OUR ROADS® SAFETY
Partnership for Responsible Driving

FMCSA's 2026 NWZAW Outreach

Each year the FMCSA actively participates in amplifying and promoting the importance of National Work Zone Awareness Week. Our agency sits on the national work zone executive planning committee providing feedback and execute several communications touchpoints leading up to and throughout the week including the following:

- **Work Zone Kickoff Video Message – Administrator Barrs**
- **Social Media Activation**
- **NWZAW Activities Participation**
- **Advertising**

FMCSA Administrator Derek Barrs



2026 FMCSA National Work Zone Awareness Week Message

FMCSA Go Orange Day

FMCSA division offices across the country including U.S. territories participated in "Go Orange Day".



Puerto Rico Division



Montana Division

FMCSA NWZAW Paid Media Metrics

FMCSA Activated its Paid Media Strategy across digital, social media, and traditional advertising outlets, amassing nearly 1.1 million total impressions and 6k clicks throughout the week.

317K

Impressions

Out-of-Home (OOH)

652K

Impressions

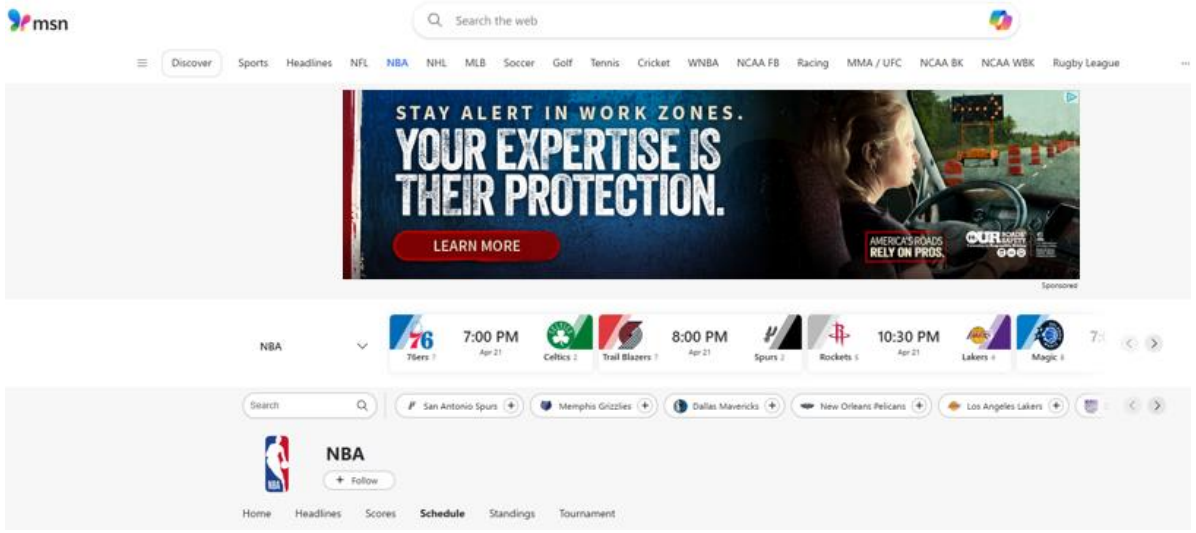
Digital Display Ads

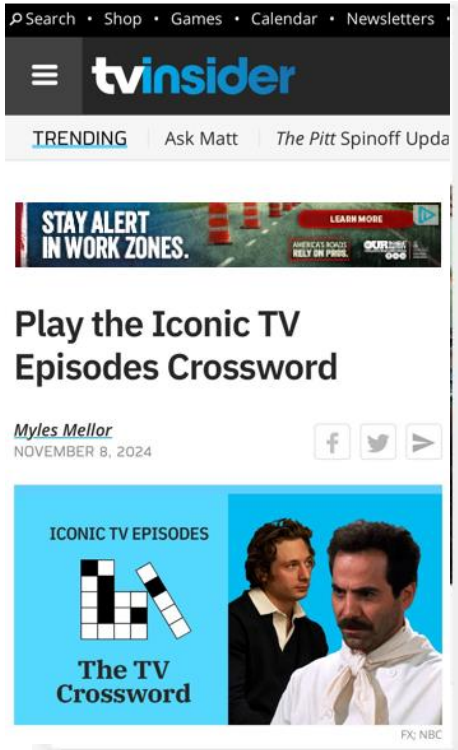
128K

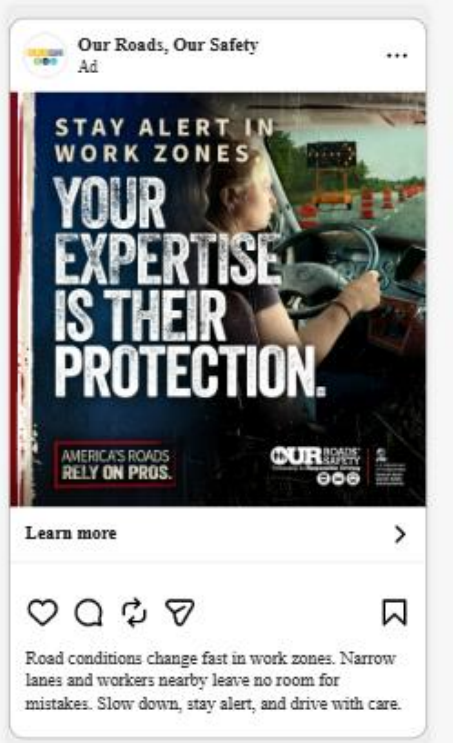
Impressions

Meta Ads

FMCSA NWZAW Digital Ad Examples







Find Our Resources

Our Roads, Our Safety® Work Zone Safety Materials

- **FMCSA Work Zone Safety Tips** – https://www.fmcsa.dot.gov/ourroads/work-zones-safety-tips
- **FMCSA Work Zone Safety Outreach Resources** – https://www.fmcsa.dot.gov/ourroads/work-zone-safety-shareable-material
- **Print Materials Request** – Email FMCSA's Office of Outreach & Education at FMCSA.Outreach@dot.gov to request your materials.

Social Media Graphics



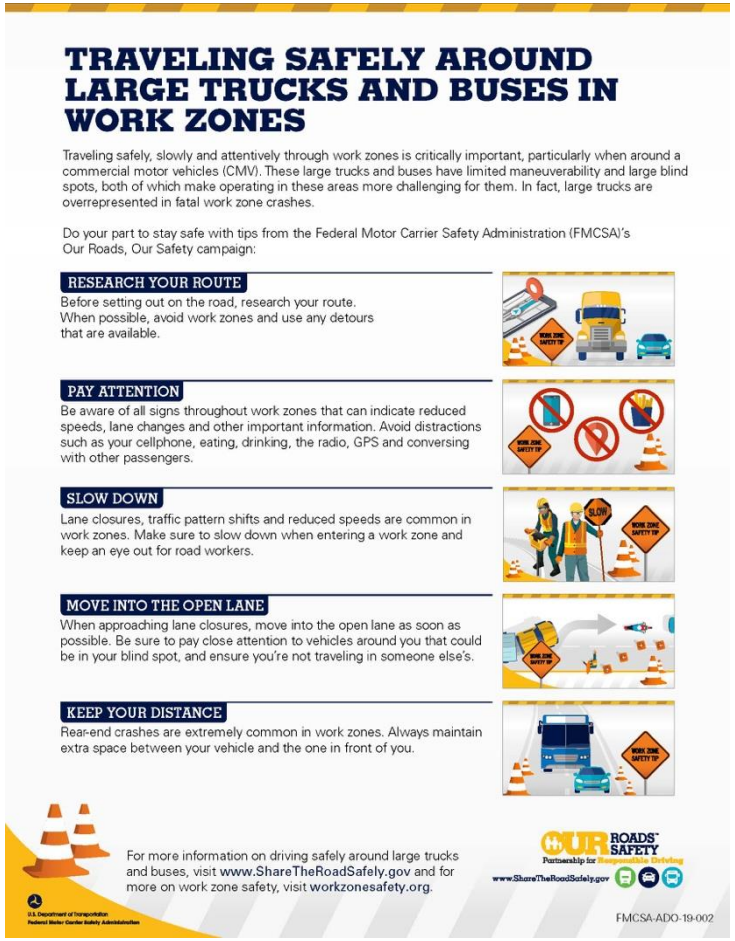


Outreach Materials





Work Zone Safety One-pager & Visor Card



TRAVELING SAFELY AROUND LARGE TRUCKS AND BUSES IN WORK ZONES

Traveling safely, slowly and attentively through work zones is critically important, particularly when around a commercial motor vehicles (CMV). These large trucks and buses have limited maneuverability and large blind spots, both of which make operating in these areas more challenging for them. In fact, large trucks are overrepresented in fatal work zone crashes.

Do your part to stay safe with tips from the Federal Motor Carrier Safety Administration (FMCSA)'s Our Roads, Our Safety campaign:

RESEARCH YOUR ROUTE

Before setting out on the road, research your route. When possible, avoid work zones and use any detours that are available.

PAY ATTENTION

Be aware of all signs throughout work zones that can indicate reduced speeds, lane changes and other important information. Avoid distractions such as your cellphone, eating, drinking, the radio, GPS and conversing with other passengers.

SLOW DOWN

Lane closures, traffic pattern shifts and reduced speeds are common in work zones. Make sure to slow down when entering a work zone and keep an eye out for road workers.

MOVE INTO THE OPEN LANE

When approaching lane closures, move into the open lane as soon as possible. Be sure to pay close attention to vehicles around you that could be in your blind spot, and ensure you're not traveling in someone else's.

KEEP YOUR DISTANCE

Rear-end crashes are extremely common in work zones. Always maintain extra space between your vehicle and the one in front of you.

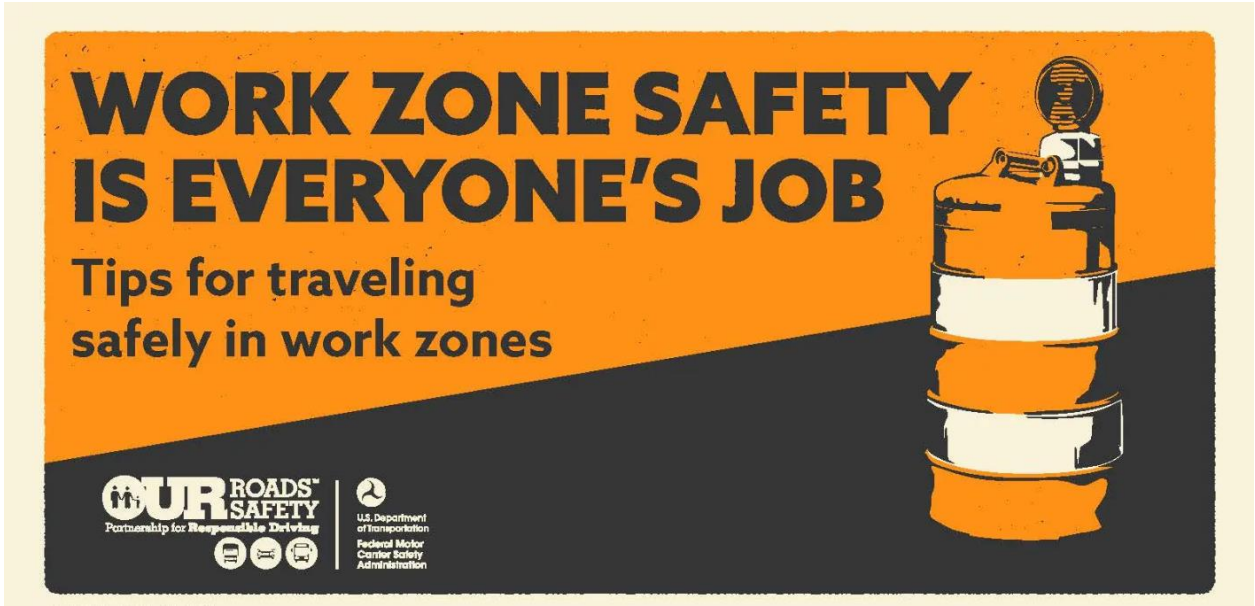
For more information on driving safely around large trucks and buses, visit www.ShareTheRoadSafely.gov and for more on work zone safety, visit workzonesafety.org.

OUR ROADS SAFETY Partnership for Responsible Driving

www.ShareTheRoadSafely.gov

U.S. Department of Transportation
Federal Motor Carrier Safety Administration

FMCSA-ADO-19-002



FMCSA Grant Opportunities

U.S. Department of Transportation
Federal Motor Carrier Safety Administration

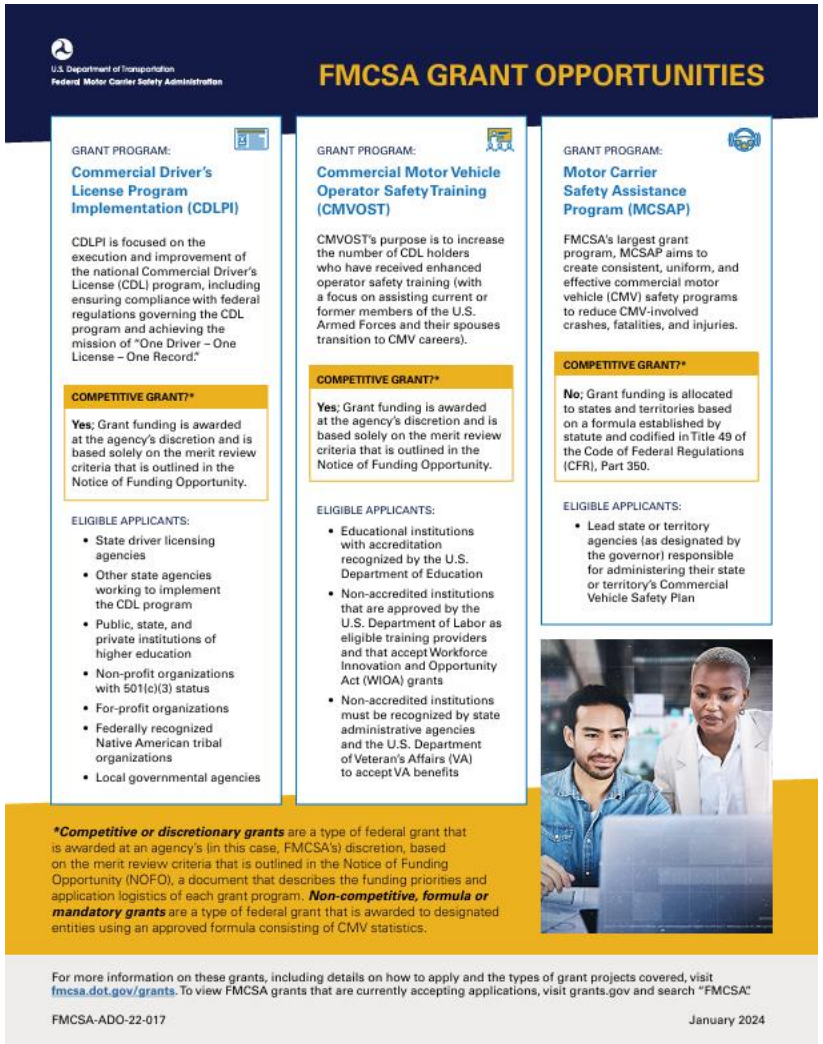
FMCSA Grants

The FMCSA Grant application and award process typically occurs between January-February through August-September each year.

Website: https://www.fmcsa.dot.gov/grants

Eligible Applicants:

- Colleges & Universities
- State & Tribal Governments
- Law Enforcement
- Non-profit Organizations
- Other Eligible Groups



Partnership Opportunities

What is Our Roads, Our Safety®?

FMCSA's initiative to reduce crashes, injuries, and fatalities involving large trucks and buses — built on two pillars: a national safety campaign and a nationwide partnership network, both working toward one mission: safer roads for everyone.



Reducing Crashes

Focused on large truck and bus safety — protecting every road user on America's highways



Millions Reached Since 2016

Nationwide through outreach, partnerships, and education — reaching every type of road user



Shared Responsibility

Practical driving tips for car drivers, professional drivers, cyclists, and pedestrians alike

Who Does the Program Reach?



Passenger Vehicle Drivers

Everyday drivers sharing the road with large trucks and buses



Commercial Motor Vehicle Drivers

Professional drivers keeping America's economy moving



Motorcyclists

Vulnerable riders who share highways with large commercial vehicles



Bicyclists

Cyclists navigating roads alongside trucks and buses every day



Pedestrians

Those most at risk when sharing space with large commercial vehicles

How the Partnership Works

OUR ROADS® SAFETY
www.ShareTheRoadSafely.gov

Led by FMCSA — the OROS partnership brings together organizations committed to improving road safety on our nation's roads, with an emphasis on safety around commercial motor vehicles.



Extend Safety Messaging

Partners extend the reach of critical safety messages through their existing channels and audiences.



Share Educational Resources

Partners distribute ready-to-use graphics, videos, and materials designed for easy, effective outreach



Real-World Expertise

Partner expertise and perspective ensure safety messages are relevant, practical, and grounded in experience.



Shared Responsibility

Together, we encourage safer behaviors, support CMV drivers, and help reduce crashes on America's roads.

Learn more: www.fmcsa.dot.gov/ourroads/our-roads-our-safety-partnership-program

Our Roads, Our Safety® Partnership



Stay Connected

U.S. Department of Transportation
Federal Motor Carrier Safety Administration

Opportunities to Connect With FMCSA

- Justin Jones, Marketing Specialist, justin.r.jones@dot.gov

- FMCSA Website – www.fmcsa.dot.gov
- FMCSA Social Media – @FMCSA, @FMCSAOurRoads (Meta only)
- **Our Roads, Our Safety® Partnership –** https://www.fmcsa.dot.gov/ourroads/our-roads-our-safety-partnership-program

THANK YOU



U.S. Department of Transportation

Federal Motor Carrier Safety Administration

CONSTRUCTION MANAGEMENT CONFERENCE 2026

SAFEZONE Overview

Improving safety in active work zones through connected vehicle technologies, video analytics, and portable smart trailer systems.

Caitlin Mackay | *CAVE Engineer, MDOT*

FUNDING

FMCSA High Priority Innovative Technology Deployment (HP-ITD) grant, supporting safer CMV travel

CONNECTED VEHICLE TECHNOLOGIES

VIDEO ANALYTICS

PORTABLE SMART TRAILER SYSTEMS

PROJECT TEAM

MDOT | Integral Blue | HNTB | Danlaw | Bosch | MH Corbin | Ver-Mac | Brandmotion

PROCESS

Project Process Overview

1. System design
2. Device integration
3. Field mock testing
4. Work zone selection
5. Full field deployment

Developed before field deployment

- TIM message strategies
- Trailer deployment plans
- Camera configurations

Included in every deployment phase

- Infrastructure testing
- Equipment calibration
- Message validation
- Vehicle testing

VALIDATION

Mock Testing

MDOT Auburn Hills lot



A controlled environment to validate the system before field deployment.

Core functions validated

Worker detection

Queue detection

Over-the-air V2X communication

Evaluated in the test setup

- Camera analytics
- Edge processor configurations
- RSU communications
- TIM message generation

DEPLOYMENT

Vehicle Installs

11

Commercial Motor Vehicles outfitted

Installation was coordinated with partner fleets to balance vehicle availability with collection of critical performance data during work zone deployments.









- **Danlaw AutoLink OBUs**
- **External antennas**
- **HDMI adapters**
- **Brandmotion HUD displays**

Drivers receive real-time TIM and PSM alerts

CHALLENGES

Challenges Selecting Deployment Locations

THE REQUIREMENT

Planned work zones needed active, unprotected workers and necessary lane closures present.

Evolving contractor schedules

Revised definitions of ‘workers present’

Access limitations

Need for predictable MOT plans

Changes in contractor timing often required reevaluating originally selected deployment areas.

THREE PHASES

Deployment on I-94

PHASE 1

6 mi

Extended concrete patch zone

Near Paw Paw

relative zone length

PHASE 2

1.25 mi

Compact dual-direction concrete repair

Near Albion

relative zone length

PHASE 3

7.3 mi

Full westbound closure

Culvert replacements

relative zone length

Each phase offered unique opportunities for message testing and detection validation.

FIELD TESTING

In-Field Testing

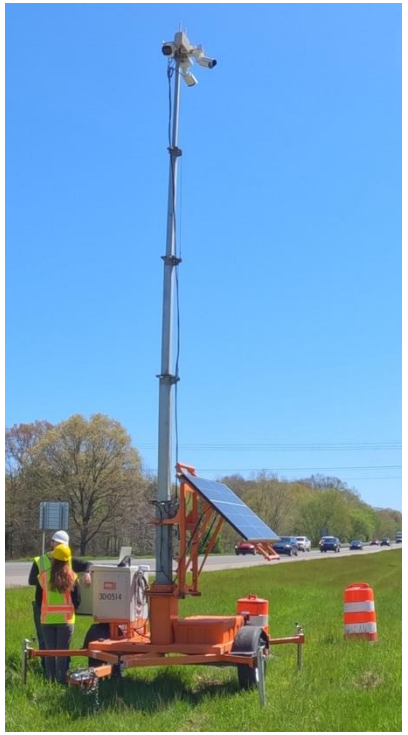
What was validated

Tests were performed at each trailer and CWZ device location.

- Detection accuracy
- TIM message timing
- Broadcast ranges
- Camera calibration
- OBU response behavior

Warnings verified:

- Worker
- Queue
- Lane closure







RSU relays delivered alerts upstream far enough for driver reaction times.

DATA

Data Collection

Data sources

- Video analytics metadata
- Radar sensors
- RSU logs
- OBU-generated messages
- Historical crash datasets

Performance metrics analyzed

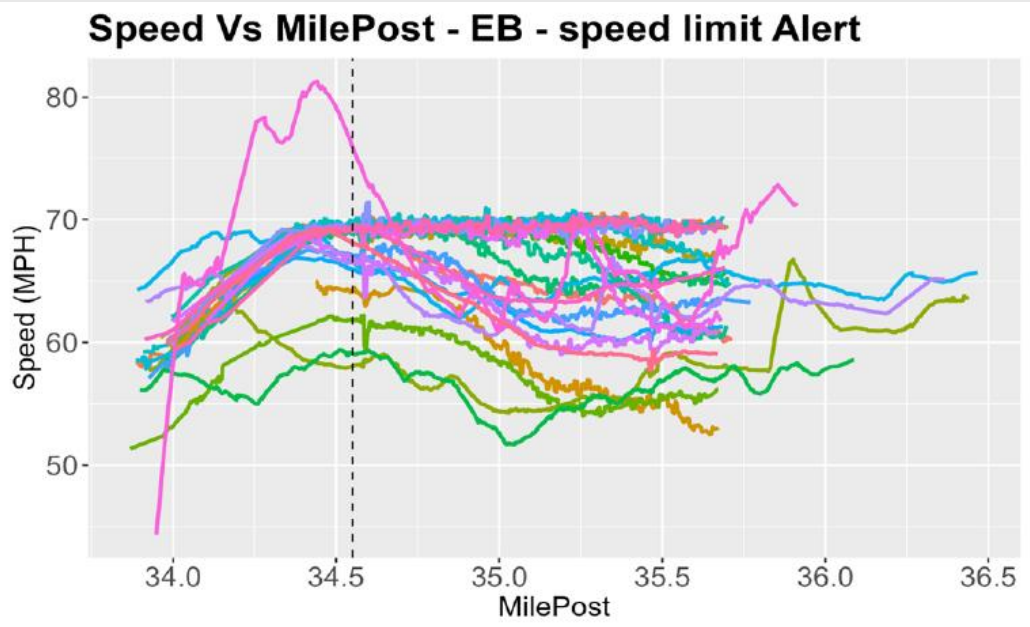
- **Speed behavior**
- **Queue formation**
- **Driver response timing**
- **CMV involvement in crashes**

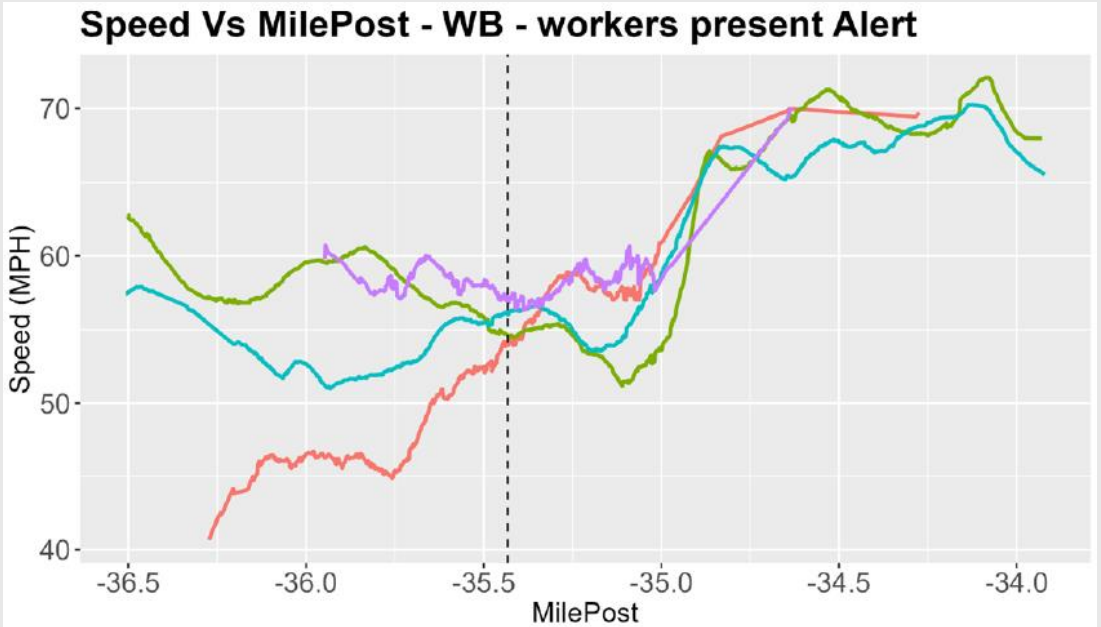
Report graphs show how speeds changed before and after different alert types.

DATA

Data Collection

RSU and OBU packet captures processed and analyzed with the help of Iowa State University and Texas Transportation Institute through NCHRP project





Report graphs show how speeds changed before and after different alert types.

LESSONS

Lessons Learned

- Solar power reliability
- TIM Region Application
- Device Integration Challenges
- Manual effort for TIM message development
- Power load management
- Inefficient camera calibration

PATH FORWARD

Automate configuration processes

Reduce engineering workload and improve system consistency.

ITSA DEMONSTRATION

ITSA Deployment & Additional Lessons

Additional insights

1. TIM laneWidth requirements
2. Message relevance processing
3. Alert prioritization

Testing confirmed the importance of

1. Precise TIM geometries
2. Optimized view angles
3. Consistent message processing thresholds



Avoid false triggers or missed alerts, especially in curved roadway environments.

BEYOND SAFEZONE

PAWZ Work Zone Efforts

MDOT's parallel initiative to advance connected and automated work zone technologies.

Not part of SAFEZONE – it complements it

- **App-based alerting through PrePass**
- **Worker safety alerts / Lane closure**
- **Improved digital mobile work zone mapping**

Connected Worker's Vest

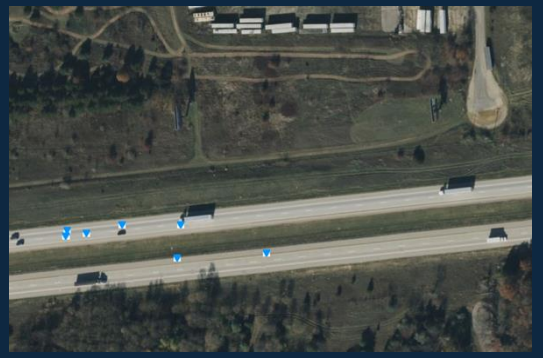


Truck Mounted Arrow Board



Vehicle Transponder







SAFEZONE findings directly support continued research and deployment of PAWZ-related innovations across Michigan.

Questions?

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