Next-Generation Traffic Incident Management: Technology for Saving Lives (NextGen TIM Tech)

Every Day Counts
Innovation for a Nation on the Move
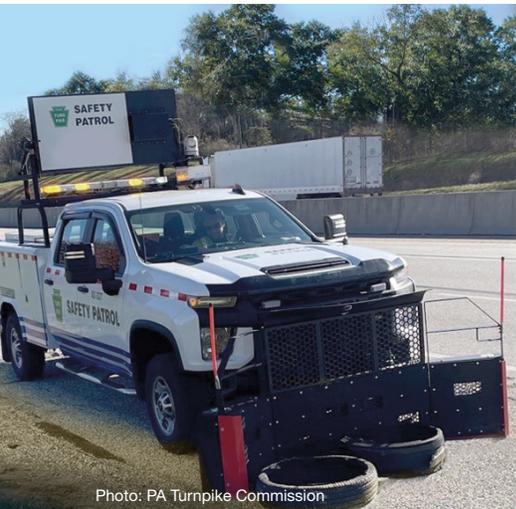
Photo: PA Turnpike Commission

Photo: Utah DOT
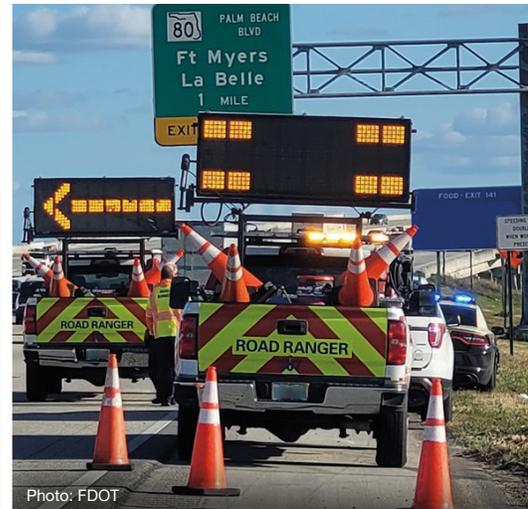
Photo: FDOT

More than 6 million reportable crashes occur each year in the United States, resulting in 2 million injuries and more than 30,000 fatalities. Additionally, there are over 32 million disabled vehicles and countless incidents of roadway debris. Each of these events places responders and motorists at risk of secondary crashes. A planned and coordinated approach to handling these incidents is the essence of Traffic Incident Management (TIM). The Federal Highway Administration's (FHWA's) national TIM responder training program has successfully trained more than 650,000 responders to clear incidents collaboratively, safely, and quickly. In practice, TIM on all types of roadways has been shown to save lives, time, and money.

TECHNOLOGY FOR MORE EFFECTIVE TIM

Today's technology has the potential to leverage TIM responder training and enable incident responders to become more effective and efficient in their response duties. Clearing roadway incidents more quickly reduces exposure for incident responders and restores traffic for commerce, productivity, and quality of life for roadway users.

TIM technology can better inform roadway users about incidents ahead, helping them to avoid or navigate around those locations more safely. Aware drivers equal alert drivers, who are potentially safer drivers. Unmanned aerial systems (UAS) have proven to be effective in reducing the amount of time responders spend mapping crash scenes, but advancements can now also help responders at the scene of incidents be more aware and protected from the dangers of working near moving traffic. Safer responders, fewer secondary crashes, and quicker removal are all products of NextGen TIM technologies.

Advance Warning Technologies – A wide range of ways that we let drivers know that there is something ahead that they should be concerned about. Advance warning includes signs, alerts, and messages that are delivered to drivers visually and audibly, originating from sources inside and outside of the driver's vehicle.

Debris Removal Systems – Truck-mounted devices to help agencies remove roadway debris without exposing individuals to the hazards of live traffic.

Emergency Vehicle Lighting – Ideas and concepts to improve the use of responder vehicle emergency lights at incident scenes. Technology allows for a wide-range of customization for the display of lights and NextGen TIM technology seeks to create a "smarter" approach to color, intensity, pattern, and synchronization.

Emergency Vehicle Preemption (EVP) – Changing traffic signal phases to allow responder vehicle passage through signalized intersections. To get responders to roadway incidents faster, signal preemption may help to reduce the TIM timeline and overall incident clearance.

TIM Technologies for Emergency Medical Services (EMS) to Support Post-Crash Care – Improving EMS personnel on-scene safety through outreach and training as well as responder and motorist safety through technology deployment.

UAS for TIM – A continuation of one of the most popular Every Day Counts-6 approaches with an emphasis on tethered and TIM applications.

BENEFITS

Increased Safety: NextGen TIM feeds a larger TIM role in the Safe System approach, and more specifically post-crash care, by creating a safe working environment for vital first responders and preventing secondary crashes through robust TIM practices.

Improved Operations: Integrating new and emerging technology, tools, and training can mitigate incident impacts from detection to roadway clearance.

Better Situational Awareness: Technology delivers timely and critical information to on-scene responders, remote support functions like transportation management centers, and roadway users who are approaching traffic incidents.

STATE OF PRACTICE

Examples of NextGen TIM technologies in use by State and local agencies:

The Indiana Department of Transportation (DOT) has reduced "hard braking" near roadway queues by deploying queue warning trucks equipped with truck-mounted attenuators, arrow boards, and digital alert systems to warn approaching motorists of dangers ahead.

The Washington State Patrol has reduced the time needed to measure, map, and photograph serious crash scenes by 70 percent with the use of UAS.

The Pennsylvania Turnpike Commission has installed specialized push bumpers on the front of service patrol and maintenance vehicles to effectively move roadway debris without the need for operators to leave their vehicle.

The New Jersey DOT uses in-cab electronic logging devices to deliver real-time alerts to trucks and other commercial motor vehicles operating in areas near traffic slowdowns, work zones, and bad weather conditions.

The North Carolina DOT's Incident Management Assistance Patrol (IMAP) program is using tethered UAS

that can fly 150 feet above incident scenes and provide video to the regional traffic management center and responders on the scene, increasing safety for both responders and approaching drivers.

Arrow boards on IMAP vehicles can detect which lane is closed by display settings and publish better alerts to mapping and navigation providers, like "right-lane closed" rather than just "incident ahead".

The Illinois State Police use emergency lighting systems that interface with the vehicle controller area network to change emergency light color, intensity, and pattern based on vehicle settings like motion, braking, and ambient lighting.

Florida's Road Ranger Safety Service Patrols replaced amber with rear-facing red emergency lights in 2023 to improve driver association with emergency response and move over compliance.

North Texas Tollway service patrol vehicles are equipped with arrow and message boards that can rotate so that drivers can better see warnings, even when the vehicle may be stopped at an angle on the road.

Safety Service Patrols in Missouri are using channelizing devices that synchronize and light sequentially to direct drivers approaching incident scenes where a lane closure is present.

RESOURCES

▸ FHWA Traffic Incident Management
▸ Talking TIM Webinar Series
▸ Subscribe to TIM e-News

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