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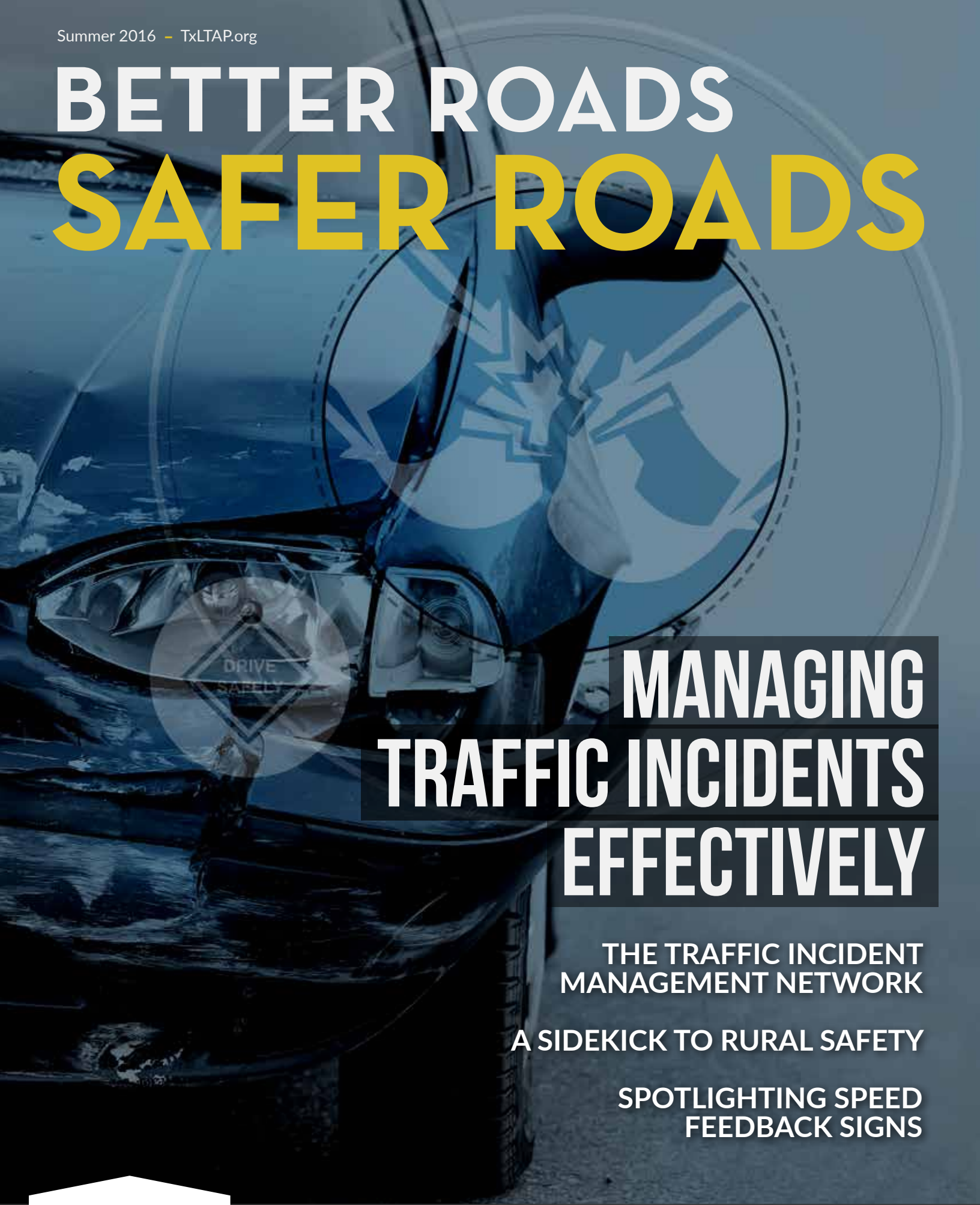

MANAGING TRAFFIC INCIDENTS EFFECTIVELY

THE TRAFFIC INCIDENT MANAGEMENT NETWORK

A SIDEKICK TO RURAL SAFETY

SPOTLIGHTING SPEED FEEDBACK SIGNS

- TxLTAP -

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The Local Technical Assistance Program (LTAP) is a nationwide effort financed by the Federal Highway Administration and individual state departments of transportation. Its purpose is to translate into understandable terms the best available technology for roadways, bridges, bicycle and pedestrian facilities, and public transportation for city and county roadway and transportation personnel. The TxLTAP, operated by the University of Texas at Arlington, is sponsored by the Texas Department of Transportation (TxDOT) and the Federal Highway Administration. This newsletter is designed to keep you informed about new publications, techniques, and training opportunities that may be helpful to you and your community.

LETTER FROM TxLTAP ADMINISTRATION

How The Time Flies By...

Last August, UTA took on the challenge of managing Texas' Local Technical Assistance Program (TxLTAP) and what a whirlwind of a year it has been! In addition to producing the Better Roads Safer Roads newsletter, our instructors have traveled thousands of miles back and forth across the state teaching over 120 classes on topics ranging from heavy equipment operations and work zone traffic control to worker safety and proper roadway maintenance procedures. More than 2,000 folks learned from our educational presentations featured at various conferences, and we're especially proud of the technical assistance provided through phone consultations, resource sharing and in-person visits.

Along the way, we've created more believers in the power of knowledge and quality training. To those of you who've shared your positive word of mouth with colleagues, many thanks! If you've been skeptical about how we can help or just haven't had a chance to schedule a TxLTAP class, give us a chance to impress.

While TxLTAP will certainly be doing more training in the future, the coming year will also see a few new additions. As a sneak peek, TxLTAP will introduce a mobile app featuring at-your-fingertip access to helpful resources such as preoperational inspection checklists, work zone reference tables, excerpts from the TMUTCD and other useful pieces of information.

Here's to the year ahead,

Ashley Mathews
TxLTAP Director
University of Texas at Arlington, Public Works Institute
txltap@uta.edu
979-307-7416

Dawn Hinton
TxLTAP Coordinator
dawnhinton@uta.edu
817-272-9678

Kim Johnson
TxLTAP Manager
kimberly.johnson2@uta.edu
817-272-9617

Texas Department of Transportation™

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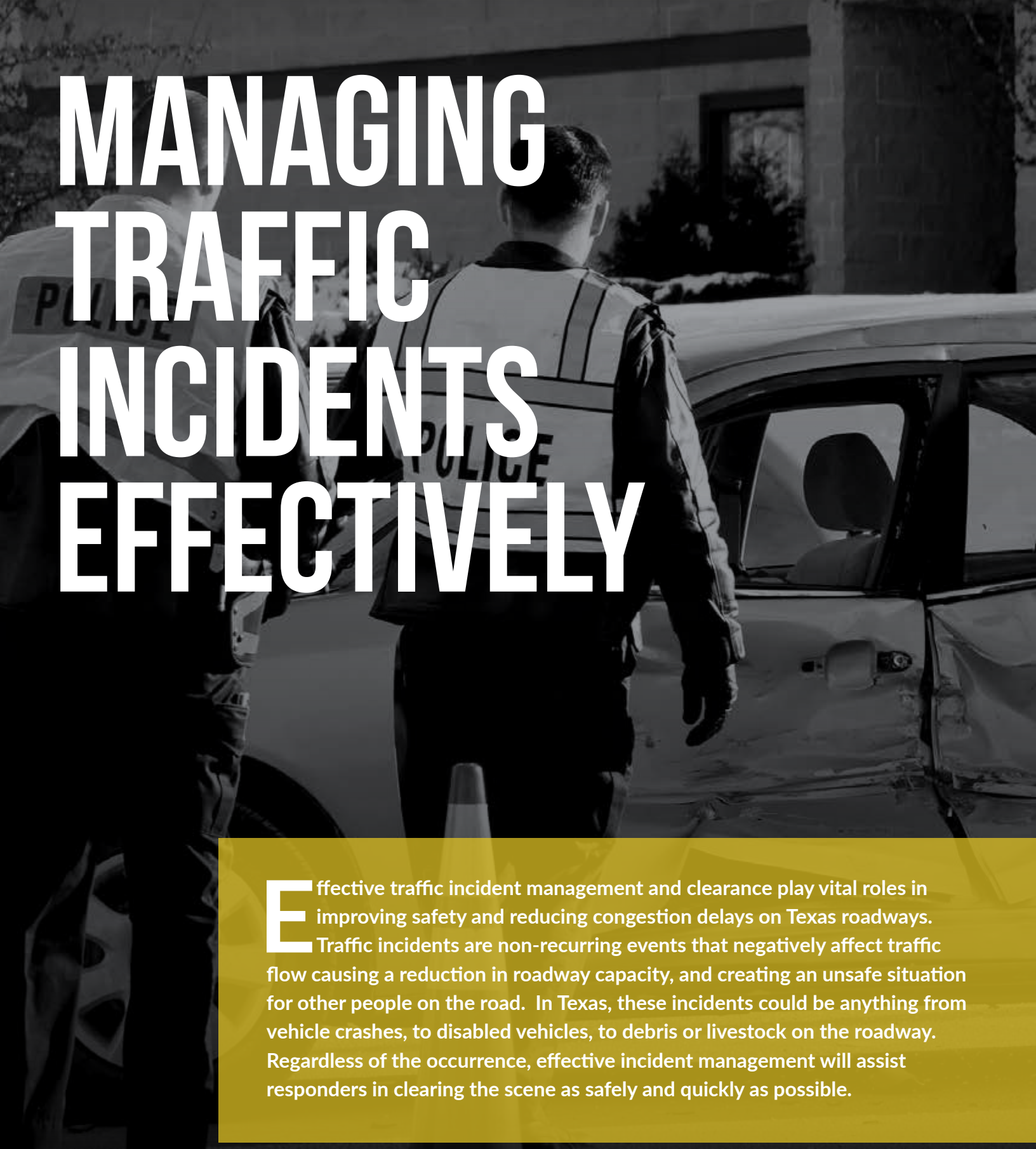


MANAGING TRAFFIC INCIDENTS EFFECTIVELY

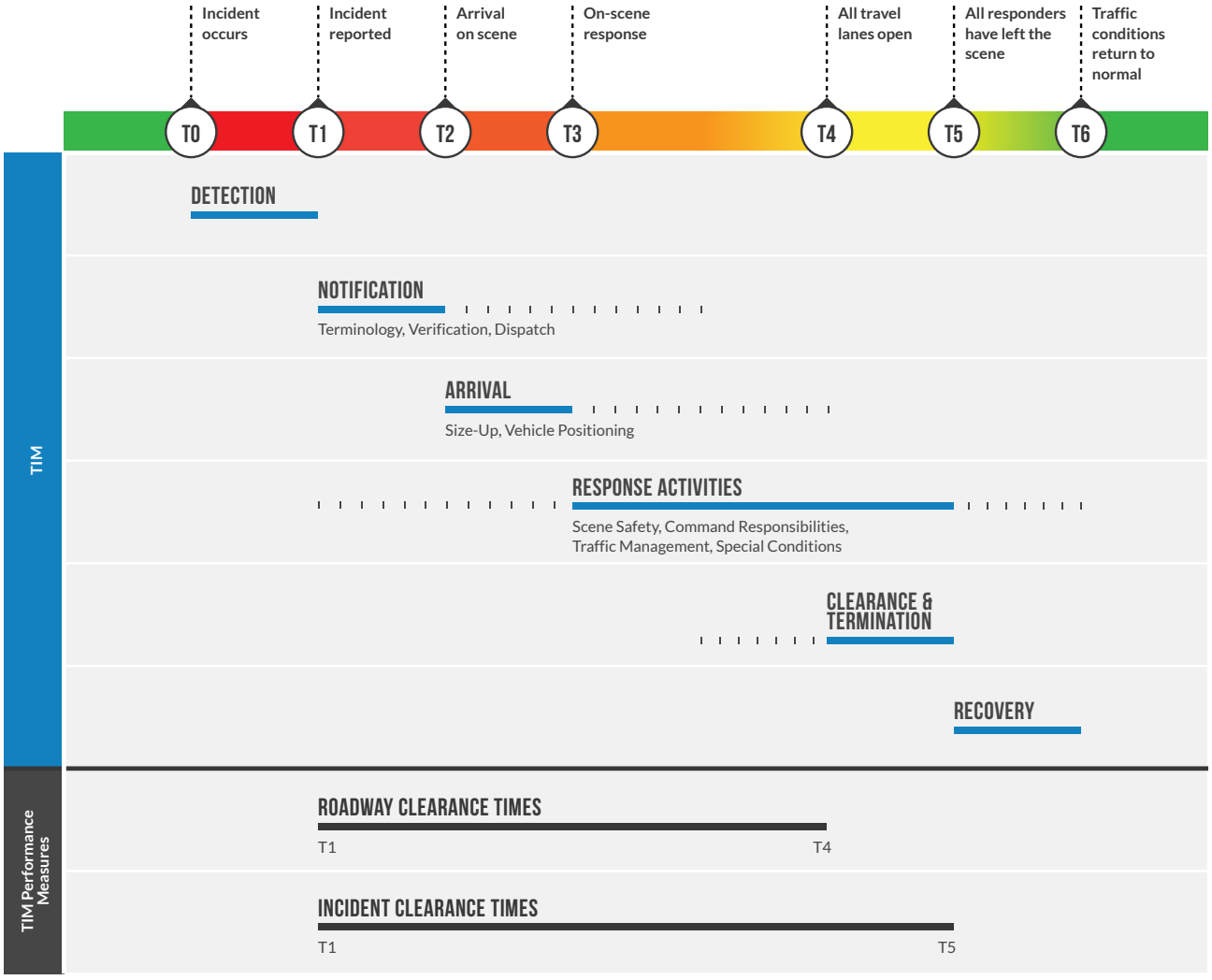
Effective traffic incident management and clearance play vital roles in improving safety and reducing congestion delays on Texas roadways. Traffic incidents are non-recurring events that negatively affect traffic flow causing a reduction in roadway capacity, and creating an unsafe situation for other people on the road. In Texas, these incidents could be anything from vehicle crashes, to disabled vehicles, to debris or livestock on the roadway. Regardless of the occurrence, effective incident management will assist responders in clearing the scene as safely and quickly as possible.

The Federal Highway Administration (FHWA) defines Traffic Incident Management (TIM) as a planned and coordinated multi-disciplinary process to detect, respond to, and clear traffic incidents from the roadway, so that traffic flow may be restored as safely and quickly as possible. When effective, TIM reduces the duration and impacts of traffic incidents and improves the safety of motorists, crash victims, and emergency responders. The multi-disciplinary process typically involves both public and private sector agencies including law enforcement; fire and rescue; towing service providers; emergency medical services; transportation agencies; and HazMat contractors. Dispatchers, Traffic Management Center staff, safety patrols, and maintenance crews are also key players in TIM. For TIM to be effective, the participating agencies must act cooperatively and in a coordinated manner during each stage of TIM.

The six major stages of TIM include Detection; Notification; Arrival; Response Activities; Clearance and Termination; and Recovery. The goal is not to interfere with the way responders perform their jobs on-scene, but to ensure actions performed at each phase are performed as efficiently as possible as every action can have an impact on returning the roadway to normal traffic flow after an incident. Every minute a lane is closed, the queue is building up and the likelihood of a secondary incident occurring increases by 2.8% for each minute a lane is closed.

THE SIX MAJOR STAGES OF TIM INCLUDE:

1. Detection;
2. Notification;
3. Arrival;
4. Response Activities;
5. Clearance and Termination;
6. Recovery



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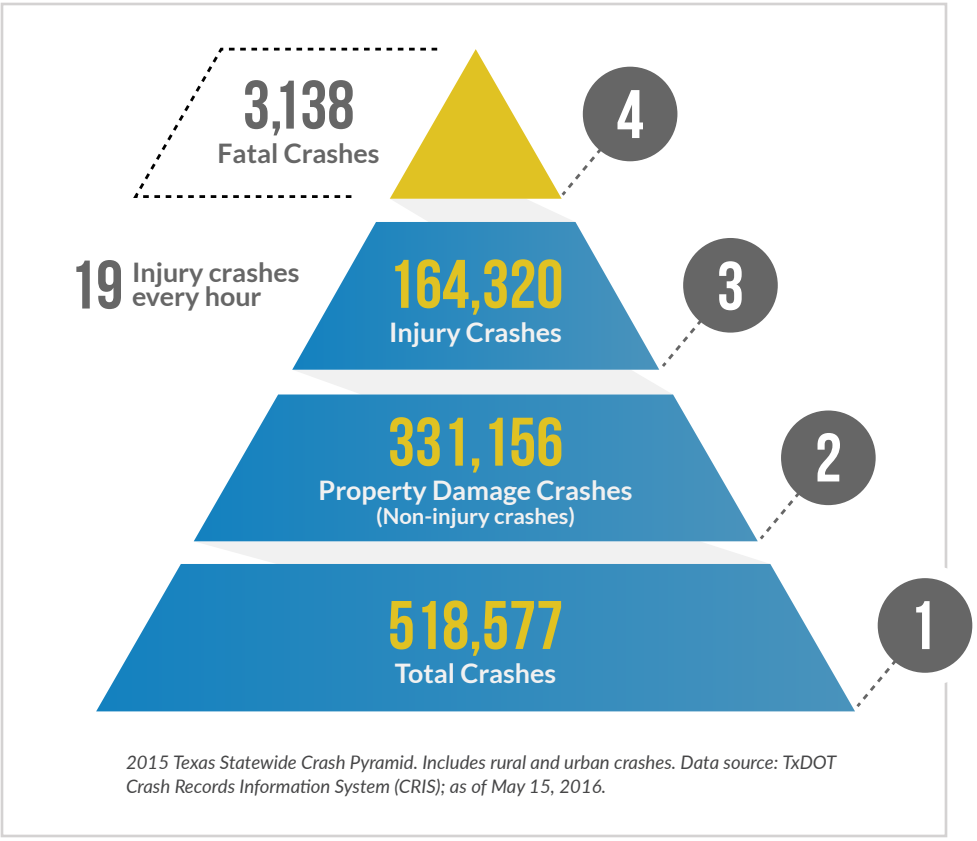
In 2015, 518,577 crashes occurred on Texas roadways, of which 164,320 were injury crashes. According to incident response experts, on average each injury crash requires at least nine responders – 2 law enforcement; 4 fire/rescue; 2 EMS; and 1 towing and recovery provider.

WHY SHOULD THIS BE IMPORTANT TO YOU? HERE'S WHY.

Based on crash statistics from the TxDOT Crash Records Information System (CRIS) in 2015 19 injury crashes occurred on Texas roadways every hour which potentially put at least 4,104 police, fire, highway workers, tow truck drivers, and other incident responders in harm's way every day. Over a one year period at least 1,497,960 responders were potentially at risk.

Congestion from these incidents can generate secondary crashes, increasing traveler delay and frustration. The longer responders remain at the scene, the greater the risk they, and the traveling public, face. A sobering statistic is that in 2015, 42% of officer deaths nationally were traffic related. TIM responders are heroes of our highways and roadways, saving lives every day. Let's do our part to help these heroes save lives.



2015 Texas Statewide Crash Pyramid. Includes rural and urban crashes. Data source: TxDOT Crash Records Information System (CRIS); as of May 15, 2016.

The National Unified Goal

The National Unified Goal (NUG) for Traffic Incident Management is a unified national policy developed by major national organizations representing traffic incident responders, under the leadership of the National Traffic Incident Management Coalition (NTIMC). Launched in 2004, NTIMC worked to promote, develop, and sustain multi-disciplinary, multi-jurisdictional TIM programs to achieve enhanced responder safety; safe, quick traffic incident clearance; and more prompt, reliable interoperable communications. In 2012, NTIMC was dissolved and the TIM Executive Leadership Group (ELG) was introduced to help identify barriers and opportunities to promote progress toward TIM goals and strategies.

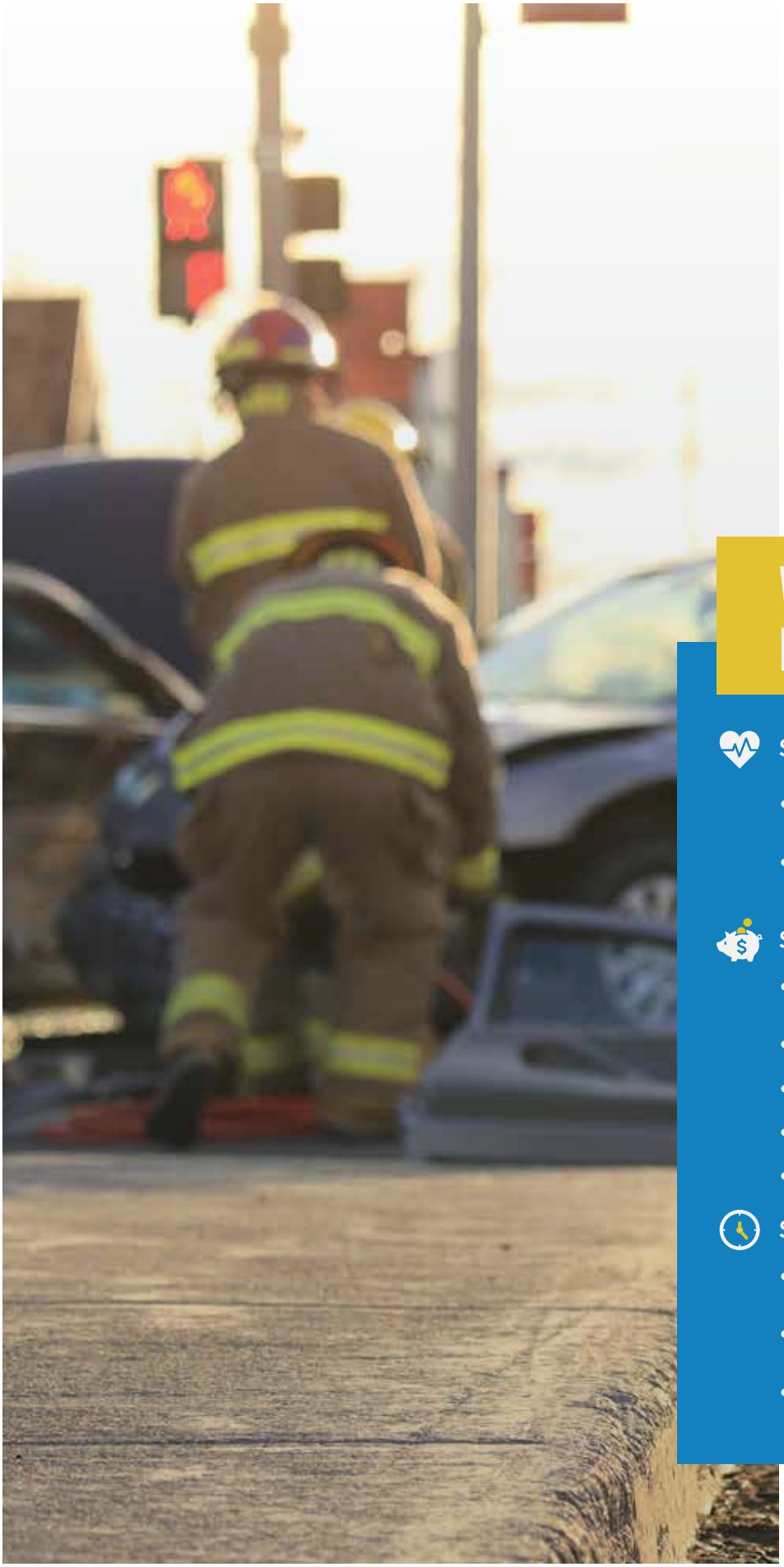
Although the NUG is not mandatory, it encourages State and local transportation and public safety agencies to adopt unified, multi-disciplinary policies, procedures, and practices that will dramatically improve the way traffic incidents are managed on U.S. roadways. The NUG includes three major objectives and 18 strategies.

NUG Objectives

1. Responder Safety
2. Safe, Quick Clearance
3. Prompt, Reliable Incident Communications

NUG Strategies

1. TIM Partnerships
2. Multidisciplinary National Incident Management Systems (NIMS) and TIM Training
3. Goals for Performance and Progress
4. TIM Technology
5. Effective TIM Policies
6. Awareness and Education Partnerships
7. Recommended Practices for Responder Safety
8. Move Over/Slow Down Laws
9. Driver Training and Awareness
10. Multidisciplinary TIM Procedures
11. Response and Clearance Time Goals
12. 24/7 Availability
13. Multidisciplinary Communications Practices and Procedures
14. Prompt, Reliable Responder Notification
15. Interoperable Voice and Data Networks



16. Broadband Emergency Communications Systems
17. Prompt, Reliable Traveler Information Systems
18. Partnerships with News Media and Information Providers

Visit http://ntimc.transportation.org/Pages/NationalUnifiedGoal(NUG).aspx for detailed explanations on the NUG strategies.

WHAT ARE THE BENEFITS?

Save Lives

- Safer and more effective on-scene techniques.
- Less exposure to responders reduces injuries and fatalities.

Save Money

- Less freight and traveler time spent in backups.
- Fewer secondary crashes.
- Fewer insurance claims.
- Fewer responder vehicles hit by traffic.
- Cost savings for response agencies.

Save Time And Improve Air Quality

- Faster incident clearance times, decreasing delays.
- Less vehicle idling, reducing vehicle emissions.
- Improve traffic flow and air quality.

TRAFFIC INCIDENT MANAGEMENT TRAINING IN THE DFW REGION

By Sonya J. Landrum

What do you get when you combine nearly seven million people with a roadway system that has over 1000 centerline miles of freeway, tolled, and managed lanes, along with nearly 2400 miles of regional arterials? In short... congestion, congestion, congestion. With the Dallas-Fort Worth (DFW) urban area as its center, the North Central Texas region is a region where congested roadways are often the norm. About 50% of the congestion in the region is caused by non-recurring traffic incidents and crashes. In an effort to address the congestion caused by these non-recurring incidents and improve safety for motorists and emergency responders on our regional roads, in 2003, the North Central Texas Council of Governments (NCTCOG), the Metropolitan Planning Organization (MPO) for the Dallas-Fort Worth (DFW) area became the first agency in the nation to formalize a traffic incident management (TIM) training program for all responders in the region.

The goal of the NCTCOG TIM Training Program is to initiate a common, coordinated response to traffic incidents that will build partnerships, enhance safety for emergency personnel and motorists, reduce upstream traffic crashes, improve the efficiency of the transportation system, and improve air quality in the DFW region.

NCTCOG offered the first TIM Training in February 2003, after a 15-month development process that resulted in the development of detailed course materials, instructor notes, slides, classroom materials, and a "train the trainer" module. To review the course content, NCTCOG assembled a Local Curriculum Review Committee, made up of 41 representatives from fire departments, police departments, emergency medical services (EMS), transportation agencies, the towing industry, the media, and the insurance industry.

Specific courses have been designed for both first responders and managers, and executive level policymakers. Each course explains the goals, objectives, and benefits of multi-agency incident management coordination and training. The First Responder and Manager's Course is a free 2-day course specifically designed for those with daily involvement in responding to traffic incidents on the region's roadways. The course includes interactive tabletop exercises and is offered six times per year. The training is eligible for TCOLE Credits, Fire Commission Credits and Emergency Medical Services (EMS) Continuing Education Units (CEUs).

The Executive Level Course is a free 2-hour course geared towards agency decision-makers and policy-makers. It is designed to provide an overview of the 2-day course and to assist decision makers in understanding what is required of all responders during an incident. The Executive Level Course also includes an interactive tabletop exercise led by an instructor from the First Responder and Manager Course. The Executive Level Course is offered twice a year. The NCTCOG TIM Courses are also certified as Equivalent to the SHRP2 National TIM Program Courses.

Since February 2003, 95 classes have been offered at the first responder level to 2,640 area fire, police, towing and transportation agencies, and media representatives. Additionally, since February 2005, 22 classes have been offered at the executive level to over 600 decision and policy makers.

In 2007, NCTCOG began offering a Photogrammetry Training Workshop as a complement to the region's TIM Training Program. The Photogrammetry system, used for crash reconstruction and forensic measurements, is an image-based 3D system that calculates measurements from photographs and digital camera images. The photogrammetry software technology works by imaging the same feature point in different photos and then using angles to calculate distances based on angles and other mathematical formulas. The system allows police departments to clear roadway incidents more quickly and conduct crash investigations from their offices using a personal computer. Attendees receive the necessary equipment/software required to operate the photogrammetry system, including digital cameras and accessories, iWitness™ and Crash Zone software and licenses at no cost to the attending agency.

The iWitness™ and Crash Zone workshops qualify for Accreditation Commission for Traffic Accident Reconstruction (ACTAR) - Continuing Education Units and TCOLE credits. The Photogrammetry Workshop is offered twice a year at the NCTCOG facility in Arlington. Since January 2007, 159 students have participated in the training.

In support of the TIM training recommendation to use Best Practice equipment and technology, NCTCOG conducted an Incident Management Equipment Purchase Call for Projects in 2014. The goal of the Call for Projects was to assist partner agencies in purchasing equipment and technology that aid in quick incident clearance and crash mitigation. The Call for Projects emphasized NCTCOG's commitment to regional traffic incident management efforts by our regional partners and emphasized the importance of implementing incident management strategies and training. Over $1.7 million was awarded to regional response agencies to assist them in purchasing equipment such as traffic control and scene management equipment, responder safety gear, changeable message signs, responder

radios, and crash investigation technology and training.

To reemphasize NCTCOG's commitment to incident management, the Regional Transportation Council (RTC) adopted Resolution R08-10: Resolution Supporting a Comprehensive, Coordinated, Interagency Approach to Freeway Incident Management (an update to RTC Resolution R03-01). A model resolution was also developed for passage by local jurisdictions. Implementation of the NCTCOG TIM Program includes a compliancy component that considers active participation in incident management training and operational implementation when considering future funding actions. As a result, active participation in TIM training opportunities by local jurisdictions is a requirement to participate in the Photogrammetry Training Workshops. Training participation and the passage of a TIM Resolution are also scoring components in NCTCOG incident management related funding and other regional funding opportunities.

Please visit www.nctcog.org/FIM for more information on the NCTCOG TIM Training Program and for course registration information.
Although this article is about the NCTCOG TIM Program, there are other TIM training opportunities available for agencies outside of the North Central Texas region. For information on the TIM training offered through the UTA Division for Enterprise Development, visit https://web-ded.uta.edu/wconnect/ShowSchedule.awp1?~~GROUP~CCT700

Sonya J. Landrum is a Principal Transportation Planner at the North Central Texas Council of Governments (NCTCOG), the Metropolitan Planning Organization (MPO) for the Dallas-Fort Worth area. She earned a Bachelor of Science degree in Civil Engineering from Southern University and A&M College in Baton Rouge, LA, and a Master of Business Administration in Management from Amberton University in Garland, TX. Sonya manages the NCTCOG Transportation Safety and Travel Demand Management program areas.

THE TRAFFIC INCIDENT MANAGEMENT (TIM) NETWORK:

A PLACE FOR ENGINEERS AND ROADWAY DESIGNERS TOO

By William "Rusty" James, III

In the early 2000s, as the concepts of traffic incident management (TIM) were being developed and discussed, a group of TIM practitioners began to communicate through e-mails, websites, and common contacts. This group consisted of law enforcement officers, firefighters, emergency medical services (EMS) personnel, department of transportation (DOT) personnel, the towing industry, traffic engineers, the Federal Highway Administration (FHWA), and others. The need to better manage traffic incidents while better protecting our personnel was a common theme in these communications. The participants decided that a formal group was needed to serve as a source of TIM information and resources. Thus, the TIM Network launched in 2009 with just a few members who were passionate about the safety of responders, the safety of motorists, and better management of traffic incidents.

As this new TIM Network continued to share information across the United States, it became even more obvious that it needed participation from all of the stakeholders involved in traffic incident management. Participants knew the obvious stakeholders, those who respond to incidents on the highways, but saw that there was a need for more involvement on the part of highway engineering, design, construction, and maintenance. There was a need to return to the 4 "Es" of highway safety: Engineering, Education, Enforcement, and EMS. Traffic incident management must start with engineering and design. Without the involvement of engineering and design, TIM was always going to be a reactive process. Not just intelligent transportation systems (ITS) engineering and design, but all aspects of highway engineering and design need to be incorporated.

Since the beginning of the evolution of the TIM Network, participants have worked hard to involve engineering and design into TIM. Presentations have been made at local, state, regional, national, and international conferences. The involvement has increased, but there is a need to further grow the network. As a practical matter, engineers do not often communicate regularly with first responders during the design process, and first responders do not often seek out engineers to express their needs in providing a safer working environment for their personnel. It is sometimes like the two groups speak different languages. The TIM Network can help to break down those communications barriers to put all stakeholders on the same page when it comes to TIM and highway safety.

One of the most valuable resources in breaking down communications barriers has been the Strategic Highway Research Program 2 (SHRP2) National Traffic Incident Management for Responders training course. This training was a product of the reliability section of the SHRP2 project. From the rollout of the training program, the need for all TIM stakeholders to participate has been stressed. Trainers were sought out from all disciplines: law enforcement, fire, EMS, DOTs, towing, traffic engineering, highway engineering and design, and others who are involved in TIM. Following Train-the-Trainer sessions, the National Traffic Incident Management for Responder training has been presented to stakeholders from all disciplines. While there is a long way to go in training all who are involved, the training has been very successful in bringing the different disciplines together to learn about improving TIM not only in this county, but around the world. As of April 4, 2016, there have been approximately 173,284 responders and stakeholders trained as a result of this training program. The interest in the training continues, and we urge all stakeholders to participate.

Over the years there have been several resources developed to provide the needed information to TIM stakeholders. In addition to the TIM Network, FHWA has developed resources, including its Knowledge Management System. There are the websites ResponderSafety.com, SafeQuickClearance.org, and the National Operations Center of Excellence's website transportationops.org to name a few. This variety of resources can make it difficult to locate information without consulting a number of sources, many of which are not linked together. The TIM Network is moving toward simplifying this process by bringing many of the resources under one umbrella and linking them together.

As the TIM Network continues to evolve,

the plan is for it to be the first resource that is consulted when TIM stakeholders have questions, are looking for peer support, and need to contact others who are involved in TIM. The TIM Network plans to serve as the location for information that is part of knowledge management systems from the different groups. To put it simply, the TIM Network would like to be a one stop shop for TIM resources.

The TIM Network continues to struggle to increase the participation by ITS design engineers and roadway design and construction engineers. There is much that could be accomplished in the TIM field with greater involvement from this group. When engineers are in the process of designing ITS plans, or highway design engineers are designing new roadways or improvements to existing roadways, it would be good to involve TIM stakeholders in the planning process. These stakeholders may be able to provide information on location and use of ITS devices, and they may be able to identify low-cost solutions to getting vehicles involved in incidents on the highways out of the travel lanes.

As the new TIM Network liaison, I urge traffic engineers and design engineers to reach out to the TIM community and involve them in your plans. If we bring TIM stakeholders into the process at these beginning stages we can begin to move TIM from an almost completely reactive to a proactive process. And, we will get better buy-in from the stakeholders if they are part of this process.

The TIM Network always welcomes traffic engineers, ITS engineers, highway design and construction engineers, both public and private, to participate. The TIM Network, although very successful, would not enjoy this success without the varied backgrounds of its members.

Please visit the TIM Network website for more information, timnetwork.org.

THE EVOLUTION OF TIM NETWORK'S FRAMEWORK

2004

The National Traffic Incident Management Coalition (NTIMC) launched as a multi-disciplinary partnership forum spanning the public safety and transportation communities to coordinate experiences, knowledge, practices, and ideas. The NTIMC was committed to the safer and more efficient management of all incidents that occur on, or substantially affect, the nation's roadways in order to: enhance the safety of on-scene responders and of motorists passing or approaching a roadway incident; strengthen services to incident victims and to stranded motorists; and reduce incident delay and costs to the traveling public and commercial carriers.

2007

The NTIMC finalized the National Unified Goal (NUG) for TIM, which was a significant step forward in identifying how TIM could be formalized within agencies at the planning level and approaches for practitioners to consider when dealing with emergencies on the highway. The NUG is focused on responder safety; safe, quick clearance; and prompt, reliable, interoperable communications. The NTIMC membership partnered to create several technical briefings to further the national dialog about TIM and raise awareness about important aspects of the NUG.

2009

The TIM Network was launched as an NTIMC outcome.

2012

The NTIMC was replaced by an Executive Leadership Group (ELG), which consists of associations representing law enforcement, fire and rescue, EMS, towing, and transportation, among other disciplines. Led by FHWA, the ELG supports various TIM-related initiatives across the United States.

2015

A new look for the TIM Network was rolled out to reinforce that all responders and TIM practitioners have an important role to play in this industry–from law enforcement, fire, EMS, towing, transportation, and public works partners, to dispatchers, traffic management center personnel, safety service patrol operators, and media partners, among others.

Please visit the TIM Network website for more information, timnetwork.org.

William "Rusty" H. James III is the TIM Network Liaison. He is an incident and emergency management specialist with Gannett Fleming, Inc. Rusty retired from the Lenexa Police Department in 2006 after 30 years of service in law enforcement. The majority of his career was devoted to the area of traffic safety. Following his retirement, Rusty was the law enforcement liaison for the Central Region at the National Highway Traffic Safety Admin-istration. In 2007, Rusty began a second career as the Incident Management Coordi-nator for Kansas City Scout. In that capacity, he is responsible for promoting Traffic Incident Management in the Kansas City Metro area. In 2013 Rusty was selected by the Federal Highway Administration as a master trainer for the SHRP2 National Traffic Incident Management Responder Course. In that role, Rusty provides traffic incident management training to responders throughout the country.

A SIDEKICK TO

By Janel Leli

Thanks to the creation of a next-generation center, rural agencies have a strong partner to help address safety challenges on their roads.

Rural roads comprise 80% of the national road system and play a critical role in the national economy by creating the network the links rural and urban communities, and connects commercial and industrial activities.

Despite an overall trend in decreasing fatalities on U.S. roadways in recent years, almost 33,000 people still lose their lives in traffic crashes annually. Although only about 20 percent of the U.S. population resides in rural areas of the country, crashes on rural roads account for more than half of all roadway fatalities. Fatalities in traffic crashes on rural Texas roads accounted for 54.5% of our state's traffic fatalities, or 1,925 deaths. Current statistics indicate that even with the national number of fatalities decreasing, the fatality rate in rural areas is 2.4 times higher than the fatality rate in urban areas.

Rural road owners and stakeholders face significant challenges in addressing safety problems adequately. The diverse nature of safety issues on rural roads requires assessment of human and environmental factors. Road agencies may lack strategies to address rural road safety issues and may be hampered by limited access to or awareness of available resources.

Funded by the Federal Highway Administration, the National Center for Rural Road Safety opened in December 2014 to identify the most effective current and emerging road safety improvements and help local agencies deploy them on rural roads. In the Moving Ahead for Progress in the 21st Century Act (MAP-21), Congress explicitly created competitively selected centers of excellence in the areas of the environment, surface transportation safety, rural safety, and project finance. The National Center for Rural Road Safety covers both rural and surface transportation, with an emphasis on rural. It embodies the Federal transportation goal for a center focusing specifically on enhancing safety on rural roads while supporting surface transportation in general.

Partnering for Excellence

The center's team of subject matter experts is led by the Western Transportation Institute at Montana State University. Other members are from Iowa State University's Institute for Transportation; Rutgers University's Center for Advanced Infrastructure and Transportation; and the Local Technical Assistance Programs of Iowa, Louisiana, Montana, and New Jersey. In addition, the center receives critical support from contractors who are an integral part of the team. This group has a robust background in transportation safety issues, including workforce development and training; engineering; research and outreach in human factors; planning; operations; and State, local, tribal, and rural challenges.

As part of a federally sanctioned center focused on rural road safety issues, the team is in a unique position to access and leverage FHWA's expertise and training resources. The center helps to integrate, coordinate, and accelerate the knowledge transfer of safety solutions.

"With over half of fatalities occurring on rural roads, and safety being a top priority, there needs to be a national, focused center that fulfills the role of a one-stop shop for research, technical assistance and transfer, and training," says Steve Albert, the center's director. "It will include, but also move beyond, engineering as a principal focus. It also will include culture and behavior because at least 90 percent of crashes are due in some part to the driver, not the infrastructure."

Two Guiding Forces

In addition to the team, two more groups lead the guidance and management of the center: a national stakeholder group and an FHWA technical panel. The team felt that it was important to keep the advisory groups small enough to encourage a high level of participation, while keeping them diverse enough to represent the interests of multiple fields and professions.

The stakeholder group brings together individuals from multiple disciplines in the name of rural road safety. The center's management team selected the members of the stakeholder group with

RURAL SAFETY

geographic diversity in mind, as well as for their complementary expertise in representing the "4 E's" of engineering, education, enforcement, and emergency medical services. The project team chose the members of the stakeholder group to represent the primary disciplines with road safety interests. The group includes the National Local Technical Assistance Program Association for its role across the country as a link to local public agencies.

Also in the group are engineers from State and county departments of transportation and representatives from public works, rural planning, law enforcement, trauma and emergency response, and local and tribal technical assistance programs. These stakeholders and transportation professionals serve as a sounding board for the center's work to ensure that its activities are not only comprehensive, but also holistic in nature. The stakeholder group is convened several times per year to provide direct input.

The technical panel has representatives from multiple FHWA offices and programs, including the FHWA Office of Technical Services' Resource Center, Technology Partnership Programs, and National Highway Institute; the Office of Federal Lands Highway; the Office of Safety; the Office of Safety Research and Development; and the Montana Division Office. This link to FHWA serves to increase accessibility to opportunities for technology transfer for local and rural users. The center uses its communications tools--a conference exhibit, electronic newsletter and announcement list, Web site, social media, webinars, and on-site training--to market available technical resources, outreach materials, and training provided by FHWA.

The center's goal is to empower as many State, local, and tribal agencies as possible with the most effective safety tools and strategies currently available. Building on a growing body of multidisciplinary research, best practices, and successful deployments in rural environments, the center is poised to help agencies with their immediate challenges for rural road safety.

"Addressing rural safety challenges is not straightforward," Albert says. "It requires a comprehensive assessment of needs and a multidisciplinary approach to investigate the many factors that have an impact on safety. Safety issues must be viewed through a wider lens, rather than addressing only one piece of an issue at a time."

There is no silver bullet to address all rural challenges. Albert's philosophy for the center, he says, is to employ a methodology "for training and technology transfer that provides safety solutions that address systemic needs, targeted not only at roads, but also driver behavior, vehicle capabilities, infrastructure, and cultural understanding, too."

The goal is to deliver training that accelerates change and makes it possible for agency managers, planners, operations staff, and maintenance crews to do their jobs better by the very next day.

Making a Difference

By using proven strategies and reaching further into rural areas with knowledge sharing and educational outreach, the center helps these jurisdictions maximize use of their available resources.

The center approaches roadway safety from every angle, drawing noteworthy practices and information from a wide variety of assets that are suitable for technology transfer. For example, almost one-third of fatalities in rural areas are speeding related. Targeted and aggressive educational and enforcement campaigns by local agencies advised by the center might help reduce that number. Identifying examples of successful campaigns of this nature is not limited to rural areas; the center's staff examines best practices from all location types to highlight and replicate effective strategies and programs. This approach can help jumpstart an agency's safety culture without having to start from scratch.

Although many roadway safety issues, like speeding, are equally germane to rural, suburban, and urban environments, rural geography compounds some challenges. The time that it takes for crash victims to reach hospitals, for example, is substantially longer for rural crashes, taking an average of 42 minutes compared to 25 minutes in urban areas. That time differential directly correlates to higher mortality rates. The Centers for Disease Control and Prevention reports that severely injured crash occupants who receive care at Level I trauma centers have a 25-percent reduction in risk of death. It is also well known that the sooner a crash victim receives surgical attention, the better the chances of survival--often referred to as the "golden hour." Rural crash victims find themselves already dangerously close to that 1-hour window upon arrival at the hospital. And that's if they even make it: With increased time for help to arrive at the scene and longer distances to an appropriate level of care, victims of rural crashes make up 68 percent of patients who die in route to treatment centers.

The center works to increase awareness and education among practitioners in

Continue on the next page.

rural areas to increase the implementation of appropriate countermeasures and technologies to minimize crash rates, improve response times, and maximize safety and survival rates when crashes do occur.

Getting the Word Out

The center maximizes communication options to reach rural agencies and road users with the rural safety message. These methods include using social media, such as Facebook, and the center's electronically distributed newsletter, the Safety Sidekick, to support information exchange.

The center's Web site, www.ruralsafetycenter.org, functions as a clearinghouse of technical resources, training, and events. Because rural access to technical assistance is a priority, the site includes a help desk feature. This function is designed to address quick-turnaround requests for rural safety guidance by offering resources or a subject matter expert to provide direct help. With technology transfer as the cornerstone of the center's activities, the site emphasizes collecting noteworthy practices to share across the United States. To that end, it includes a library of videos and recorded webinars to accelerate implementation of practical, low-cost solutions to safety challenges.

Training from Coast to Coast

Traditionally, educational opportunities are considered the workhorses of technology transfer. By improving the understanding of safety data, analysis, design and maintenance countermeasures, and multidisciplinary and holistic approaches, the center helps to expand the tools and technologies put into practice. With the many facets of safety in mind, the team works with the technical panel and stakeholder group to determine topics for educational offerings that range from in-person classroom settings to webinars available 24/7.

Bringing Together a National Audience

Rural communities provide food, energy, resources, and more to keep the Nation running. They need safe, viable roads and multimodal systems to move both people and goods from place to place. Recognizing that rural roads are a foundational building block for commerce, agriculture, tourism, and technology development, the center is coordinating the National Working Summit on Transportation in Rural America: Advancing Safe Transportation Systems to Enhance Economic Development and Quality of Life. Attendees will discuss and debate road safety and transportation issues that impact quality of life and economic prosperity in rural areas and identify collaborative opportunities.

National Center for Rural Road Safety

Unlike many conferences and events, the summit will present a multidisciplinary agenda instead of focusing on a single theme. This strategy will be reflected in both the audience and the session topics. The center aims to bring together those who build and maintain roads with those who set policy and provide funding, attendees with a variety of economic and public safety interests, and road users including cyclists, pedestrians, and transit users. The summit will examine economic concerns, community and livability issues, policy development, and safety culture in a collaborative environment. The summit's format will include working sessions both in silo groups and in cross groups, providing for facilitated discussions by interest area as well as in a multidisciplinary environment.

The expected outcomes of the summit are (1) the identification of key strategies to promote meaningful and productive dialogue to continue well after the summit, (2) preparation of a white paper based on the thematic sessions that occur during the summit, and (3) use of the momentum from the summit and white paper to establish partnerships and coalitions that promote positive change for rural road safety.

The summit will be held September 7–9, 2016, in Denver, CO. For more information, visit www.ruralsafetycenter.org/news-events/moving-rural-america-summit.

Supporting Critical Networks

Rural roads serve the travel and commerce needs of the whole Nation, including approximately 60 million people in rural areas. About 80 percent of the Nation's roadway miles traverse rural terrain. The vastness and importance of rural roads make safety issues a very real concern. Mitigating those issues through training, education, and interdisciplinary safety strategies has the potential to make roads safer and to save lives.

The National Center for Rural Road Safety provides a valuable resource and partnership for rural stakeholders because of its ability to provide coordinated and scalable safety measures unique to rural roads.

"Ultimately," says Clint Dicksen, director of public works for Fanwood, NJ, "the center offers services that help to deliver the safety message by empowering local stakeholders, hindered by limited resources, to take strategies for road safety into their own hands and to develop and implement safety programs and methods that address the needs of their roads. Many of us have small towns, with small staffs. We always have a need for help."

Janet Leli *is the associate director for technology transfer at Rutgers University's Center for Advanced Infrastructure and Transportation and a member of the National Center for Rural Road Safety team. She is also the director of the New Jersey Local Technical Assistance Program Center. Leli has a master's degree and graduate certificate in advanced governmental administration from Rider University and a bachelor's degree in political science from Rutgers University. She serves on the Transportation Research Board's Highway Safety Workforce Development and Technology Transfer Committees.*

For more information, see www.ruralsafetycenter.org or contact Janet Leli at 848–445–2906 or jleli@rci.rutgers.edu.

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PHONE APP TO GATHER PUBLIC INPUT ON FLASH FLOODING CONDITIONS

D.J. Seo wants you to be his eyes on the weather – and more specifically to be watching for flash floods.

The University of Texas at Arlington associate professor of civil engineering has launched a new Android cell phone app called iSeeFlood to encourage the public to file timely reports when they see flooding of varying severity on the streets, in and around their houses, and in streams and creeks. Such flash floods can be dangerous to pedestrians and motorists alike.

The free Google Play app is a new addition to the tool kit that researchers, forecasters and emergency management professionals are using to improve their ability to protect lives and property. An iPhone version is under consideration.

The app will work with the regional Collaborative Adaptive Sensing of the Atmosphere, or CASA, radar system that in recent years has delivered faster, more precise information about severe weather and flash flooding. Seo was instrumental in hosting the first CASA unit in North Texas on top of UTA's Carlisle Hall in 2012.

At the same time, Seo's team also has been installing innovative wireless sensors to improve high-resolution modeling of urban water systems. Researchers have started deploying 10 of the high-tech sensors in Fort Worth and Grand Prairie in the first phase of the research. More in Dallas, Arlington and Kennedale are planned in the near future.

"We will integrate the information that people send us using the app and the data from the sensors and the CASA system with flash flood forecasting models," Seo said. "This type of research in real-time sensing and prediction is important particularly because this area is growing fast. Urbanization means we have changing land surface conditions such as increasing impervious land cover, which change how rain may be running off and accumulating."

This new innovative, wireless sensor will be installed in Fort Worth and Arlington. Later, the sensors will be installed in Arlington, Dallas and Kennedale.

Greg Waller, service coordination hydrologist for the National Weather Service's West Gulf River Forecast Center, said Seo's work already has advanced the agency's ability to better serve the public and is being shared with agencies like the U.S. Corps of Engineers and U.S. Geological Survey.

"The data helps us calibrate our models, which leads to better forecasts and warnings," Waller said.

Ali Abolmaali, chair of the UTA Civil Engineering Department, said Seo's work illustrates the University's commitment to advancing sustainable urban communities and data-driven discovery under the Strategic Plan 2020: Bold Solutions | Global Impact.

"This is data-driven research with a direct impact on saving lives," Abolmaali said. "The app makes it very easy to report flooding conditions, and we are using sensors to gather additional information in real time. That information is useful not only during floods but in providing guidance on managing water-related hazards in future development."

The iSeeFlood app and the wireless sensors are research outcomes of Integrative Sensing and Prediction of Urban Water for Sustainable Cities, a joint project among The University of Texas at Arlington, University of Michigan and University of Massachusetts Amherst. The project is supported by a $1.2 million National Science Foundation grant Seo received in 2014 to improve sustainability of large urban areas affected by extreme weather, urbanization and climate change through the NSF's Cyber-Innovation for Sustainability Science and Engineering, or Cyber-SEES, program.

Seo is UTA's Robert S. Gooch Professor of Water Resources Engineering. He joined the University in 2010 following professional appointments to the National Weather Service's Hydrologic Research Laboratory in Maryland and as a senior researcher in the Environmental Remote Sensing Research Laboratory at the Korea Institute of Science and Technology in Taejon, Korea. Seo earned his master's degree from the Massachusetts Institute of Technology and his doctoral degree from Utah State University.

Download the Android iSeeFlood app at https://play.google.com/store/search?q=iseeflood&hl=en.

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SPOTLIGHTING SPEED FEEDBACK SIGNS

By Abdul Zineddin, Shauna Hallmark, Omar Smadi, and Neal Hawkins

An FHWA study links dynamic messages to a reduction in roadway departures on two-lane rural curves that have high crash histories

Roadway departures are a significant safety concern on U.S. roads. According to the latest data from the National Highway Traffic Safety Administration's Fatality Analysis Reporting System, roadway departures continue to account for more than half of U.S. highway fatalities annually and nearly 40 percent of serious injuries. Roadway departure crashes that involved a single vehicle resulted in 1,255 deaths on Texas roadways in 2015. This accounts for 35.54 % of all motor vehicle traffic deaths on Texas roadways in 2015.

Nationally most departure crashes occur on rural two-lane roadways, with a disproportionate number taking place on horizontal curves. The average crash rate at horizontal curves is about three times that of other types of highway segments. These curves, which change the alignment or direction of the road, are associated with more than 25 percent of fatal crashes, and the majority of those fatalities are associated with roadway departures. In addition, about 75 percent of curve-related fatal crashes involve single vehicles leaving the roadway.

"The reduction of roadway departures must be a major emphasis if we want to significantly reduce fatalities and serious injuries in the United States," says Monique Evans, director of the Federal Highway Administration's Office of Safety Research and Development.

Not surprisingly, speed is a factor in whether drivers negotiate curves successfully. Dynamic speed feedback signs are one type of traffic control device that State departments of transportation use to reduce vehicle speeds, and therefore crashes, by giving drivers who are traveling over the posted or advisory speed a targeted message such as "YOUR SPEED XX" or "SLOW DOWN."

These sign systems include a speed-measuring device, which consists of loop detectors or radar, and a message sign that displays feedback to those drivers who exceed a predetermined speed threshold. The feedback can include displaying the driver's actual speed, showing a message such as SLOW DOWN, or activating some warning device, such as beacons or a curve warning sign.

To better understand the effectiveness of speed feedback signs in reducing speeds on curves, the Center for Transportation Research and Education at Iowa State University conducted a national field evaluation of the signs at horizontal curves on rural two-lane roadways. The study is described in a January 2015 report, Evaluation of Dynamic Speed Feedback Signs on Curves: A National Demonstration Project (FHWA-HRT-14-020).

Sponsors of the project included FHWA, the Midwest Transportation Center at Iowa State University, the Iowa Department of Transportation, the Iowa Highway Research Board, and the Texas Department of Transportation. In addition, the Texas A&M Transportation Institute and Portland State University were partners in the research. Here's how the researchers did the study and what they found.

Selection of Sites

Seven States participated in the field evaluation: Arizona, Florida, Iowa, Ohio, Oregon, Texas, and Washington. The researchers asked each State DOT or corresponding local agency to identify at least 20 high-crash curve sites on rural two-lane roadways. The research team defined "rural" as 1mile (1.6 kilometers) or more outside an incorporated area.

The study started in 2007 and concluded in 2013. The team required that, during the 2-year evaluation period for each project site, the State DOTs or corresponding local agencies would schedule no rehabilitation or reconstruction activities that would change the geometry of the roadways under consideration. Nor were the DOTs to have conducted any geometric or cross-section changes for 3 years prior to the beginning of the study. In addition to these requirements, the posted speed limit on the preceding tangent section of road had to be 50 miles per hour (mi/h) (80 kilometers per hour, km/h) or greater.

The research team also asked each DOT to provide data on crash frequency, traffic volume (annual average daily traffic and percent of trucks), geometry (including lane and shoulder width), and the posted and advisory speed limits. The researchers ranked the sites in each State by the number of crashes. They also counted sites above a predetermined threshold as high-crash locations and included them on a list for site visits.

The team conducted a preliminary speed study using a radar gun at each site to determine whether a speeding problem existed, and those findings led to picking a final list of sites. Overall, the researchers selected 22 treatment sites and 46 control sites. They used the control sites only for crash analysis. For each treatment site, they randomly assigned one of the various types of speed feedback signs for the States to implement.

Selection of Signs

The selection of systems focused on what a sign can display. The most common sign simply shows a vehicle's speed when it exceeds a set threshold. This kind of sign also can activate a flashing beacon. Another type of sign can show a static message, such as SLOW DOWN or TOO FAST. More complex signs display unique messages, limited only by the number of alphanumeric characters the sign can show.

The research team developed the following set of minimum criteria to guide the final selection of the type of speed feedback sign:

- Can be mounted permanently on a standard wooden or metal pole.
- Can display a warning or a simple message (for example, TOO FAST or XX mi/h).
- Is durable enough to survive the 2-year study period and perform in various climates.
- Has self-contained power (for example, alternating current or solar).
- Costs less than $10,000 per sign (including installation, support, and maintenance).
- Meets all applicable Manual on Uniform Traffic Control Devices requirements or is capable of being approved under MUTCD.
- Provides repeatable and accurate speed measurements.
- Projects a clear, bright, non-glare message that motorists can read easily.

LOCATION OF THE STUDY'S TREATMENT SITES IN TEXAS

STATE	ID	LOCATION	POSTED SPEED (MI/H)	ADVISORY SPEED (MI/H)	ADT*	CRASHES / YEAR	NUMBER OF CONTROL SITES
TX	4	FM 755	65 TRUCK 60 - DAY TRUCK 55 - NIGHT	50	970	2.0	6
	30	SH 359	70 TRUCK 70 - DAY TRUCK 65- NIGHT	NONE	3,490	1.3	
	38	FM 481	65 TRUCK 60 - DAY TRUCK 55 - NIGHT	50	890	1.3	
	39	US 90	70	NONE	3,160	1.3	

Source: FHWA
*ADT = Average Daily Traffic

For the first message type, the team selected the dynamic display of YOUR SPEED XX or SPEED LIMIT XX, with the message determined by the speed threshold.

For the second message type, the researchers chose a sign that displays an advance curve warning symbol. When activated, the sign displays a standard curve warning symbol as specified by the MUTCD and the words SLOW DOWN. The sign also has two lights on the top and bottom that blink in an alternating pattern while the curve warning symbol is displayed. Popular in Europe, this message type has had limited application in the United States.

A commonly accepted view is that speed displays should have an upper speed threshold above which they no longer display speed, so that drivers do not "test" the sign at unsafe speeds. The researchers settled upon 20 mi/h (32 km/h) over the posted speed limit as the upper threshold. For each site, they also selected a unique lower threshold--the lowest speed at which the speed display would be activated.

Based on the upper and lower speed thresholds, the sign face for the speed display showed the following for each situation (driver speed was measured at the point of curvature):

- Blank sign: When a curve advisory sign was present, no message was given for drivers who were traveling at or below the advisory speed limit plus 5 mi/h (8 km/h). When no advisory sign was present, the sign was blank for drivers traveling at or below the posted speed plus 5 mi/h (8 km/h).
- YOUR SPEED followed by the vehicle's speed XX in miles per hour: When drivers were traveling 5 mi/h (8 km/h) or more over the advisory speed if present or posted speed limit with no advisory speed, up to 20 mi/h (32 km/h) over the posted speed limit.
- SPEED LIMIT XX with the actual speed limit displayed: When drivers were traveling 20 mi/h (32 km/h) or more over the posted speed limit

Based on the upper and lower speed thresholds, the sign face for the curve warning display showed the following for each situation:

- Blank sign: When a curve advisory sign was present, no message was given for drivers who were traveling at or below the advisory speed plus 5 mi/h (8 km/h). When no advisory sign was present, the sign was blank for drivers traveling at or below the posted speed plus 5 mi/h (8 km/h).
- Curve warning sign plus alternating lights and the words SLOW DOWN: When drivers were traveling 5 mi/h (8 km/h) or more over the advisory speed if present or posted speed limit with no advisory speed.

Methodology of the Study

The researchers conducted a full-scale, before-and-after speed study. They collected speed and volume data at the 22 test sites for 2 days about 1 month before the State DOTs installed the signs, and again about 1 month, 1 year, and 2 years after installation. Altogether, the research team collected data for 2 years to determine whether the effectiveness of the speed feedback signs decreases over time as drivers habituate to the signs.

The researchers used pneumatic road tubes and counters for data collection. The advantage of the road tubes is that they are fairly accurate, can collect individual vehicle speeds (enabling spot-checking of the data), are relatively low cost, and can be placed without cutting the pavement. The team also decided they are practical because other technologies, such as video, are more cumbersome, less accurate, or more expensive.

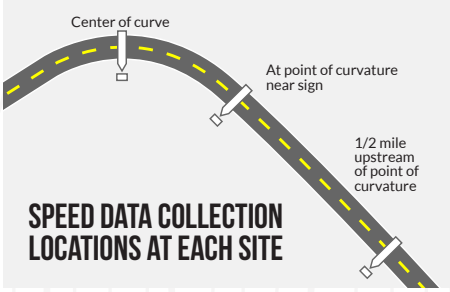
For each data collection period, the counters recorded time, vehicle speed, and vehicle class for individual vehicles. The team calculated other metrics, such as volume, headway, and average speed, from the data collected by the counters.

At each site, the team placed the speed-activated feedback sign near the point of curvature for one direction of travel. For each data collection period, the team collected data from the road tubes approximately 0.5 mile (0.8 kilometer) upstream of the point of curvature, at the point of curvature, and at the center of the curve.

Each collection period consisted of 48 hours and took place from Mondays through Fridays. The researchers chose the 48-hour period to ensure that a large sample size would result and that the data would not be biased toward a specific time of day.

Speed Analysis

The team calculated several speed metrics for the direction of travel toward the sign. The metrics included average speed, standard deviation, 50th percentile speed, 85th percentile speed, and the number of vehicles traveling 5, 10, 15, or 20 mi/h (8, 16, 24, or 32 km/h) over the posted or advisory speed limit. The team expected the signs to affect driver behavior shortly upstream of the curve and throughout it. As a result, the researchers evaluated the effectiveness of the signs by the change in speed at the point of curvature and at the curve's center.



SPEED DATA COLLECTION LOCATIONS AT EACH SITE

Point of Curvature

The team examined the change in speed metrics averaged over all treatment sites at the point of curvature. The speed data facilitated determining the difference between the before-period speeds (1 month before sign installation) and the after-period speeds (1, 12, and 24 months after sign installation). The average change in speeds at the point of curvature is included in the table below.

AVERAGE CHANGE IN SPEEDS AT THE POINT OF CURVATURE		1 MONTH			12 MONTHS			24 MONTHS		
		ALL SITES	CURVE SIGN SITES	SPEED SIGN SITES	ALL SITES	CURVE SIGN SITES	SPEED SIGN SITES	ALL SITES	CURVE SIGN SITES	SPEED SIGN SITES
AVERAGE MEAN SPEED (MI/H)		-1.82	-1.68	-1.95	-2.57	-2.47	-2.66	-1.97	-1.99	-1.96
AVERAGE 85TH PERCENTILE SPEED (MI/H)		-2.19	-1.90	-2.45	-2.86	-2.40	-2.70	-2.17	-2.0	-2.30
AVERAGE CHANGE IN FRACTION OF VEHICLES EXCEEDING POSTED OR ADVISORY SPEED BY	5 MI/H	-11.8%	-9.8%	-13.7%	-18.6%	-22.1%	-15.0%	-19.8%	-27.1%	-13.3%
	10 MI/H	-29.9%	-30.4%	-29.4%	-34.4%	-36.5%	-32.2%	-29.3%	-42.5%	-17.7%
	15 MI/H	-36.3%	-39.4%	-33.5%	-36.2%	-27.3%	-45.2%	-29.6%	-42.5%	-18.2%
	20 MI/H	-28.5%	-29.6%	-27.6%	-49.8%	-46.1%	-53.5%	-30.0%	-42.6%	-18.7%

Source: FHWA

The team also tabulated and compared data by sign type. In general, the researchers noted larger decreases for the speed signs than for the curve signs, although the differences were not statistically significant.

Center of Curve

Similar to the data from the point of curvature, the average change in mean speed for all sites at the center of the curve also decreased. The average percent change in the fraction of vehicles exceeding the posted or advisory speed tended to have greater decreases at the center of the curve when compared to the point of the curve.

AVERAGE CHANGE IN SPEEDS AT THE CENTER OF THE CURVE		1 MONTH			12 MONTHS			24 MONTHS		
		ALL SITES	CURVE SIGN SITES	SPEED SIGN SITES	ALL SITES	CURVE SIGN SITES	SPEED SIGN SITES	ALL SITES	CURVE SIGN SITES	SPEED SIGN SITES
AVERAGE MEAN SPEED (MI/H)		-2.08	-2.01	-2.15	-1.65	-1.47	-1.84	-1.76	-1.46	-2.00
AVERAGE 85TH PERCENTILE SPEED (MI/H)		-2.52	-2.50	-2.55	-1.55	-0.82	-2.27	-1.89	-1.25	-2.40
AVERAGE CHANGE IN FRACTION OF VEHICLES EXCEEDING POSTED OR ADVISORY SPEED BY	5 MI/H	-28%	-28%	-27%	-20%	-21%	-18%	-19.8%	-30%	-23%
	10 MI/H	-42%	-43%	-41%	-33%	-32%	-33%	-42%	-43%	-40%
	15 MI/H	-57%	-71%	-44%	-37%	-42%	-33%	-44%	-38%	-50%
	20 MI/H	-31%	-55%	-9%	-14%	-35%	-7%	-37%	-25%	-47%

Source: FHWA

These data anecdotally suggest that the signs remained effective over time. However, the researchers used a statistical test to determine whether the differences were due to the treatment for the 1-, 12-, and 24-month-after periods. The analysis indicated no statistically significant differences among changes in mean speeds at the point of curvature and the center of the curve for any of the time periods. This finding suggests that the signs might have a long-term impact on reducing speeds.

Crash Analysis

The researchers modeled the crashes by quarter rather than by year. By using quarters, they could exclude from the analysis the quarter in which installation occurred without having to exclude the entire installation year. In addition, the signs stopped functioning at several sites for various periods, so the quarter in which the signs were nonfunctional also could be excluded from the analysis without discarding the entire year's data.

Total crashes in both directions decreased by 0.08 crashes per quarter for the control sites, while crashes per quarter at the treatment sites decreased by 0.22 (17-percent reduction compared to 40-percent reduction). Single vehicle crashes for both directions decreased by 0.07 crashes per quarter at the control sites and by 0.21 at the treatment sites (19-percent decrease compared to 47-percent decrease). Reductions at treatment sites were 2.75 and 3.0 times greater than at control sites. Fluctuations in speed at the control sites could be due to a number of factors that were not known and could not be controlled. For

instance, short-term maintenance in the vicinity of one of the curves could have impacted speeds. Every attempt was made to collect data under similar circumstances, but it was impossible to be aware of every situation that might have impacted speed.

Total crashes in the direction of the outside of the curve increased by 0.02 crash per quarter for control sites and decreased by 0.12 crash per quarter in the direction of the sign for the treatment sites

(9-percent increase compared to 35-percent decrease). Similarly, single vehicle crashes decreased by 0.01 crash per quarter at the control sites compared with a decrease of 0.14 at treatment sites (4-percent decrease compared to 49-percent decrease). Reductions at treatment sites were 6 to 14 times greater than at control sites.

The results show that a much greater decrease in crashes per quarter occurred for treatment sites compared to control sites. However, caution should be used in applying the results for the simple analysis because the data are not adjusted to account for the seasons, and more quarters of a particular season might have been present in the before period than the after period

Before-and-After Analysis

The team also conducted a before-and-after analysis using a full Bayes model to develop crash modification factors. The model accounts for trends in the data that cannot be accounted for using other models. For instance, crashes might increase or decrease at a treatment site due to random fluctuations in the data not related to the treatment. Full Bayes is able to account for this phenomenon.

The researchers developed predictive models using data from control sites for all periods and before data for treatment sites. The models accounted for season, differences in the length of sites, and multiple measures at the same site. The team then used the models to calculate the number of crashes for the after period for treatment sites that would have been expected had no treatment been applied. They also calculated crash modification factors by dividing the observed crashes by the predicted values.

The model indicated that expected total crashes for both directions would decrease by 5 percent (0.95 crash modification factor) with installation of the speed feedback signs. The team expected total crashes in the direction of the signs to decrease by 7 percent (0.93 crash modification factor). Both figures are statistically significant.

The model indicated that expected single vehicle crashes in both directions would decrease by 5 percent, and single vehicle crashes in the direction of the sign to decrease by 5 percent as well. Both changes are statistically significant.

Conclusions

The goal of this national demonstration project was to evaluate the effectiveness of two types of speed feedback signs in reducing speed and crashes on rural horizontal curves. If the signs were effective, that would provide traffic safety engineers with additional tools to improve roadway safety.

The results indicate that the systems are reasonably effective in reducing both vehicle speeds and crashes. And, it is noteworthy, the reductions were maintained for more than 2 years, indicating drivers did not habituate to the dynamic signs, although the study did not specifically look at this.

On average, most sites had decreases in mean speeds, with decreases up to 10.9 mi/h (17.5 km/h) noted for both the point of curvature and center of curve. Most sites experienced changes in the 85th percentile speed of 3 mi/h (4.8 km/h) or more at the point of curvature, with the majority of sites having a decrease of 2 mi/h (3.2 km/h) at the center of the curve.

Large reductions in the number of vehicles traveling over the posted or advisory speeds occurred for all of the after periods at the beginning and center of the curves, indicating that the signs were effective in reducing high-end speeds, as well as average and 85th percentile speeds.

“In the right place and for the right situation, dynamic speed feedback signs are a good option to consider to reduce vehicle speeds,” says Sandra Larson, systems operations bureau director, highway division, Iowa DOT. “We have used these signs effectively for interstate and non-interstate work zones, rural expressway intersections where there is a speed limit reduction, school zones, and with pavement painting operations.”

***Abdul Zineddin**, Ph.D., is a transportation specialist with FHWA’s Office of Safety Research and Development at the Turner-Fairbank Highway Research Center. He oversees the speed management research program. Zineddin holds bachelor of science, master of engineering, and doctorate degrees in civil engineering with two graduate minors in human factors and statistics from Pennsylvania State University.*

***Shauna Hallmark**, Ph.D., is a professor of civil engineering at Iowa State University and is director of Iowa State’s Institute for Transportation. She holds a Ph.D. from Georgia Institute of Technology, an M.S. from Utah State University, and a B.S. from Brigham Young University, all in civil engineering.*

Omar Smadi, *Ph.D., is an associate professor of civil engineering at Iowa State University. He also is director of the Roadway Infrastructure Management & Operations Systems program and is a research scientist at the Center for Transportation Research and Education. He holds a Ph.D. and an M.S. in transportation engineering from Iowa State.*

***Neal Hawkins** is the director of the Center for Transportation Research and Education and also the Center for Weather Impacts on Mobility and Safety at Iowa State University. He has an M.S. from Iowa State and a B.S. from the University of Oklahoma in civil engineering.*

For more information, contact Abdul Zineddin at 202–493–3288 or abdul.zineddin@dot.gov or Shauna Hallmark at 515–294–5249 or shallmar@iastate.edu, or see Evaluation of Dynamic Speed Feedback Signs on Curves: A National Demonstration Project at www.fhwa.dot.gov/publications/research/safety/14020/index.cfm.

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NSC HONORS TEXAS EMPLOYERS WITH TRAFFIC SAFETY AWARDS

TWELVE ORGANIZATIONS DEMONSTRATE COMMITMENT TO KEEPING EMPLOYEES SAFER ON TEXAS ROADWAYS.

On May 24, 2016, the National Safety Council announced recipients of the third annual Our Driving Concern Texas Employer Traffic Safety Awards, presented in partnership with the Texas Department of Transportation. These awards recognize employers who have demonstrated an outstanding commitment to the safety and well-being of their employees on and off the job in the area of traffic safety.

"Texas is a leader among states in many areas, but sadly it has the highest rate of fatal car crashes," said Deborah A.P. Hersman, president and CEO of the National Safety Council. "These employers are working to protect their employees and reverse this trend. We are thrilled to recognize their work."

The 2016 honorees were selected through an application process that evaluated each company's commitment to promoting safe driving behaviors among their employees. Employee education, training and other activities centered on traffic safety were considered. While each of these employers has in common a notable commitment to traffic safety, the group is diverse in many ways. Applicants ranged from employers with as few as 100 employees to those with 2,000 and from nonprofits to municipal organizations.

Plaques will be delivered to recipients of the 2016 Our Driving Concern Texas Employer Traffic Safety Awards during presentation ceremonies at their workplaces, and their achievements will be highlighted throughout the year as a means of showcasing traffic safety in Texas.

NSC and Our Driving Concern recognize the following employers for their efforts in making Texas roads safer:

- Ainsworth Trucking
- BHP Billiton Petroleum
- Central Texas Rural Transit District
- City of Irving
- City of Waco
- ConocoPhillips
- Dallas ISD
- Eagle Ford Shale, STEPS
- GBJ Inc./AFC Transportation
- Mid-Coast Electric Supply, Inc.
- Texas Medical Center
- Walmart Distribution #6083

About the National Safety Council

Founded in 1913 and chartered by Congress, the National Safety Council is a nonprofit organization whose mission is to save lives by preventing injuries and deaths at work, in homes and communities, and on the road through leadership, research, education and advocacy. NSC advances this mission by partnering with businesses, government agencies, elected officials and the public in areas where we can make the most impact – distracted driving, teen driving, workplace safety, prescription drug overdoses and Safe Communities.

About the Our Driving Concern Texas Employer Traffic Safety Program

The Our Driving Concern Texas Employer Traffic Safety Program is a landmark driving initiative of the National Safety Council and funded, in part, by the Texas Department of Transportation. This initiative supports a statewide network of employer involvement in crash prevention for the benefit of employees, both on and off the job. The program provides a variety of free resources, training opportunities and materials to help employers engage their employees in safe driving behaviors.

Have a question or a request for your organization? Please contact Lisa Robinson, CFLE, Program Manager, Texas Employer Traffic Safety Program, (512) 466-7383.

STATE HIGHWAY SAFETY OFFICIALS CONCERNED BY PROJECTED 7.7% INCREASE IN MOTOR VEHICLE FATALITIES

GHSA data indicate pedestrians and motorcyclist deaths spike even greater

Statement for attribution to Governors Highway Safety Association (GHSA) Executive Director Jonathan Adkins

The estimated 35,200 individuals killed in motor vehicle fatalities on U.S. roads in 2015 is alarming to the Governors Highway Safety Association (GHSA) and our State Highway Safety Office members. This represents the largest year-over-year percentage increase (7.7 percent) since national record-keeping began.

Although we are still well below the more than 40,000 people killed annually just a decade ago, each death on U.S. roadways is unacceptable, and, after many years of progress, this increase is troubling.

The good news is that the solutions to reducing traffic deaths aren't a mystery. They include strong laws coupled with highly-visible law enforcement and robust public education campaigns. By using these tactics, the nation saw a nearly 25% drop in the number of fatalities between 2005 and 2014, including a record low in 2011.

We are especially committed to keeping the most at-risk road users safe. While national data suggest an overall 7.7 percent increase in traffic 2015 fatalities, recent GHSA reports project even higher percentage increases for pedestrians and motorcyclists (10 percent each). As improving vehicle safety has increased the likelihood for passenger vehicle occupants to survive a crash, pedestrians and motorcyclists lack these same benefits and remain just as susceptible to serious injury or death in the event of a collision.

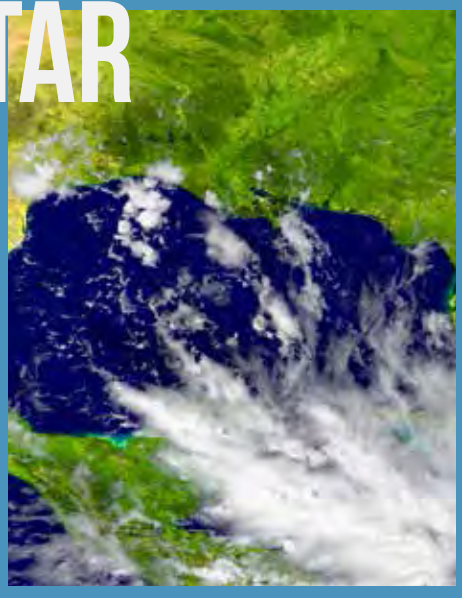
Working together with our federal and private sector partners, we are confident that we can find the right blend of enforcement, education and engineering solutions to turn the tide and once again move toward zero deaths on our nation's roads.

Data are available from the National Highway Traffic Safety Administration.

About GHSA

The Governors Highway Safety Association (GHSA) is a nonprofit association representing the highway safety offices of states, territories, the District of Columbia and Puerto Rico. GHSA provides leadership and representation for the states and territories to improve traffic safety, influence national policy, enhance program management and promote best practices. Its members are appointed by their Governors to administer federal and state highway safety funds and implement state highway safety plans. Contact GHSA at 202-789-0942 or visit www.ghsa.org. Find us on Facebook at www.facebook.com/GHSAhq or follow us on Twitter at @GHSAHQ.

PREPARING FOR HURRICANE SEASON IN THE LONE STAR



Summertime in the Lone Star State brings with it more than just hot and humid days. It also marks the start of the hurricane season in the Atlantic Basin, which includes the Gulf of Mexico. Running from June 1st to November 30th, the peak period of the Atlantic Hurricane Season normally occurs between early August and the end of October.

If most Texans are like me, when I think of hurricane evacuations in Texas, my mind immediately goes to the near-mass evacuation of Houston and other low-lying areas along the Texas Gulf Coast ahead of Hurricane Rita in 2005. It is estimated that nearly two million people heeded the call to evacuate before the storm's arrival. Simply do a quick internet search for "Hurricane Rita evacuation pictures" to be reminded of the massive evaluations that occurred before the storm in September 2005.

Although a hurricane has not made land fall in Texas since Hurricane Ike in 2008, the State of Texas, the Department of

Continue on the next page.

Public Safety (DPS), TxDOT, and other local agencies are prepared for the almost inevitable occurrence. The Evacuation and Population Protection Annex (E) of the State of Texas Emergency Management Plan outlines the state's planned response to support capabilities for population protection, which include coordination, public notification, resource management and the implementation of protective actions such as evacuation, shelter-in-place and refuge of last resort. The document also identifies strategies used by the state to mitigate safety issues during evacuations and assist with the repopulation of areas affected by disaster. The intention of Annex E is to provide guidance and is not prescriptive or comprehensive. The guidelines outlined in the document do not override local or regional plans, but are designed to complement those planning activities. As such, Annex E does not prohibit local jurisdictions from implementing additional requirements or operating procedures within that jurisdiction.

Strategy 5 of Annex E addresses traffic management coordination and procedures during an evacuation on Texas roadways. DPS is the lead state agency for evacuations; and during large-scale evacuations the Texas Highway Patrol (THP) coordinates traffic management, expediting the evacuation flow. In identified hurricane evacuation zones, staff from the local THP division, TxDOT, and local law enforcement agencies work together to develop comprehensive traffic management plans. These plans establish specific evacuation routes, identify areas that need additional lane use, and designate routes for contraflow lane reversal.

The Hurricane Annex of the State of Texas Emergency Management Plan outlines actions that protect life safety and reduces losses from storm surge, inland flood, tornado, and wind hazards that can cause large-scale damage when hurricanes impact populated areas in Texas. As outline in the Hurricane Annex, the state's planned response to hurricanes involves many governmental and nongovernmental agencies and organizations that collaborate to monitor hurricane threats; provide support to local operations; and assist in recovery. The Hurricane Response Functions as outlined in the Hurricane Annex is included in the table below.

HURRICANE RESPONSE FUNCTIONS

This table provides possible notification and activation timeframes for core emergency response functions. The amount of warning time prior to the onset of hurricane hazards can vary greatly depending on the storm. While some hurricanes may afford an H - 120, or five day, warning, other tropical cyclones may arise with little notice and require immediate activation. These timelines are meant to provide a frame of reference only. The timing of response decisions varies, depending on storm forecasts and effects. There are four timeframes: **1. Advisory (A):** notification of a potential threat; **2. Alert (B):** personnel prepare for activation; **3. Activation (C):** resources begin movement to support response operations; and **4. Onsite/operational (D):** resources perform response functions.

EMERGENCY FUNCTION (ANNEX)	H-120	H-96 TO 72	H-72 TO 48	H-48 TO 0	H-HR. +	R-HR. +
Emergency Management (N)	D	D	D	D	D	D
Communications (B)	D	D	D	D	D	D
Warning (A)	C	D	D	D	D	D
Public Information (I)	C	D	D	D	D	D
Resource Support (M)	C	D	D	D	D	D
Food & Water (V)	C	D	D	D	D	D
Health & Medical (H)	C	D	D	D	D	D
Transportation (S)	B	C	D	D	D	D
Evacuation (E)	B	C	D	D	D	D
Shelter/Mass Care (C)	B	C	D	D	D	D
HAZMAT Response (Q)	B	B	C	D	D	D
Radiological EM (D)	B	B	C	D	D	D
Animals/Agriculture (O)	A	B	C	D	D	D
Firefighting (F)	A	B	C	D	D	D
Search & Rescue (R)	A	B	B	C	D	D
Law Enforcement (G)	A	B	B	C	D	D
Energy (L)	A	A	B	C	D	D
Public Works/Engineering (K)	A	A	B	C	D	D
Volunteer/Donations Mgmt. (T)	A	A	B	C	D	D
Recovery (J)	A	A	B	C	D	D

H = number of hours before (-) or after (+) the onset of hurricane hazards.
R = number of hours before (-) or after (+) the post-landfall operations resume.

- H-120: Monitor
- H-96 to 72: Elevated Threat
- H-72 to 48: Credible Threat
- H-48 to 0: Pre-Incident
- H+0 to TBD: Post-Incident
- R+0 to TBD: Recovery

The Texas Coast is divided into five areas, referred to as Texas Hurricane Evacuation Study (HES) Areas, for storm surge vulnerability analysis. HES provide planning assumptions like evacuation clearance times for populations within designated hurricane evacuation zones. Evacuation zones are currently defined by zip code, roads, jurisdictional boundaries or storm surge projections.

STUDY AREA	COUNTIES
Sabine Lake	Hardin, Jasper, Jefferson, Liberty, Newton, Orange
Houston-Galveston	Chambers, Brazoria, Galveston, Harris
Matagorda Bay	Calhoun, Jackson, Matagorda, Victoria
Coastal Bend	Aransas, Kenedy, Kleberg, Nueces, Refugio, San Patricio
Rio Grande Valley Laguna Madre	Cameron, Hidalgo, Willacy

For additional information on the State of Texas Emergency Management Plan Annex E and Hurricane Annex, visit www.txdps.state.tx.us/dem/downloadableforms.htm#stateplan.

TxDOT has a dedicated web portal for Hurricane information which includes links to evacuation brochures and route maps, including contraflow maps; contraflow instructional videos; links to up-to-the-minute news feeds and notification on Facebook and Twitter, along with a list of Twitter feeds and hashtags for each district; and links to other emergency management websites and contact information. Visit TxDOT's Hurricane Information portal at www.txdot.gov/driver/weather/hurricane.html for more information.

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