# TEXAS STRATEGIC HIGHWAY SAFETY PLAN

2017–2022

Texas Department of Transportation

Save a Life™ Texas Department of Transportation

Center for Transportation Safety
Safety Research and Outreach

Texas A&M Transportation Institute

## VISION

*Texas envisions a future with zero traffic fatalities and serious injuries*

## MISSION

*Texans will work together on the road to zero traffic fatalities and serious injuries*

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# Executive Summary

Texas is facing a crisis in road safety. Fatalities have steadily increased from just at 3,000 to over 3,700 since 2012 despite extensive efforts to improve road user behavior and upgrade roadway conditions. The 2017 Strategic Highway Safety Plan (SHSP), developed through collaboration across disciplines, modes, and public and private sector agencies and organizations, represents an effort to stem the tide and begin reducing traffic fatalities and injuries. The number of stakeholders will grow over time and eventually touch every citizen and visitor in Texas. The state is ready to meet this challenge, and we invite you to join us.

The vision of zero deaths on our roadways is founded on the belief that everyone, no matter how they travel, should be able to arrive at their destinations safely. This document represents a collective aspiration to make Texas travel safer by reducing crashes, fatalities, and injuries. The SHSP draws on the experience, knowledge, and expertise of citizens who represent a multidisciplinary group of government agencies and private sector organizations committed to the vision.

The SHSP is structured around seven emphasis areas (EAs) identified through extensive data analysis and discussion throughout a comprehensive development, implementation, and evaluation structure. This process was overseen by the executive committee (EC) and

supported by a stakeholder group (SG), EA teams to address each of the subjects, and a management team. The EAs will ensure resources are used where they can most effectively and efficiently improve road safety. The areas are presented below in alphabetical order rather than prioritized, because each of them is a priority:

- Distracted driving.
- Impaired driving.
- Intersection safety.
- Older road users.
- Pedestrian safety.
- Roadway and lane departures.
- Speeding.

The EA teams with support from the other working groups met several times to identify and develop strategies and countermeasures or programs with a history of effectiveness.

The stakeholders and executives involved in the SHSP came to a very clear consensus that the long-term aspirational goal for fatalities and serious injuries in Texas is zero, and indeed, the branding being developed for the Texas SHSP will reflect that sentiment. However, several analytic methods used to explore future fatality levels suggest that the risk of fatal and serious injuries crashes on Texas roadways is expected to remain relatively constant in terms of economic influences and behavioral laws. For the purposes of near-term target setting, it was determined that the target should reflect a realistic assessment of both the likely amount of exposure (travel), and the potential to reduce risk over the five-year SHSP period given expected levels of resources.

**Distracted Driving**
**Impaired Driving**
**Intersection Safety**
**Older Road Users**
**Pedestrian Safety**
**Roadway and Lane Departures**
**Speeding**

We invite you to join in the quest to reach zero fatalities and serious injuries on Texas roads; to study the strategies and countermeasures; and to make a personal commitment to take action to implement projects and programs that lower fatalities and reduce injuries.

# History and Accomplishments

Texas first developed an SHSP in 2006. Subsequent SHSPs were built on this initial plan, using new data and input from safety stakeholders to update goals, objectives, and key EAs. The Texas Department of Transportation (TxDOT) has used the SHSP to help guide many safety initiatives since the development of the first plan.

A 2009 Safety Bond Program was funded with $600 million and accomplished the following safety improvements:

- Widened 588 miles of narrow highways.
- Installed 290 miles of new concrete or cable median barrier on divided highways.
- Installed 101 new left-turn lanes or two-way, continuous left-turn lanes on rural highways.
- Converted 9 projects from existing four-lane undivided highways to four-lane divided highways and constructed additional shoulders.
- Built 28 grade separations at existing highway intersections.

In conjunction with an earlier safety bond program implemented in 2005, it was estimated these safety improvements saved more than 180 lives and prevented more than 680 incapacitating injuries annually over the life of the projects.

TxDOT has programmed nearly $700 million of highway safety projects for FY 2017 through FY 2020 in the Highway Safety Improvement Program (HSIP), focusing on barriers, curve improvements, intersection improvements, pedestrians, rumble strips, widening highways, and off-system improvements submitted by local agencies. TxDOT developed the Crash Analysis and Visualization Tool to enhance the process of selecting safety projects for HSIP funding.

In 2013, TxDOT began programming an additional $15.5 million of state funds per year for systemic widening of narrow rural two-lane two-way highways. Projects are evaluated using a systemic analysis method that calculates a total risk factor weight based on roadway characteristics such as paved surface width, average daily traffic, roadway alignment, and truck percentages. TxDOT also funds $15 million per year in rail-highway grade crossing safety improvements.

In addition to these physical safety improvements, TxDOT also programmed more than $105 million of FY 2017 state and federal funds for traffic safety programs in:

- Alcohol and other drug countermeasures.
- Emergency medical services.
- Motorcycle safety.
- Occupant protection.
- Pedestrian and bicyclist safety.
- Police traffic services.
- Speed control.
- Traffic records.
- Driver education and behavior.
- Railroad/highway crossing safety.
- Roadway safety.
- Safe communities.
- School bus safety.


# SHSP Structure and Development Process

## SHSP Structure

The SHSP update process was guided by an Executive Committee (EC) and a Stakeholder Group (SG) representing a diverse assembly of road safety agencies, organizations, advocates, and experts. The members of the EC and SG are listed in Appendix A. After these teams determined priorities based on data and discussion, seven Emphasis Area Teams were formed to develop the content. The development process was supported by the Management Team, which included representatives from TxDOT, FHWA, and a TTI support group. These relationships are illustrated in Figure 1.

The EC consisted of representatives of TxDOT, FHWA, the National Highway Traffic Safety Administration (NHTSA), metropolitan planning organizations (MPOs), cities that have adopted Vision Zero, state and local law enforcement agencies, transit agencies, trucking and railroad agencies and organizations, the Texas Department of Motor Vehicles, the Texas Department of Public Safety, county transportation officials, bicycle and pedestrian advocates, the Texas Department of State Health Services, the judiciary, the Texas Alcohol Beverage Commission,

and TTI.[1] The SG included 49 participants with a diverse representation including state agencies, state and local police, advocacy groups, MPOs, cities, the National Safety Council, and the American Automobile Association (AAA).

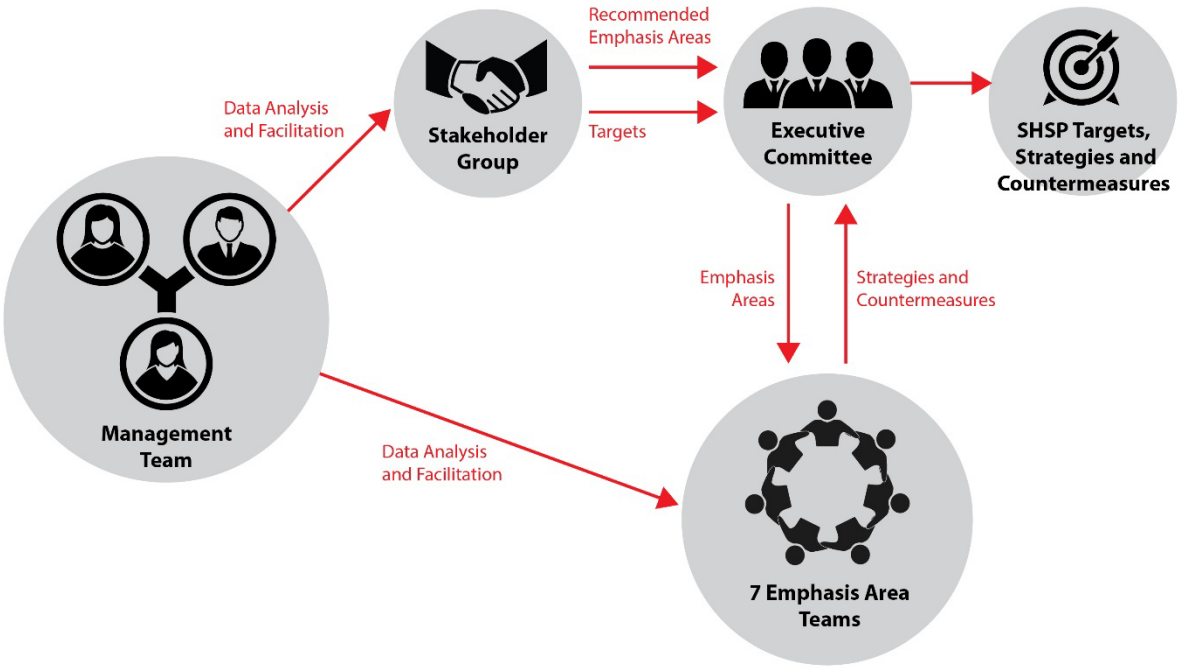



*Figure 1. SHSP Structure.*

## SHSP Development Process

The basic development approach is outlined in Table 1 and began with the management team conducting an extensive data analysis to identify priority safety areas and organizing initial meetings of the EC and the SG.[2] The meetings defined the roles and responsibilities for each group, discussed the federal SHSP requirements and components, showed a timeline for SHSP development tasks, provided an overview of the data findings, and determined SHSP EAs. The seven selected EAs are: distracted driving, impaired driving, intersection safety, older road users, pedestrian safety, roadway and lane departures, and speeding.

[1] Tribal governments were invited but did not attend any of the meetings.
[2] For details on the data examined, analysis methods, data sources, and other information, please see Target Setting Strategy.

*Table 1. Outline of the Basic Development Approach*

| Months | Participants | Accomplishments |
|---|---|---|
| **September–October** | TxDOT, FHWA, TTI | 1. Organized a Management Team<br>2. Conducted data analysis<br>3. Identified and recruited EC and SG members |
| **November–December** | EC, SG, Management Team | 1. Reviewed the SHSP requirements<br>2. Conducted data analysis<br>3. Selected emphasis or focus areas<br>4. Created EA Teams for each EA |
| **January–April** | EA Teams, Management Team | 1. Selected strategies and countermeasures to form the SHSP content<br>2. Began action planning |
| **May–June** | EC, SG, Management Team | 1. Reviewed the SHSP strategies and countermeasures<br>2. Crafted vision and mission statements<br>3. Selected SHSP five-year targets<br>4. Facilitated a statewide conference<br>5. Prioritized the countermeasures in each EA<br>6. Continued action planning<br>7. Began SHSP production |
| **July** | Management Team | 1. Revised the SHSP based on FHWA comments and requirements. Finalized the SHSP<br>2. Began working on SHSP branding |
| **August 1, 2017** | Management Team TxDOT | 1. Finalized the SHSP<br>2. Submitted SHSP to FHWA for approval |

With support from the EC and the SG, the management team identified and recruited volunteer teams for each of the EAs to review the data and identify strategies and countermeasures for addressing the strategies. Careful attention was devoted to the membership of the EA teams to ensure each one had representation from engineering, enforcement, education, and emergency response. Tribal government representatives were also invited to join the EA teams. Approximately 30 EA team meetings took place. In selecting strategies and countermeasures, the team members were cautioned to follow a set of principles:

- To the extent possible, select proven effective countermeasure with a known benefit cost.
- Identify countermeasures with a large impact in terms of reducing the number of fatalities and serious injuries.
- Avoid countermeasures not feasible due to the inability to enact specific laws and policies, resource requirements, lack of expertise or sponsors, and unlikely public acceptance.

The EA teams successfully drafted strategies and countermeasures for each area. Meanwhile, the management team used several models for setting the SHSP targets for five required performance measures based on previous research, developed alternative strategies for SHSP branding, drafted vision and mission statements, and organized additional EC and SG meetings. The meeting purposes were to review the data and the models to establish targets for fatality and serious injury levels and rates, and fatality and serious injury levels for non-motorized road users; select an SHSP brand; and adopt vision and mission statements.

The EC and SG also considered options for an SHSP brand. The SG recommended and the EC concurred that the branding should a) work in concert with the national Road to Zero (*1*) initiative to eliminate traffic fatalities within 30 years; b) reflect a Texas-specific theme and c) express the concept that it is both necessary and beneficial for all to work together toward this goal. Work continues on developing these principals into graphics and other branding material. This work will be completed early in Phase II and will continue to be overseen by the EC. Appendix B contains their approval signatures for the current version of the SHSP.

The 2017 Texas Traffic Safety Conference provided a broader range of SHSP safety stakeholders the opportunity to review and prioritize the strategies and countermeasures or programs proposed for the EAs. More than 250 safety stakeholders engaged in the conference's unique format. The participants were divided into seven groups that rotated through a series of meetings to discuss and prioritize countermeasures within each of the seven EAs. In some cases, additional countermeasures were suggested, which the management team will review and determine if the countermeasure merits inclusion in the work already accomplished by the EA teams. Following the round robin series, participants chose two of the seven EAs according to their interest, experiences, and expertise. They attended a 90-minute session on each of their choices and worked on countermeasure action plans. They established leading agencies and organizations for each priority countermeasure, levels of cost, and time to implement. The results of this exercise will be used in Phase II of the SHSP program to enhance and fine tune the action planning phase.

# Target Setting Strategy

## Target Setting for Fatalities

*Methodology and Approach for Projecting Fatality Levels*

To set realistic target levels for fatal and serious injury, it is important to first develop a data-driven methodology for predicting the level of casualties expected in the absence of the actions taken to implement the SHSP. Several methodologies were examined by the SHSP development team to examine future levels of casualties.

All the methodologies are based on the premise that casualties and serious injuries are the product of exposure and risk. For traffic crashes, exposure is generally represented as the amount of travel and risk as the number of casualties (fatalities or serious injuries) per unit of travel. The unit of travel chosen for this analysis is vehicle miles of travel (VMT), and fatality risk is expressed as the chance of a fatality per VMT. Reduction in either risk or exposure, or both, could lead to lower levels of fatalities.

The first method calculated a linear trend line based on the last five years of total traffic fatalities reported in NHTSA's Fatality Analysis Reporting System (FARS) database and projected them into the future. This is a traditional approach and has been used historically for setting

Texas safety goals, but it relies on the assumption that recent trends will continue. Because traffic fatality trends have varied substantially over the past 15 years, as shown in Figure 2, the reliability of this assumption required validation.

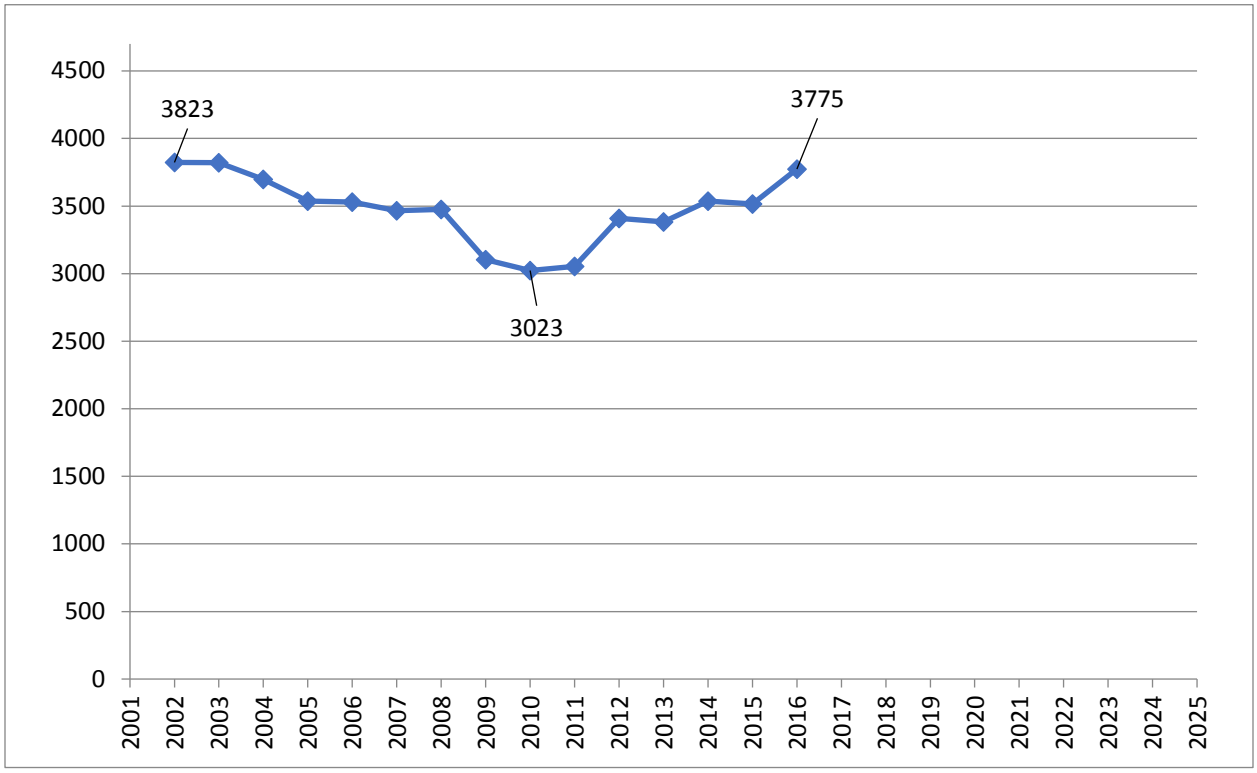



*Figure 2. Traffic Fatality Trends in Texas, 2002–2016.*

Two other approaches were used to develop projections to compare to the trend line. The first analysis was conducted using a negative binomial model developed by TTI in conjunction with the University of Michigan Transportation Research Institute for as yet unpublished research into the identification of factors contributing to the traffic fatalities decline in the United States from 2008 to 2012. This model uses input on economic factors, capital and safety spending, vehicle fleet characteristics, and safety laws to predict risk, which is then multiplied by VMT to predict the number of fatalities. A separate model was developed for each state in this project. The Texas risk model was applied using predictions for input variables prepared by TTI. Because none of the input variables are expected to vary greatly during the five year target horizon/period, risk is expected to remain fairly constant. The second method averaged fatality risk for the past few years and assumed the level would stay constant for the next five years. This average value (1.42 fatalities per 100 million VMT) was then applied to the VMT predictions to determine the future value of fatalities. Figure 3 shows a comparison of these three approaches.

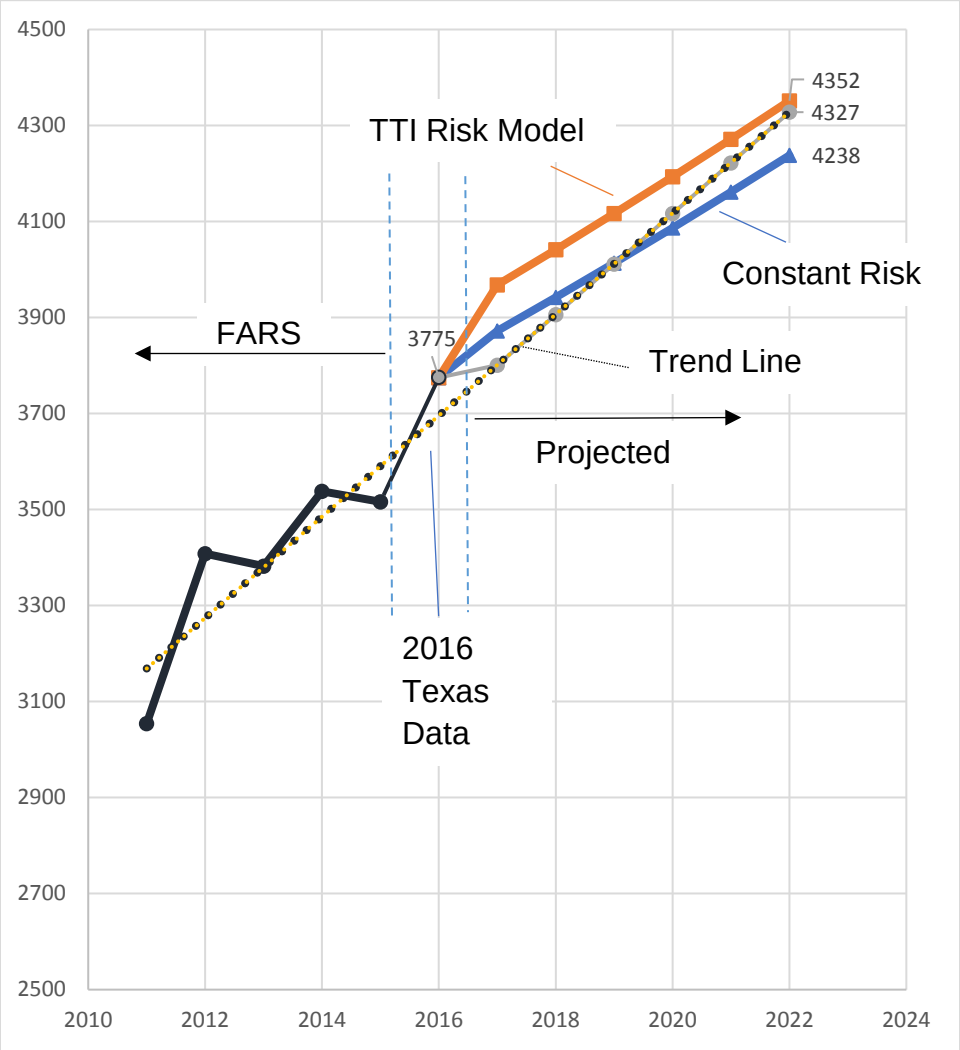



*Figure 3. Comparison of Three Prediction Approaches.*

All of the projection approaches result in similar trends and relatively consistent values for fatalities in 2022, the target year. The trend can be summarized as constant risk accompanied by growing VMT. The two models confirm that using a continuation of the trend, which occurred from 2011–2015, is a valid approach.

Inherent in these projections are the assumptions that economic conditions will continue to reflect a growing economy, gas prices will not rise significantly, 16–24 year old employment will be fairly constant and relatively low (11.5 percent), and motor vehicle crashworthiness and safety features will not significantly reduce risk. The probable fatality level outcome given the existing levels of safety projects and programs is 4,327 fatalities. This trend line projection approach was also used to establish targets for serious injuries, fatality and serious injury rates, and non-motorized fatalities and serious injuries.

### *Setting Targets for Total Fatalities*

Once the probable number of fatalities was established, an analysis and discussion of setting targets was undertaken. During the work sessions with the SG and EC teams, a difference between long-term aspirational goals and near-term targets became evident.

### *Aspirational Goals versus Targets*

The results of the projection analyses for fatalities were presented to the SG and EC teams; during these discussions, a consensus emerged on a long-term aspirational goal for Texas fatalities—zero—and the SHSP branding will reflect that the goal. For the purposes of near-term target setting, the target should reflect our best assessment of both the likely amount of exposure (travel) and potential to reduce risk over the five-year period following plan implementation.

For travel, continued economic and population growth is likely to result in continued growth in travel, expressed in terms of VMT. The expected growth is about 1.8 percent each year. Risk is expected to remain fairly constant in terms of economic influences and laws addressing user behavior. The influence of vehicle safety features is not completely known, but the reduction from improvements due to air bags and crashworthiness may have already been completely realized and reductions from technology are not likely to make a large impact in the short term.

### *Fatality Targets*

The intent of the countermeasures included in the SHSP is to reduce risk, but it should be recognized that many of these actions are already part of the baseline conditions in Texas. Unless significantly more resources are put toward these countermeasures, it is unrealistic to believe the plan alone can significantly affect risk. However, TxDOT is allocating an additional $600 million from 2018–2022 for the HSIP in the Unified Transportation Program (UTP), which may influence risk on roadways in Texas. A rough estimate of the impact of this additional funding is a 2 percent overall reduction in Texas traffic fatalities.

Figure 4 shows a 2 percent reduction in fatalities in the target year of 2022. The decline is assumed to begin gradually in 2018 and progress to the 2 percent reduction in the target year. The target level of fatalities is 4,241 in 2022.

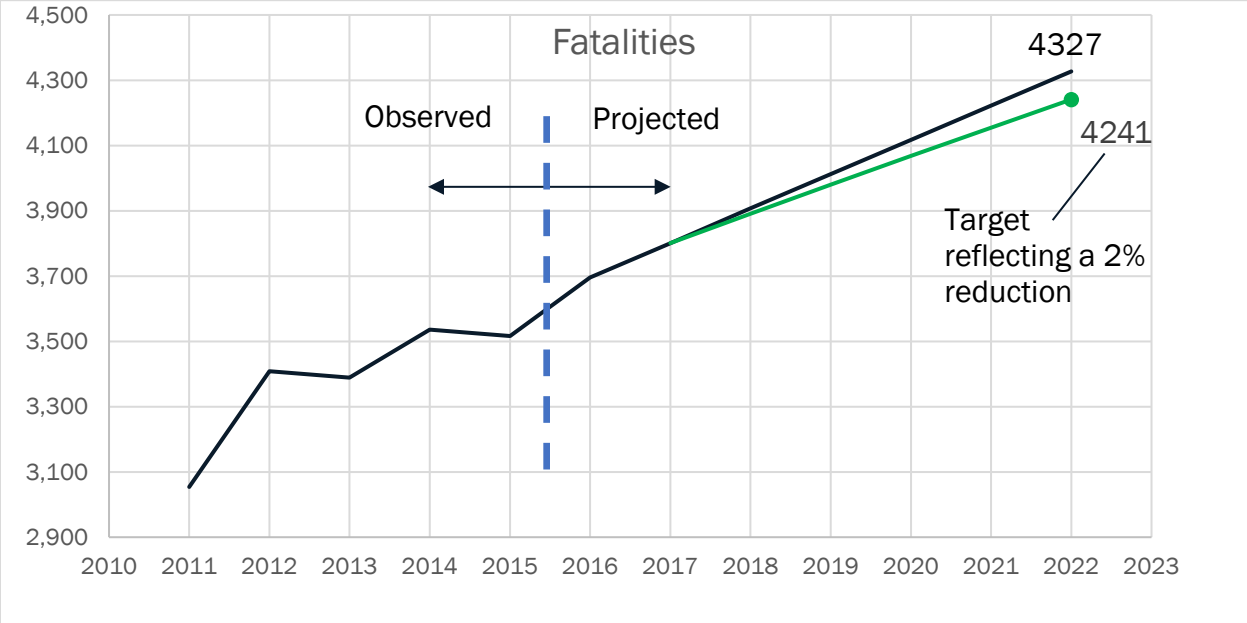



*Figure 4. Trend Line for Target Prediction of Fatalities in 2022.*

## Target Setting for Serious Injuries, Fatality Rate, and Serious Injury Rates, and Non-Motorized Fatalities and Serious Injuries

Once a determination was made to use a trend line projection to develop targets for fatalities, the same approach was used to determine targeted reductions for serious injury, fatality and serious injury rates, and non-motorized fatalities and serious injuries.

*Serious Injuries*

Figure 5 depicts the trend line projection for serious injuries based on data from the Texas Crash Record Information System (CRIS). The trend line projection method with a 2 percent reduction in 2022 results in serious injury target of 19,065.

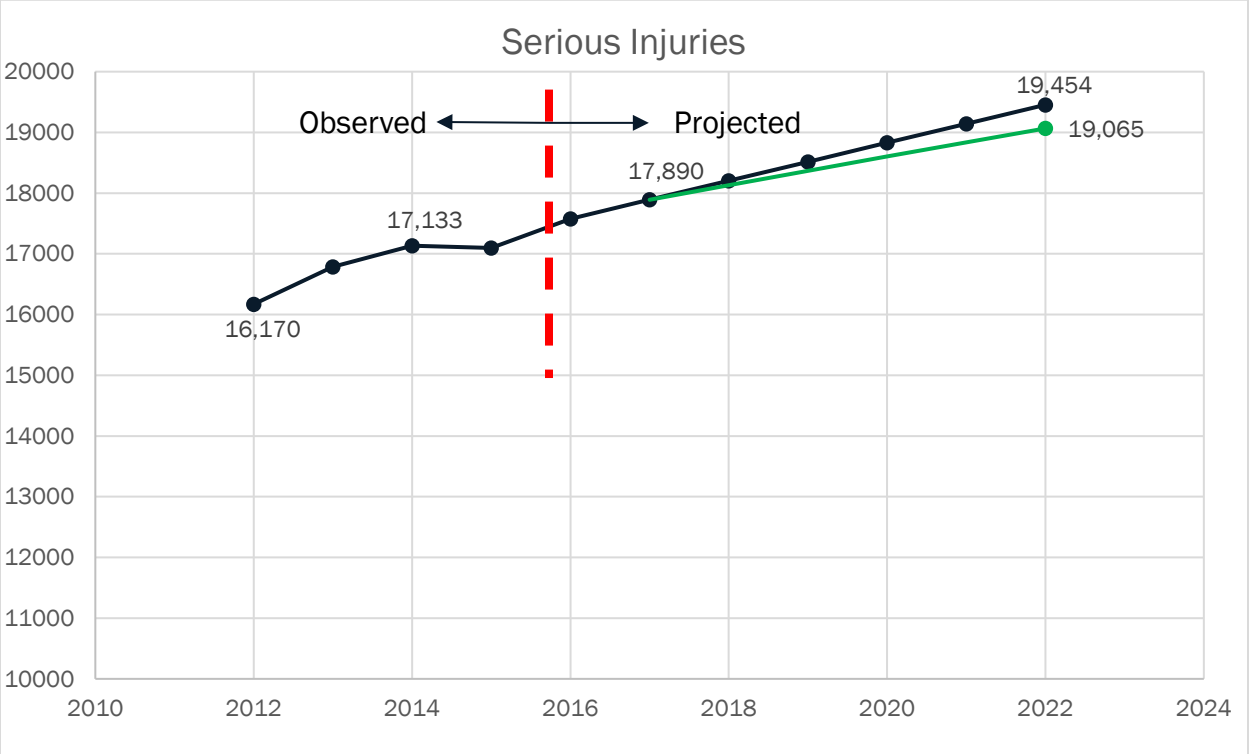



***Figure 5. Trend Line for Target Prediction of Serious Injuries in 2022.***

*Fatality Rate*

Figure 6 depicts the trend line projection for fatality rate (fatalities per 100 million VMT) based on the reported fatalities in the FARS database and estimates for the total VMT in Texas for the corresponding years. The trend line projection method with a 2 percent reduction in 2022 results in fatality rate target of 1.5 fatalities per 100 million VMT.

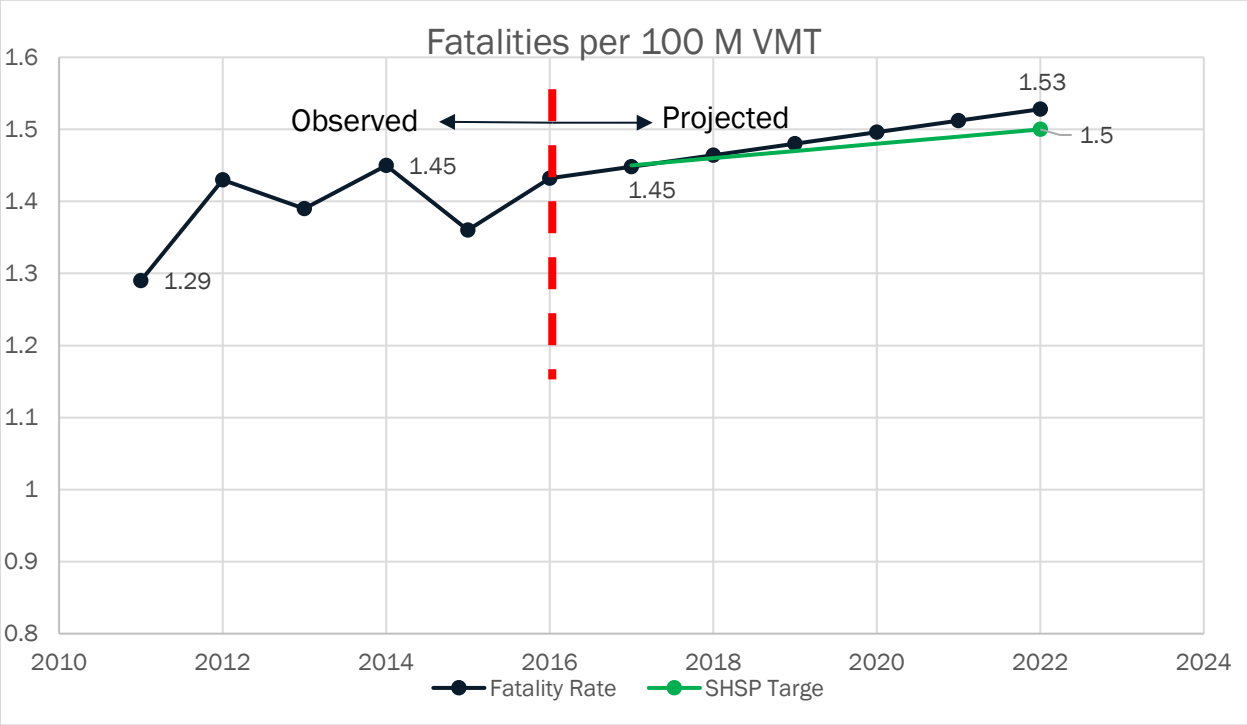



***Figure 6. Trend Line for Target Prediction of Fatalities per VMT in 2022.***

*Serious Injury Rate*

Figure 7 depicts the trend line projection for the serious injury rate (serious injuries per 100 million VMT) based on serious injuries recorded in the CRIS database and TxDOT estimates for the total VMT in Texas for the corresponding years. Unlike the other crash trends in Texas, the serious injury rate has been declining over the recent past and it is projected that this trend will continue, so the target was set at 6.47 serious injuries per 100 million VMT.

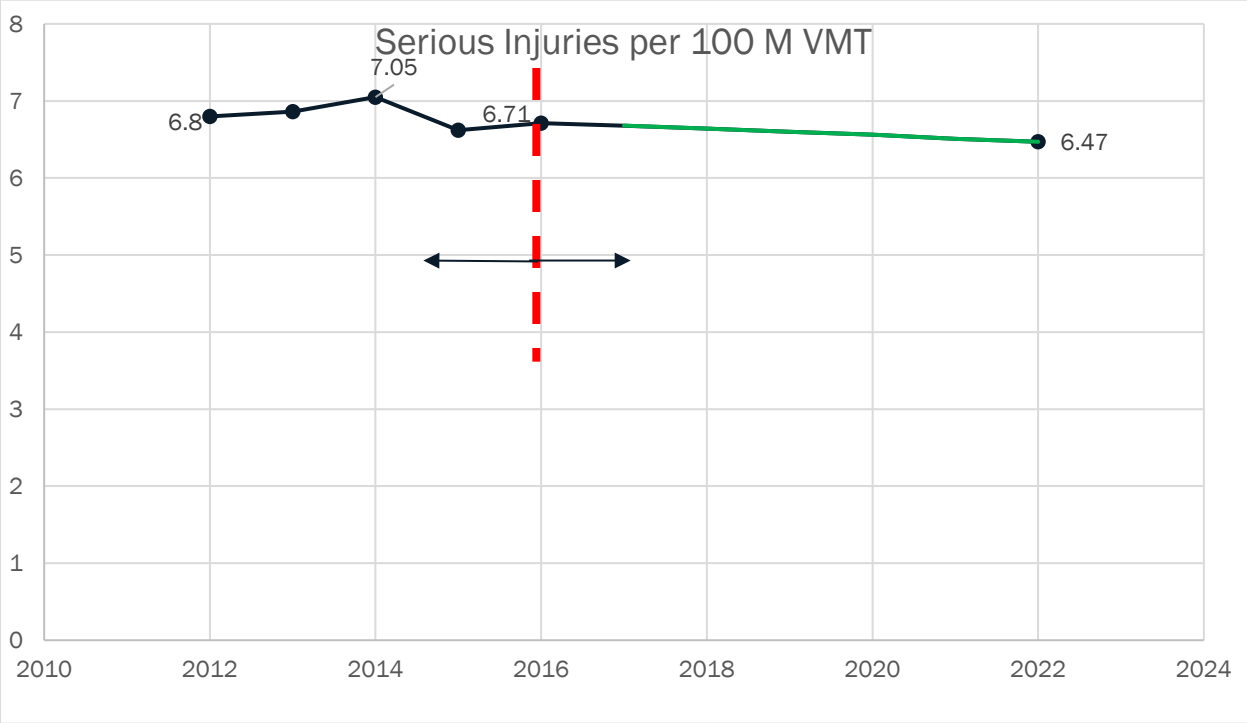



***Figure 7. Trend Line for Target Prediction of Serious Injuries per VMT in 2022.***

*Non-Motorized Fatalities and Serious Injuries*

The trends in pedestrian and bicyclist fatalities and serious injuries in Texas differ significantly as can be seen in Figure 8 and Figure 9. Pedestrian fatalities and injuries have been increasing significantly. Bicyclist fatalities have been relatively stable but bicyclist serious injuries have been increasing, though not as much as pedestrian serious injuries. Therefore, separate projections were made for pedestrians and bicyclists and then combined to develop a projection. Figure 10 shows this trend. The target with a 2 percent reduction in 2022 is 2,640 fatalities and serious injuries.

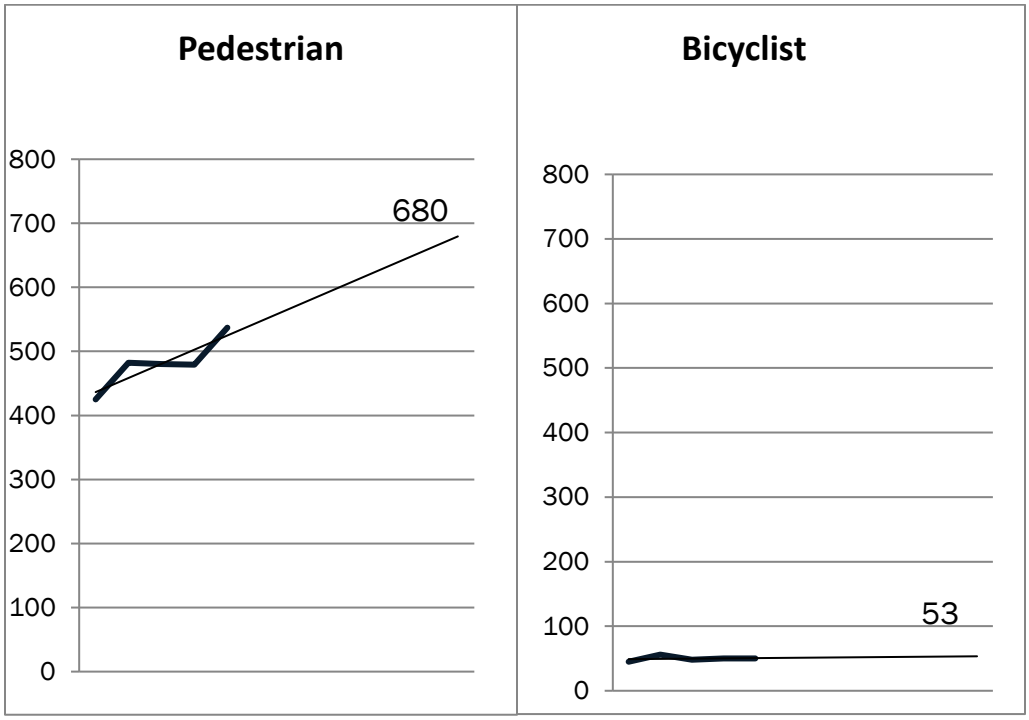



***Figure 8. Non-Motorized Fatalities 2011–2022.***

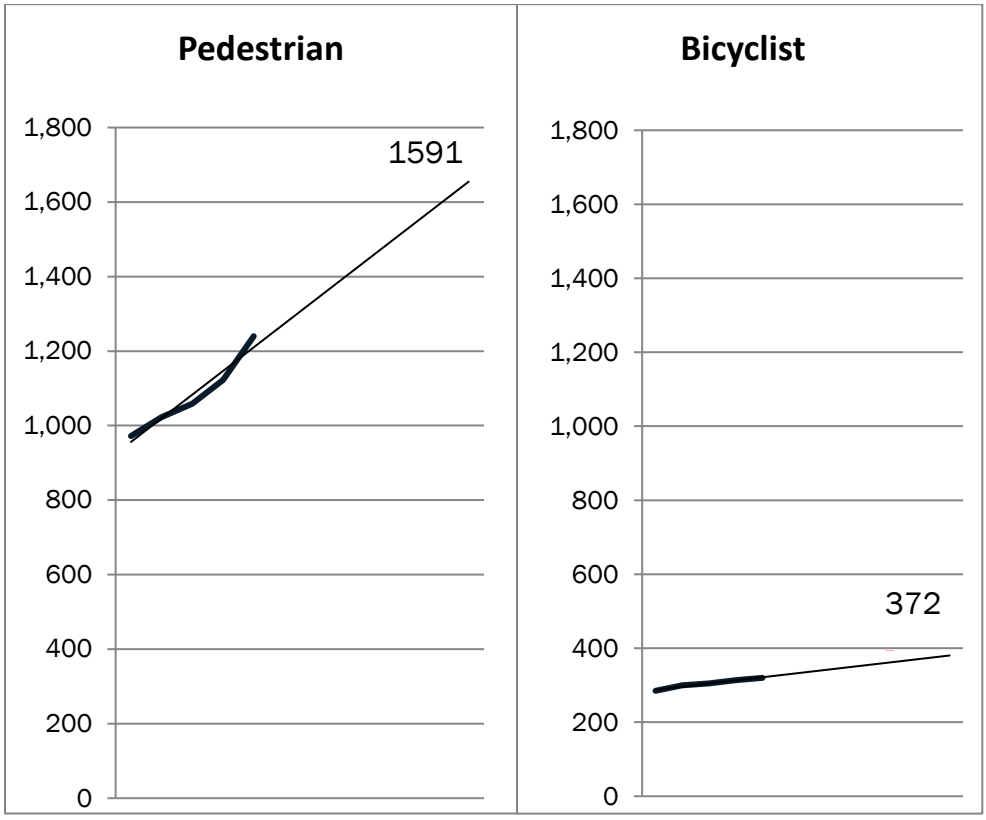



*Figure 9. Non-Motorized Serious Injuries, 2011–2022.*

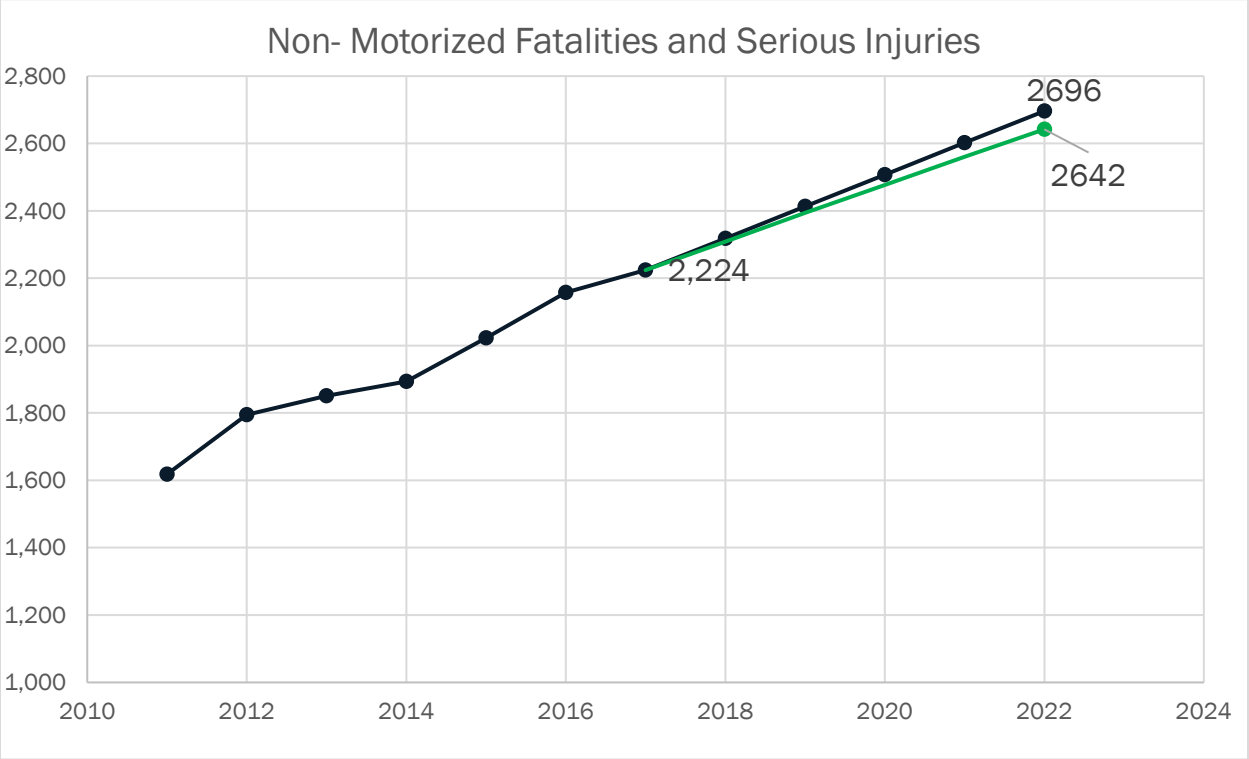



*Figure 10. Project Target for Non-Motorized Fatalities and Serious Injuries in 2022.*

# SHSP Plan Coordination

SHSP implementation and evaluation efforts will be strengthened by coordinating with other transportation and safety planning exercises to align goals, objectives, and strategies. Coordination, communication, and collaboration can result in shared responsibility and leveraging resources, which leads to more efficient and effective road safety practices. The first step is to establish a baseline by examining the relevant documents, including the following:

- Current Texas SHSP.
- Solutions for Saving Lives on Texas Roads.
- Current Highway Safety Plan (*2*).
- Current Highway Safety Improvement Program Manual (*3*).
- Unified Transportation Plan (*4*).
- TxDOT Long Range Transportation Plan.
- A sample of MPO long range transportation plans including the Capital Area MPO (CAMPO), the North Central Texas Council of Governments (NCTCOG), Houston-Galveston Area Council (HGAC), and the Alamo Area MPO (AAMPO).

- Commercial Vehicle Safety Plan.[3]
- Austin Vision Zero Plan.
- San Antonio Vision Zero Action Plan.

## SHSP

The 2017 SHSP long-term vision is to achieve zero fatalities and serious injuries on the Texas roadways. In the interim, the current SHSP establishes five targets to be achieved over the next five years or by the end of 2022. These targets are aligned with the HSIP and the Highway Safety Plan.[4]

Table 2 shows the required SHSP targets and definitions, the 2022 projections if current trends continue, and targets recommended by the SG and established by the EC.

***Table 2. SHSP 2022 Targets.***

| Target Area | Definition | Linear Trend | SHSP Target |
|---|---|---|---|
| Number of Fatalities | Total number of persons suffering fatal injuries in a motor vehicle crash during a calendar year | 4,327 | 4,241 |
| Rate of Fatalities | Ratio of total number of fatalities to the number of VMT (in 100 million VMT) in a calendar year | 1.53 | 1.50 |
| Number of Serious Injuries | Total number of persons suffering at least one serious injury in a motor vehicle crash during a calendar year | 19,454 | 19,065 |
| Rate of Serious Injuries | Ratio of total number of serious injuries to the number of VMT (in 100 million VMT) in a calendar year | 6.47 | 6.47 |
| Number of Non-motorized Fatalities and Non-motorized Serious Injuries | Combined total number of non-motorized fatalities and non-motorized serious injuries involving a motor vehicle during a calendar year | 2,696 | 2,642 |

## Texas Traffic Safety Task Force Report

The 2016 Texas Task Force Report (*Solutions for Saving Lives on Texas Roads*) lays out the financial resources required to reduce the number of fatalities and serious injuries. It does not specify goals, objectives, and performance measures, but does identify specific safety initiatives, and recommends tracking progress on those initiatives, such as engineering improvements and behavioral change strategies to measure performance.

[3] The study team's attempts to secure a copy of the Commercial Vehicle Safety Plan have been unsuccessful. The team was advised by the Federal Motor Carrier Safety Administration's Regional Administrator that they would need to use the Freedom of Information Act to obtain a copy.
[4] The Highway Safety Plan established 46 performance measures or targets aligned with the SHSP.

The SHSP, which identifies emphasis areas, additional actions, and performance measures is consistent with the Task Force approach and includes broader collaboration among partners.

## TxDOT Plan and Program Documents

The Texas Transportation Commission has adopted rules governing the planning and development of transportation projects. These rules include guidance for the development of the Unified Transportation Program and any updates. The Statewide Long Range Transportation Plan (SLRTP), also known as the Texas Transportation Plan, identifies the needs to be met and specific goals that projects listed in the UTP are oriented toward achieving. The different plans and programs in this family of documents are shown in Figure 11, with the UTP serving as a mid-range programming document linking the planning activities of the SLRTP, the Metropolitan Transportation Plans, and Rural Transportation Plans to the detailed programming activities under the Statewide Transportation Improvement Program (STIP) and TxDOT's 2-year Letting Schedule.


*Figure 11. UTP in the TxDOT Family of Documents (4).*

### *Statewide Long Range Transportation Plan*

The Texas Transportation Commission adopted the Texas Transportation Plan (TTP) 2040 (*4*) in 2015 to serve as TxDOT's long-range, performance-based transportation plan (LRTP) (*5*). The TTP 2040 was developed through a collaborative process of MPOs and communities, as well as city, county, transit, stakeholder, and private company officials. TTP 2040 guides planning and programming decisions for the development, management, and operation of the statewide, multimodal transportation system in Texas over the next 25 years. Among other things, the TTP includes a section on performance goals, measures, and targets.

The safety goal stated in the TTP is "improve multimodal transportation safety." The TTP specific objectives follow. Those in bold indicate strategies or objectives also addressed in the SHSP:

- **Reduce fatalities and serious injuries.**
- Improve safety of at-grade rail crossings.
- **Eliminate conflicts between modes wherever possible (particularly in the section on Intersection Safety).**
- **Increase bicycle and pedestrian safety through education, the design and construction of new facilities, and improvements to existing facilities.**
- **Educate the public on the dangers of high-risk driving behaviors.**
- **Coordinate with enforcement to improve driver compliance with laws.**
- Improve incident response times.

The TTP performance measures include the number and rate of fatalities and serious injuries by each mode. Specific performance measures for non-motorized users were not included, but TxDOT intends to track the extent to which bicycle and pedestrian needs are met. Bicycle and pedestrian needs include local projects identified to preserve facility infrastructure, enhance connectivity, and improve safety.

SHSP managers will work with TxDOT planners to encourage quantification of these four measures overall and by individual mode, and to consider a measure for non-motorized (e.g., pedestrians and bicyclists fatalities).

LRTP implementation is a multistep process beginning with the Unified Transportation Program (UTP) and ending with the Statewide Transportation Improvement Program (STEP).

### *Unified Transportation Program (UTP)*

The UTP is an intermediate programming document linking the planning activities of the statewide LRTP, the metropolitan transportation plans, and rural transportation plans to the detailed programming activities under the STIP and TxDOT's 24-month (2-year) letting schedule (*4*). Specifically, the UTP lists projects and programs planned for construction and/or developed within the first 10 years of the 24-year SLRTP. Project development includes activities such as

preliminary engineering work, environmental analysis, and right-of-way acquisition and design. Attention to safety is not specifically required in project development.

Despite its importance to TxDOT as a planning and programming tool, the UTP is neither a budget nor a guarantee that projects will or can be built. It is a critical tool in guiding transportation project development within the long-term planning context. In addition, it serves as a communication tool for stakeholders and the public in understanding the project development commitments TxDOT is making.

### *Texas Statewide Transportation Improvement Program (STIP)*

The STIP is the programming document for prioritizing and scheduling projects (*6*). The Highway Safety Improvement Program (HSIP) projects are included in the STIP, and other road safety projects also may be included utilizing state funds.

While the STIP does not contain goals and performance measures, it is based on a set of needs set out in the LRTP, the first of which addresses the need to "maintain a safe transportation system for all transportation users." The plan projects $3,177,700,000 for spending on safety projects.

## MPO Long Range Plans

The long range plans for CAMPO, NCTCOG, HGAC, and AAMPO were examined for evidence of safety goals, objectives, and performance measures. The MPO LRTPs typically are used as the guiding force for an MPO. For the most part, the LRTPs were adopted before the FAST Act became law, but the safety planning requirements were enacted into law in the Transportation Equity Act for the 21st Century in 1998. The sample of MPOs demonstrates a consistent commitment to safety; SHSP managers and participants will encourage the MPOs to include performance targets consistent with the SHSP in future planning efforts.

### *North Central Texas Council of Governments*

The NCTCOG LRTP (Mobility 2040) is focused on growth and mobility for the region. The introductory materials acknowledge the MAP-21 planning goals including "safety: To achieve a significant reduction in traffic fatalities and serious injuries on all public roads" and discuss safety in the vision statement, "enhancing the safety of the traveling public." The section on goals states, "Goals define the purpose of Mobility 2040 and guide efforts to accommodate the multimodal mobility needs of a growing region. These goals support and advance the development of a transportation system that contributes to the region's mobility, quality of life, system sustainability, and continued project implementation" (*7*). Safety is highlighted under the System Sustainability section as, "Ensure adequate maintenance and enhance the safety and reliability of the existing transportation system." In addition, the Metropolitan Transportation Plan Development Process noted that, "Impacts to system safety and security,

Environmental Justice, environmental mitigation, and intermodal planning were also considered throughout the development of Mobility 2040."

Searching the website for "safety" reveals a substantial safety program as outlined below. The safety section begins with an overview: "The Transportation Safety program area focuses on improving traffic safety throughout the region by supporting planning efforts to develop safety policies, programs, and projects and the development of the Dallas-Fort Worth Regional Safety Information System" (*8*). The safety program includes Traffic Incident Management and other training programs, a Regional Safety Advisory Committee, the Dallas-Fort Worth Regional Safety Information System, publication of the NCTCOG Regional Crash Rates fact sheet, a Work Zone Safety Working Group, Mobility Assistance Patrols, the Intersection Safety Implementation Plan, and other activities (*9*, *10*, *11*, *12*, *13*, *14*, *15*).

### *Houston-Galveston Area Council*

The first goal listed in the regional transportation plan is *reduce crash rates*, and both goals three and four list *incident response* as a part of the goal statement. Incident response is a large factor not only in mobility, but also in safety (*16*):

> Safety is a top regional priority. Although motorists are the largest group of system users injured or killed in crashes, pedestrians and cyclists are also at risk. Addressing this goal will not only benefit regional health, but the community's quality of life, and economic competitiveness. A safe regional transportation system operates reliably, delivers goods and services on time, and returns users home at the end of their trip. In 2012, the region experienced a significant increase in the number of vehicle crashes compared to 2011. Fatalities from impaired driving crashes are up 10 percent in the same time period, also up over the last 5 years. This region has two of the top 10 counties for impaired driving-related fatalities, one of which also has the highest rates of DUI fatalities per capita. Population and economic growth will increase system demand, increasing congestion and contributing to system deterioration, both of which are implicated in safety issues. Technology is emerging that enables vehicle-to-vehicle and vehicle-to infrastructure interaction enabling vehicles to have the capability to sense threats and hazards, issue driver warnings, and take preemptive actions to avoid accidents.

The 2040 LRTP employs four strategies as implementation tools to realize the goals, one of which is **Improve System Management and Operations** (maximizing reliability and efficiency of existing assets through intelligent transportation systems, traffic incident management, crash avoidance technology, etc.).

The LRTP acknowledges the MAP-21 requirement to develop safety performance measures. "MPOs across the country will need to adopt and implement programs and priorities based on performance measures—easy to understand indicators of achievement" (*12*). The adopted performance measure is improve safety, which tracks safety measures related to traffic, bus,

and rail to provide a sense of overall system safety. The performance measures most closely related to the SHSP address traffic, bicycle and pedestrian crash rates.

### *Capital Area Metropolitan Planning Organization*

The first goal listed in the CAMPO 2040 Regional Transportation Plan is the safety goal, "Increase the safety and security of the transportation system because every year our region suffers injury and loss of life due to crashes involving motor vehicles, pedestrians, and bicyclists" (*17*). The plan "affirms that even a single loss is one too many, and makes safety its guiding principle." The plan "strongly encourages all recipients of federal, state, and/or local funds to continue making safety a major priority as it develops and implements transportation projects throughout the region."

The one safety objective listed in the action plan is to make "three miles of improvements to high crash corridors," and it is listed under the Social Equity section. A specific safety section is not included in the action plan. Under the section Balance Project Prioritization, an objective is to "prioritize projects by balancing immediate needs to improve safety and mobility with preparation for future growth" (*13*).

### *Alamo Area Metropolitan Planning Organization*

The LRTP recognizes the federally required planning factors, which include "Increase the safety of the transportation system for motorized and non-motorized users," and the vision statement says, "The 2040 Metropolitan Transportation Plan will meet growing needs while enhancing the safety of the traveling public" (*18*). Among the plan's goals is an objective to maintain a focus on safety. According to the budget, $7M is devoted to safety projects annually. The AAMPO LRTP includes separate sections to address pedestrian and bicycle safety concerns as outlined below.

#### *AAMPO Pedestrian Safety*

There is a continued awareness and momentum toward improving pedestrian facilities. In 2012, AAMPO completed and adopted a Pedestrian Safety Action Plan that defines an infrastructure tool box to make walking safer. As this momentum continues, AAMPO is closer to developing a truly comprehensive pedestrian facilities system that will accommodate pedestrian mobility needs. Three of AAMPO's goals directly address safety issues (*18*):

- Goal 1—Institutionalize transportation planning for pedestrians: recognize and incorporate walking as a significant and required element for all persons.
- Goal 3—Make walking safer through education, encouragement, and enforcement.
- Goal 4—Identify and effectively use available funding. Everyone is a pedestrian at one end or the other of their trips whether they are commute or recreational trips. With the growing concerns of congestion, air quality and the public interest in

promoting alternative transportation modes, the adoption of policies and performance measures that encourage alternate transportation modes will aid in reducing congestion, improving air quality, and enhancing the community's quality of life" (*14*).

### *AAMPO Bicycle Safety*

In the last five years, the region has continued to see improvements in and the expansion of bicycle projects and programs. Regional leaders understand the importance of creating and maintaining a multimodal transportation system. Various goals and objectives have been identified to ensure this area continues to develop and implement a comprehensive bicycle network. The MPO has adopted the following vision statement for bicycling in the region: "The Alamo Area recognizes bicycling as a clean, healthy and affordable form of transportation and recreation. A comprehensive on-road and off-road bicycle network will make our community a place where bicycling will be desirable for trips of all kinds by all segments of the population" (*18*). Goal three of the plan's four goals addresses bicycling safety: "Make bicycling safer through education, encouragement, and enforcement: Grow the program to educate elected officials and the general public concerning the opportunities, benefits, and safety aspects of bicycling in the region" (*18*).

## Vision Zero Plans

Following a growing national trend, Austin and San Antonio have adopted Vision Zero policies and action plans and have joined the national Vision Zero Network. The Dallas/Fort Worth region is considering joining the Network, as are other Texas communities. Vision Zero started in Sweden as a response to traffic deaths and injuries and has since spread to cities throughout the United States. These cities adopt the goal of reaching zero fatalities and serious injuries. As the SHSP managers conduct outreach to transportation planning organizations, discussions will include attention to the relationship between the Vision Zero cities and other safety plans and the SHSP.

As the title implies, the targets in the current Vision Zero cities are zero. They can be encouraged to develop interim targets in alignment with the statewide and the five required MPO safety performance measures, which would closely align them with the surrounding regional MPO targets.

### *Austin Vision Zero*

Vision Zero holds that traffic deaths and injuries are not unavoidable accidents, but instead a preventable public health problem. Vision Zero is an ongoing effort to eliminate traffic deaths and serious injuries on Austin's streets by 2025. Austin's City Council adopted Vision Zero as a policy within the Imagine Austin Comprehensive Plan in October 2015 and adopted the Vision Zero Action Plan in May 2016, setting the citywide direction to collaboratively improve safety

for all road users. This effort involves numerous city departments, state and federal agencies, and community groups. The concerted, multipronged approach involves:

- A holistic approach to land use and transportation.
- A complete streets approach to street design.
- Traffic engineering and infrastructure.
- Enforcement and prosecution of dangerous behaviors.
- Education and culture change.
- Public health, equity, and related issues.
- Policy analysis and changes at the local and regional level, including speed management.

The Vision Zero Program is housed within the Active Transportation Division of the Austin Transportation Department. Its task force is made up of city departments, state and federal agencies, and community groups. It continues to meet to guide its implementation.

### *San Antonio*

The San Antonio safety goal is to achieve zero fatalities on the roadways. "The responsibility for roadway safety is shared between those who design the road and those who use the road. Vision Zero is both an attitude toward life and a strategy for designing a safe transportation system" (*19*). San Antonio's Vision Zero action plan documents the process and groups involved in developing key actions and milestones for five essential elements for a safe transportation system. The five elements are: education, encouragement, engineering, enforcement, and evaluation. Table 3 provides a description of each element.

***Table 3. San Antonio Vision Zero Essential Elements for a Safe Transportation System.***

| | Element | Understanding |
|---|---|---|
|  | Education | Communicate with children and adults the importance of safety for all on our roadways whether a person is driving, walking, bicycling, or riding. Emphasize self-accountability and responsibility for safety. |
|  | Encouragement | To be effective in such an effort, encouraging our citizens is mandatory to reemphasize the message of safety for all. |
|  | Engineering | Through engineering transportation choices, infrastructure improvements can reduce speeds and potential conflicts, and establish safer and fully accessible crossings, walkways, and bikeways. |
|  | Enforcement | Enforcement of traffic safety laws is essential. Continue to support strong safety campaigns and initiatives such as Click it or Ticket, Buzzed Driving is Drunk Driving, Distract Driving and Traffic Safety Programs. |
|  | Evaluation | The city will continue to evaluate and improve the traffic safety effort to monitor their effectiveness. |

## Summary

The Texas safety and transportation planning documents address safety as an important issue and goal. The SHSP is consistent with, and builds upon, existing traffic safety efforts and plans in the state.


# Emphasis Areas

Emphasis areas (EAs) and their associated strategies focus resources on areas of greatest need. Strategies are selected such that they have the greatest potential to reduce highway fatalities and serious injuries (*20*). Specific countermeasures are selected to specifically address each strategy. The selection of EAs, strategies, and countermeasures is based on crash data, other evidence, and stakeholder input.

The process used in Texas involved active participation from the management team, SG, and EC and comprised three steps. Initially, the management team undertook a statewide data analysis to identify and describe the top contributors to fatal and severe crashes within the categories of driver behaviors (i.e., impaired driving, distracted driving, speeding, restraint use, and fatigue), system users (older road users, young drivers, motorcyclists, pedestrians, and bicyclists), and crash types (i.e., intersection, roadway and lane departures, work zone, and railroad crossing). Crashes often involve multiple factors, and many of these contributors overlap.

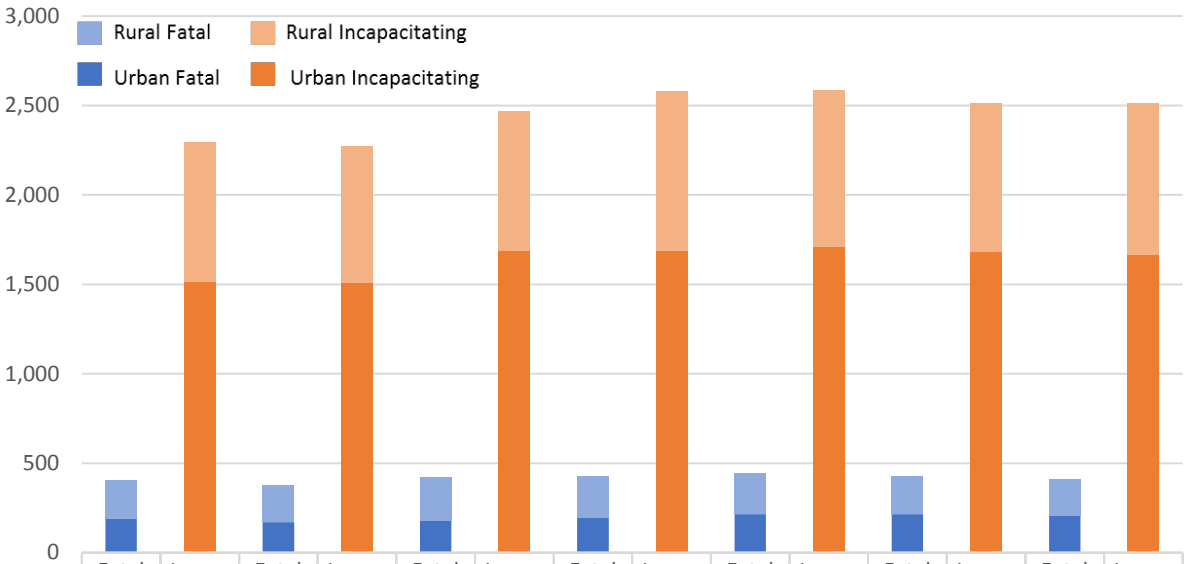
**Distracted Driving**
**Impaired Driving**
**Intersection Safety**
**Older Road Users**
**Pedestrian Safety**
**Roadway and Lane Departures**
**Speeding**

In the next step, the management team presented the data to the SG on November 20, 2016. At this meeting, the stakeholders discussed the data and then completed a voting process to select the EAs. The SG chose seven EAs: distracted driving, impaired driving, intersection safety, older road users, pedestrian safety, roadway and lane departures, and speeding. The EC reviewed the data and the voting process completed by the SG. The EC approved the selection process and the seven chosen EAs.

In the final step and as described in the History and Accomplishments section, EA teams were formed based on input from the EC and SG. The EA teams reviewed crash data and other evidence to identify strategies and appropriate countermeasures. The remainder of this section presents a description of each EA. The strategies and countermeasures for each EA are listed in Appendix C. A glossary of common terms and abbreviations is contained in Appendix D. Additional data for each EA can be found at the SHSP website (www.texasshsp.com).

## Distracted Driving

The Distracted Driving EA includes a range of driver distractions. It encompasses crashes where distraction in vehicle, driver inattention, or cell phone or mobile use was cited as a contributing factor. Distracted driving, specifically texting while driving, is a growing concern in Texas. As evidence of this trend, Texas recently became the 47th state to pass a statewide ban on texting while driving. Distracted driving was identified as a factor for 2,906 fatal crashes (14 percent) and 17,221 severe crashes (19 percent) from 2010–2016. Crash counts by year are shown in Figure 12. These crashes resulted in 3,218 fatalities (14 percent) and 21,447 serious injuries (19 percent) from 2010–2016. It should be noted that these numbers may be an undercount because it can be difficult to identify distracted drivers.




| | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | 2016 | |
| Rural | 213 | 782 | 205 | 761 | 242 | 782 | 234 | 893 | 225 | 873 | 212 | 829 | 204 | 846 |
| Urban | 189 | 1516 | 171 | 1508 | 177 | 1686 | 194 | 1688 | 216 | 1709 | 216 | 1683 | 208 | 1665 |
| Total | 402 | 2,298 | 376 | 2,269 | 419 | 2,468 | 428 | 2,581 | 441 | 2,582 | 428 | 2,512 | 412 | 2,511 |

***Figure 12. Fatal and Serious Injury Distracted Driving Crashes, 2010–2016.***

Key points for fatal and serious injury crashes from 2010–2015:

- Males approximately ages 16 to 70 years and females approximately ages 16 to 33 years are overrepresented for drivers involved in fatal and severe crashes who are identified as distracted.
- Overall, the majority of distracted driving crashes occurred in urban areas (64 percent) and on the state system (66 percent). Of those crashes occurring on the state system, 43 percent were in urban areas. For crashes occurring off the state system (34 percent), a much greater proportion (79 percent) was in urban areas.

- Nearly 80 percent of distracted driving crashes also involved speeding, failure to yield the right of way, faulty evasive action, or problems with lane keeping.

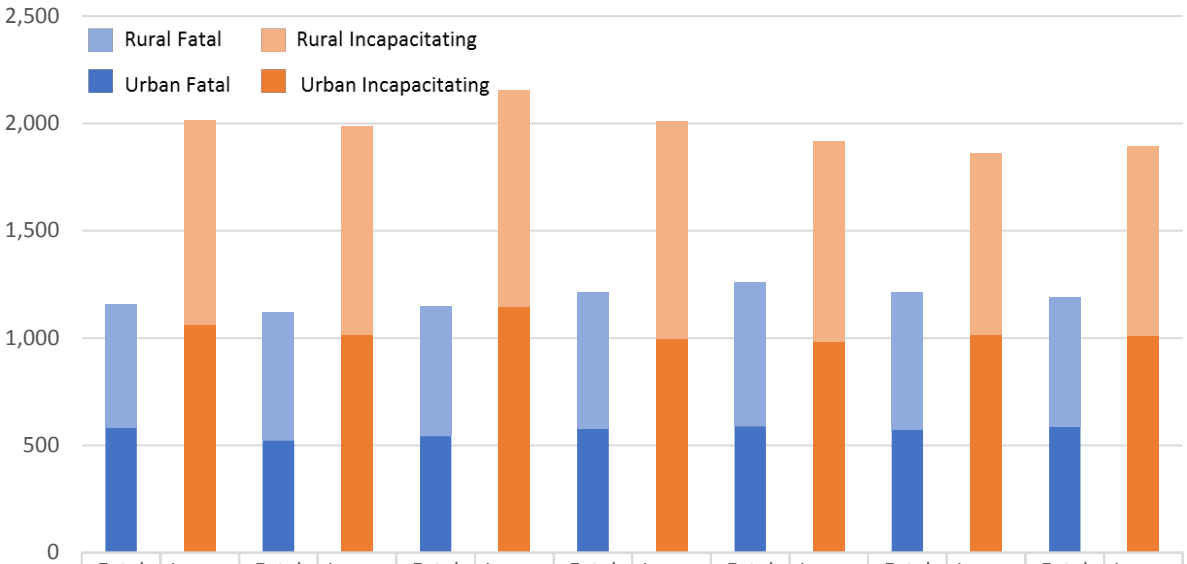
The Distracted Driving EA team identified 5 strategies and 28 countermeasures to address these strategies. Table 4 presents the strategies while Appendix C contains both the strategies and countermeasures.

*Table 4. Strategies for the Distracted Driving Emphasis Area.*

| Number | Strategy |
|---|---|
| 1 | Reduce fatalities and serious injuries by identifying and implementing education and awareness strategies to reduce distracted driving. |
| 2 | Improve the effectiveness of distracted road user educational techniques, tools, and strategies. |
| 3 | Improve and increase enforcement capabilities for addressing distracted driving. |
| 4 | Increase the installation of engineering countermeasures known to reduce distracted driving. |
| 5 | Use technology to reduce distracted driving crashes, serious injuries, and fatalities. |

## Impaired Driving

Impaired driving was the most common factor among fatal crashes in Texas from 2010–2015. In addition, the rates of alcohol-impaired fatal crashes often exceed national rates. The Impaired Driving EA includes those crashes where at least one driver was identified as having been drinking, having taken medication, been under the influence of alcohol or drugs, a blood alcohol content greater than zero, or a positive drug test. Impaired driving was identified as a factor for 8,301 fatal crashes (39 percent of all fatal crashes) and 13,841 serious injury crashes (15 percent of serious injury crashes) from 2010–2016. Crash counts by year are shown in Figure 13. These crashes resulted in to 9,389 fatalities (39 percent of all fatalities) and 19,495 serious injuries (17 percent of all serious injuries).




| | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | 2016 | |
| Rural | 575 | 955 | 596 | 972 | 604 | 1,007 | 636 | 1,014 | 670 | 932 | 640 | 847 | 601 | 882 |
| Urban | 582 | 1063 | 523 | 1016 | 543 | 1147 | 579 | 998 | 589 | 982 | 574 | 1014 | 589 | 1012 |
| Total | 1,157 | 2,018 | 1,119 | 1,988 | 1,147 | 2,154 | 1,215 | 2,012 | 1,259 | 1,914 | 1,214 | 1,861 | 1,190 | 1,894 |

***Figure 13. Fatal and Serious Injury Impaired Driving Crashes, 2010–2016.***

Key points for fatal and serious injury crashes from 2010–2015:

- Male drivers ages 16 to 60 years and female drivers ages 21 to 25 years of age were overrepresented for drivers involved in fatal and severe crashes who were identified as impaired.
- Impaired driving crashes occurred equally in rural (50 percent) and urban (50 percent) areas.
- The majority of impaired driving crashes occurred on the state system (65 percent). Of those that occurred on the state system, 48 percent were on arterials, 28 percent were on freeways or freeway frontage roads, and 24 percent were on collector roadways. For

crashes that occurred off the state system (35 percent), 43 percent were on local roadways, 32 percent were on arterials, and 22 percent were on collector roadways.

- The majority (70 percent) of impaired crashes occurred on weekends at night from 9:00 p.m. to 2:00 a.m.
- Nearly 60 percent of impaired driving crashes also involved a single vehicle running off the road or a head-on crash type. About 26 percent involved speeding while 24 percent involved an intersection.

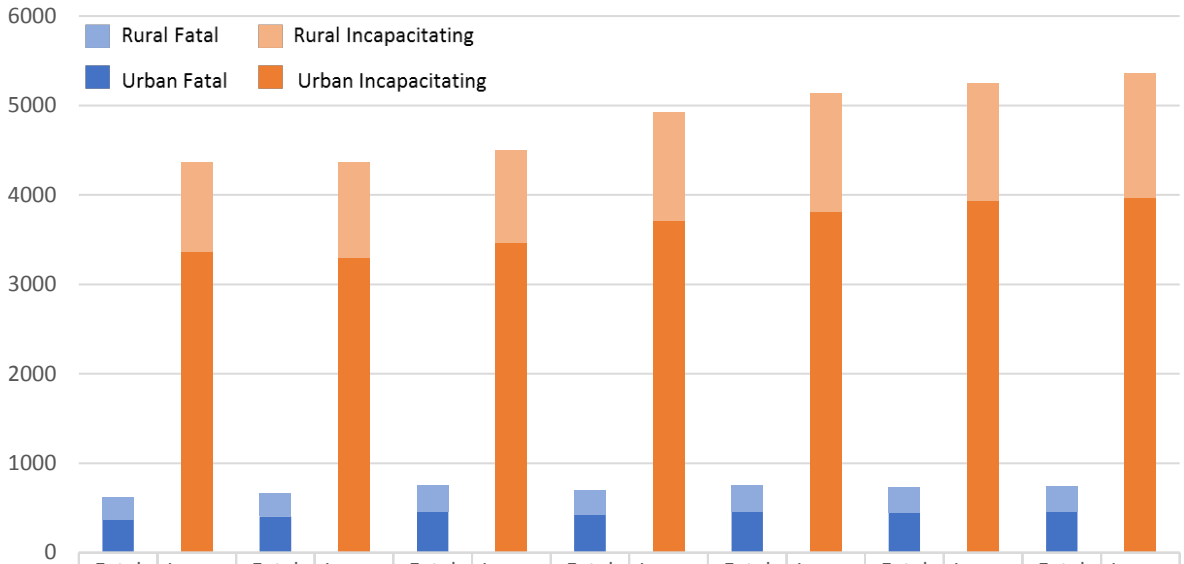
The Impaired Driving EA team identified 5 strategies and 29 countermeasures to address these strategies. Table 5 presents the strategies while Appendix C contains both the strategies and countermeasures.

*Table 5. Strategies for the Impaired Driving Emphasis Area*

| Number | Strategy |
|---|---|
| 1 | Use data systems to identify alcohol licensed and permitted locations within a community and Alcoholic Beverage Code violation history at these locations to determine any correlation with alcohol related crashes. |
| 2 | Increase education for all road users on the impact of impaired driving and its prevention. |
| 3 | Increase officer contacts with impaired drivers through regular traffic enforcement. |
| 4 | Improve mobility options for impaired road users. |
| 5 | Increase data, training, and resources for prosecutors and officers in the area of drugged driving. |

## Intersection Safety

An intersection crash is one that occurs within the boundaries of an intersection or in which the first harmful event occurred on an approach to or an exit from an intersection and is related to movement through the intersection. As such the Intersection Safety EA includes crashes at or related to an intersection. Intersection crashes are the second most common type of crash in Texas. Intersection crashes was the identified crash type for 4,970 fatal crashes (23 percent of all fatal crashes) and 33,909 serious crashes (37 percent of all serious injury crashes) from 2010–2016. Crash counts by year are shown in Figure 14. These crashes resulted in 5,467 fatalities (23 percent of all fatalities) and 42,419 serious injuries (37 percent of all serious injuries) from 2010–2016.




| | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | 2016 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. |
| Rural | 255 | 1003 | 256 | 1066 | 295 | 1035 | 274 | 1211 | 292 | 1327 | 287 | 1316 | 280 | 1396 |
| Urban | 370 | 3359 | 407 | 3299 | 456 | 3468 | 425 | 3716 | 460 | 3814 | 448 | 3931 | 465 | 3968 |
| Total | 625 | 4362 | 663 | 4365 | 751 | 4503 | 699 | 4927 | 752 | 5141 | 735 | 5247 | 745 | 5364 |

*Figure 14. Fatal and Serious Injury Intersection Crashes, 2010–2016.*

Key points for fatal and serious injury crashes from 2010–2015:

- Male drivers under the age of 35 years and older than the age of 74 years and female drivers under age 25 years and older than 79 years were overrepresented for drivers involved in fatal and severe intersection crashes.
- Intersection crashes largely occurred in urban areas (74 percent) and on the state system (56 percent). Of those on the state system, 67 percent occurred on arterial roadways.

- In urban areas, 52 percent of crashes on the state system involved signalized intersections. Off the state system, 39 percent of crashes occurred at signalized locations.
- At least 67 percent of intersection crashes also involved failure to yield the right of way, speeding, disregarding a signal or light, distracted driving, or impaired driving.

The Intersection Safety EA team identified 6 strategies and 20 countermeasures to address these strategies. Table 6 presents the strategies while Appendix C contains both the strategies and countermeasures.

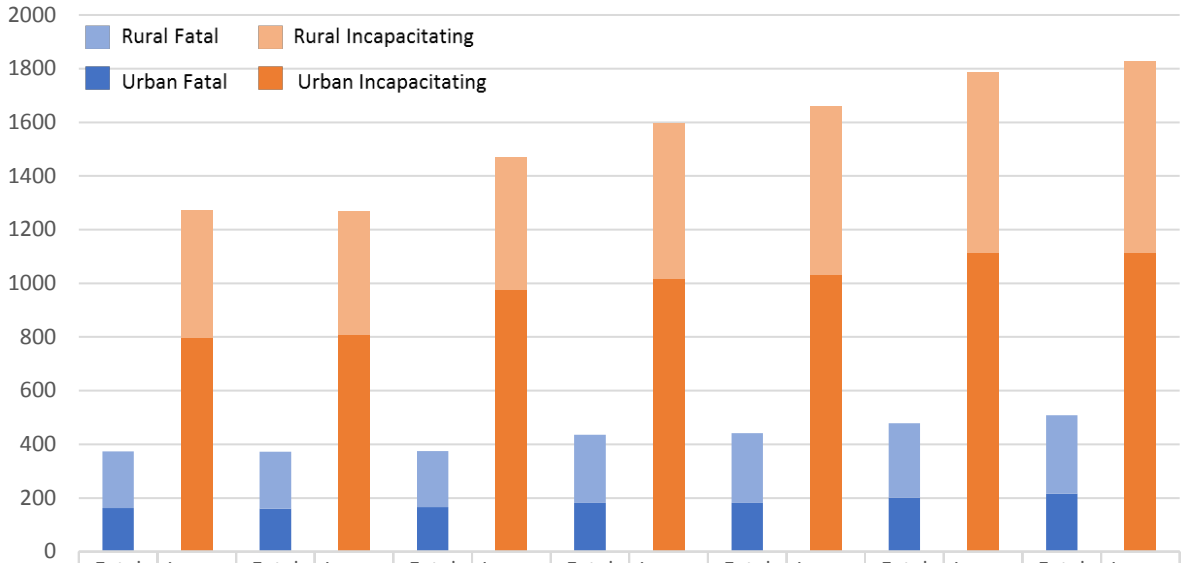
*Table 6. Strategies for the Intersection Safety Emphasis Area*

| Number | Strategy |
|---|---|
| 1 | Improve data systems for identifying specific intersections and intersection types at high probability for serious injury crashes. |
| 2 | Consider alternative design strategies for improving intersection safety. |
| 3 | Improve pedestrian safety at intersections with high probability of crashes. |
| 4 | Increase driver awareness of intersections. |
| 5 | Develop educational campaigns incorporating data analysis to improve intersection safety. |
| 6 | Reduce red light running. |

Note: All intersection strategies and countermeasures should consider the needs of persons with disabilities.

## Older Road Users

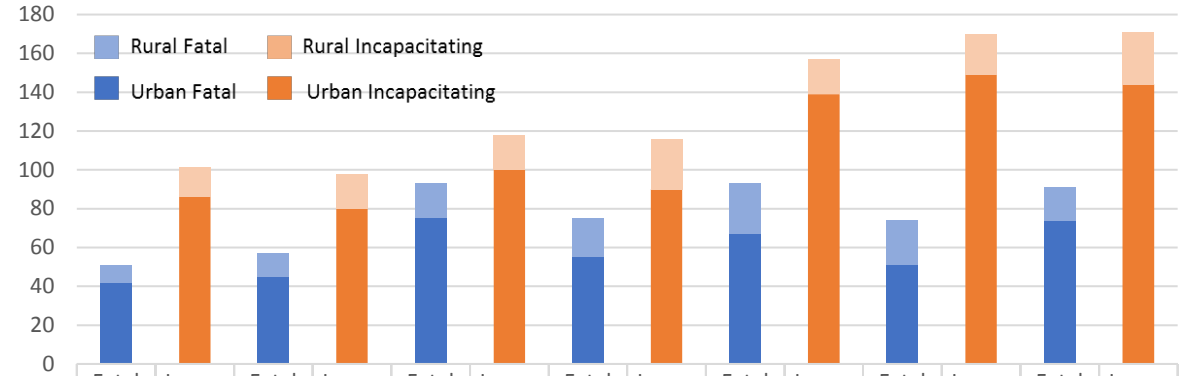
With the continued aging of the baby boomer generation, more system users will be older drivers and pedestrians. This is a concern given that physical frailty may put older road users at an increased risk of sustaining a fatal or serious injury. The Older Road Users EA focuses on drivers and pedestrians who are ages 65 years and older. There were 2,983 fatal crashes (14 percent of all fatal crashes) and 10,882 serious injury crashes (12 percent of all serious injury crashes) involving older drivers from 2010–2016. Crash counts by year are shown in Figure 15. These crashes resulted in 3,335 fatalities (14 percent of all fatalities) and 14,018 serious injuries (12 percent of all serious injuries) from 2010–2016.




| | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | 2016 | |
| Rural | 211 | 477 | 212 | 460 | 209 | 493 | 255 | 579 | 259 | 628 | 277 | 671 | 292 | 713 |
| Urban | 162 | 798 | 160 | 807 | 166 | 977 | 181 | 1,018 | 182 | 1,032 | 201 | 1114 | 216 | 1115 |
| Total | 373 | 1,275 | 372 | 1,267 | 375 | 1,470 | 436 | 1,597 | 441 | 1,660 | 478 | 1,785 | 508 | 1,828 |

*Figure 15. Fatal and Serious Injury Crashes Involving Older Drivers 2010–2016.*

Older pedestrian crashes accounted for 540 fatal crashes (2 percent) and 913 severe crashes (1 percent) from 2010–2016. This amounted to 534 fatalities (2 percent) and 931 serious injuries (1 percent) from 2010–2016. Crash counts by year are shown in Figure 16.




| | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | 2016 | |
| Rural | 9 | 15 | 12 | 18 | 18 | 18 | 20 | 26 | 26 | 18 | 23 | 21 | 17 | 27 |
| Urban | 42 | 86 | 45 | 80 | 75 | 100 | 55 | 90 | 67 | 139 | 51 | 149 | 74 | 144 |
| Total | 51 | 101 | 57 | 98 | 93 | 118 | 75 | 116 | 93 | 157 | 74 | 170 | 91 | 171 |

*Figure 16. Fatal and Serious Injury Crashes Involving Older Pedestrians, 2010–2016.*

Key points for fatal and serious injury crashes from 2010–2015:

- Male drivers ages 75 years and older and females ages 80 years and older are overrepresented in crashes based on the amount of vehicle miles that older drivers travel. For pedestrians, older males are overrepresented.
- The rates of older driver and older pedestrian crashes have increased steadily at least since 2010. The rate for older pedestrians increased three times faster than older driver rates.
- Older driver crashes occurred in both urban (59 percent) and rural (41 percent) areas. Older pedestrian crashes largely occurred in urban areas (82 percent).
- Of older pedestrian crashes that occurred on the state system (44 percent), 71 percent occurred on arterial roadways. Of older pedestrian crashes that occurred off the state system (56 percent), 42 percent occurred on arterial roadways and 39 percent occurred on local roadways.
- For the crash type, older drivers were more likely to have angle, same direction, and opposite direction crashes and less likely to have single motor vehicle crashes compared to drivers under age 65 years. The percentages for older drivers versus drivers under age 65 years is as follows: 27 versus 15 percent for angle crashes, 25 versus 19 percent

for same direction crashes, 21 versus 13 percent for opposite direction crashes, and 27 versus 53 percent for single vehicle crashes, respectively.

- For the first harmful event, older drivers were more likely to hit another moving vehicle and less likely to hit a fixed object/overturning or hit a pedestrian compared to drivers under age 65 years. The percentages for older drivers versus drivers under age 65 years are: 73 versus 47 percent for hit another moving vehicle, 19 versus 39 percent for hitting a fixed object/overturning, and 5 versus 8 percent for hitting a pedestrian.

The Older Road Users EA team identified 5 strategies and 21 countermeasures to address these strategies. Table 7 presents the strategies while Appendix C contains both the strategies and countermeasures.

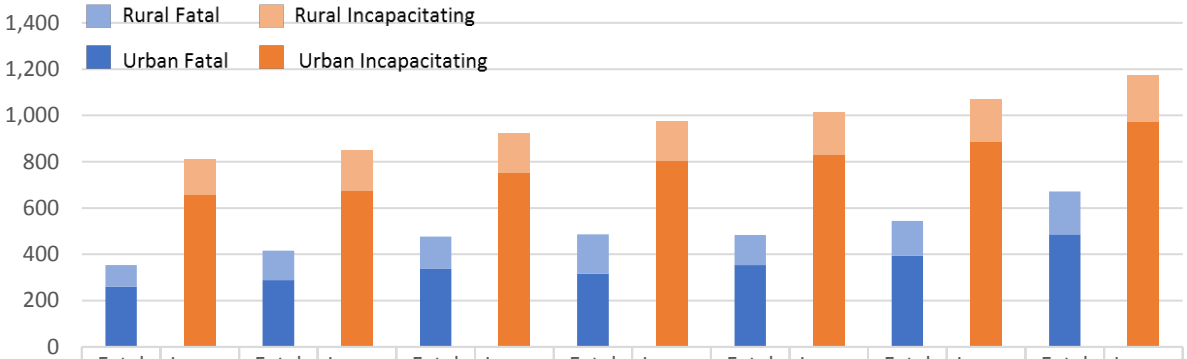
*Table 7. Strategies for the Older Road Users Emphasis Area*

| Number | Strategy |
|---|---|
| 1 | Reduce wrong way crashes. |
| 2 | Design and operate roadways to meet the needs of older road users. |
| 3 | Implement effective methods and tools to prepare older road users to deal with the limitations brought on by the aging process. |
| 4 | Improve mobility options for older road users. |
| 5 | Implement methods to reduce injury severity among older road users. |

Note: All older system users strategies and countermeasures should consider the needs of persons with disabilities.

## Pedestrian Safety

Crashes with pedestrians are a concern given that the pedestrians are more likely to sustain fatal or severe injuries compared to vehicle occupants. The Pedestrian Safety EA encompasses crashes that involve at least one pedestrian and one motor vehicle. Pedestrian crashes accounted for 3,434 fatal crashes (16 percent) and 6,815 severe crashes (7 percent) from 2010–2016. Crash counts by year are shown in Figure 17. These crashes resulted in to 3,490 fatalities (15 percent) and 7,179 serious injuries (6 percent) from 2010–2016.




| | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | 2016 | |
| Rural | 95 | 155 | 127 | 177 | 140 | 171 | 170 | 169 | 130 | 182 | 151 | 182 | 184 | 202 |
| Urban | 259 | 657 | 289 | 675 | 337 | 752 | 317 | 803 | 354 | 830 | 394 | 888 | 487 | 972 |
| Total | 354 | 812 | 416 | 852 | 477 | 923 | 487 | 972 | 484 | 1,012 | 545 | 1,070 | 671 | 1,174 |

*Figure 17. Fatal and Serious Injury Pedestrian Crashes, 2010–2016.*

Key points for fatal and severe crashes from 2010–2015:

- Overall, male pedestrians approximately ages 15 years and older were overrepresented. For drivers involved in pedestrian crashes, the greatest proportion were younger (under age 35 years) and male drivers.
- The majority of pedestrian crashes occurred in urban areas (78 percent). Of crashes in urban areas, 65 percent occurred at a midblock location away from an intersection and 31 percent at or near the intersection. In rural areas, the majority (82 percent) occurred at locations other than at intersections.
- Pedestrian crashes occurred on the state system (45 percent) and off the state system (55 percent) to a similar degree. The majority on both types of roadways occurred in urban areas. For crashes on the state system, 64 percent were in large urban areas (greater than 100,000 population) compared to the 89 percent of off-state system crashes that occurred in large urban areas.
- Approximately one-quarter of pedestrian crashes involve impairment. Of those identified as impaired, 33 percent were the driver and 67 percent were the pedestrian. This translates to 8 percent of all pedestrian crashes involved an impaired driver while 16 percent involved an impaired pedestrian.

The Pedestrian Safety EA team identified 7 strategies and 28 countermeasures to address these strategies. Table 8 presents the strategies while Appendix C contains both the strategies and countermeasures.

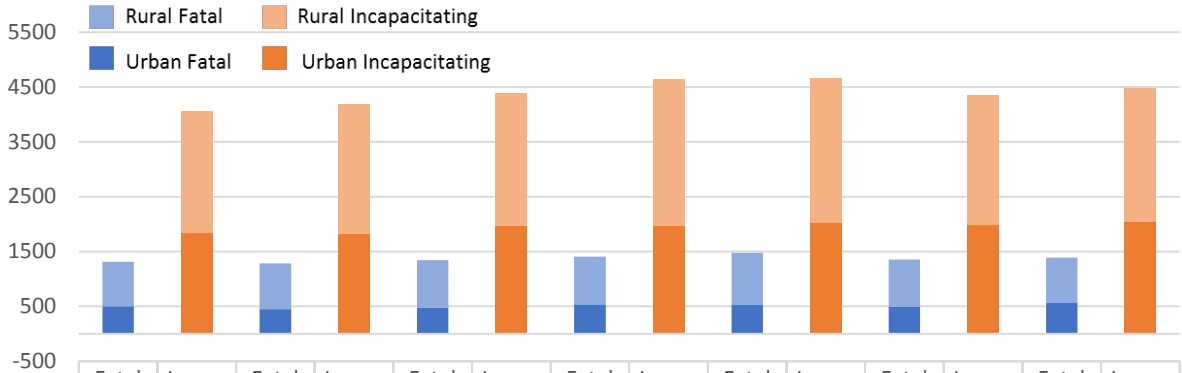
*Table 8. Strategies for the Pedestrian Safety Emphasis Area.*

| Number | Strategy |
|---|---|
| 1 | Improve driver and pedestrian safety awareness and behavior. |
| 2 | Reduce pedestrian crashes on urban arterials and local roadways. |
| 3 | Improve pedestrians' visibility at crossing locations. |
| 4 | Improve pedestrian networks. |
| 5 | Improve pedestrian involved crash reporting. |
| 6 | Establish vehicle operating speeds to decrease crash severity. |
| 7 | Develop strategic pedestrian safety plans tailored to local conditions. |

Note: All pedestrian strategies and countermeasures should consider the needs of persons with disabilities.

## Roadway and Lane Departures

The Roadway and Lane Departures EA encompasses two crash types pertaining to difficulties with lane keeping: single motor vehicles that run off the road (SVROR) and head-on collisions. SVROR describes a crash where only one vehicle is involved and the first harmful event impact occurred on the shoulder, beyond the shoulder, or in the median of the roadway. Head-on crashes involve two motor vehicles traveling straight and in opposite directions prior to impact. Roadway and lane departure crashes are the most common type of crash in Texas. These types of crashes were the identified crash type for 9,560 fatal crashes (45 percent of all fatal crashes) and 30,766 serious injury crashes (34 percent of all serious injury crashes) from 2010–2016. Crash counts by year are shown in Figure 18. These crashes resulted in to 10,652 fatalities (45 percent of all fatalities) and 38,205 serious injuries (33 percent of all serious injuries) from 2010–2016.




| | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | 2016 | |
| Rural | 806 | 2213 | 830 | 2359 | 864 | 2425 | 865 | 2663 | 955 | 2635 | 866 | 2365 | 816 | 2426 |
| Urban | 505 | 1841 | 452 | 1834 | 478 | 1974 | 539 | 1979 | 523 | 2023 | 489 | 1988 | 572 | 2041 |
| Total | 1311 | 4054 | 1282 | 4193 | 1342 | 4399 | 1404 | 4642 | 1478 | 4658 | 1355 | 4353 | 1388 | 4467 |

*Figure 18. Fatal and Serious Injury Lane Departure Crashes 2010–2016.*

Key points for fatal and serious injury crashes from 2010–2015:

- Male drivers under the age of 35 years and older than the age of approximately 71 years and female drivers under the age of approximately 27 years were overrepresented for drivers involved in fatal and severe lane and roadway departure crashes.
- Lane and roadway departure crashes are common in rural (58 percent) and urban (42 percent) areas.
- Of the 68 percent of lane and roadway departure crashes that occurred on the state system, 72 percent occurred on arterial roadways and freeways. Of those crashes that occurred off the state system (32 percent), 70 percent occurred on collector and local roadways.
- Over 50 percent of lane and roadway departure crashes involved hitting a fixed object as a first harmful event across all functional class of road types. The percentage increased to 74 percent on urban freeways. Overturning as a first harmful event differed

across functional class of road type from 13 to 17 percent in urban areas and 27 to 39 percent in rural areas.

- Common factors in lane and roadway departure crashes included the following. Crashes occurred equally during daytime (50 percent) and nighttime (50 percent). Approximately 80 percent occurred under dry conditions. Other factors in these crashes were speeding (44 percent), impaired driving (29 percent), and distraction (15 percent).

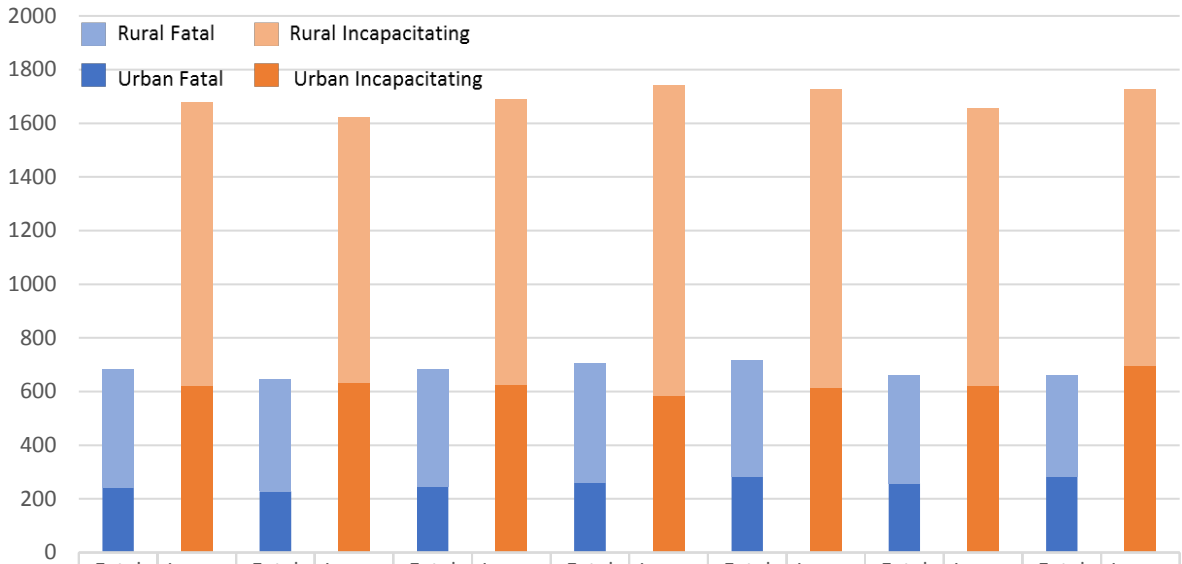
The Roadway and Lane Departures EA team identified 6 strategies and 16 countermeasures to address these strategies. Table 9 presents the strategies while Appendix C contains both the strategies and countermeasures.

*Table 9. Strategies for the Roadway and Lane Departures Emphasis Area*

| Number | Strategy |
|---|---|
| 1 | Analyze run off the road and head-on crashes and roadway characteristics using the new safety methodologies (e.g., Highway Safety Manual and systemic approaches). |
| 2 | Keep vehicles from encroaching on the roadside or opposite lane. |
| 3 | Minimize the consequences of vehicles leaving the road. |
| 4 | Minimize the likelihood of crashing in adverse conditions. |
| 5 | Identify and address behavioral characteristics associated with roadway departure. |
| 6 | Improve emergency response time in rural areas. |

## Speeding

Speeding is a concern because the injury severity of crashes increases as speed increases. The Speeding EA includes those crashes where unsafe speed under the limit or speeding over the limit was cited as a contributing factor. Speeding was identified as a factor for 4,762 fatal crashes (22 percent of all fatal crashes) and 11,840 serious injury crashes (13 percent of all serious injury crashes) from 2010–2016. Crash counts by year are shown in Figure 19. These crashes resulted in 5,360 fatalities (22 percent of fatalities) and 15,612 serious injuries (14 percent of all serious injuries) from 2010–2016.




| | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. | Fatal | Incap. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | 2016 | |
| Rural | 443 | 1057 | 417 | 989 | 438 | 1063 | 446 | 1159 | 436 | 1112 | 403 | 1033 | 379 | 1032 |
| Urban | 241 | 620 | 228 | 634 | 245 | 626 | 261 | 584 | 283 | 614 | 258 | 623 | 284 | 694 |
| Total | 684 | 1677 | 645 | 1623 | 683 | 1689 | 707 | 1743 | 719 | 1726 | 661 | 1656 | 663 | 1726 |

***Figure 19. Fatal and Serious Injury Speeding Crashes, 2010–2016.***

Key points for fatal and serious injury crashes from 2010–2015:

- Male drivers approximately ages 16 to 63 years and female drivers approximately ages 18 to 25 years of age were overrepresented for drivers involved in fatal and severe crashes who were speeding.
- Driving at an unsafe speed under the limit was more common in rural areas and accounted for 63 percent of these type of speeding crashes. Conversely, driving over the speed limit was more common in urban areas and accounted for 62 percent of these type of speeding crashes.
- The majority (62 percent) of speeding crashes occurred on the state system. Of crashes that occurred on the state system, 49 percent were in rural areas while 26 percent occurred in large urban areas (greater than 100,000 population). Of crashes that

occurred off the state system, 24 percent were in rural areas while 50 percent occurred in large urban areas (greater than 100,000 population).

- Approximately 70 percent of speeding crashes also involved a single motor vehicle running off the road or a head-on collision. Of speeding crashes, 35 percent also involved impaired driving, 18 percent occurred at an intersection, and 12 percent involved a distracted driver.

The Speeding EA team identified 5 strategies and 19 countermeasures to address these strategies. Table 10 presents the strategies while Appendix C contains both the strategies and countermeasures.

*Table 10. Strategies for the Speeding Emphasis Area*

| Number | Strategy |
|---|---|
| 1 | Use the concept of establishing target speed limit and road characteristics to reduce speeding. |
| 2 | Educate law enforcement on contributing crash factors to improve crash data collection. |
| 3 | Leverage data to improve engineering, education, and enforcement. |
| 4 | Increase and sustain high visibility speeding enforcement. (Develop, catalogue, and disseminate tools and other resources to improve enforcement capabilities). |
| 5 | Improve the effectiveness of educational techniques, tools, and strategies for speeding (target specific age groups). |

# Implementation

The *Implementation Process Model* lists the "Essential Eight" elements and steps for successful SHSP implementation (*21*). The elements and steps are based on best practice found in successful state SHSP implementation practices and include the following:

- Fundamental elements:
  1. Leadership.
  2. Collaboration.
  3. Communication.
  4. Data collection and analysis.
- Steps for implementation
  5. EA action plans.
  6. Linkage to other plans.
  7. Marketing.
  8. Monitoring, evaluation, and feedback.

This section demonstrates how each of the elements and steps have been or will be achieved.

## Fundamental Elements

### *Leadership*

SHSP leadership includes the EC, SG, and EA team leaders with support from a management team. (Appendix A lists these teams.) These entities are already structured and committed to continue supporting SHSP implementation.

### *Collaboration*

Collaboration among stakeholders has been widespread with nearly 300 persons engaged in SHSP development through numerous EC, SG, and EA team meetings and discussions, as well as the 2017 Texas Traffic Safety Conference. This collaborative enterprise will continue its journey as the stakeholders develop, implement, and evaluate EA action plans, which will be informed by the SG and supported by the EC. The management team will facilitate and document these meetings and follow up as requested by the various entities.

During Phase II of the process, the management team will organize and implement at least four regional workshops to explain the SHSP and engage additional stakeholders to assist with SHSP implementation. Included in this activity will be an attempt to host a tribal workshop or meet individually with the tribal leaders to encourage their input and participation.

### *Communication*

For the most part, communication has taken place through teleconferences, webinars, meetings, and the Texas SHSP website (texasshsp.com), which serves as an archive and resource for process participants. The management team, with input from the EC and SG, is working on a theme, or branding, for the SHSP, which will be implemented through various media efforts. Development of a comprehensive communications plan will be accomplished during the early part of Phase II. Partners will be encouraged to use the brand in their own activities to help develop a consistent message about safety throughout the state.

### *Data Collection and Analysis*

Texas crash data were used to develop information on prevalent fatal and serious injury crash types and characteristics. Additional data analyses were conducted throughout the EA strategy and countermeasure development process. Historical and projected data were used to develop the targets. The EA teams will continue to identify data needs that the management team will support. The management team will conduct an annual data update for distribution through EC, SG, and EA team meetings and the HSIP annual report.

## Steps for Implementation

### *Emphasis Area Action Plans*

EA strategies and countermeasures are complete. The Texas Traffic Safety Conference developed action plans for each of the countermeasures. Phase II of the program will update, fine tune, and enhance the action plans, which identify leadership (e.g., what agency or organization will lead the effort) and cost in a range of high, medium, and low. The refined action plan is expected to be completed by August 1, 2018.

### *Linkage to Other Plans*

The management team reviewed statewide safety and transportation plans and a sampling of the same for MPO and Vision Zero cities. In addition, the UTP and a sampling of transportation improvement plans were examined. Virtually all the Texas plans demonstrate a commitment to safety. TxDOT has informed its planning department and the MPOs of the SHSP targets and offered assistance in setting consistent targets across all the planning documents.

### *Marketing*

SHSP marketing begins with establishing a recognizable brand. The goal is to engage the public and all possible organizations and agencies in SHSP implementation through branding and marketing practices, which will be outlined in the communications plan discussed above. The workshops discussed above will be the first step in a broad rollout of the SHSP. Workshop participants will be encouraged and provided with support to take the SHSP a step further and discuss it with regional and local entities to build on the impetus created during the workshops.

### *Monitoring, Evaluation, and Feedback*

Early in Phase II, an evaluation plan will be written and data collection will begin. The following section provides additional information on the SHSP evaluation process and expected outcomes.

## Evaluation

Evaluation is defined as the systematic collection of information about the activities, characteristics, and outcomes of a program to make judgments about it, improve its effectiveness, and/or inform decisions about future programming (*22*). The Texas evaluation will measure both process and performance. A process evaluation will be conducted annually through a retreat, group meeting, survey, or interviews to assess the strength of the SHSP implementation structure, which is expected to follow the same principles used in developing the SHSP. In other words, the evaluation will be data driven, multidisciplinary, broadly collaborative, and involve all levels of agencies and stakeholders. The process evaluation is

similar to a strengths, weaknesses, opportunities, and threats analysis used regularly by many organizations to improve the efficiency and effectiveness of the entity and its component parts.

The SHSP management team will prepare an annual evaluation report and share it with the EC, SG, and EA teams to identify errors and omissions, and to discuss opportunities for improvement. Many of the partners will accept "ownership" of a specific countermeasure because, in large measure, they already lead the effort. For example, TxDOT leads and provides funding for the road safety programs (HSP and HSIP) and DPS not only enforces the traffic laws, but also implements information programs. Phase II will focus on recruiting additional partners and resources to support the existing efforts.

As a point of departure, the team will use the suggested steps offered in the *Evaluation Process Model* as outlined below:

- Review the SHSP organizational structure to identify and document its format and function(s).
- Examine the positions of persons serving on SHSP committees (e.g., steering and EC) and EA and local/regional/district teams to determine their contribution to the SHSP process and access to leadership and resources.
- Review the schedule of SHSP leadership and committee meetings to determine if they meet as frequently as planned or needed.
- Review the SHSP organizational structure to determine the level of support provided to partners in local and regional coalitions.
- Review the role and function of SHSP committees, teams, and/or groups.
- Compare these current roles and functions with the expectations set at the beginning of the SHSP process (*22*).
- Incorporate the evaluation of the SHSP in the HSIP annual report.

SHSP performance evaluation will include measures for both outputs, or the extent to which SHSP strategies and actions are implemented, and outcomes, or the degree to which SHSP strategies and activities contribute to fatality and serious injury reductions or improve road user safety attitudes and behaviors. The management team will create a tool for capturing the relevant data and facilitate EA team meetings to track outputs or the degree to which the countermeasures are implemented, identify and address challenges, and perhaps chart new directions.

Outcome measures will be determined through continuing data review and analysis. An annual overall data summary will be produced and broken down by EA to show the degree to which the overall SHSP and each of the EAs are achieving the targets established through the SHSP. The data will be presented and discussed with the EC and SG. Finally, it will be addressed during the annual Texas Traffic Safety Conference.


# Appendix A: Acknowledgment

**Thank you to all the individuals who supported the development of the SHSP!**

This SHSP resulted from the hard work of many dedicated individuals from a wide variety of disciplines, interest groups, and backgrounds. It would not have been possible without their support, guidance, and passion for reducing fatalities, serious injuries and crashes in Texas. Special thanks are extended to the Executive Committee, Stakeholder Group, and Emphasis Area Teams and their leaders.

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## APPENDIX A: ACKNOWLEDGMENT

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## APPENDIX A: ACKNOWLEDGMENT

| Texas Strategic Highway Safety Plan<br>Stakeholder Group | |
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# APPENDIX A: ACKNOWLEDGMENT

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## APPENDIX A: ACKNOWLEDGMENT

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## APPENDIX A: ACKNOWLEDGMENT

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| Texas Strategic Highway Safety Plan<br>**Older Road Users**<br>Emphasis Area Team | |
|---|---|
| **Name** | **Organization** |
| **Marcus Brewer** | Texas A&M Transportation Institute |
| **Randy Chhabra** | Austin Travis County EMS |
| **Sue Chrysler** | Texas A&M Transportation Institute |
| **Susan Herbel** | SBH Consulting Services, LLC |
| **Major Hofheins** | San Angelo MPO |
| **Sonya Landrum** | North Central TX Council of Governments |
| **David Morris** | Federal Highway Administration |
| **Daniel Plumer** | Dallas Sheriff's Office |
| **Sandi Rosenbloom** | University of Texas |
| **Kara Thorp (Team Leader)** | American Automobile Association |
| **Rosemary Williams** | University Health System |

# APPENDIX A: ACKNOWLEDGMENT

| Texas Strategic Highway Safety Plan<br>**Pedestrian Safety**<br>Emphasis Area Team | |
|---|---|
| **Name** | **Organization** |
| **Lilly Banda** | City of San Antonio |
| **Robbie Barrera** | Texas Department of Public Safety |
| **Lydia Bryan-Valdez** | Texas Department of Transportation- Traffic Operations Division |
| **Alex Carroll** | Alamo Area Metropolitan |
| **Jay Crossley** | Vision Zero ATX |
| **Dan Dao** | Department of State Health Services |
| **John Denholm** | Lee Engineering |
| **Kay Fitzpatrick** | Texas A&M Transportation Institute |
| **Camille Fountain** | North Central TX Council of Governments |
| **Eric Hemphill** | North Texas Tollway Authority |
| **Susan Herbel** | SBH Consulting Services, LLC |
| **Major Hofheins** | San Angelo MPO |
| **Joan Hudson** | Texas A&M Transportation Institute |
| **Brian Jahn** | City of Fort Worth |
| **David Morris** | Federal Highway Administration |
| **Rebecca Pacini** | City of San Antonio |
| **Kelly Porter** | Williamson County |
| **Stephen Ratke** | Federal Highway Administration |
| **Francis Reilly** | Austin Transportation Dept., Vision Zero |
| **Joe Schmider** | Department of State Health Services |
| **Brian Shamburger (Team Leader)** | Kimley-Horn |
| **Brian Sullivan** | San Antonio Police Department |
| **Thomas Sullivan** | Office of Court Administration |
| **Heyden Walker** | Walk Austin |

| Texas Strategic Highway Safety Plan<br>Roadway and Lane Departures<br>Emphasis Area Team | |
|---|---|
| **Name** | **Organization** |
| **Paul Carlson** | Texas A&M Transportation Institute |
| **Paul Causey** | Associated General Contractors of TX |
| **David Dennis** | Oldcastle Materials |
| **Karen Dixon** | Texas A&M Transportation Institute |
| **Stephan Gage** | Houston-Galveston Area Council |
| **Eric Hemphill** | North Texas Tollway Authority |
| **Sonya Landrum** | North Central TX Council of Governments |
| **Lucille Maes** | Angleton Area Emergency Medical Corps |
| **Amanda Martinez** | Texas Department of Transportation- Traffic Operations Division |
| **Darren McDaniel** | Texas Department of Transportation- Traffic Operations Division |
| **Ken Mora** | Texas Department of Transportation- Design Division |
| **Daniel Plumer** | Dallas Sheriff's Office |
| **Stephen Ratke** | Federal Highway Administration |
| **Buck Russel** | Union Pacific Railroad Public Safety |
| **Rebecca Wells (Team Leader)** | Texas Department of Transportation – Atlanta District |

## APPENDIX A: ACKNOWLEDGMENT

| Texas Strategic Highway Safety Plan<br>**Speeding**<br>Emphasis Area Team | |
|---|---|
| **Name** | **Organization** |
| **Colin Crocker** | Department of State Health Services |
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| **Larry Krantz (Team Leader)** | Texas Department of Transportation- Traffic Operations Division |
| **Kevin Kroll** | North Central Texas Council of Governments |
| **Caroline Love** | Texas Department of Motor Vehicles |
| **Darren McDaniel** | Texas Department of Transportation- Traffic Operations Division |
| **Rebecca Pacini** | City of San Antonio |
| **Major David Palmer** | Texas Department of Public Safety |
| **Stephen Ratke** | Federal Highway Administration |
| **Francis Reilly** | Austin Transportation Department, Vision Zero |
| **Brent Smith** | San Antonio Police Department |
| **Thomas Smith** | Killeen Police Department |
| **Bill Stockton** | Texas A&M Transportation Institute |
| **Bryon Vecera** | Houston Police Department |

# APPENDIX A: ACKNOWLEDGMENT

# Appendix B: Executive Committee Signatures

# APPENDIX B: EXECUTIVE COMMITTEE SIGNATURES

| Signer Events | Signature | Timestamp |
|---|---|---|
| Al Alonzi, FHWA | DocuSigned by: 7E18AF567EC74C5... | Sent: 7/24/2017 2:18:50 PM<br>Viewed: 7/24/2017 2:36:19 PM<br>Signed: 7/24/2017 2:37:48 PM |
| Bryan Jones, City of Texline | DocuSigned by: 5FF33EF1242745A... | Sent: 7/21/2017 6:49:38 PM<br>Resent: 7/24/2017 10:23:35 AM<br>Viewed: 7/26/2017 1:11:35 PM<br>Signed: 7/26/2017 1:16:01 PM |
| Buck Russel, Union Pacific Railroad | DocuSigned by: 5E9CD33662BE40A... | Sent: 7/24/2017 2:19:00 PM<br>Viewed: 7/25/2017 1:50:08 PM<br>Signed: 7/25/2017 1:51:14 PM |
| Caroline Love, Texas DMV | DocuSigned by: B27789472638400... | Sent: 7/24/2017 2:18:58 PM<br>Viewed: 7/26/2017 1:33:06 PM<br>Signed: 7/26/2017 1:33:59 PM |
| David Slayton, Texas Office of Court Administration | DocuSigned by: David Slayton, Texas Office of Court Administration 0167081079994E... | Sent: 7/24/2017 2:19:00 PM<br>Viewed: 7/24/2017 2:23:24 PM<br>Signed: 7/24/2017 2:26:28 PM |
| Frank Dixon, Austin Police Department | DocuSigned by: 9F5682C9AA4A44D... | Sent: 7/24/2017 2:18:53 PM<br>Viewed: 7/26/2017 10:15:48 AM<br>Signed: 7/26/2017 10:24:56 AM |
| Hope Lochridge, Texas Municipal Courts Education Center | DocuSigned by: 048E2CBB83724D2... | Sent: 7/24/2017 2:18:57 PM<br>Viewed: 7/26/2017 4:08:02 PM<br>Signed: 7/26/2017 4:11:51 PM |
| Isidro Martinez, Alamo Area MPO | DocuSigned by: Isidro Martinez, Alamo Area MPO 834F5E8CED074B1... | Sent: 7/24/2017 2:18:58 PM<br>Viewed: 7/26/2017 10:00:05 AM<br>Signed: 7/26/2017 10:00:54 AM |
| James Beauchamp, MOTRAN | DocuSigned by: James Beauchamp DC59B0BA5F4C4AB... | Sent: 7/24/2017 2:18:50 PM<br>Viewed: 7/26/2017 11:15:46 AM<br>Signed: 7/26/2017 3:36:24 PM |
| Mark Atkinson, Texas Center for the Judiciary | DocuSigned by: Mark D. Atkinson 7E4260A2B60740E... | Sent: 7/24/2017 2:18:49 PM<br>Viewed: 7/26/2017 9:53:40 AM<br>Signed: 7/26/2017 10:03:38 AM |
| Melanie Twehues, FHWA | DocuSigned by: Melanie Twehues, FHWA C13AEBB963114B0... | Sent: 7/24/2017 2:19:02 PM<br>Viewed: 7/24/2017 6:28:18 PM<br>Signed: 7/25/2017 11:22:23 AM |
| ReaDonnna Jones, Texarkana MPO | DocuSigned by: ReaDonnna Jones, Texarkana MPO 96963FE235CA429... | Sent: 7/24/2017 2:18:56 PM<br>Viewed: 7/25/2017 5:01:58 PM<br>Signed: 7/25/2017 5:30:41 PM |
| Samuel Sinclair, NHTSA | DocuSigned by: Samuel Sinclair, NHTSA 3138CD37E2BE42C... | Sent: 7/24/2017 2:19:00 PM<br>Viewed: 7/25/2017 8:47:30 AM<br>Signed: 7/25/2017 8:49:08 AM |

# APPENDIX B: EXECUTIVE COMMITTEE SIGNATURES

| | | |
|---|---|---|
| Tony Vasquez, Texas Assoc. of County Engineers and Road Administrators | DocuSigned by: 786265C45B644EF... | Sent: 7/24/2017 2:19:02 PM<br>Viewed: 7/25/2017 7:51:14 AM<br>Signed: 7/25/2017 7:53:32 AM |
| Whitney Brewster, Texas Department of Motor Vehicles | DocuSigned by: 80A56EAAD12A422... | Sent: 7/24/2017 2:18:51 PM<br>Viewed: 7/27/2017 6:12:14 AM<br>Signed: 7/27/2017 6:26:36 AM |
| William R. Stockton, TTI | DocuSigned by: William R. Stockton, TTI 70EF36DA88B641A... | Sent: 7/24/2017 2:19:00 PM<br>Viewed: 7/24/2017 2:22:48 PM<br>Signed: 7/24/2017 2:23:32 PM |
| Dan Dao, MPH - DSHS | DocuSigned by: 632C10999BB34D5... | Sent: 7/26/2017 9:52:34 AM<br>Viewed: 7/26/2017 9:56:20 AM<br>Signed: 7/26/2017 9:58:50 AM |
| Jeff Pollack, Corpus Christi MPO | DocuSigned by: 4E97C381FB4449C... | Sent: 7/25/2017 4:18:25 PM<br>Viewed: 7/25/2017 4:19:29 PM<br>Signed: 7/25/2017 4:20:48 PM |


# Appendix C: Emphasis Area Countermeasures

*Strategies and Countermeasures for the Distracted Driving Emphasis Area.*

| Strategy #1 | Reduce fatalities and serious injuries by identifying and implementing education and awareness strategies to reduce distracted driving |
|---|---|
| ***Countermeasures and Programs:*** | |
| 1a | Develop and document a suite of countermeasures targeting distracted road users by age group. |
| 1b | Educate the consumers, parents, and the public with age-specific messages about car technology and safety options (e.g., mycardoeswhat.org) through car dealers, the media, and employers. |
| 1c | Educate the public with age-specific messages (pre-teen to adult) about the dangers of distracted driving through the media, schools, car dealers, community events, and employers. |
| 1d | Educate public officials and employers about the human and economic costs of distracted driving through outreach programs. |
| 1e | Educate the public with age-specific messages on tools to encourage distraction-free driving (apps, technology, programs) through outreach programs. Examples: Inform adults/parents on tools they can use to limit teen cell phone use while driving. Educate consumers on apps that will disable phones while in a vehicle. |
| 1f | Inform members of the judiciary branch about tools that limit cell phone use and training programs such as Impact Texas Teen Drivers and the Texas Municipal Police Association/TxDOT adult course. Encourage voluntary participation in these courses. |
| 1g | Consider using teens to conduct a public survey to determine level of support for laws restricting distracted driving. |
| 1h | Inform teen drivers about cell phone, texting, and other restrictions under the Texas Graduated Driver Licensing law. |
| 1i | Continue to implement Impact Texas Teen Drivers, an informational tool (2-hour video) designed to educate teens on the dangers of distracted driving. |
| 1j | Target messages to people from other states who move to Texas. |
| 1k | Encourage transit use to avoid distracted driving. |

| Strategy #2 | Improve the effectiveness of distracted road user educational techniques, tools, and strategies |
|---|---|
| ***Countermeasures and Programs:*** | |
| 2a | Test the efficacy of current and future messaging with different age groups to determine which types are effective. |
| 2b | Use age, behavior, and citation data to target messages to specific classes of violators. |
| 2c | Test the effectiveness of using personal stories/tragedies to impact teens and middle school students' behaviors when distracted driving. |
| 2d | Use crash data to target locations for media buys and other distracted driving education and awareness campaign methods. |

| Strategy #3 | Improve and increase enforcement capabilities for addressing distracted driving |
|---|---|
| ***Countermeasures and Programs:*** | |
| 3a | Use Selective Traffic Enforcement Program (STEP) grants and high visibility enforcement techniques to enforce distracted driving state laws and local ordinances. |
| 3b | Use crash data to determine the deployment of distracted driving STEP grants. |
| 3c | Encourage law enforcement personnel to track cell phone use where appropriate state laws and local ordinances do not support a citation; provide distracted driving educational tools for law enforcement. |
| 3d | Catalogue and disseminate state laws and local ordinances on distracted driving. |
| 3e | Encourage the use of phone records to identify and document distracted driving as a contributing crash factor and encourage the use of the narrative to provide additional details. |
| 3f | Encourage adoption of the Model Minimum Uniform Crash Criteria recommendations on distracted driving. |
| 3g | Identify and disseminate model distracted driving policies for law enforcement agencies. |
| 3h | Identify and catalogue strategies used by the judiciary to educate violators on the dangers of distracted driving and effective methods for changing behavior. |

| Strategy #4 | Increase the installation of engineering countermeasures known to reduce distracted driving |
|---|---|
| ***Countermeasures and Programs:*** | |
| 4a | Identify and systemically implement engineering countermeasures known to reduce distracted driving, such as edge line, centerline and transverse rumble strips, wider and brighter striping, and lighting especially in areas associated with distracted driving crashes. |
| 4b | Use network screening techniques to identify distracted driving crash sites and appropriate countermeasures for systemic installation across Texas. |

| Strategy #5 | Use technology to reduce distracted driving crashes, serious injuries, and fatalities |
|---|---|
| ***Countermeasures and Programs:*** | |
| 5a | Test and implement apps to encourage distraction-free driving or discourage distracted driving. |
| 5b | Encourage employers to adapt company vehicles to include the safe-driving apps and encourage use in private employee vehicles. |
| 5c | Team with the National Safety Council to become informed about and use the technology for tracking employee cell phone use while driving. |

# APPENDIX C: EMPHASIS AREA COUNTERMEASURES

*Strategies and Countermeasures for the Impaired Driving Emphasis Area.*

| **Strategy #1** | **Use data systems to identify alcohol licensed and permitted locations within a community and Alcoholic Beverage Code violation history at these locations to determine any correlation with alcohol related crashes** |
|---|---|
| ***Countermeasures and Programs:*** | |
| 1a | Develop and maintain data to identify correlations between impaired driving crashes and citations, road type, corridor, region, county and community and Texas Alcohol Beverage Control licensing data. |
| 1b | Track frequent driving under the influence (DUI) offenders to identify and address persons with multiple impaired driving arrests and/or crashes. Pursue more intensive interventions. |
| 1c | Partner, where possible, with community groups and task forces to promote a comprehensive action plan to determine and address community hot spots. |

| **Strategy #2** | **Increase education for all road users on the impact of impaired driving and its prevention** |
|---|---|
| ***Countermeasures and Programs:*** | |
| 2a | Identify gaps in knowledge with respect to the impact of illegal behaviors (e.g., specifically prescription drugs, marijuana and substances other than alcohol) on road safety. |
| 2b | Identify gaps in knowledge on the negative consequences of traffic violations among road users (e.g., fines, loss of license, effects of criminal record on future employment). |
| 2c | Demonstrate to all road users the magnitude of the impact of impaired driving crashes on fatality rates by making comparisons with other causes of death (e.g., murder rate). |
| 2d | Demonstrate to all road users the magnitude of the cost and liability exposure associated with impaired driving crashes resulting in injury and/or fatality. |
| 2e | Educate medical professionals to inform patients of the effects of medications on the ability to drive or operate heavy machinery. |
| 2f | Identify the gaps in knowledge of judges and prosecutors about impaired driving and provide messaging or training to close the gaps. |
| 2g | Educate emergency medical professionals about the changes in the Blood Test law, which has been modified from the option to refuse format. |

| **Strategy #3** | **Increase officer contacts with impaired drivers through regular traffic enforcement** |
|---|---|
| ***Countermeasures and Programs:*** | |
| 3a | Educate the police, community leaders, public, and traffic safety partners on the role of regular traffic enforcement as a primary tool in detecting impaired drivers. |
| 3b | Use a data driven approach to optimize areas and times for enforcement. |
| 3c | Identify trends in DUI arrests and compare the data to trends in citations and crashes. |
| 3d | Identify training gaps for police on locations with a high probability for alcohol and drug use that lead to impaired driving (e.g., breaking up/preventing underage drinking parties). |
| 3e | Encourage motorists to safely report potential impaired drivers to law enforcement. |
| 3f | Research and identify strategies to streamline the system of processing impaired drivers. |
| 3g | Conduct surveys to assess public support for sobriety checkpoints and enhanced impaired driving penalties; develop a report on the survey results and impaired driving countermeasure effectiveness; and share the reports with lawmakers and the public. |

| Strategy #4 | Improve mobility options for impaired road users |
|---|---|
| ***Countermeasures and Programs:*** | |
| 4a | Educate the public and community leaders on methods for identifying mobility options at the community level. |
| 4b | Create local task forces to identify local actions. |
| 4c | Promote trip planning, including designated drivers, public transportation, taxis, and alternate transportation service companies. |

| Strategy #5 | Increase data, training, and resources for prosecutors and officers in the area of drugged driving |
|---|---|
| ***Countermeasures and Programs:*** | |
| 5a | Develop training for prosecutors and regular patrol officers on detecting and prosecuting drugged drivers. |
| 5b | Develop joint training for prosecutors and laboratory personnel (Forensic Toxicologist) to assist in presenting scientific evidence of drug impairment in court. |
| 5c | Continue and increase Standardized Field Sobriety Testing (SFST), Advanced Roadside Impaired Driving Enforcement, and Drug Recognition Evaluator (DRE) training. |
| 5d | Identify methodologies and resources for improving the identification of drugged driving as a contributing factor in impaired driving crashes. |
| 5e | Secure additional resources for laboratories. |
| 5f | Continue to monitor the development of roadside drug testing instruments and, as appropriate, investigate deploying them into the field as an additional tool to detect impaired driving. |
| 5g | Encourage adoption of laws that increase penalties for impaired driving. |
| 5h | Encourage adoption of laws that streamline the processing of impaired drivers by law enforcement. |
| 5i | Encourage adoption of laws that allow sobriety checkpoints. |

## *Strategies and Countermeasures for the Intersection Safety Emphasis Area.*[5]

| Strategy #1 | Improve data systems for identifying specific intersections and intersection types at high probability for serious injury crashes |
|---|---|
| ***Countermeasures and Programs:*** | |
| 1a | Create a statewide intersection safety and roadway elements database.<br>(Incorporate Model Inventory of Roadway Elements format, create a standardized data structure to support GIS applications, create an app for data collection, develop partnerships between TxDOT, MPOs, and local agencies to populate the database, and develop and implement an intersection identifier system for posting at intersections). |

| Strategy #2 | Consider alternative design strategies for improving intersection safety |
|---|---|
| ***Countermeasures and Programs:*** | |
| 2a | Construct roundabouts and create an outreach program to educate the public and public officials about roundabout advantages and safety benefits. |
| 2b | Convert signalized intersections to diverging left intersections. |
| 2c | Encourage use of the Intersection Control Evaluation process for use in project development by TxDOT and local agencies—develop case studies, provide training, and conduct outreach. |

| Strategy #3 | Improve pedestrian safety at intersections with high probability of crashes |
|---|---|
| ***Countermeasures and Programs:*** | |
| 3a | Develop methods to identify and target high pedestrian crash probability locations:<br>Systemic methods (i.e., based on characteristics) and screening for locations with above average crash experience. |
| 3b | At targeted intersections:<br>Prohibit right on red and permissive left turns at high probability locations, install/improve pedestrian signals, pedestrian crosswalks, lighting, and/or high friction surface treatment on intersection approaches, and ensure pedestrian signals, push buttons, crosswalk markings, etc. meet current requirements or upgrade to current requirements, including signal timing. |
| 3c | Install low to medium cost improvements to increase pedestrian safety:<br>Eliminate free flow turn lanes or convert them to angled turn lanes that require stopping/yielding, add turn islands and median islands and curb bulb outs, convert permissive only or protected permissive phasing to protected only (when pedestrian is present or during active times of day), provide enhanced measures—rectangular rapid flash beacon, pedestrian hybrid beacon, lighting, etc. at uncontrolled high risk locations, and pedestrian islands. |

[5] All intersection strategies and countermeasures should consider the needs of persons with disabilities.

| Strategy #4 | Increase driver awareness of intersections |
|---|---|
| ***Countermeasures and Programs:*** | |
| 4a | Develop Texas specific resources on the use of specific countermeasures, based on roadway types, system ownerships, rural/urban character, etc. as a guide to practitioners. |
| 4b | Install driver speed feedback signs in advance of intersections. |
| 4c | Implement current Texas Intersection Safety Implementation Plan to prepare for the next iteration of the HSIP. |

| Strategy #5 | Develop educational campaigns incorporating data analysis to improve intersection safety. |
|---|---|
| ***Countermeasures and Programs:*** | |
| 5a | Publicize high crash locations and point out the contributing crash factors (e.g., red light running, speeding impaired driving, texting, phone use). |
| 5b | Increase and renew emphasis on safe driving behaviors in driver education. |
| 5c | Create info graphics and other social media friendly information. |
| 5d | Develop and implement a young driver educational campaign relating to signalized intersections. |

| Strategy #6 | Reduce red light running |
|---|---|
| ***Countermeasures and Programs:*** | |
| 6a | Use targeted enforcement at high incident locations. |
| 6b | Research, identify, and address the factors contributing to the trend of reduced law enforcement citations for intersection violations. |
| 6c | Educate decision makers and the public on the effectiveness and appropriate use of automated enforcement. |
| 6d | Install automated red light enforcement cameras. |
| 6e | Improve traffic signal timing and interconnect signals to improve efficient traffic flow and encourage a safe travel speed. |
| 6f | Install red light indicator (in most cases, white) lights to inform law enforcement of red signal onset. |

*Strategies and Countermeasures for the Older Road Users Emphasis Area.*[6]

| Strategy #1 | Reduce wrong way crashes |
|---|---|
| ***Countermeasures and Programs:*** | |
| 1a | Track and disseminate the results of wrong way crash mitigation programs around the state. |
| 1b | Install wrong way driver warning signs, pavement markings, and advanced technology to detect and warn wrong way drivers. |
| 1c | Address high speed intersections with medians where drivers are likely to turn into oncoming traffic. |

| Strategy #2 | Design and operate roadways to meet the needs of older road users |
|---|---|
| ***Countermeasures and Programs:*** | |
| 2a | Implement strategies and standards included in the Human Factors Guide and the Handbook for Designing Roadways for the Aging Population broadly across Texas. Specifically adopt as standard practice: Turn lane channelization, offset left-turn lanes, edge line and curb delineation, left-turn traffic control for signalized intersections (protected left turn phases), advance street name signs, particularly at three-legged intersections and locations with a relatively large annual average daily traffic or a large expected number of crashes, larger signs, advance warning signs, overhead lane assignment on intersection approach, and improved signal head visibility. |
| 2b | Adopt Safe System (Vision Zero) and Complete Streets approaches that benefit older road users when designing and operating roadways. |
| 2c | Continue to investigate the effectiveness of intersection geometric features (e.g., channelization, island size, lane width) related to older driver and pedestrian safety. |
| 2d | Encourage developers to work with law enforcement to proactively mitigate potential crash hazards for older motorists and pedestrians when building or expanding commercial developments based on the FHWA aging population guidance. |
| 2e | Bring FHWA and National Highway Institute training courses on the Handbook for Designing Roadways for the Aging Population and Human Factors Guidelines to TxDOT districts, MPOs, and city engineering audiences. |

[6]All older road users strategies and countermeasures should consider the needs of persons with disabilities.

| Strategy #3 | Implement effective methods and tools to prepare older road users to deal with the limitations brought on by the aging process |
|---|---|
| ***Countermeasures and Programs:*** | |
| 3a | Identify resources and disseminate the information to increase older road user safety knowledge and awareness (AAA, AARP, Hartford Insurance, Hillcrest Medical Center caregiver-focused mature driver program, and the Fort Worth Blue Zone). |
| 3b | Initiate a pilot program designed to test a smartphone-based application that provides real-time information and warnings to older road users. |
| 3c | Implement CarFit, an educational program that offers older adults the opportunity to check how well their personal vehicles fit them. |
| 3d | Encourage participation by older road users in the education and training opportunities, such as AARP Smart Driver™. |
| 3e | Encourage adoption of a law requiring periodic driver licensing tests for adults.<br>Educate and encourage medical professionals to discuss driving ability especially as it relates to post-surgery, specific medications, and general aging. |

| Strategy #4 | Improve mobility options for older road users |
|---|---|
| ***Countermeasures and Programs:*** | |
| 4a | Create regional clearinghouses on mobility options available to older road users and educate the public on methods for identifying mobility options at the community level. |
| 4b | Identify current and recommended strategies for improving older person mobility in rural communities. |
| 4c | Fund research on ways to encourage use of mobility options other than driving (including transit and transportation network companies) by older drivers. |

| Strategy #5 | Implement methods to reduce injury severity among older road users |
|---|---|
| ***Countermeasures and Programs:*** | |
| 5a | Adopt a Safe System (Vision Zero) approach to reduce the consequences of human error. |
| 5b | Educate older drivers on vehicle safety technologies, vehicle safety systems, and after-market products useful for reducing injuries due to traffic incidences (Pilot test providing vehicle safety system information from the My Car Does What program in one or more motor vehicle offices). |
| 5c | Provide incentives for purchase of vehicles with enhanced safety features. |
| 5d | Determine older road users safety belt use from TxDOT surveys and conduct a targeted campaign explaining the benefits of safety belt use. |
| 5e | Work with Texas Automobile Dealers Association to educate older vehicle purchasers on vehicle safety technologies and provide incentives for purchasing safer vehicles. |

## *Strategies and Countermeasures for the Pedestrian Safety Emphasis Area.*[7]

| Strategy #1 | Improve driver and pedestrian safety awareness and behavior |
|---|---|
| ***Countermeasures and Programs:*** | |
| 1a | Educate motorists on appropriate actions if they become stranded on a freeway or high speed roadway to reduce crashes with unintended pedestrians on high speed roadways (stay in the vehicle, call for help, Steer It and Clear It). |
| 1b | Consider policies for moving over and encourage motorists to move over away from stranded cars and roadside pedestrians (Safe Passing Law).<br>Examples: expansion of the Move Over/Slow Down Law, safe passing laws such as the San Antonio ordinance and proposed statewide legislation. |
| 1c | Improve driver awareness of pedestrians.<br>Examples: Look Right and Yield to Pedestrian Campaign, Square Your Turns, Rock and Roll in the seat to see pedestrians and bicyclists; educational videos about laws on yielding to pedestrians in crosswalks, targeted education by location, demographics, and other factors. |
| 1d | Reduce crashes involving impaired and distracted pedestrians (Adapt impaired driving messages to impaired walking and biking). |
| 1e | Implement a campaign about drugged, drunk walking. Identify alternatives to impaired walking such as transit, taxis, and transportation network companies (e.g., Uber/Lyft). Work with Teens in the Driver's Seat (high school age program) and U in the Driver's Seat (college-age program) to create awareness around walking and biking issues for young drivers and pedestrians. |
| 1f | Incorporate pedestrian issues into driver testing and defensive driving courses. |

[7] All pedestrian strategies and countermeasures should consider the needs of persons with disabilities.

| Strategy #2 | Reduce pedestrian crashes on urban arterials and local roadways |
|---|---|
| ***Countermeasures and Programs:*** | |
| 2a | Research the distance needed between safe pedestrian crossings:<br>Develop criteria for the maximum desirable distances between safe crossing opportunities for different roadway classifications. Use FHWA materials on Safe Transportation for Every Pedestrian; level of service calculations for all users at signalized intersection and retrofit locations to increase safety (narrowing, speed management treatments). |
| 2b | Encourage use of pedestrian compatible target speeds for the design of arterial, collector, and local roadways. |
| 2c | Implement raised crosswalks at high pedestrian activity locations (Include: right turn channelization roadways, midblock crossings, and on the approach/departure lanes of roundabouts). |
| 2d | Use leading or exclusive pedestrian intervals at signalized intersections (i.e., pedestrian walk signals activate prior to parallel green), at high pedestrian use signaled intersections, and pedestrian push button locations. |
| 2e | Develop and implement a program to assist cities and other agencies to develop policies and implement projects that address common pedestrian crash types (shorten crossing distances, provide complete sidewalk networks, provide enhanced crossing devices, median islands, etc.). |
| 2f | Disseminate information/training on effectiveness/appropriateness of pedestrian traffic control measures.<br>Examples: pedestrian hybrid beacons, rectangular rapid flash beacon; determine effectiveness of lights embedded in the crosswalk that flash while crossing. |
| 2g | Disseminate information on the connection between urban form (driveway density, setbacks, pedestrian scale frontage, roadway design speeds, etc.) and safety outcomes. Encourage incorporation into local land use planning and review. |
| 2h | Disseminate information on FHWA's Every Day Counts Safe Transportation for Every Pedestrian for countermeasures for improving pedestrian safety. |

| Strategy #3 | Improve pedestrians' visibility at crossing locations |
|---|---|
| ***Countermeasures and Programs:*** | |
| 3a | Improve nighttime visibility of pedestrians.<br>Examples: use of visible/reflective clothing by pedestrians, pedestrian-illuminating lighting on urban corridors, midblock crosswalk lighting in accordance with FHWA guidance, smart lighting to illuminate when pedestrians are detected, identify target audiences for information dissemination. |
| 3b | Minimize the screening of pedestrians by parked or stopped vehicles, vegetation, and other objects (remove on-street parking, encourage Don't Block the Box campaigns) or add bulb-outs. |
| 3c | Deploy bulb-outs, neckdowns, median islands, parking restrictions, advance yield bars, Z crossings, and associated improvements that allow pedestrians to find refuge from, and visibility to, vehicular traffic. |

| Strategy #4 | Improve pedestrian networks |
|---|---|
| ***Countermeasures and Programs:*** | |
| 4a | Incorporate pedestrian considerations in transportation plans. Prioritize pedestrian safety and considerations for mobility and accessibility in the context of land use and roadway environment. Prioritize improvements to fill gaps in networks and crossings within ¼ mile of bus stops and ½ mile of other mass transportation. |
| 4b | Develop policies to analyze pedestrian levels of service, delay, and network connectivity as part of project development. Develop and disseminate a complete streets policy support guide with model policy and implementation information for local agencies and MPOs. |
| 4c | Ensure opportunities for crossing arterials/highways safely consider the overall pedestrian network and travel desire lines. Consider setting standards or guidelines for the distance between safe crossings given land uses/densities/roadway function. Provide safe crossings of freeways. |
| 4d | Provide appropriate features along the pedestrian network (wide shoulders, sidewalks, pedestrian crossing treatments, pedestrian refuge islands). |
| 4e | Create connected pedestrian networks and remove barriers to pedestrian travel (Pedestrian over/under passes, crossings to overcome physical barriers). |

| Strategy #5 | Improve pedestrian involved crash reporting |
|---|---|
| ***Countermeasures and Programs:*** | |
| 5a | Work to include crash typing in the pedestrian crash reporting. Use the Pedestrian Crash Analysis Tool (PBCAT) for categories on crash typing. |
| 5b | Add fields to the standard crash report form to better define pedestrian crashes and provide additional detail on the specifics of each crash. This includes those needed to use the PBCAT tool and develop law enforcement roll call videos on the need for and uses of pedestrian crash data. |

| Strategy #6 | Establish vehicle operating speeds to decrease crash severity |
|---|---|
| ***Countermeasures and Programs:*** | |
| 6a | Encourage use of target speeds that consider pedestrians, land use, and the roadway context (e.g., a target speed of 35 mph or less on arterials).<br>Other examples: provide design flexibility guidance for techniques to reduce operating speeds on surface streets; encourage use of tree lined medians, bicycle lanes, safe and attractive pedestrian crossings and walkways; support use of traffic calming for local streets. |
| 6b | Design new roadways for a target speed appropriate for the adjacent environment and safety of all users rather than for a design speed intended to maximize motor vehicle speeds. |

| Strategy #7 | Develop strategic pedestrian safety plans tailored to local conditions |
|---|---|
| ***Countermeasures and Programs:*** | |
| 7a | Develop Pedestrian Safety Action Plans (PSAPs) in urbanized areas. |
| 7b | Identify/create funding sources (i.e., match funding, funding barriers).<br>Other examples: identify barriers which limit use to existing funds; allow for systemic approach (based on site characteristics and not crashes) when implementing countermeasures recommended in PSAPs. |

# APPENDIX C: EMPHASIS AREA COUNTERMEASURES

*Strategies and Countermeasures for the Roadway and Lane Departures Emphasis Area.*

| Strategy #1 | Analyze run off the road and head-on crashes and roadway characteristics using the new safety methodologies (e.g., Highway Safety Manual and systemic approaches) |
|---|---|
| ***Countermeasures and Programs:*** | |
| 1a | Improve data systems for targeting locations with a high probability for roadway departure crashes by: road type, geometric characteristics, vehicle type, and area type. |

| Strategy #2 | Keep vehicles from encroaching on the roadside or opposite lane |
|---|---|
| ***Countermeasures and Programs:*** | |
| 2a | Revise roadway configuration to provide additional paved recovery area (e.g., convert four lane roadways to three lane roadways with design features compatible with surrounding land use context). |
| 2b | Provide additional positive guidance (i.e., rumble strips, stripe lines, raised pavement markings, chevrons including LED chevrons, curve delineators, speed feedback signs, edge line and center lines, wider edge lines) and conduct public information campaigns to explain the purpose and how to navigate the roadway safely. |
| 2c | Establish target speeds and use engineering techniques to manage speeds in areas experiencing or susceptible to roadway and lane departures. |
| 2d | Educate drivers about driving around trucks (e.g., avoiding the No Zone). |

| Strategy #3 | Minimize the consequences of vehicles leaving the road |
|---|---|
| ***Countermeasures and Programs:*** | |
| 3a | Implement barriers, median treatments and forgiving roadside objects (e.g., median barriers, safety treat fixed objects, establish safe clear policies, and improve slopes) with consideration given to land use context. |

| Strategy #4 | Minimize the likelihood of crashing in adverse conditions |
|---|---|
| ***Countermeasures and Programs:*** | |
| 4a | Identify locations subject to nighttime crashes.<br>Examples: Develop and use screening and systemic crash analysis tools to identify locations; provide additional roadway delineation; and provide roadway lighting. |
| 4b | Identify and address locations subject to wet weather run off the road crashes. |

| Strategy #5 | Identify and address behavioral characteristics associated with roadway departure |
|---|---|
| ***Countermeasures and Programs:*** | |
| 5a | Develop and implement strategies to encourage drivers to adjust speeds appropriately to roadway conditions: wet weather speed advisories, speed feedback signs, and speed advisories for nighttime conditions. |
| 5b | Provide consistent curve treatments and advisory speeds for similar conditions. |
| 5c | Encourage adoption of laws that allow automated speed enforcement. |
| 5d | Encourage adoption of laws that change medical card requirements for truck drivers. |
| 5e | Encourage adoption of laws that require automated recording systems for trucks to monitor driving hours. |
| 5f | Encourage adoption of truck driver health check-ups and driving restrictions. |

| Strategy #6 | Improve emergency response time in rural areas |
|---|---|
| ***Countermeasures and Programs:*** | |
| 6a | Provide resources to decrease emergency air flight response time. |
| 6b | Provide resources to increase the availability and use of advanced life support equipment to first responders. |
| 6c | Implement measures to provide faster crash notification. |

# APPENDIX C: EMPHASIS AREA COUNTERMEASURES

*Strategies and Countermeasures for the Speeding Emphasis Area.*

| Strategy #1 | Use the concept of establishing target speed limit and road characteristics to reduce speeding |
|---|---|
| ***Countermeasures and Programs:*** | |
| 1a | Encourage use of target speeds for arterial, collector, and local roadways; encourage use of target speeds with pedestrian, land use and roadway context, including options for target speeds of 35 mph or less on arterials and the evaluation of existing speed limits to appropriate target speeds. |
| 1b | Design and redesign roadways for a target speed appropriate for the adjacent environment (see National Association of City Transportation Officials guidelines). Use speed management techniques as described in ITE Urban Thoroughfares report, such as traffic calming, re-designation of road space (road diets) or other redesign for roads with speeding crash problems. |

| Strategy #2 | Educate law enforcement on contributing crash factors to improve crash data collection |
|---|---|
| ***Countermeasures and Programs:*** | |
| 2a | Educate law enforcement on the use of crash data and the need for accurate information. Examples: Encourage periodic training for officers on crash reporting; better define contributing factors in instructions for law enforcement officers; highlight difference between failure to control speed and speeding over the limit. |
| 2b | Ensure law enforcement and crash analysts understand the difference in speeding related contributing factors and their association with statutes when analyzing crash data. |
| 2c | Encourage electronic submission of CR-3 and citations, with features to ensure all fields completed. |
| 2d | Collaborate with law enforcement to explore methods to add estimated speed of vehicles to crash reports (including when vehicles are traveling at or below speed limit). |

| Strategy #3 | Leverage data to improve engineering, education, and enforcement |
|---|---|
| ***Countermeasures and Programs:*** | |
| 3a | Develop a resource center for assisting law enforcement agencies with data driven development, including high crash (especially injury and fatality) mapping and mapping of contributing factors). |
| 3b | Train and encourage law enforcement agencies to make effective use of data to plan and during patrol. |
| 3c | Require STEP grant-funded enforcement programs to be data driven. |
| 3d | Produce a report on the potential crash, death, and serious injury reduction of shifting all surface streets in urban districts under TxDOT control to a lower operating speed, including feeder/frontage roads. |
| 3e | Encourage cities to implement safe design speed demonstration projects in various settings. This could include involving neighborhoods in community-based traffic calming. |
| 3f | Encourage partnerships of agencies with school districts to implement safe streets projects across the state, while also providing the students with knowledge of the crisis of traffic deaths and the potential solutions that modify their behavior and decisions. |

| Strategy #4 | Increase and sustain high visibility speeding enforcement. (Develop, catalogue, and disseminate tools and other resources to improve enforcement capabilities) |
|---|---|
| ***Countermeasures and Programs:*** | |
| 4a | Develop a best practices guide for speed enforcement techniques. |
| 4b | Conduct a pilot program to test the effectiveness and acceptance of automated speed enforcement. |
| 4c | Explore the effectiveness of Dynamic Display Speed Devices. |

| Strategy #5 | Improve the effectiveness of educational techniques, tools, and strategies for speeding (target specific age groups) |
|---|---|
| ***Countermeasures and Programs:*** | |
| 5a | Redesign ticket dismissal courses and driver's education courses to improve driver behavior. |
| 5b | Disseminate information from cities pursuing Vision Zero (e.g., 20 mph vs. 40 mph crash outcomes). |
| 5c | Revisit parent-taught program design and document benefits of certified instructor training. |
| 5d | Educate the public on the difference between posted speed limit, speed design, and safe driving speed. |

# Appendix D: Data Sources and Glossaries

## Data Sources

All crash and casualty data in this document originated from Texas peace officer crash reports, received and processed by TxDOT, as coded in the Crash Records Information System (CRIS). The data used to report targets and provide summary tables for each EA included crashes and casualties coded in CRIS as of April 13, 2017. Because the development of the SHSP began in 2016, earlier editions of CRIS were used to develop descriptive statistics for the emphasis areas included in this report. Crash and casualty frequencies based on crash type and specific driver classifications and/or driver behaviors are dependent on how each of those categories is defined and the specific data codes used. Definitions of the pertinent variables employed are provided below and are stated in terms of crashes. Casualties reported in the SHSP related to the crashes included deaths and serious injuries to all persons involved in a given crash type unless otherwise stated.

## Crash Identification Glossary

| Crash Type & Location Crash | Definition | CRIS Data Codes |
|---|---|---|
| **Run Off the Road Crash—All** | A single vehicle crash where the impact of the first harmful event occurred on the shoulder, beyond the shoulder or in the median of the roadway. | ROAD_RELAT_ID VALUES =<br>2 - Off Roadway, or<br>3 - Shoulder, or<br>4 – Median, and<br>COLLSN_ID =<br>1 - OMV Vehicle Going Straight, or<br>2 - OMV Vehicle Turning Right, or<br>3 - OMV Vehicle Turning Left, or<br>4 - OMV Vehicle Backing, or<br>5 - OMV Other |
| **Run Off the Road Crash—Hit Fixed Object** | A single vehicle crash where the impact of the first harmful event occurred on the shoulder, beyond the shoulder or in the median of the roadway and which resulted from hitting a fixed object. | ROAD_RELAT_ID VALUES =<br>2 - Off Roadway, or<br>3 - Shoulder, or<br>4 - Median, and<br>COLLSN_ID =<br>1 - OMV Vehicle Going Straight, or<br>2 - OMV Vehicle Turning Right, or<br>3 - OMV Vehicle Turning Left, or<br>4 - OMV Vehicle Backing, or<br>5 - OMV Other, and<br>HARM_EVNT_ID =<br>7 - Fixed Object |
| **Run Off the Road Crash—Overturned** | A single vehicle crash where the impact of the first harmful event occurred on the shoulder, beyond the shoulder or in the median of the roadway and which resulted in the vehicle overturning. | ROAD_RELAT_ID VALUES =<br>2 - Off Roadway, or<br>3 - Shoulder, or<br>4 - Median, and<br>COLLSN_ID =<br>1 - OMV Vehicle Going Straight, or<br>2 - OMV Vehicle Turning Right, or<br>3 - OMV Vehicle Turning Left, or<br>4 - OMV Vehicle Backing, or<br>5 - OMV Other, and<br>HARM_EVNT_ID =<br>10 - Overturned |
| **Head On Crash—All** | A crash involving two vehicles going straight, that were traveling in opposite directions prior to impact. | COLLSN_ID =<br>30 - OD Both Going Straight |
| **Head On Crash—Wrong Side, Not Passing** | A crash involving two vehicles going straight that were traveling in opposite directions prior to impact. One of vehicles was on the wrong side of the roadway, but was not passing. | COLLSN_ID =<br>30 - OD Both Going Straight, and<br>CONTRIB_FACTR_ID =<br>70- Wrong Side - Not Passing |

| Crash Type & Location Crash | Definition | CRIS Data Codes |
|---|---|---|
| **Intersection and Intersection Related Crash—All** | A crash that occurs within the boundaries of an intersection or in which the first harmful event occurred on an approach to or exit from an intersection and resulted from an activity, behavior- or control-related to the movement of traffic units through the intersection. | INTRST_RELAT_ID =<br>1 - Intersection, or<br>2 - Intersection Related |
| **Intersection and Intersection Related Crash—Failure to Yield Right of Way** | A crash in which the first harmful event occurred on an approach to or exit from an intersection and resulted from an activity, behavior- or control-related to the movement of traffic units through the intersection and in which at least one vehicle failed to yield right of way. | INTRST_RELAT_ID =<br>1 - Intersection, or<br>2 - Intersection Related), and<br>CONTRIB_FACTR_ID =<br>32 - Failed To Yield Row – Emergency Vehicle, or<br>33 - Failed To Yield Row – Open Intersection, or<br>35 - Failed To Yield Row – Stop Sign, or<br>36 - Failed To Yield Row – To Pedestrian, or<br>37 - Failed To Yield Row – Turning Left, or<br>38 - Failed To Yield Row – Turn On Red, or<br>39 - Failed To Yield Row – Yield Sign |
| **Work Zone Crash** | A crash in a construction zone or other maintenance area, whether or not it was construction related. | CRASH ROAD CONSTRUCTION ZONE FLAG_ID = Y, or<br>CRASH ROAD CONSTRUCTION ZONE WORKER FLAG_ID = Y, or<br>OTHR_ FACTR =<br>49 - Construction Zone - Not Construction Related), or<br>50 - Construction Zone - Construction Related, or<br>51 - Other Maintenance Area - Not Construction Related, or<br>52 - Other Maintenance Area - Construction Related |
| **Railroad Grade Crossing Crash** | A crash at an at-grade railroad/highway crossing, whether or not a train was involved. | CRASH RAILROAD RELATED FLAG ID = Y, or<br>HARM_EVNT = 3 - RR Train, or<br>PHYSICAL FEATURE = 17 – RR Grade Crossing, or<br>OBJECT STRUCK =<br>10 - Hit Train Moving Forward) , or<br>11 - Hit Train Backing), or<br>12 - Hit Train Standing Still, or<br>13 - Hit Train-Action Unknown, or<br>24 - Hit Railroad Signal Pole or Post, or<br>25 - Hit Railroad Crossing Gates |

| System User Crashes | Definition | CRIS Data Codes |
|---|---|---|
| **Older Driver Crash** | A crash involving at least one driver age 65 or older. | Drivers Age ≥ 65 |
| **Young Driver Crash** | A crash involving at least one driver 15–20 years of age. | Drivers Age ≥ 15 and ≤ 20 |
| **Motorcyclist Crash** | A crash involving at least one motorcycle, motor scooter, or moped, includes police motorcycles. Casualties related to motorcyclist crashes are reported for motorcycle operators and passengers only. | VEH_BODY_STYLE_ID =<br>71 - Motorcycle, or<br>90 - Motorcycle Police OR<br>PERSN_TYPE_ID =<br>5 - Driver Of Motorcycle Type Vehicle, or<br>6 - Passenger On Motorcycle Type Vehicle |
| **Bicyclist Crash** | A crash involving at least one bicycle and one motor vehicle. Casualties related to bicyclist crashes are reported for bicyclists only. | HARM_EVNT_ID = 5 - Pedalcyclist, or<br>PERSN_TYPE_ID = 3 - Pedalcyclist |
| **Pedestrian Crash** | A crash involving at least one pedestrian and one motor vehicle. Casualties related to pedestrian crashes are reported for pedestrians only. | HARM_EVNT_ID = 1 - Pedestrian, or<br>PERSN_TYPE_ID = 4 - Pedestrian |
| **Large Truck Crash (formerly Commercial Driver Crash)** | A crash involving at least one large truck, defined as a truck tractor or semi-trailer. | VEH_BODY_STYL_ID =<br>87 - Truck-Tractor, or<br>91 – Semi-Trailer |

| User Behavior Crash | Definition | CRIS Data Code |
|---|---|---|
| **Driving Under the Influence (DUI) of Alcohol or Drugs Crash** | A crash involving at least one driver under the influence of alcohol or other drug. | Unit_Desc_ID =<br>1 - Motor Vehicle, or<br>5 - Motorized Conveyance, or<br>7 – Non Contact<br>AND<br>CONTRIB_FACTR_ID =<br>67 - Under Influence – Alcohol, or<br>45 - Had Been Drinking, or<br>68 - Under Influence – Drug, or<br>62 - Taking Medication, or<br>Unit Alcohol Factor Flag='Y', or<br>Unit Drug Factor Flag='Y', or<br>Driver BAC Positive Count>0, or<br>Driver Drug Positive Count>0 |
| **Speeding Related Crash** | A crash in which at least one driver was speeding above the limit or driving at an unsafe speed below the limit. | CONTRIB_FACTR_ID =<br>60 - Speeding - Unsafe (Under Limit), or<br>61 - Speeding - (Over limit) |
| **Lack of Restraint Use—Unrestrained Casualty** | An injury or death to a vehicle driver or occupant (where restraint usage is known and applicable), involved in any crash, who was not restrained. | PRSN_TYPE_ID =<br>1 – Driver<br>2 – Passenger/Occupant, and<br>REST_ID =<br>8 - None |
| **Distracted Driving** | A crash in which at least one driver was distracted, inattentive, or using a cell phone. | CONTRIB_FACTR_ID =<br>19 – Distraction In Vehicle<br>20 – Driver Inattention<br>72 – Cell/Mobile Phone Use |

## General Glossary with Acronym Definitions

| *Term* | *Definition* | *Acronym* |
|---|---|---|
| **85th percentile Speed** | A speed at or below which 85 percent of people drive at any given location under good weather and visibility conditions may be considered as the maximum safe speed for that location. | |
| **AARP Smart Driver ™** | Online and self-paced refresher course focusing on effective safe driving practices, skills, and strategies you can use on the road every day, state laws and traffic rules, how to deal with aggressive drivers, and proper vehicle maintenance. | |
| **Advanced Life Support Equipment** | First responder equipment beyond the required basic life support equipment. | ALS |
| **Advanced Roadside Impaired Driving Enforcement** | Program that bridges the gap between the SFST and DEC/DRE programs by providing officers with general knowledge related to drug impairment and by promoting the use of DREs in states that have the DEC Program. The program stresses the importance of the signs and symptoms of the seven drug categories. | ARIDE |
| **Advanced Yield Bars** | An advance stop or yield line placed 20 to 50 ft ahead of the crosswalk can greatly reduce the likelihood of a multiple-threat crash at unsignalized midblock crossings. | |
| **Annual Average Daily Traffic** | A measure of how busy a roadway is (the total volume of vehicle traffic of a highway or road for a year divided by 365 day). | AADT |
| **Bicyclist Crash** | A crash involving at least one bicycle and one motor vehicle. Casualties related to bicyclist crashes are reported for bicyclists only. | |
| **Bulb Outs** | A curb extension that extends the sidewalk into the parking lane to narrow the roadway and provide additional pedestrian space at key locations. | |
| **CarFit** | An educational program that offers older adults the opportunity to check how well their personal vehicles fit them. The program also provides information and materials on community-specific resources that could enhance their safety as drivers, and/or increase their mobility in the community. | |
| **CR-3** | Texas Peace Officer's Crash Report Form to be used to report all reportable crashes. | CR-3 |
| **Data-Driven Approaches to Crime and Traffic Safety** | A law enforcement operational model that integrates location-based crash, crime, calls for service and enforcement data to establish effective and efficient methods for deploying law enforcement resources. | DDACTS |
| **Design Speed** | A selected speed used to determine the various geometric features of the roadway. The assumed design speed should be a logical one for the topography, anticipated operating speed, the adjacent land use, and the functional classification of the highway. | |
| **Distracted Driving** | A crash in which at least one driver was distracted, inattentive, or using a cell phone. | |

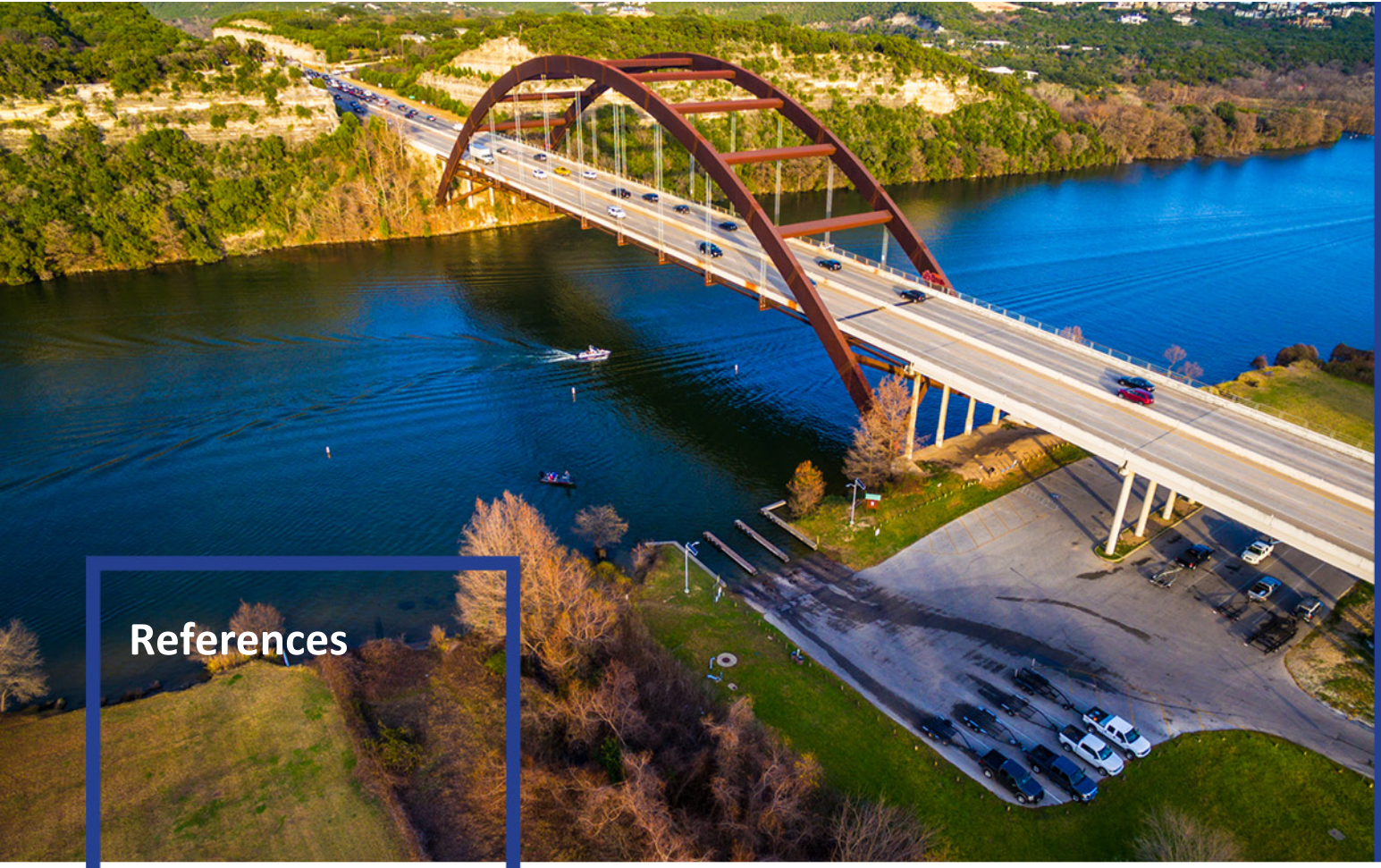
# APPENDIX D: DATA SOURCES AND GLOSSARIES

| *Term* | *Definition* | *Acronym* |
|---|---|---|
| **Driving Under the Influence of Alcohol or Drug Crash** | A crash involving at least one driver under the influence of alcohol or other drug. | DUI |
| **Drug Evaluation and Classification** | A standardized and systematic process to recognize impairment in drivers who are under the influence of drugs other than, or in addition to, alcohol. | DEC |
| **Drug Recognition Evaluator** | A police officer who is trained to recognize impairment in drivers who are under the influence of drugs other than, or in addition to, alcohol. | DRE |
| **Dynamic Display Speed Devices** | Device that measures and displays the speed of vehicles approaching the face of the device. | DDSD |
| **Federal Highway Administration** | An agency within the U.S. Department of Transportation that supports state and local governments in the design, construction, and maintenance of the nation's highway system (Federal Aid Highway Program) and various federally and tribal owned lands (Federal Lands Highway Program). | FHWA |
| **Geographic Information System** | A system designed to capture, store, manipulate, analyze, manage, and present spatial or geographic data. | GIS |
| **Head-on Crash** | A crash involving two vehicles going straight, that were traveling in opposite directions prior to impact. | |
| **High Risk Rural Road** | A high risk rural road is defined as any rural major collector, minor collector or local road with a crash risk classified as high or very high using the crash rate and ADT ranges identified in the Highway Safety Improvement Program Screening Tool developed in TxDOT project: 58-7XXIA001 *23*. | HRRR |
| **Highway Safety Improvement Program** | A core federal-aid program with the purpose to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-state-owned roads and roads on tribal land. | HSIP |
| **Impact Texas Teen Drivers** | An eight-part video that explains with hard facts the dangers of distracted driving along with real life stories of teens that have lost their life from distracted driving. | ITTD |
| **Institute of Transportation Engineers** | An international membership association of transportation professionals who work to improve mobility and safety for all transportation system users and help build smart and livable communities. | ITE |
| **Intersection and Intersection Related Crash** | A crash that occurs within the boundaries of an intersection or in which the first harmful event occurred on an approach to or exit from an intersection and resulted from an activity, behavior- or control-related to the movement of traffic units through the intersection. | |
| **Intersection Control Evaluation process** | The process and framework to provide a more balanced or holistic approach to the consideration and selection of access strategies and concepts during transportation planning, project identification and initiation processes that contemplate the addition, expansion or full control of major intersections. | ICE |
| **Intersection Safety Implementation Plan** | Plan that provides the specifics on countermeasures, actions, key steps, schedules, and investments needed to significantly improve intersection safety. | ISIP |

| Term | Definition | Acronym |
|---|---|---|
| **Lack of Restraint Use – Unrestrained Casualty** | An injury or death to a vehicle driver or occupant (where restraint usage is known and applicable), involved in any crash, who was not restrained. | |
| **Large Truck Crash** | A crash involving at least one large truck, defined as a truck tractor or semi-trailer. | |
| **Leading Pedestrian Intervals** | A 3- to 10-second pedestrian-only phase within a signalized intersection timing schedule that gives pedestrians a head start over cars going in the same direction or turning across the pedestrians' paths. | |
| **Metropolitan Planning Organization** | A local decision-making body that is responsible for overseeing the metropolitan transportation planning process. | MPO |
| **Model Minimum Uniform Crash Criteria Guideline** | A minimum, standardized data set for describing motor vehicle crashes and the vehicles, persons, and environment involved. | MMUCC |
| **Motorcyclist Crash** | A crash involving at least one motorcycle, motor scooter, or moped, includes police motorcycles. Casualties related to motorcyclist crashes are reported for motorcycle operators and passengers only. | |
| **National Association of City Transportation Officials** | A 501(c)(3) non-profit association with mission is to build cities as places for people, with safe, sustainable, accessible and equitable transportation choices that support a strong economy and vibrant quality of life (Nacto.org). | NACTO |
| **National Highway Institute** | The training and education arm of FHWA. | NHI |
| **Offset Left-Turn Lanes** | Alignment that places the vehicles waiting to make a left turn as far to the left as practical, maximizing the offset between the opposing left-turn lanes, providing improved visibility of opposing through traffic. | |
| **Older Driver Crash** | A crash involving at least one driver age 65 or older. | |
| **Pedestrian and Bicycle Crash Analysis Tool** | A software product intended to assist state and local pedestrian and bicycle coordinators, planners, and engineers with this problem. | PBCAT |
| **Pedestrian Crash** | A crash involving at least one pedestrian and one motor vehicle. Casualties related to pedestrian crashes are reported for pedestrians only. | |
| **Pedestrian Hybrid Beacon** | A pedestrian-activated warning device located on the roadside or on mast arms over midblock pedestrian crossings (also known as the High intensity Activated crossWalK [or HAWK]). | PHB |
| **Pedestrian Island** | A space between roadways where pedestrians can await a break in vehicular traffic | |
| **Pedestrian Safety Action Plan** | A plan developed by community stakeholders that is intended to improve pedestrian safety in the community. | PSAP |
| **Railroad Grade Crossing Crash** | A crash at an at-grade railroad/highway crossing, whether or not a train was involved. | |

| Term | Definition | Acronym |
|---|---|---|
| **Raised Crosswalks** | A traffic calming measure that involves extending the sidewalk across the road and bringing motor vehicles to the pedestrian level. | |
| **Rectangular Rapid Flash Beacon** | User-actuated amber LEDs that supplement warning signs at unsignalized intersections or mid-block crosswalks. | RRFB |
| **Run Off the Road Crash** | A single vehicle crash where the impact of the first harmful event occurred on the shoulder, beyond the shoulder or in the median of the roadway. | ROR |
| **Safe Clear Policies** | Policies to reduce traffic congestion and to make freeways safer by removing vehicles that are stalled due to any reason. | |
| **Selective Traffic Enforcement Program** | Projects reimburse for overtime activities by local law enforcement to reduce the incidence of speeding, failure to use occupant restraint systems, intersection traffic control violations, driving while intoxicated, and/or driving under the influence of alcohol by a minor, and enforcement of state and local ordinances on cellular and texting devices. | STEP |
| **Speeding Related Crash** | A crash in which at least one driver was speeding above the limit or driving at an unsafe speed below the limit. | |
| **Standardized Field Sobriety Testing** | Three tests administered and evaluated in a standardized manner by law enforcement officers at roadside to assist them in making an arrest decision. Horizontal gaze nystagmus is an involuntary jerking of the eyes that occurs as the eyes move to the side. When a person has consumed alcohol, nystagmus is exaggerated and may occur at lesser angles depending on the degree of impairment. The Walk and Turn and One-Leg Stand tests require a person to listen to and follow instructions while performing simple physical movements. Since these tests are alcohol sensitive, impaired persons have difficulty with these divided attention tasks. During the tests, officers observe and record clues that are indicators of impairment. | SFST |
| **Strategic Highway Safety Plan** | A statewide-coordinated safety plan that provides a comprehensive framework for reducing highway fatalities and serious injuries on all public roads. | SHSP |
| **Target Speed** | A selected speed used to determine the various geometric features of the roadway that will encourage drivers to drive at the selected speed. | |
| **Texas Alcohol Beverage Commission** | State agency that regulates all phases of the alcoholic beverage industry in Texas. The duties of the commission include regulating sales, taxation, importation, manufacturing, transporting, and advertising of alcoholic beverages. | TABC |
| **Texas Department of Transportation** | State agency responsible for the construction and maintenance of the state's highway system and overseeing aviation, rail and public transportation. It is comprised of 25 geographical districts and 34 divisions. | TxDOT |
| **Texas District of the Institute of Transportation Engineers** | Texas division of the international membership association of transportation professionals who work to improve mobility and safety for all transportation system users and help build smart and livable communities. | TexITE |
| **Texas Municipal Police Association** | Organization to protect the rights and interest of Texas law enforcement officers by providing the best legal assistance in the country, effective lobbying at state and local levels, affordable training, and exemplary member support. | TMPA |
| **Texas A&M Transportation Institute** | One of the premier higher education-affiliated transportation research agencies in the nation. TTI develops solutions to the problems and challenges facing all modes of transportation. | TTI |

| *Term* | *Definition* | *Acronym* |
|---|---|---|
| **Vision Zero** | A multinational road traffic safety project that aims to achieve a highway system with no fatalities or serious injuries in road traffic. | |
| **Work Zone Crash** | A crash in a construction zone or other maintenance area, whether or not it was construction related. | |
| **Young Driver Crash** | A crash involving at least one driver 15–20 years of age. | |
| **Z Crossings** | An at-grade channel in median at a 45° angle toward advancing traffic to encourage pedestrians to look for oncoming traffic. | |



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