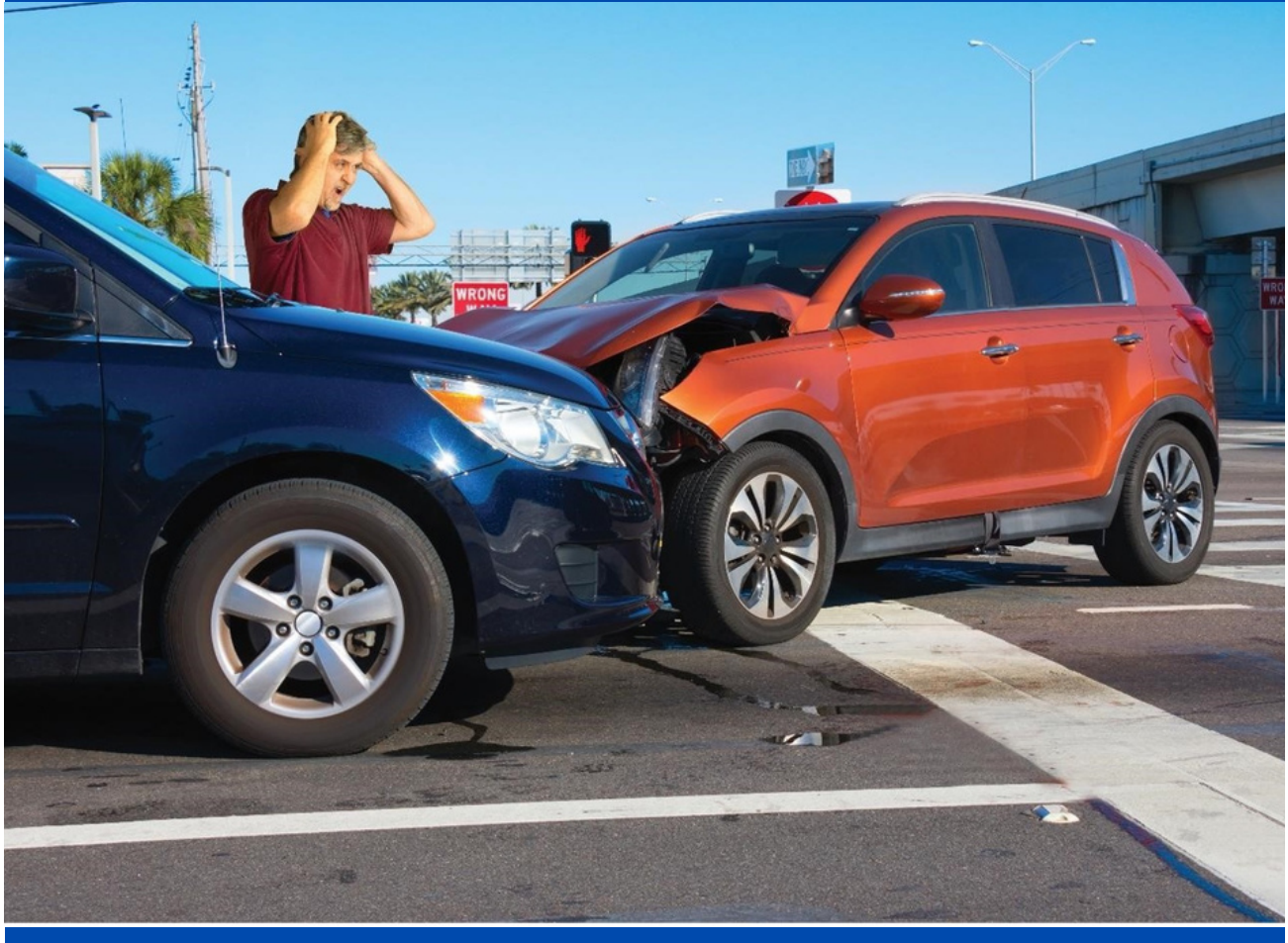
TEXAS SHSP

Intersection Safety Emphasis Area



2022 – 2027

TEXAS TOGETHER

on the Road to Zero

The development of the *Texas Strategic Highway Safety Plan* was led by the Traffic Safety Division of the Texas Department of Transportation working in conjunction with the Center for Transportation Safety at the Texas A&M Transportation Institute. Hundreds of safety stakeholders from across the state representing local, regional, and state agencies, law enforcement, industry and advocates, engineers, clinicians, and educators actively participated in the process.

Texas Department of Transportation

Save a Life™ Texas Department of Transportation

Center for Transportation Safety
Texas Transportation Institute

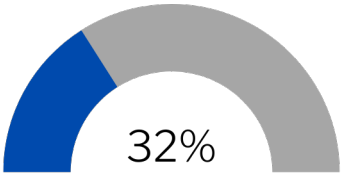
Texas A&M Transportation Institute

Section 6.4 Intersection Safety

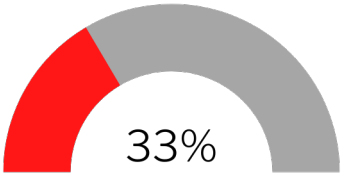
Background

The Federal Highway Administration's The Safe System Approach states that "Humans are unlikely to survive high-speed crashes. Reducing speeds can accommodate human injury tolerances in three ways: reducing impact forces, providing additional time for drivers to stop, and improving visibility." Intersections are a critical area to address based on this assertion.

Intersection Related



% of Total Fatal & Serious Injury Crashes



% of Total Fatal & Serious Injuries

Addressing infrastructure to reduce fatal and suspected serious injury crashes is a primary focus of a Safe System. Intersections are particularly problematic since they not only involve vehicles, but also vulnerable road users such as pedestrians and bicyclists.

A Safe System approach emphasizes the design of an intersection with consideration of human behavior especially in terms of potential driver errors. The focus of this approach is to reduce risk and, subsequently, death and serious injury related to traffic crashes (vehicle occupants, pedestrians, and bicyclists). The EA team considered behavioral countermeasures as well as engineering solutions addressing conflict points, speed reduction, visibility, and space for vulnerable road users. Some of these approaches are also addressed in the speed related and pedestrian EAs.

Overlapping behavioral factors such as speed, distraction, and impairment exacerbate the intersection issue. Although statutes currently prohibit some of the countermeasures proven effective in other states, Texas is addressing intersection safety with infrastructure and behavioral strategies along with assessing potential options for technology-based interventions on the system and in vehicles.

Historical & Trend Crash Data Analysis

The fatal and suspected serious injury crashes related to intersections represents 32% of all crashes. Between 2017 and 2020, intersection crashes were decreasing, but there was a sharp increase in both fatal and suspected serious injury crashes in 2021. It is important to reverse this trend to reach the state goal of zero deaths by 2050. The intersection crashes are illustrated in Figure 6.4.1 and the fatal and suspected serious injuries are summarized in Figure 6.4.2.

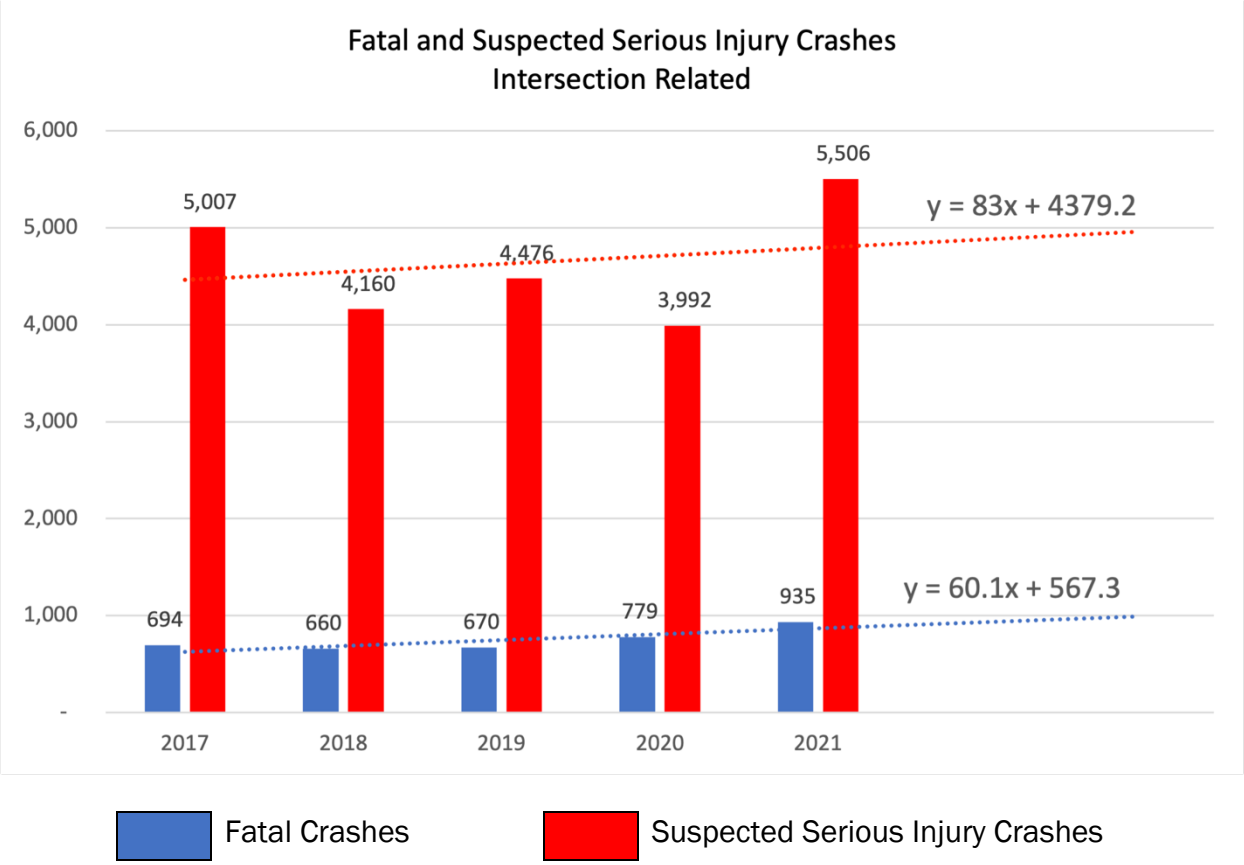


Figure 6.4.1 Intersection EA: Fatal and Suspected Serious Injury Crashes (2017-2021)

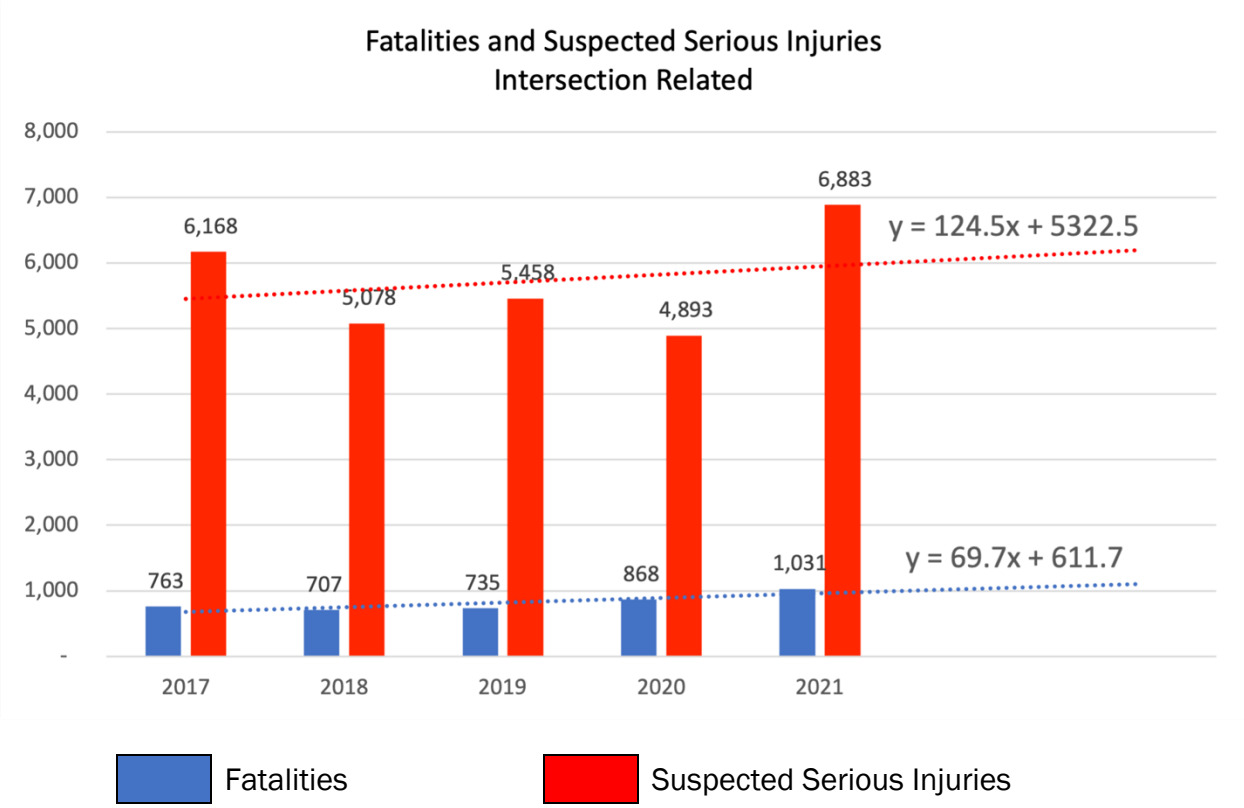
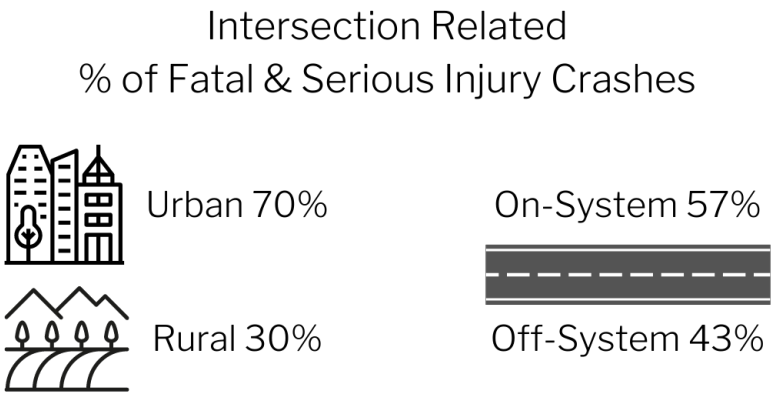


Figure 6.4.2. Intersection EA: Fatal and Suspected Serious Injuries (2017-2021)

Throughout the Strategic Highway Safety Plan (SHSP) process, the Emphasis Area (EA) teams examined the representation of rural and urban as well as on- and off-system in terms of the crash factors associated with the specific EA. Regarding intersection related factors, 70% of the crashes occurred in areas designated as urban while 57% of these types of crashes happened on roadways considered on-system.



Since intersection crashes typically involve at least two vehicles that are frequently entering an intersection from different directions and/or vehicles that are changing directions, it was important to look at crash type. When the EA team discussed the crash data, the EA team was able to consider crash type for the strategy identification and implementation plan development. Angle crashes accounted for 35% and left turn crashes accounted for 28%. These crashes can be a prime opportunity for fatal and serious injury since the struck vehicle receives a side impact.

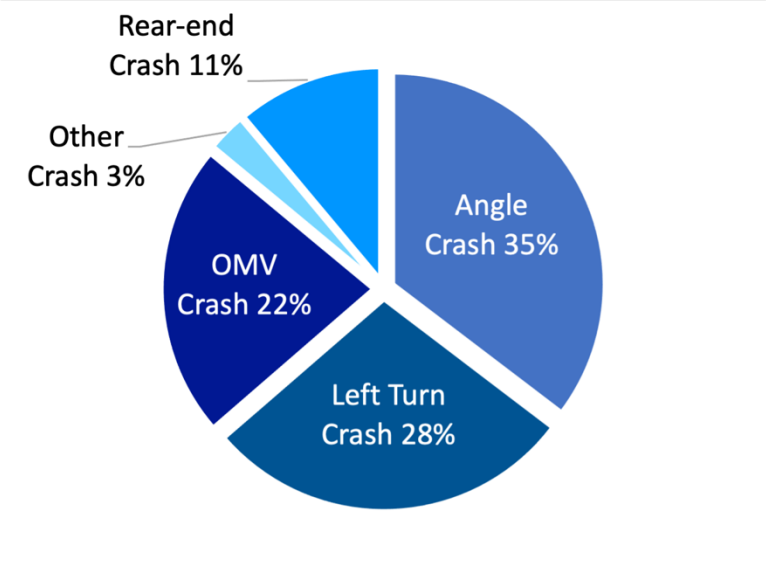


Figure 6.4.4. Intersection EA: Collision Types

From 2017 through 2021, there were 26,879 fatal and suspected serious injury crashes that occurred at intersections. These crashes resulted in 4,404 fatalities and 28,480 additional individuals with suspected serious injuries. Intersections are only a location crash factor. Therefore, other factors likely play a role in intersection. Intersection crashes are a significant part of the traffic safety challenges in Texas and represent 21% of the fatal crashes and 21% of the total fatalities. If the state can address the risk of crashes that occur at intersections, it will have a significant impact on our ability to reach zero deaths. After identifying prevalent crash factors, within intersection crashes, there are several observations that the EA team considered during the identification of strategies and the development of implementation plans. These crash factors include:

- ⇒ 36% (9,561) occurred in dark lighting conditions
  - Of those occurring dark conditions, 11% (1,104) involved a pedestrian
  - Of those occurring dark conditions, 24% (2,280) involved an impaired driver
- ⇒ 16% (4,418) also involved distraction
- ⇒ 23% (6,131) intersection crashes were speed related (over-the-limit, unsafe speed or failure to control speed)
  - 35% (2,133) of speed related crashes at intersections were **rear-end** collisions
  - 18% (1,099) of speed related crashes at intersections were **left-turn** collisions
  - 16% (986) of speed related crashes at intersections were angle collisions

Objective for Emphasis Area

Reduce the frequency of fatal and serious injury crashes associated with intersections through infrastructure improvements and driver behavior modification.

Strategies & Implementation Plans

Strategy 6.4.1 **Expand intersection safety practices through planning, design, and implementation.**

Implementation Action Plan	
6.4.1.1	Evaluate intersection controls. Use ICE and other appropriate evaluation processes in project development by TxDOT and local agencies. Coordinate with MPOs, required for projects within districts & statewide. Identify threshold for requirements.
6.4.1.2	Expand (state and local systems) implementation of low-cost safety improvements at urban and rural intersections.
6.4.1.3	Identify and develop case studies to illustrate best practices and innovative approaches including alternative intersection designs.
6.4.1.4	Provide training to state and local stakeholders including, but not limited to, external webinar on Safety Scoring Tool for Urban Intersections, how to use data dashboards for DES Safety Tools, and road safety planning.
Facilitator(s)	TxDOT, MPOs
Participating Organizations	TxDOT, MPOs, Cities, Counties
Effectiveness	***
Cost to Implement	6.4.1.1 $, 6.4.1.2 $$$, 6.4.1.3 $$, 6.4.1.4 $
Time to Implement	6.4.1.1 Short, 6.4.1.2 Short, 6.4.1.3 Short, 6.4.1.4 Short
Barriers	Lack of funding

Strategy 6.4.2 Reduce intersection violations.

Implementation Action Plan	
6.4.2.1	Train law enforcement agencies on effective techniques to use targeted enforcement at high-volume incident locations. Install signal indicator lights to inform law enforcement of red signal onset.
6.4.2.2	Deploy abbreviated FHWA traffic engineering for law enforcement training. Identify best practices for partnerships between traffic engineering and law enforcement to encourage integrated approach to intersection safety.
6.4.2.3	Develop safety campaigns to educate public on intersection safety including focus on vulnerable road users, older & younger drivers. Employ evidenced based countermeasures focused on those "causing" the risk.
6.4.2.4	Develop case studies to illustrate methods on how to utilize technology to focus on targeted intersections to inform/educate state and local agencies.
6.4.2.5	Improve and expand access to CRIS data through dashboards related to intersection safety.
6.4.2.6	Address signal timing and assess technology - Interconnect traffic signals, optimize traffic signal timings, and/or implement technology to improve traffic flow, encourage safe travel speed and reduce crashes. Identify how we can we better use mature and exploratory data sets to inform the targeting of problematic intersections.

Facilitator(s)	TxDOT (Design Division & Traffic Safety)
Participating Organizations	TxDOT (Design Division & Traffic Safety)
Effectiveness	***
Cost to Implement	6.4.2.1 $, 6.4.2.2 $, 6.4.2.3 $, 6.4.2.4 $, 6.4.2.5 $, 6.4.2.6 $$
Time to Implement	6.4.2.1 Short, 6.4.2.2 Short, 6.4.2.3, Short, 6.4.2.4, Short, 6.4.2.5 Short, 6.4.2.6 Medium
Barriers	Lack of funding, Integration of Resources, Conflicting Priorities

Intersection Safety Emphasis Area Team		
First Name	Last Name	Organization
Nicholas (Nick)	Aiello	TxDOT (TRF)
Chris	Adkins	Professional Pavement Products
Ed	Burgos-Gomez	FHWA – TX
Craig	Casper	Corpus Christi MPO
Jay	Crossley	Vision Zero Austin
John	Denholm	Lee Engineering
Rafael	Guzman	TxDOT
Carly	Haithcock	City of Austin Pedestrian Council
Clifton	Hall	Alamo MPO
Amelia "Millie"	Hayes	FHWA
Curtis	Jarecki	City of Frisco
Sonia	Jimenez	Alamo MPO
James	Keener	TxDOT
Kevin	Kroll	North Central TX Council of Governments
Ben	LaBorde	Abilene MPO
Heather	Lott	TxDOT
Amanda	Martinez	TxDOT
Ruby	Martinez	TxDOT
Brian	Moen	City of Frisco
Jason	Person	TxDOT
Stephen	Ratke	FHWA - TX
Robyn	Root	City of McKinney
Buck	Russel	Union Pacific Railroad Public Safety
Gabby	Tassin	ATG
Melissa	Walden	TTI – Center for Transportation Safety
Rebecca	Wells	TxDOT – Atlanta District
Robert	Wunderlich	Texas A&M Transportation Institute

EA Team Members current as of September 2022