



TEXAS SHSP

VULNERABLE USER SAFETY

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.



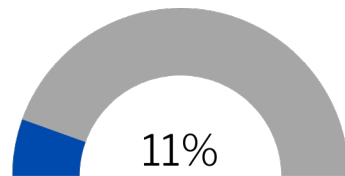
Section 6.8 Vulnerable Road Users

Background

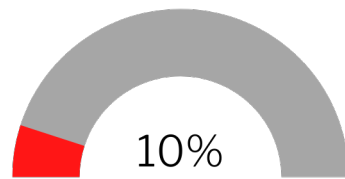
One of the primary tenets of a Safe System Strategy is anticipating human error. Vulnerable road users are more susceptible to fatal or serious injury when they are involved in a crash with a motor vehicle. In the case of pedestrians, pedalcyclists and vulnerable road users, we need to consider separating users in terms of time and/or space. These aspects address both infrastructure and behavior by looking to dedicated transportation space for users moving at different speeds and, subsequently, reduce adverse interactions between users. Ultimately, every road user has a responsibility to use the road safely, whether they are driving, biking, walking, riding, or traveling by other modes and act within the limits of the road system's design (cite ITE).

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." Pedestrians are even more vulnerable road users than those exposed to consequences of speed within the confines of a vehicle, therefore it is critical to consider vulnerable road users.

Pedestrian Related



% of Total Fatal & Serious Injury Crashes



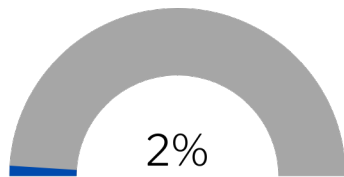
% of Total Fatal & Serious Injuries

Addressing infrastructure to reduce fatal and 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. Pedestrians use the roadway at intersections as well as other types of infrastructure, so it is important to

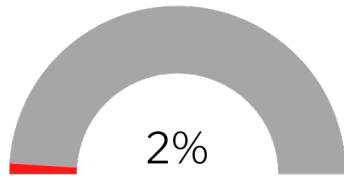
consider countermeasures that increase visibility through lighting and other approaches proven to be effective. For the part of the driver, there are countermeasures that increase attentiveness so that they can be more aware of the possibility of the presence of pedestrians.

The focus of a Safe System is to reduce risk and, subsequently, death and serious injury related to traffic crashes (vehicle occupants, pedestrians, and bicyclists). The EA representatives 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 intersection areas.

Pedalcyclist Related



% of Total Fatal & Serious Injury Crashes



% of Total Fatal & Serious Injuries

Pedestrian Historical & Trend Crash Data Analysis

The fatal and suspected serious injury crashes related to pedestrians represents 11% of all crashes. Since 2017, pedestrian crash trend has increased, therefore it is important to reverse this trend to reach the state goal of zero deaths in 2050. The pedestrian related crashes are illustrated in Figure 6.8.1 and the fatal and serious injuries are summarized in Figure 6.8.2.

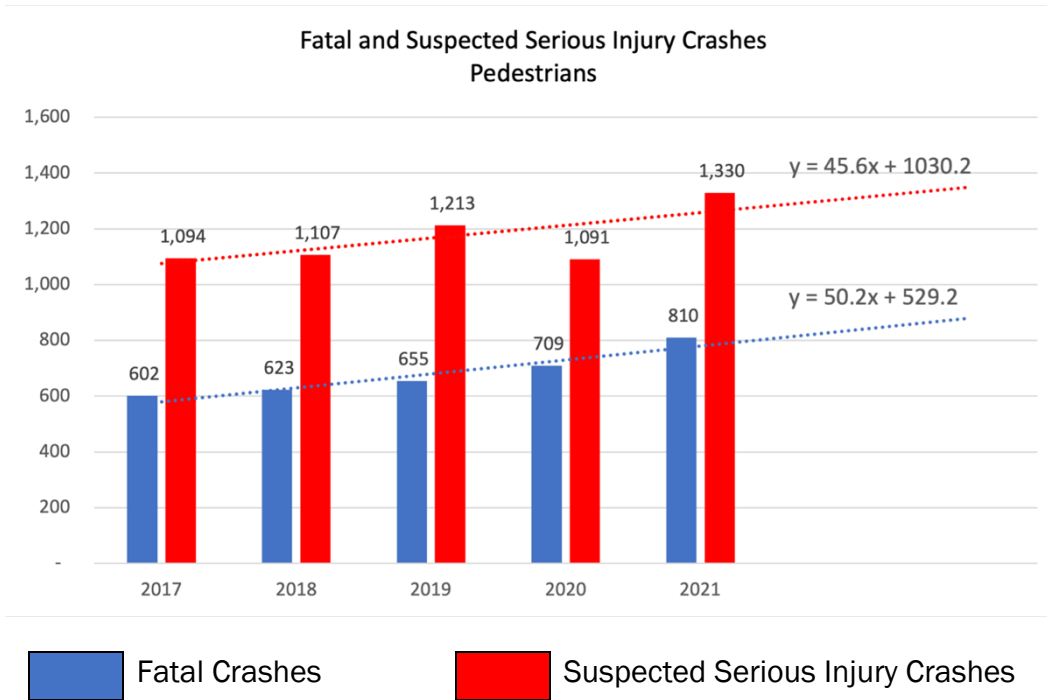


Figure 6.8.1. Pedestrian EA: Fatal and Suspected Serious Injury Crashes (2017-2021)

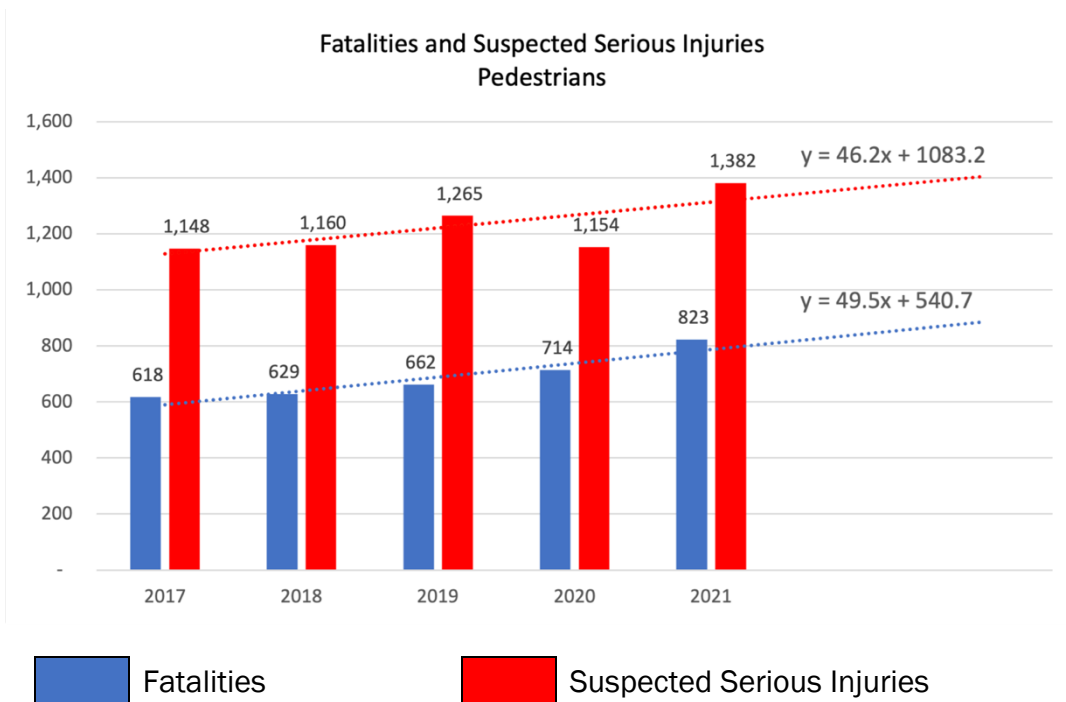
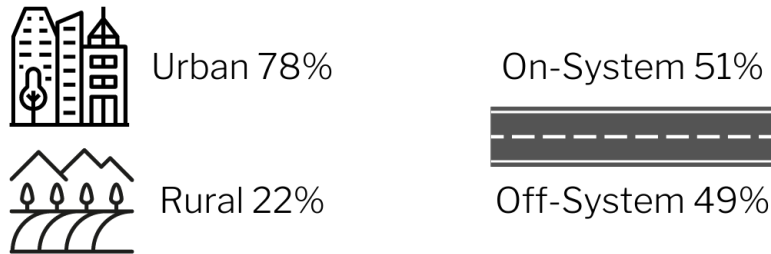


Figure 6.8.2. Pedestrian EA: Fatal and Suspected Serious Injuries (2017-2021)

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. The vulnerable road user data has been separated to provide details related to pedestrians and pedalcyclists. The following data is only representative of pedestrians involved in fatal or suspected serious injury crashes.

Vulnerable Users: Pedestrians % of Fatal & Serious Injury Crashes



From 2017 through 2021, there were 9,234 fatal or suspected serious injury crashes and 9,555 fatalities and suspected serious injuries. The Pedestrian EA team considered strategies to reduce the number of fatal and serious injury crashes and, subsequently, fatal, and serious injuries that not only addressed infrastructure, but also driver and pedestrian behavior. Of the pedestrian related crashes, one-third (3,399) resulted in at least one fatality while the other two-thirds (5,835) resulted in suspected serious injuries. The same proportions existed when injuries were analyzed with one-third (3,446) of the injuries were fatal and the remaining two-thirds (6,109) were classified as suspected serious injuries.

Pedestrians are especially vulnerable road users and demand specific traffic safety countermeasures to mitigate the risk. The state plans to work on the infrastructure and behavioral aspects of this challenge in partnership with state and local planning organizations as well as advocacy groups (all represented on the Pedestrian EA team). By addressing the occurrence of pedestrian involved crashes, we can have a significant effect on our ability to reach zero deaths. After identifying predominant, overlapping crash factors, related to pedestrian involved crashes, there are several aspects that the EA team

considered during the identification of strategies and the development of implementation plans. The overlapping crash factor observations include:

- ⇒ 41% of the crashes involved a pick-up truck or SUV
- ⇒ 23% of the pedestrian involved crashes occurred at an intersection while 75% occurred at a part of the roadway that was not designated as an intersection
- ⇒ 77% of the pedestrian crashes occurred during dark conditions in an urban setting
- ⇒ 12% (1,134) of the pedestrian crashes were also classified as distracted driver crashes
- ⇒ 18% (3,446) of the total fatal injuries and 6,104 suspected serious injuries were attributed to crashes involving at least one pedestrian

Pedalcyclist Historical & Trend Crash Data Analysis

The fatal and suspected serious injury crashes related to pedalcyclist represents 11% of all crashes#. Since 2017, pedalcyclist crash trend has fluctuated. The number of fatal crashes increased from 57 in 2017 to 91 in 2021 while the number of suspected serious injury crashes was 328 in 2017 and 323 in 2021 with decreases in 2018 and 2020. In terms of the injuries, the number of pedalcyclist fatalities increased from 57 in 2017 to 91 in 2021. The number of suspected serious injuries changed from 334 in 2017 and 332 in 2021 after being lower in the years between (2018-2020). As with the other EA areas, there needs to be significant focus to make an impact on the risks faced by vulnerable road users to achieve the state goal of zero deaths in 2050. The pedalcyclist related crashes are illustrated in Figure 6.8.4 and the fatal and serious injuries are summarized in Figure 6.8.5.

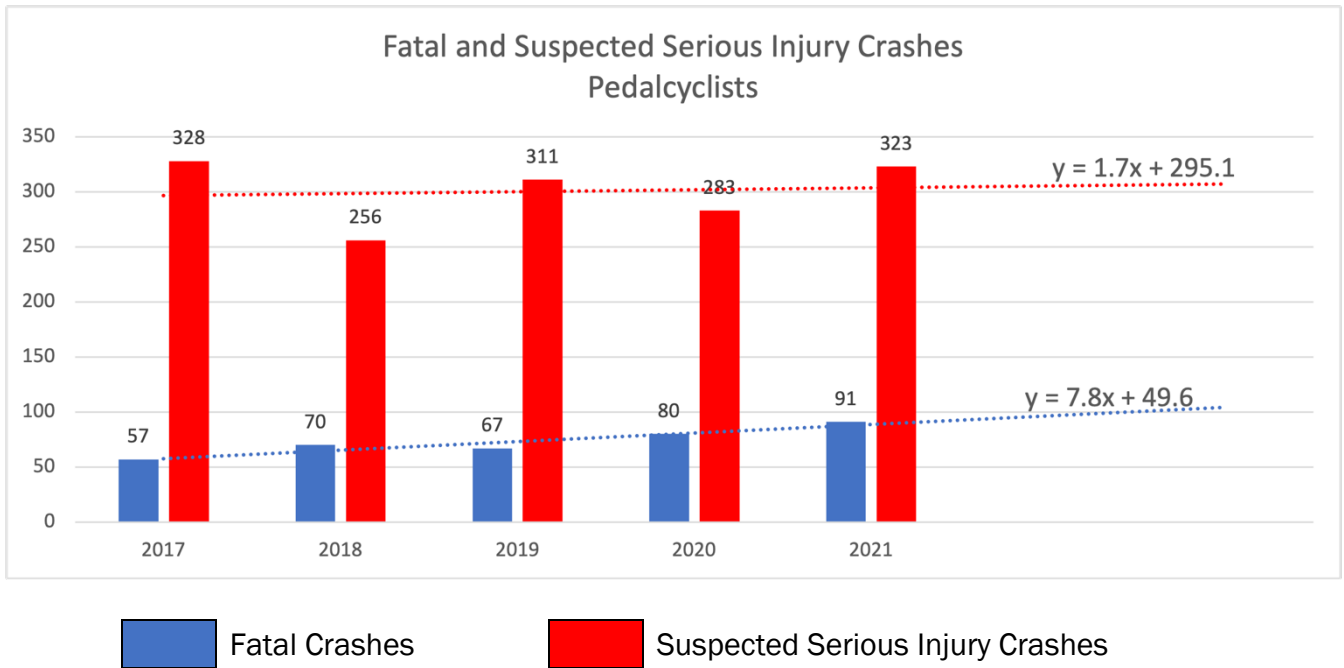


Figure 6.8.4. Pedalcyclist EA: Fatal and Suspected Serious Injury Crashes (2017-2021)

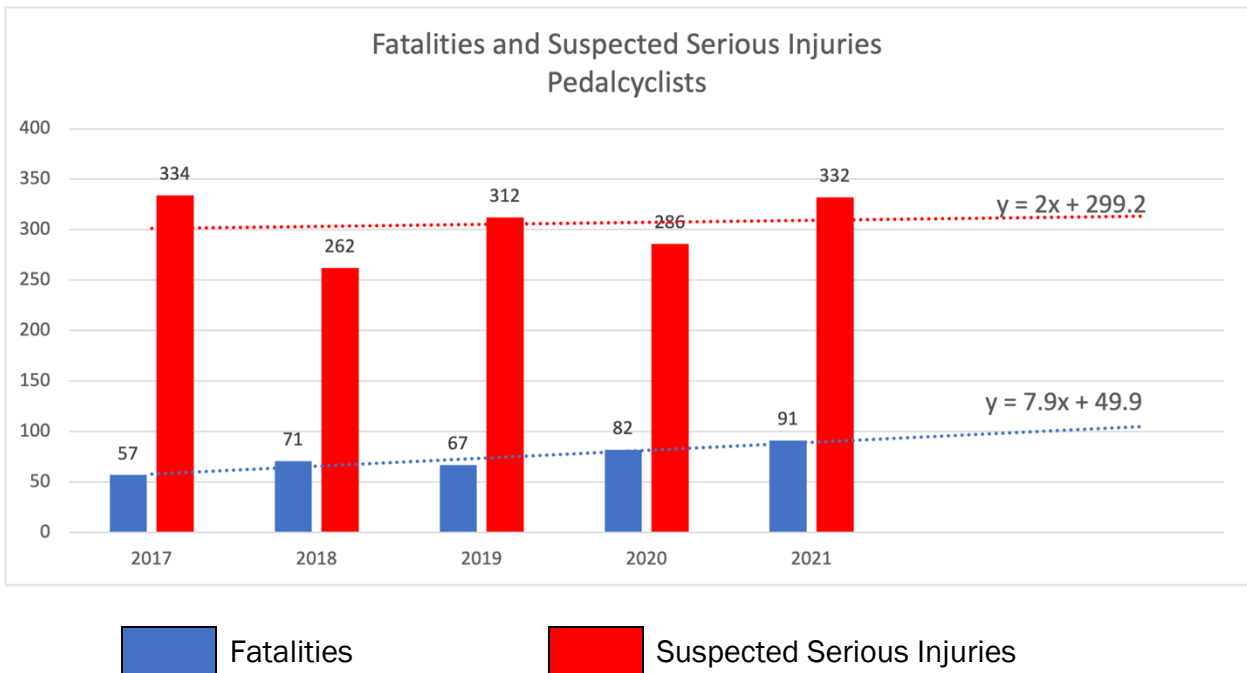
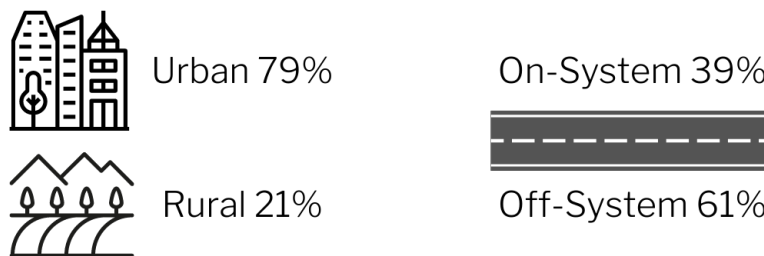


Figure 6.8.5. Pedalcyclist EA: Fatal and Suspected Serious Injuries (2017-2021)

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. The vulnerable road user data has been separated to provide details related to pedestrians and pedalcyclists. The following data is only representative of pedalcyclists involved in fatal or suspected serious injury crashes.

Vulnerable Users: Pedalcyclist % of Fatal & Serious Injury Crashes



The Vulnerable Road User EA team considered strategies to reduce the number of fatal and serious injury crashes and, subsequently, fatal, and serious injuries that not only addressed infrastructure, but also driver, pedalcyclist, and pedestrian behavior. Of the pedalcyclist related crashes, 19% (365) resulted in at least one fatality while the other 81% (1,501) resulted in suspected serious injuries. The same proportions existed when injuries were analyzed with 20% (386) of the injuries were fatal and the remaining 80% (1,526) were classified as suspected serious injuries.

In the same way that pedestrian risks are addressed, the state plans to work on the infrastructure and behavioral aspects of this challenge in partnership with state and local planning organizations as well as advocacy groups (all represented on the Vulnerable Road User EA team). By addressing the occurrence of pedalcyclist involved crashes, we can have a significant effect on our ability to reach zero deaths. After identifying predominant, overlapping crash factors, related to pedalcyclist involved crashes, there are several aspects

that the EA team considered during the identification of strategies and the development of implementation plans. For fatal and suspected serious injury crashes, the crash factors observations include:

- ⇒ Intersections present risks for all roadway users and pedalcyclists are especially vulnerable road users due to several factors – the overlapping factors between pedalcyclists and intersection types is detailed in Figure 6.8.6.
- ⇒ 68% (574 of 846) of the intersection related crashes occurred in daylight conditions
- ⇒ 53% (485 of 917) of the non-intersection crashes occurred in dark condition
- ⇒ 78% (1,455 of 1,866) of the pedalcyclist fatal and suspected serious injury crashes occurred in areas designated as urban
- ⇒ 61% of the pedalcyclist fatal and suspected serious injury crashes occurred on-system
- ⇒ 43% of the crashes involved a pick-up truck or SUV

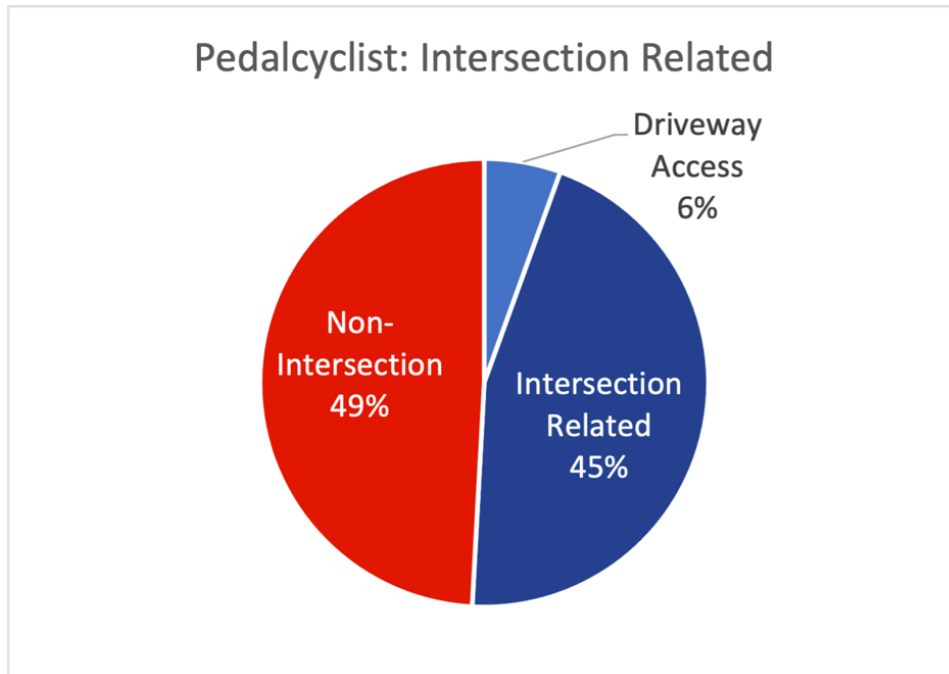


Figure 6.8.6. Pedalcyclist EA: Intersection Type Crashes

Objective for Emphasis Area

Utilize a data driven approach to decrease the number of fatal and serious injuries

sustained by vulnerable road users by identifying and targeting audiences for education efforts designed to increase occupant protect usage including correctly installed and applied safety belts and child car seats.

Strategies & Implementation Plans

Strategy 6.8.1 Improve driver and vulnerable road user safety awareness and behavior.

Implementation Action Plan	
6.8.1.1	Educate motorists on appropriate actions if they become stranded on a freeway or high-speed roadway to reduce crashes with unintended pedestrians on roadways.
6.8.1.2	Provide driver and pedestrian safety messages and education.
6.8.1.3	Educate vulnerable road users through campaigns like Walk Bike Safe and encourage alternatives such as transit, taxis, and transportation network companies.
6.8.1.4	Improve nighttime visibility of vulnerable road users using educational programs such as Be Safe. Be Seen.
Facilitator(s)	TxDOT, MPOs
Participating Organizations	TxDOT, TTI, MPOs, COGs, Advocacy groups
Effectiveness	**
Cost to Implement	6.8.1.1 \$\$, 6.8.1.2 \$\$, 6.8.1.3 \$, 6.8.1.4 \$
Time to Implement	6.8.1.1 Medium, 6.8.1.2 Long, 6.8.1.3 Long, 6.8.1.4 Short
Barriers	Lack of sufficient funding

Strategy 6.8.2 Reduce vulnerable road user crashes on urban arterials and local roadways.

Implementation Action Plan	
6.8.2.1	Complete sidewalk inventory and implement pedestrian-oriented design treatments at high-volume and/or high-risk pedestrian or pedalcyclist locations.
6.8.2.2	Implement proven countermeasures such as leading or exclusive pedestrian intervals at signalized intersections (i.e., pedestrian walk signals activate prior to parallel green), high-volume pedestrian-use signaled intersections, and pedestrian push-button locations.
6.8.2.3	Develop and implement a program (i.e. Vision Zero, Road to Zero, Safe Systems, ped action plans) to assist cities, developers and other agencies to develop policies and implement projects that address common pedestrian and pedalcyclist crash types.
6.8.2.4	Disseminate information and training for traffic safety professionals on the effectiveness and appropriateness of pedestrian traffic control measures.
6.8.2.5	Provide available protected paths when construction impedes on sidewalk, etc.
Facilitator(s)	TxDOT (Design Division & Traffic Safety)
Participating Organizations	TxDOT (Design Division & Traffic Safety), MPOs
Effectiveness	***
Cost to Implement	6.8.2.1 \$\$, 6.8.2.2 \$\$, 6.8.2.3 \$, 6.8.2.4 \$, 6.8.2.5 \$\$
Time to Implement	6.8.2.1 Medium, 6.8.2.2 Medium, 6.8.2.3, Short, 6.8.2.4, Short, 6.8.2.5 Short
Barriers	Lack of funding, Integration of Resources, Conflicting Priorities

Strategy 6.8.3 Improve vulnerable road user networks.

Implementation Action Plan	
6.8.3.1	Develop policies to analyze vulnerable road user 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.
6.8.3.2	Create connected vulnerable road user networks and remove barriers to pedestrian/pedalcyclist travel (pedestrian over/underpasses and crossings to overcome physical barriers). Consider setting standards or guidelines for the distance between safe crossings given land uses, densities, and roadway function.
Facilitator(s)	TxDOT, MPOs
Participating Organizations	TxDOT, MPOs, COGs, Cities, Counties
Effectiveness	**
Cost to Implement	6.8.3.1 \$\$, 6.8.3.2 \$\$
Time to Implement	6.8.3.1 Medium, 6.8.3.2 Medium
Barriers	Lack of sufficient funding & Priorities

Strategy 6.8.4 Develop strategic pedestrian safety plans tailored to local conditions.

Implementation Action Plan	
6.8.4.1	Develop a statewide inventory of local Pedestrian Safety Action Plans (PSAPs) and a statewide inventory of those PSAPs.
6.8.4.2	Develop a State Pedestrian Safety Action Plan including how equity is to be addressed.
Facilitator(s)	TxDOT, MPOs
Participating Organizations	TxDOT, TTI, MPOs, COGs, Advocacy groups
Effectiveness	**
Cost to Implement	6.8.1.1 \$\$, 6.8.1.2 \$
Time to Implement	6.8.1.1 Medium, 6.8.1.2 Short
Barriers	Lack of sufficient funding & Priorities

Vulnerable Road Users - Emphasis Area Team		
First Name	Last Name	Organization
Nicholas (Nick)	Aiello	TxDOT (TRF)
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Ed	Burgos-Gomez	FHWA - TX
Michelle	Canton	TTI
Craig	Casper	Corpus Christi MPO
Jay	Crossley	Vision Zero ATX
Kay	Fitzpatrick	TTI
Camille	Fountain	North Central TX Council of Governments
Carly	Haitcock	City of Austin Pedestrian Council
Clifton	Hall	Alamo MPO
Amelia "Millie"	Hayes	FHWA
Noah	Heath	TxDOT
Major	Hofheins	San Angelo MPO
Jeff	Howell	El Paso MPO
Joan	Hudson	TTI
Sonia	Jimenez	Alamo MPO
Lisa	Johnson	TxDOT
Tommy	Johnson	San Antonio PD
Brooks	Jonathan	LINK Houston
Elizabeth	Jones	TxDOT
James	Keener	TxDOT
Myung	Ko	TTI
Gaby	Kolodzy	TTI
Pete	Krause	TxDOT

Vulnerable Road Users - Emphasis Area Team		
First Name	Last Name	Organization
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Heather	Lott	TxDOT
Tim	McDaniel	El Paso MPO
Jason	Person	TxDOT
Wayne	Powell	City of Dallas
Stephen	Ratke	FHWA - TX
Robyn	Root	City of McKinney
Barbara	Russell	TxDOT
Joe	Schmider	Department of State Health Services
Brian	Shamburger	Kimley-Horn
Bonnie	Sherman	TxDOT
E'Lisa	Smetana	Abilene MPO
Freddie	Summer	TxDOT
Monica	Thompson	Professional Pavement Products
Lauren	Wolf	TxDOT

EA Team Members current as of September 2022