



# Oklahoma Department of Transportation Strategic Highway Safety Plan

October 2023

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# INTRODUCTION AND OVERVIEW



## INTRODUCTION AND OVERVIEW

According to the U.S. Department of Transportation, a Strategic Highway Safety Plan (SHSP) is a “statewide coordinated safety plan that provides a comprehensive framework for reducing fatalities and serious injuries on all public roads.” The purpose of the SHSP is to identify effective safety strategies to address areas of greatest need to make roadways safer.

The Federal Highway Administration (FHWA) determines policy guiding the implementation and evaluation of the SHSP. The SHSP describes the process, actions, and potential resources for implementing the strategies in emphasis areas prioritized by each state. The FHWA has partnered with key stakeholders to reinforce a data-driven approach. This includes improving collaboration with a wide range of safety partners and providing transparency for the American public as states set goals, report on safety targets and, most importantly, save lives.

The Oklahoma Department of Transportation (ODOT) fully intends to be a “Top 10 State” in transportation. Objectives from the 2020 - 2045 Oklahoma Long Range Transportation Plan (LRTP) that address safety include:

- Reduce traffic-related fatalities and serious injuries sustained on Oklahoma’s multimodal transportation system.
- Improve design, construction, and maintenance of transportation infrastructure to reduce the number and severity of crashes.
- Increase seat belt usage.
- Improve transportation security and emergency preparedness, response, and recovery.

For the 2023 SHSP, the Executive Committee determined to use the following eight emphasis areas:

- Lane Departures
- Impaired Driving
- Occupant Protection
- Unsafe Speed
- Intersections
- Commercial Motor Vehicle Crashes and Work Zones
- Motorcycle Crashes and All-Terrain Vehicles
- Vulnerable Road Users

The 2023 SHSP includes Action Plans that address how the eight SHSP emphasis areas will be implemented. The Action Plans are listed in the appendix and will be updated each year. For each emphasis area within the SHSP, goals, countermeasures, performance measures, and measurable objectives are included in the Action Plan.

Nationwide developments concerning SHSPs have been summarized as a guiding philosophy for the 2023 SHSP. These four areas are Toward Zero Deaths, Safe System Approach, Traffic Safety Culture, and the Four E’s of Safety (Plus Two)

### Vision, Mission, Goal

The American Association of State Highway Transportation Officials (AASHTO) has formally recognized the Toward Zero Deaths (TZD) as the highway safety vision for the United States. TZD advocates for eliminating serious injuries and deaths on our nation’s roadways. Achieving

a target of zero fatalities and zero serious injuries means creating a traffic safety culture that prioritizes safety, encourages safe road user behavior, and facilitates cooperation among stakeholders.

Traffic safety culture focuses on how social factors in a community's culture influence how people prioritize and accept traffic safety strategies. The Safe System Approach encourages engineers to explore the influence of roadway design on traffic safety, attempting to prevent crashes through design and roadway modifications for all users. For these efforts to be effective, stakeholder organizations may need to begin exploring their own internal culture to align it with the Safe System Approach and vision for zero traffic fatalities and zero serious injuries.

### **Vision**

The zero deaths vision acknowledges that even one death on our transportation system is unacceptable. The vision of the Oklahoma SHSP is to provide and promote the safest roadway transportation system for all travelers – zero deaths, zero serious injuries.

### **Mission**

The mission of the ODOT is to provide a safe, economical, and effective transportation network for the people, commerce, and communities of Oklahoma.

The mission of the Oklahoma SHSP is to develop, implement, and evaluate a data-driven, multidisciplinary process to maximize road safety through widespread collaboration.

### **Goal**

The goal for Oklahoma's 5-year SHSP is to achieve reductions in fatalities and serious injuries in all emphasis areas on the path to zero.

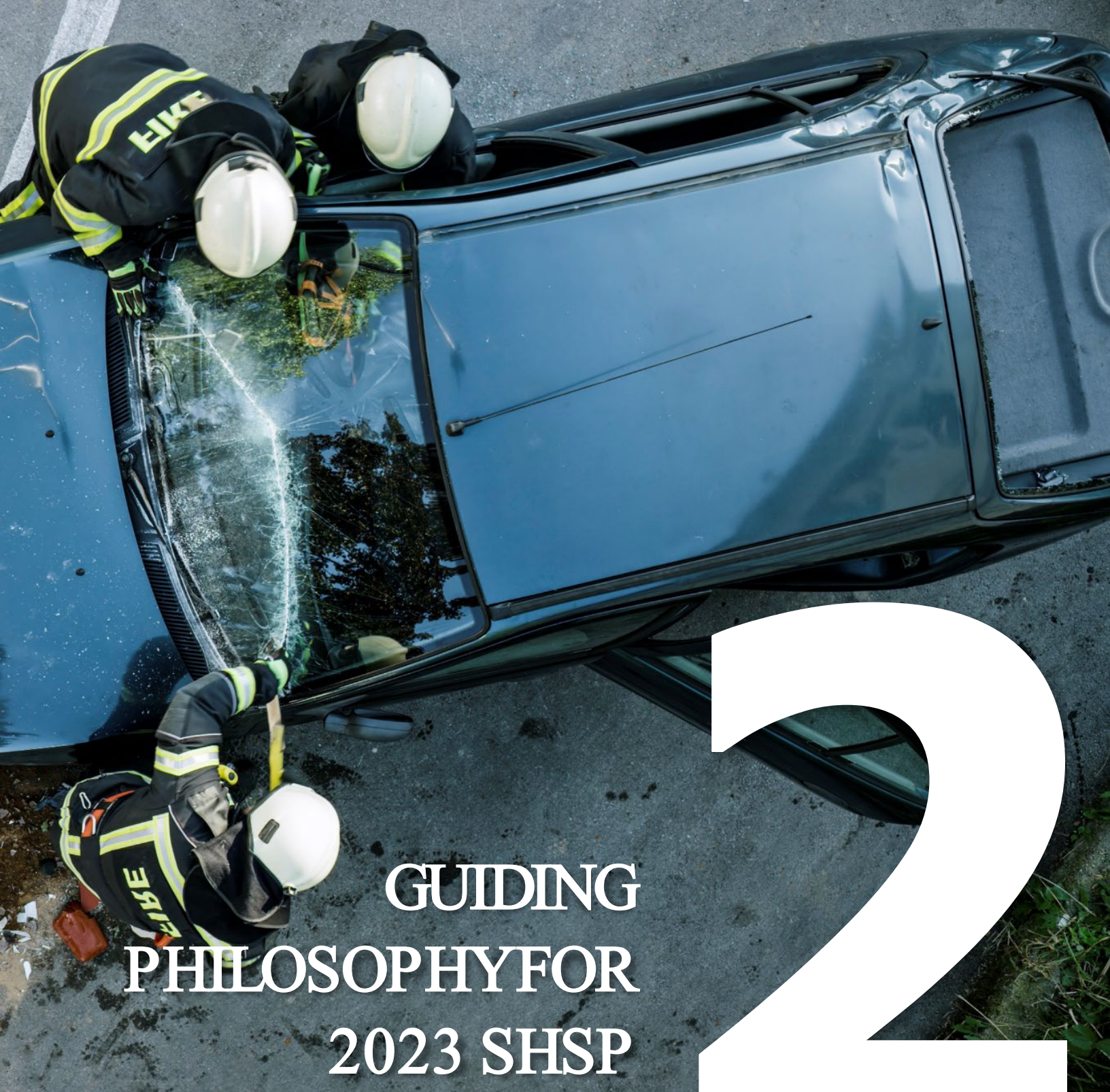
## **Performance Measures and Coordination with other Transportation Plans**

The SHSP Executive Committee provides leadership for SHSP development, implementation, and evaluation. Top management representatives from the stakeholder agencies gain consensus at a high level. Executive committee members have the authority to commit agency resources to the planning process and promote the SHSP within individual agency plans. Other agencies actively participate in the development of the state SHSP, allowing for coordination as highway safety countermeasures are selected for the Action Plan.

Federal law requires the SHSP to serve as a guide for Oklahoma's roadway safety investment decisions, forming a consistent safety program for the state. The SHSP Coordination process ensures that the SHSP, the HSIP, and the state Highway Safety Plan (HSP), as well as the Commercial Motor Vehicle Safety Plan (CMVSP), contain core performance measures and targets in common. In alignment with the other State safety plans, the 2023 SHSP includes the following Performance Measures:

- 1) Number of Fatalities - The number of persons killed in crashes on all public roads in a calendar year.
- 2) Rate of Fatalities per 100 million Vehicle Miles Traveled (VMT) in a calendar year.
- 3) Number of Serious Injuries - The number of persons seriously injured in crashes on all public roads in a calendar year.
- 4) Rate of Serious Injuries per 100 million VMT in a calendar year.
- 5) Number of Non-motorized Fatalities and Non-motorized Serious Injuries on all public roads in a calendar year.

Final Draft



GUIDING  
PHILOSOPHY FOR  
2023 SHSP

2



## GUIDING PHILOSOPHY FOR 2023 SHSP

During the past five years, there have been several developments nationwide concerning SHSPs. These developments have been summarized as a guiding philosophy for the 2023 SHSP. These four areas are:

- Toward Zero Deaths
- Safe System Approach
- Traffic Safety Culture
- The Four E's of Safety (Plus Two)

### Toward Zero Deaths

Here in the United States, TZD is a national strategy on highway safety to advocate for eliminating serious injuries and deaths on our nation's roadways. The zero deaths vision acknowledges that even one death on our transportation system is unacceptable.

The AASHTO has formally recognized TZD as the highway safety vision for the United States. Within each state, TZD focuses on coordination through the DOT.



Safety practitioners, researchers, and advocates conceptualized TZD. TZD engagement happens across the country, throughout state and local organizations, and within communities that all focus on the goal of zero traffic-related deaths.

A multi-disciplinary approach encourages involvement from a variety of stakeholders. All TZD stakeholders champion the idea that one death on our nation's roadways is too many, and everyone works together to bring the annual number of roadway deaths down to zero.

Expanding on the nation's TZD goal, the SHSP's goal encourages setting realistic and achievable steps for Oklahoma to move toward zero fatalities and zero serious injuries. This means demonstrating constant improved performance toward zero deaths. In 2022 ODOT began an agency wide performance measure aiming for an annual 2% reduction in fatalities for the next five years.

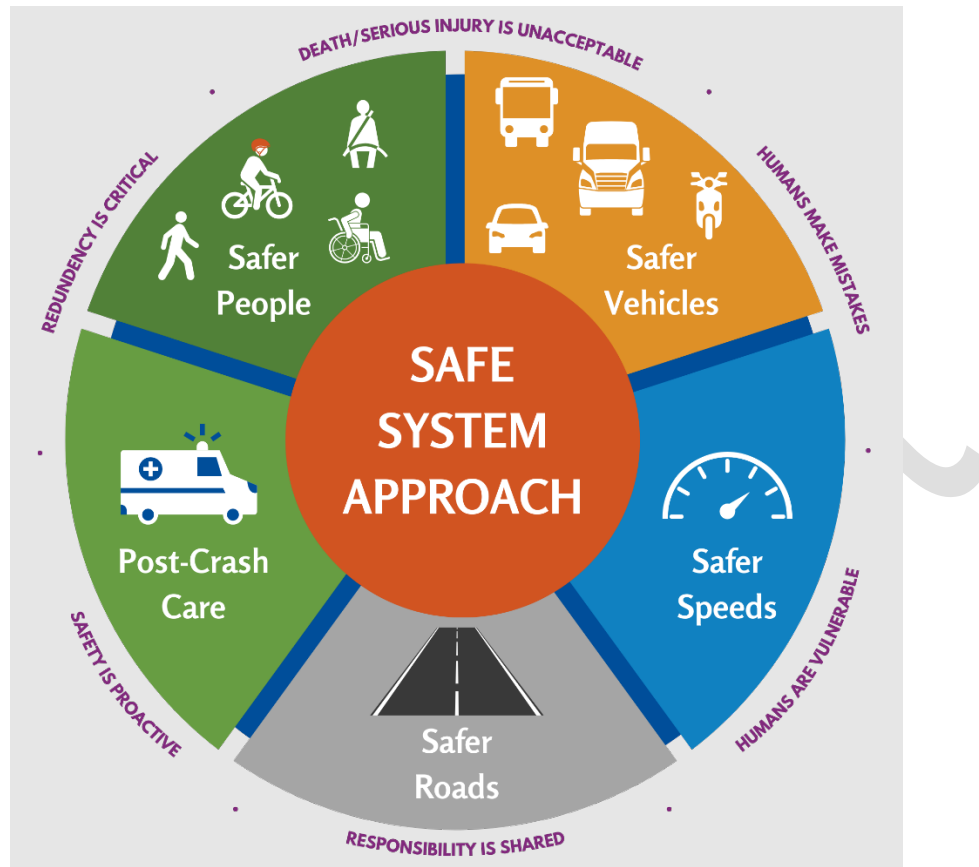
### Safe System Approach

The Safe System Approach is a worldwide movement that has been in place for more than 30 years. In early 2022 the U.S. Department of Transportation adopted a Safe System Approach. The Safe System Approach places safety first and foremost in road system investment decisions. Applying the Safe System Approach means designing and managing road infrastructure to reduce the risk of human mistakes, including Vulnerable Road Users (VRU) such as bicyclists and pedestrians.

A Safe System requires broad, sustained political commitment. This means establishing a safety culture by adjusting internal agency cultures to align with the Safe System principles and elements:

- The outer ring of the diagram represents the six Safe System principles.
- The inner ring of the diagram represents the five Safe System elements.





As of January 2022, the U.S. Department of Transportation introduced the National Road Safety Strategy to implement the Safe System Approach with a focus on the following approach elements:

- **Safer People:** Encourage safe, responsible behavior by people who use our roads and create conditions that prioritize their ability to reach their destinations unharmed.
- **Safer Roads:** Design roadway environments to mitigate human mistakes and account for injury tolerances, to encourage safer behaviors and to facilitate safe travel by the most vulnerable road users.
- **Safer Vehicles:** Expand the availability of vehicle systems and features that help to prevent crashes and minimize the impact of crashes on both occupants and non-occupants.
- **Safer Speeds:** Promote safer speeds in all roadway environments through a combination of thoughtful, context appropriate roadway design, targeted education and outreach campaigns and enforcement.
- **Post-Crash Care:** Enhance the survivability of crashes through expedient access to emergency medical care, while creating a safe working environment for vital first responders and preventing secondary crashes through robust traffic incident management practices.

Within the Safe System Approach, a culture of safety promotes the expectation that all users of the roadway system, regardless of mode, will be protected and that responsibility is shared with

those who plan, build, maintain, and use the transportation system. This includes planners and engineers as well as elected officials who oversee policy decisions that influence road safety.

The Safe System Approach can be institutionalized through Highway Safety Improvement Plans (HSIP), Strategic Highway Safety Plans (SHSP), local planning efforts, and agency-level policies and practices. Lessons learned and best practices are essential tools for widespread adoption and implementation.

The Safe System Approach does not absolve people driving from their responsibility to operate vehicles safely. Everyone in Oklahoma is encouraged to consider culture change as a new approach to traffic safety.

## Traffic Safety Culture

In order to achieve a target of zero fatalities and zero serious injuries a culture must be embraced. Traffic safety culture consists of values and beliefs shared among groups of road users and stakeholders that influence their decisions to behave or act in ways that affect traffic safety.

Part of being human means that people make mistakes. By increasing the awareness and improving culture around traffic safety, the severity of those mistakes can be reduced or eliminated.

Leveraging beliefs, behaviors, and consequences means adopting a behavioral model to guide strategy development. Tips to grow traffic safety culture include:

- Raising concern and hope
- Changing beliefs to change behavior
- Correcting misperceptions of culture
- Engaging in strategies across the social ecology

Public information and education aids in achieving a change in attitudes and behaviors. Encouraging our target audience to adopt safe driving practices reduces traffic collisions and related consequences. Public information and education are primary countermeasures that have been recognized as an effective part of any traffic safety program by acknowledging concerns and raising hope. One simple effort toward culture change is shifting away from the use of the word “accident” as the connotation of the word assumes no accountability. Crashes are preventable, and adjusting this mindset is one move toward culture change.

A key element of the TZD National Strategy on Highway Safety means transforming the traffic safety culture in the United States among all road users, including non-motorized users.

Oklahoma can set a goal of zero fatalities and zero serious injuries by creating a traffic safety culture that:

- Prioritizes safety
- Encourages safe road user behavior
- Facilitates cooperation among stakeholders

Effective strategies leverage values and change beliefs within a specific social group. For example, implementing a focused strategy on pickup drivers in rural Oklahoma who are statistically unlikely to wear their seatbelts.



Statewide traffic safety culture change must be equitable, serving all members of a diverse community. Expanding safety culture throughout Oklahoma cannot be done in a vacuum; it must be adopted and infused across individuals, communities, governments, businesses, and schools.

One example is Successful Approaches for the Development of an Organization Wide Safety Culture in Transportation Agencies supported by the NCHRP.

Developing a strong safety culture provides the foundation for two of FHWA's main priorities – reaching zero traffic deaths and advancing the Safe System Approach. Research shows that real, sustained cultural change within organizations typically takes more than five years. As stakeholder organizations align their organizations with the vision for zero traffic fatalities and zero serious injuries, the changes are likely to last into the future.

## The Four “E’s” of Safety (Plus Two)

The Four “Es” of safety refers to those professionals included in education, emergency medical services, enforcement, and engineering. Each discipline has a unique perspective on how to improve traffic safety while also remaining connected to the other disciplines. Through stakeholder engagement, two additional Es were identified for the SHSP, Emerging Technologies and Engagement.

The Oklahoma Highway Safety Office (OHSO) supports highway safety grant projects designed to develop and support educational, enforcement, and engineering programs. The grant programs address impaired driving, occupant protection and child passenger safety, pedestrian and bicycle safety, driver education programs and motorcycle safety.

The 2020 - 2045 Oklahoma LRTP lists improving design, construction, and maintenance of transportation infrastructure to reduce the number and severity of crashes as a goal.

Reaching zero fatalities and zero serious injuries requires the dedication of professionals who represent the four “E’s” of roadway safety.

### Education



This “E” involves providing information to road users that help them make good choices. Education consists of prevention specialists, communication professionals, educators, and citizen advocacy groups.

Resources exist that advance traffic safety for children worldwide. This includes a Road Safety Week. Education informs the public concerning laws and safety when driving and navigating the transportation system. A strong memorable message, such as NHTSA's campaign to combat driving under the influence of marijuana "If You Feel Different, You Drive Different", can reinforce the education.

The Oklahoma Highway Safety Office (OHSO) has identified schools as an ideal setting to reach teenagers with prevention education. Throughout Oklahoma, school districts coordinate with local police to offer road safety education to school children.

The ODOT has implemented a program called Oklahoma Work Zone Safe to reach teen drivers aged 15-19 with three key principles in work zone safety: safe drivers, signs & laws, and the

faces that serve us. Teen drivers who successfully complete the course receive a \$500 Oklahoma 529 Educational Scholarship from the Association of Oklahoma General Contractors.

Effective education efforts can lead to a cultural change in road user behavior habits and ultimately a decline in fatalities and serious injuries on roadways.

## Emergency Medical Services



This “E” involves the efforts of emergency responders in providing medical services quickly and effectively to individuals involved in crashes. Emergency responders include first responders, paramedics, fire & rescue.

While emergency medical personnel assist those injured in a crash, other emergency responders clear roadways and manage traffic, reducing the risk of secondary crashes due to unexpected traffic conditions.

In Oklahoma, Emergency Medical Services (EMS) oversees regulatory compliance of agencies and personnel providing pre-hospital care in Oklahoma. Trauma and systems development oversees a system of trauma care in Oklahoma involving patient prioritization, transportation, and timely care. Their motto: Getting the patient to the right place, receiving the right treatment in the right amount of time.

The post-crash care component of the Safe System Approach extends beyond emergency services. Quick response by EMS and ensuring timely care for the injured are vital to saving the injured person’s life. Proper incident management is also important to quickly clear the crash scene by removing the road debris and impacted vehicles, documenting crash factors, and providing advance warning of an incident to restore traffic flow as safely as possible. Faster emergency response and incident clearance times significantly reduce the risk of subsequent crashes and can prevent a serious injury leading to a fatality. Under the Safe System Approach, post-crash care is especially important for pedestrians and bicyclists.

## Enforcement



This “E” reminds people to follow laws when using our transportation system. Enforcement involves the actions and efforts by the thousands of state and local law enforcement officers throughout Oklahoma who are working to ensure road users follow the law.

State, county, and municipal law enforcement agencies work alongside highway safety partner agencies to enforce traffic laws during regular patrols, as well as during specialized mobilization efforts. The OHSO has identified many local police departments throughout Oklahoma that will conduct high visibility enforcement to reduce fatalities and serious injuries.

## Engineering



This “E” involves the design of roadways and the surrounding environment using solutions that reduce crashes or minimize the severity of crashes when they occur.

The Safe System Approach is especially important for engineers who design and construct roadways to encourage safe speeds and accommodate all road users whether they are driving, walking, biking, or rolling via a mobility device. Furthermore, safe streets are designed and built to be forgiving so that when people make mistakes, the outcomes are less severe.

Transportation engineers use proven design methods and national standards for signs and traffic markings to provide consistency for the traveling public. In addition, engineers continue to research new ways to make transportation safer.

Although the four “E’s” remain connected, the traditional focus on the four “E’s” alone will not reach the target of zero fatalities and zero serious injuries. Therefore, ODOT has added two more “E’s.”

### Emerging Technologies



The fifth “E” involves the application of emerging technologies to roadways, vehicles, and road users. Emerging technologies include the Safe System Approach principle of Safe Vehicles.

Emerging technologies such as vehicle & infrastructure technology as well as specialized equipment can potentially reduce the frequency or severity of crashes. Examples of emerging technologies include features in vehicles that monitor speed or blind spots as well as lane keeping assist. It is hoped that emerging technologies will have a positive impact on reducing fatalities and serious injuries within the next thirty years.

Automatic emergency braking can stop vehicles if a crash is imminent or slow them down to reduce the severity. Two new U.S. studies show that automatic emergency braking can cut the number of rear-end automobile crashes in half and reduce pickup truck crashes by more than 40%. One study showed that automatic emergency braking works well in all conditions, even when roadway, weather or lighting conditions were not ideal.

Safety Pilot is an initiative that investigates connected vehicle technology for real-world application during inclement weather driving conditions. Black ice causes numerous crashes on Oklahoma roadways each year. Another example of emerging technology is a prototype decision support system that is an automatic air, water, and ice detection system. One challenge for the prototype is designing the system to be automatic, compact, and low-cost.

Emerging technologies include advanced vehicles that include “active” safety measures to help prevent crashes from occurring and “passive” safety devices providing protection when a crash does occur. While manufacturers are key stakeholders in the continuously evolving automated vehicle safety industry, the interaction and connectivity with road elements and traffic control with multimodal users will also improve safety.

Additional examples of emerging technologies include features in vehicles that monitor speed or blind spots as well as lane keeping assist.

## Engagement



Including a sixth “E” of engaging everyone means every person walking, biking, riding, or rolling on Oklahoma’s roadways is responsible to make safe choices.

Engaging everyone is closely related to traffic safety culture and depends on educating the public. The Safe System Approach advocates for shared responsibility between stakeholders and road users for prevention of fatalities and serious injuries. Serious crashes are preventable if everyone does their part. For example, individuals can practice safe driving, riding, and walking behaviors, avoid unnecessary risks, and share the road safely with other users. An educator can promote traffic safety through interactions with their students. An emergency responder can enhance the timeliness of response to crashes and the quality care for crash victims. A vehicle manufacturer can develop and refine vehicle systems to reduce driver error and prevent crashes. An elected official can make safety a high priority through proactive and visible leadership. Everyone in Oklahoma is encouraged to consider culture change as a new approach to traffic safety.

The OHSO reaches their audience by increasing education, generating engagements, and converting their audience into brand advocates. In Oklahoma, encouraging a culture of traffic safety means that everyone ensures their safety as well as the safety of others traveling on the roadway. Engaging everyone is critical.



**SAFETY EMPHASIS  
AREAS FOR  
2023 SHSP**

**3**



## SAFETY EMPHASIS AREAS FOR 2023 SHSP

The Emphasis Areas section describes the States priority safety problems that will be addressed by the SHSP. Compared to the 2018 SHSP, the 2023 SHSP discusses Toward Zero Deaths, the Safe System Approach, Traffic Safety Culture, and the E's of Safety.

For the 2023 update, Unsafe Driver Behavior from the 2018 SHSP was divided into four sub-categories and added to the previous emphasis areas. Then these were ranked based on number of collisions for each emphasis area. It may be worth noting that behaviors such as unsafe speeds and distraction are often difficult to prove or record and are often under-reported as contributing factors.

The ODOT developed the Statewide Analysis for Engineering & Technology (SAFE-T) database through a partnership between the OHSO and the University of Oklahoma Center for Intelligent Transportation Systems (ITS).

**All data shown is from 2017 – 2021  
unless otherwise noted.**

Data driven strategies offer the greatest potential to reduce highway fatalities and serious injuries on all public roads. This meant conducting data analysis for each Emphasis Area, including development of trends such as time of day, day of week, lighting, precipitation, and weather conditions.



**Fatal and injury  
crashes occur  
more often  
between 8:00 p.m.  
and 4:00 a.m.**

**...and more often on  
Saturday and Sunday  
than any other day of  
the week.**



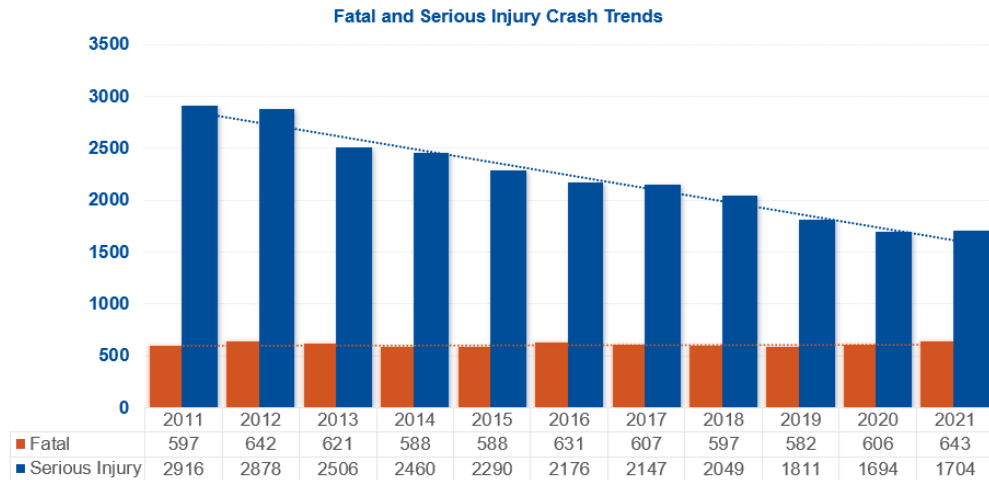
According to NHTSA, nearly 25% of crashes happen during severe weather conditions. In November of 2021, the Oklahoma Transportation Cabinet emphasized “Weather Driving Safety Awareness” in their public education campaign.



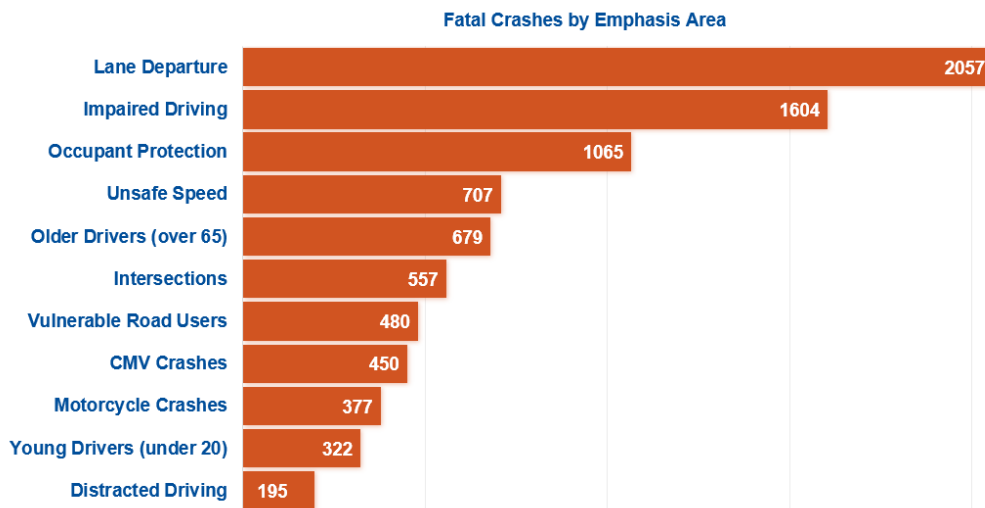
**172 People were killed or seriously injured  
due to Severe Weather Conditions.**



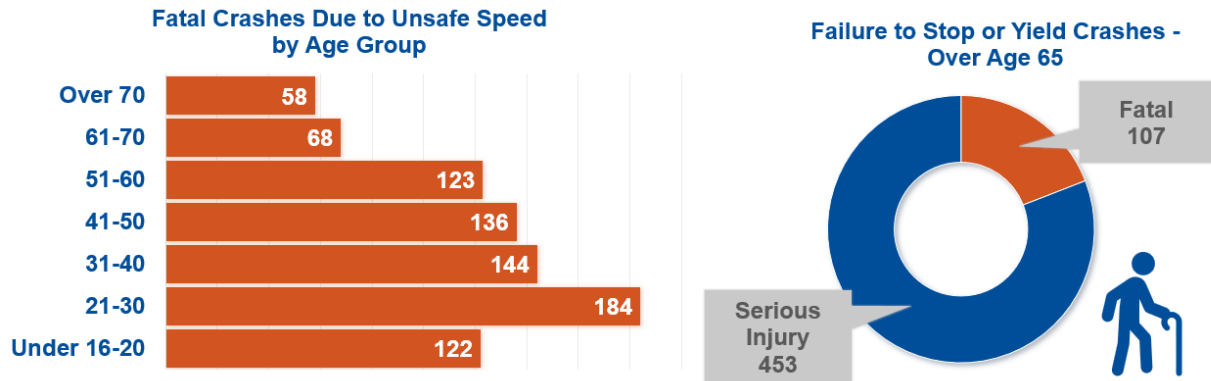
Serious traffic injuries in Oklahoma have continued to decline from 2011 until 2020. However, fatal crashes increased overall.



Due to the increase in fatal crashes, the 2023 SHSP depends on fatal crash rates for determining emphasis areas. Since financial resources are limited, emphasis areas are an important part of the SHSP. Emphasis areas have been prioritized by ranking the number of fatal crashes by each factor, as shown below:



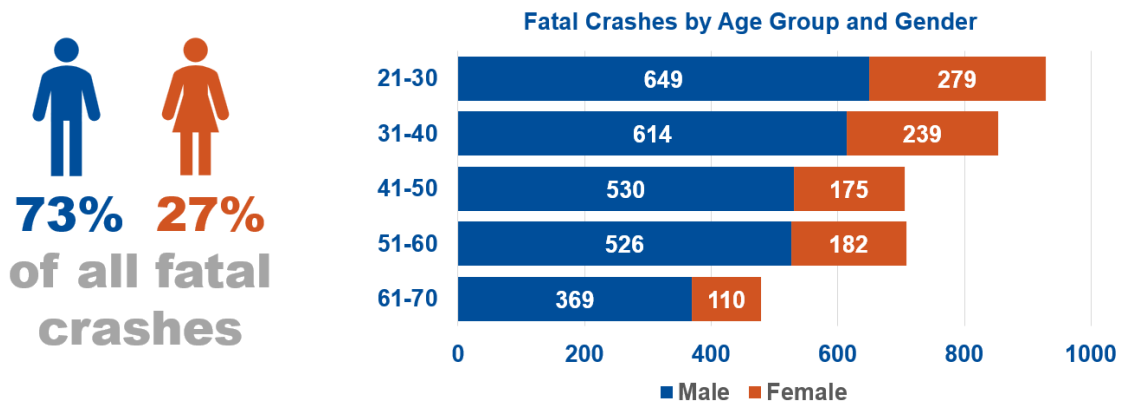
A crash is a complex event that usually cannot be attributed to a single factor. This creates overlaps between the emphasis areas. For instance, during the pandemic speeding related fatalities increased by 17%. Analysis from NHTSA indicates that the main behaviors that drove the increase include impaired driving, speeding, and failure to wear a seat belt. The 2023 SHSP addresses all three of these unsafe behaviors. That said, proposed strategies for one emphasis area may contribute to reducing fatal crashes and serious injuries in another emphasis area.



Another example of overlap often involves older drivers who are prone to be involved in intersection crashes due to their failure to stop or failure to yield. On the other hand, young drivers are often prone to drive at unsafe speeds. From 2017 through 2021, fatal crashes involving unsafe speed were highest for those in the 21 to 30 age group.

Due to overlaps, older drivers and young drivers have been removed from the list of emphasis areas. However, older drivers and young drivers are included within the other emphasis areas such as intersections and unsafe speeds.

Data was also evaluated for trends by gender. Males have been the victims in traffic crashes almost 3 times more often than females. This information can guide education campaigns toward the demographics most likely to be involved in these severe outcomes.

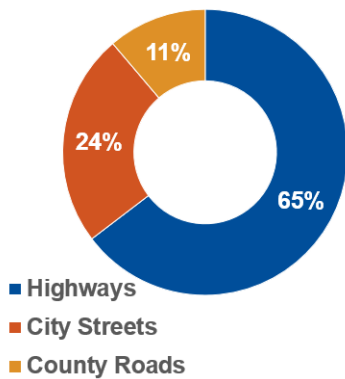


Distracted driving is another unsafe behavior. According to NHTSA, “Distracted driving is any activity that... takes your attention away from the task of safe driving.” Distracted driving activities include things such as eating, talking on a cell phone, or texting. Texting is particularly dangerous because it combines visual, manual, and cognitive distraction.

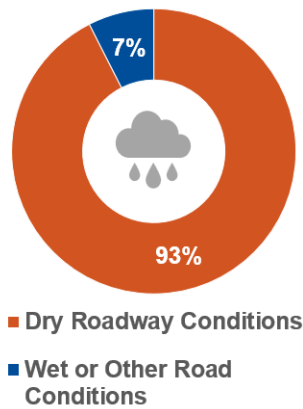


Source: OHSO

Distracted Driving Crashes by Road Type



Distracted Driving Crashes by Precipitation Conditions



The FHWA states that emerging topics such as distracted driving are proving complicated to address in SHSPs when the science is inadequate to allow for the same level of data analysis and countermeasure selection. Distractions are widely recognized as being underreported and effective strategies are often challenging to implement. This is especially true for the crash report form used by police officers in Oklahoma. Even so, NHTSA has partnered with states and local police to pass and enforce laws that address distracted driving.

Highway safety programs often coordinate the use of the “E’s” of Safety. For example, a distracted driving campaign might include education campaigns from OHSO, high visibility enforcement by OHP, and rumble strip installation by ODOT. In January of 2021, the Oklahoma Transportation Cabinet emphasized “Put Away Distractions” in their public education campaign.

The 2023 SHSP identifies Oklahoma’s priority emphasis areas as well as relevant strategies for implementation. Furthermore, the 2023 SHSP is used to coordinate the efforts of all agencies and stakeholders that have a role in highway safety. SHSP leaders evaluate the outcome-based metrics to ensure success. This allows for annual modifications within the Action Plan leading to continual improvement in performance over the next five years.

For the 2023 SHSP, the Executive Committee determined to use the following eight emphasis areas:

- Lane Departures
- Impaired Driving
- Occupant Protection
- Unsafe Speed
- Intersections
- Commercial Motor Vehicle Crashes and Work Zones
- Motorcycle Crashes and All-Terrain Vehicles
- Vulnerable Road Users



Source: ODOT



**Lane Departure**



**Impaired Driving**



**Occupant Protection**



**Unsafe Speed**



**Intersections**



**Commercial Motor Vehicles  
and Work Zones**



**Motorcycles and  
All Terrain Vehicles**



**Vulnerable Road Users**

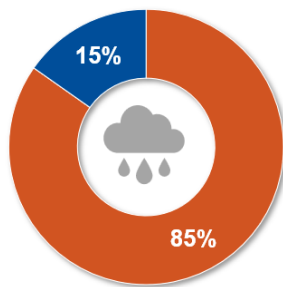
# Lane Departures



## Lane Departures

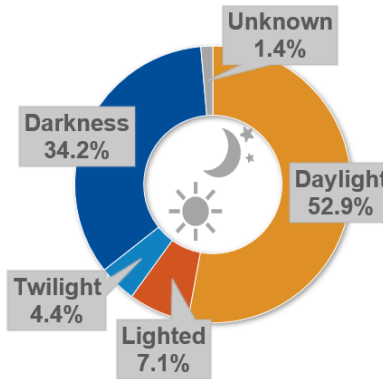
Lane departures are the most common type of crash in Oklahoma. From 2017 through 2021, there were 2,057 fatal collisions involving lane departures – more than any other emphasis area. A lane departure crash happens when a vehicle crosses an edge line, a centerline, or otherwise leaves the traveled way.

Lane Departure Fatal and Serious Injury Crashes by Precipitation Conditions

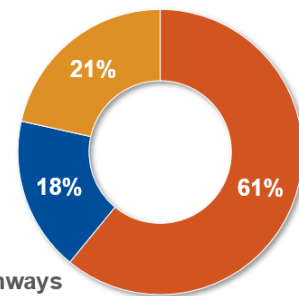


■ Dry Roadway Conditions  
■ Wet or Other Road Conditions

Lane Departure Lighting Conditions for Fatal Crashes

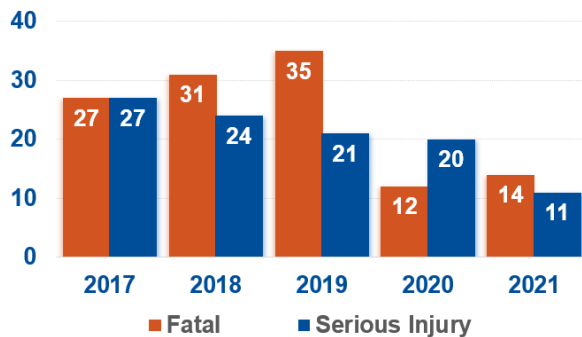


Lane Departure Fatal and Serious Injury Crashes by Road Type

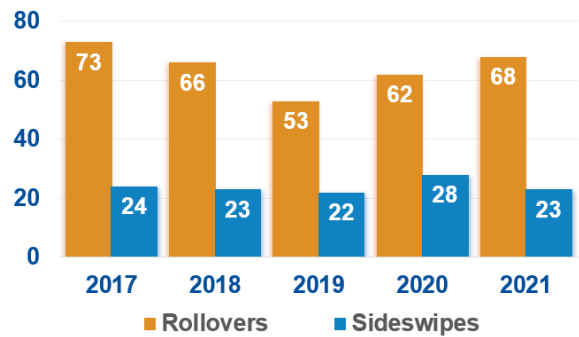


■ Highways  
■ City Streets  
■ County Roads

Cross Centerline Head-On Collisions

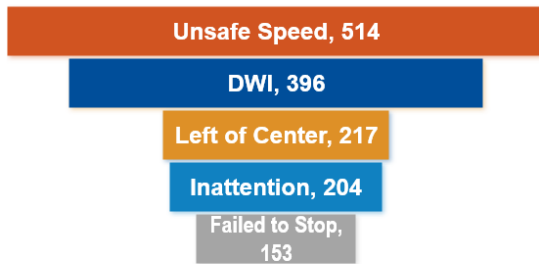


Lane Departure Fatal Crashes

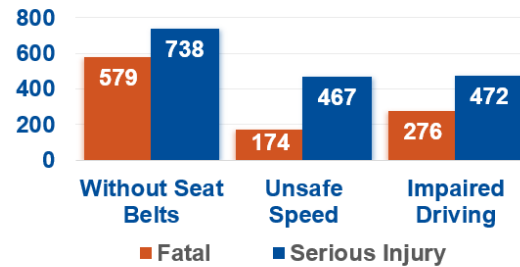




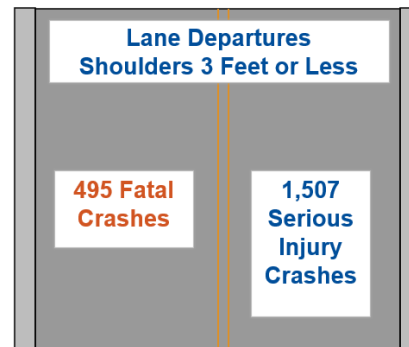
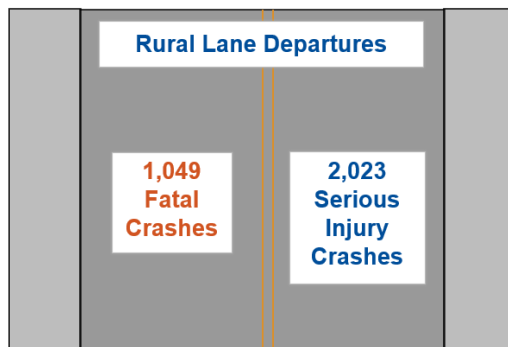
Lane Departure Fatal Crashes Due to Driver Behavior



Rural Lane Departure Crashes by Type



**Fatal Lane Departure Crashes**  
**4% Crossover Median**  
**57% Struck a Fixed Object**  
**57% Depart Right**  
**vs. 43% Depart Left**



Strategies such as installation of cable barrier and shoulder/centerline rumble strips are proving have proven to be effective. Since 2016, cross-centerline head-on collisions have significantly improved.

In the SAFE-T database, Lane Departures are divided into categories: Road Departure Right, Road Departure Left, Fixed Object, and Crossover Median. Please note that there are overlaps between the categories so that the overall number of the categories exceeds the number of statewide fatalities due to lane departures. For example, a vehicle may crossover a median and then strike a fixed object.

Lane departure crashes also include rollover and sideswipe. Since 2017, rollover and sideswipe fatal crashes have remained relatively flat. In Oklahoma, 15% all lane departure fatalities are



rollovers. Countermeasures for rollover crashes include delineation treatments, shoulder and edge line rumble strips, friction treatments, as well as safety edge, recoverable slopes, clear zones, and maintenance to control vegetation growth. The majority of rollover crashes are due to unsafe speed and DWI.

Sideswipe collisions are often due to lane changes or attempts to merge in the same direction. Same direction sideswipe collisions are extremely dangerous at speeds greater than 70 mph. One example of a countermeasure for sideswipe collisions are rumble strips between lanes.

Within emerging technology, lane assist on newer vehicles provides hope for the future. A driver who is speeding, impaired, drowsy, or distracted often has difficulty staying in the lane.

Even though 19% of the U.S. population lives in rural areas, nearly half of all fatal crashes occur on rural roads. In Oklahoma, 60% of fatalities occur on rural roads. Lane departure crashes often involve only one vehicle traveling at a high speed and result in fatalities or serious injuries. During the pandemic, increased speeding on rural roads have taken a disproportionate toll on rural residents.

According to the Governors Highway Safety Association (GHSA), more than half of persons killed in rural road crashes were not wearing their seatbelts. Between 2017 and 2021, 579 people who were killed in rural lane departures were driving without a seat belt in Oklahoma.

Road departure issues are a problem for rural areas in Oklahoma. Nationwide, adults 65 and older make up 19% of the rural population but account for 21% of rural road deaths. Even though a 2% difference seems small, the increase in older drivers within the U.S. rural population is reason for concern.

As drivers increase travel speed on rural roads, rates for single-vehicle crashes increase too. Between 2017 and 2021, 174 people were killed in rural lane departures when driving at an unsafe speed in Oklahoma, and 276 people were killed in rural lane departures when driving impaired in Oklahoma.

Over the last five years, nearly 3,000 serious injury and fatal collisions in Oklahoma have occurred on roads with no shoulders. 17% of those collisions had unsafe speed cited as a cause. ODOT recently reported that blind hills and blind curves can be a problem. From 2017 to 2021, there were 253 fatal crashes and 557 serious injuries on rural roadways that curve left or curve right. Using High Friction Surface Treatments (HFST) can reduce lane departures on tight horizontal curves.

Oklahoma Public Safety's most recent Highway Safety Crash Facts Book shows that in 2020 rural crashes in Oklahoma accounted for roughly 25% of total crashes statewide. Oklahoma has taken advantage of the federal Rural Project Initiative that is designed to accelerate rural, two-lane improvement projects such as adding shoulders already in the state's Eight-Year construction plan.

In the case of lane departure crashes, the Safe System Approach emphasizes the predictability of the road course, forgiveness of the roadway environment and driver behavior. Engineers can help prevent lane departures by improving roadway design. Education through public safety announcements can promote traffic safety culture, addressing driver behaviors that contribute to lane departures. Emerging technologies such as data analysis, vehicle & infrastructure technology, specialized equipment, and tech-based solutions can potentially reduce the frequency or severity of crashes. One emerging technology is lane keeping assist that warns





drivers when they begin to depart from the lane. However, it may take up to ten years for lane keeping assist to spread throughout the nation's vehicle fleets and to make a difference.

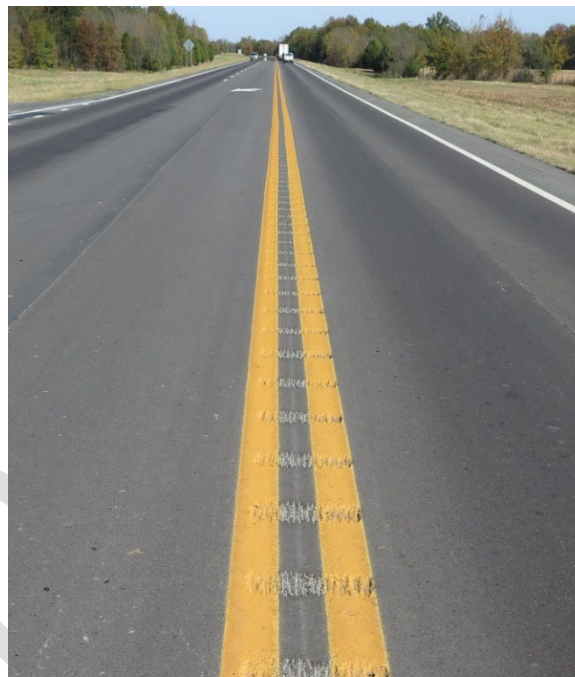
The Strategic Plan from the FHWA uses a data driven approach to focus on head-on collisions, rollovers, and fixed objects such as trees.

Other fixed objects include signs, poles, signals, and barriers as well as protection from roadside ditches and embankments.

Vehicles can be kept on the roadway by using pavement friction, rumble strips, horizontal curve safety, and nighttime visibility.

Safe Recovery can be achieved with Safety Edge and Clear Zones.

Crash Severity can be reduced through roadside safety hardware eligibility letters, guidance and polices, as well as other resources.



Source: ODOT

There are a variety of proven effective strategies for mitigating roadway departure fatalities and serious injuries. The transportation network should be analyzed to determine areas with the greatest opportunity for improvement. Locations may be identified using a hot spot or systemic approach and utilizing AASHTO Highway Safety Manual principles.

Using the FHWA Crash Modification Factor Clearinghouse allows practitioners to implement treatments that are appropriate and effective under specific circumstances.

The Oklahoma Rural Improvements for Safety Act (House Bill 2352) will add 250 center-lane mile upgrades for rural two-lane highways. The bill will prioritize projects based on historic fatality rates and areas experiencing traffic growth over the past five years.

Reaching the TZD goal means preventing as many lane departures as possible. For Emphasis Area Action Plan strategies and performance measures, see Appendix A.

# Impaired Driving

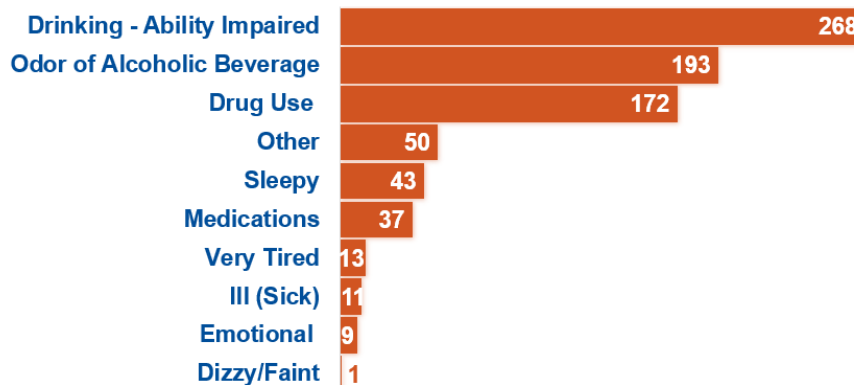


## Impaired Driving

Crashes involving occupants who are impaired are the second most common type in Oklahoma. From 2017 through 2021, nearly 56% of fatal crashes and serious injuries involving impaired driving occurred on highways.

While the dangers of drunk driving are relatively well known, impaired driving is not limited to alcohol use. It also consists of drugs, including prescription medications, and physical impairments such as drowsy driving, poor vision, or reduced cognitive capabilities. Using alcohol, drugs, or some medications will affect the driver's ability to perceive danger and react appropriately in a reasonable amount of time to avoid a collision.

Impaired Driving by Category - Fatal Crashes



Oklahoma law defines different levels of impaired driving:

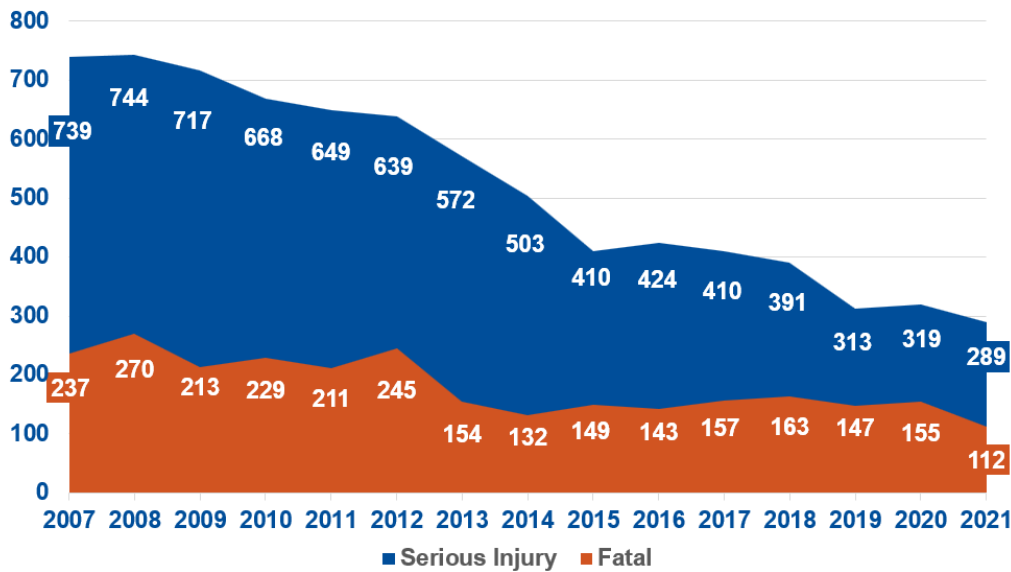
- **Driving While Impaired (DWI)** – Blood or breath alcohol content (BAC) greater than 0.05 percent but less than 0.08 percent and evidence of impaired ability to drive safely
- **Driving Under the Influence (DUI)** – BAC of 0.08 percent or more, any amount of a Schedule I (non-medical) controlled substance detected, under the influence of any other substance or a substance combined with alcohol that renders a person incapable of driving safely
- **DUI under 21** – Any measurable alcohol in the blood or breath, any other intoxicant detected in blood, breath, saliva, or urine, combined influence of alcohol and any other intoxicant
- **Aggravated DUI** – BAC of 0.15 percent or greater



Drug related fatalities are often due to the national opioid crises and increasing usage of marijuana among drivers. On June 26, 2018, Oklahoma voters approved legalization of medical cannabis. Due to medical cannabis and other medications, a driver who is impaired may have difficulty staying in the lane.

For the past several decades, significant strides have been made in addressing drunk driving through a combination of public messaging, tougher laws, and increased enforcement. As a result, the number of fatalities and serious injuries attributed to driving while under the influence of alcohol, drugs, or medications have decreased.

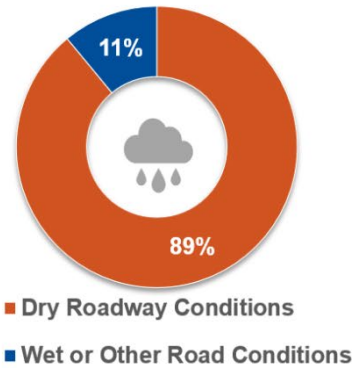
Impaired Driving Crashes



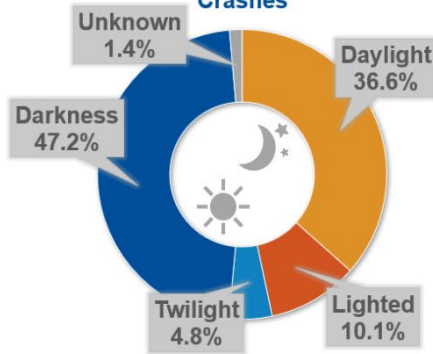


Source: OHSO

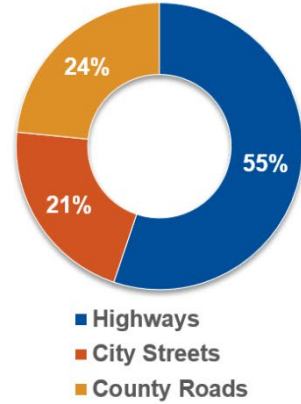
**Impaired Fatal & Serious Injury Crashes by Precipitation Conditions**



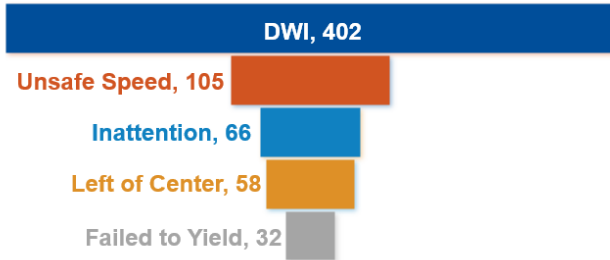
**Lighting Conditions of Impaired Driving Fatal Crashes**



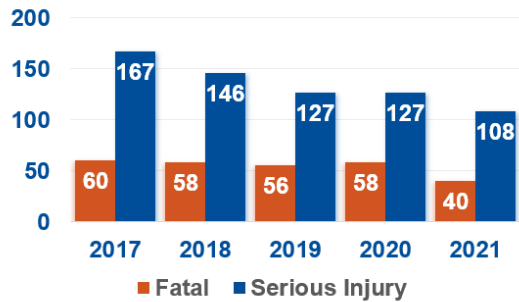
**Impaired Fatal & Serious Injury Crashes by Road Type**



**Impaired Driving Fatal Crashes Due to Driver Behavior**



**Impaired Driving Crashes Ages 16-30 Years Old**



Drivers in the age category 16-30 are involved in more alcohol impaired crashes than any other age group. For many of the younger people in this age group, neuroscience indicates the brain is not yet fully developed, leading to a higher propensity for risk-taking.

The OHSO has identified schools as an ideal setting to reach teenagers with prevention education. The AlcoholEdu for High School program has demonstrated positive outcomes in increasing alcohol-related knowledge, decreasing acceptance of underage drinking, reducing underage drinking, reducing youth riding with an intoxicated driver, and reducing students driving while impaired.



Source: ODOT

In September of 2021, the Oklahoma Transportation Cabinet emphasized “Perils of Impaired Driving” in their public education campaign. During Thanksgiving of 2022, NHTSA partnered with the OHP and local law enforcement to educate drivers that buzzed driving is drunk driving. Enforcement is an important element of Oklahoma’s efforts to address impaired driving.

In Oklahoma, the Department of Public Safety has a Medical Advisory Board that reviews individual fitness to drive. The 2022 Highway Safety Plan from the OHSO describes grants for occupant protection, state traffic safety information system improvements, impaired driving countermeasures, and motorcyclist safety. As of 2022, the SHSP for Oklahoma has adopted guidelines from the FHWA, including adding an annual Action Plan as an appendix.



Source: OHSO

The OHSO provides trained, qualified personnel to develop, monitor, coordinate, and manage the various Impaired Driving Prevention projects.

The OHSO also coordinates judicial education and outreach aimed at educating professionals in the court system.

The goal of judicial education is to reduce impaired driving and increase public safety throughout the state.

The Oklahoma City Police Department trains officers from various areas of the state to become Drug Recognition Experts and increase enforcement of DUI laws.

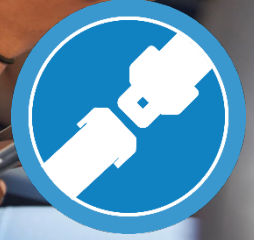
Breath Test Devices (BTD)s are commonly used when testing for the presence of alcohol in a person's system. Oklahoma recognizes results from BTDs as admissible in court proceedings. The BTD is used for impaired driving enforcement and in removing impaired drivers from the roadway. Oklahoma laws require that any driver convicted of DUI must install an ignition interlock device on every vehicle that is registered to them.

The Oklahoma Board of Tests for Alcohol and Drug Influence provides breath alcohol analysis results data on drivers arrested for driving under the influence. The OHSO Data Analyst uses this information to compile crash data statistics.

As a promising development within emerging technology, oral fluid screening is convenient for law enforcement to identify drivers under the influence of drugs. Public education concerning oral fluid screening may help deter impaired driving. It is important for all Oklahomans to understand that it is never okay to drive impaired, regardless of the substance.

Reaching the TZD goal means preventing as many crashes involving impaired drivers as possible. For Emphasis Area Action Plan strategies and performance measures, see Appendix A.

# Occupant Protection



## Occupant Protection

Crashes involving occupants who are unbuckled or unrestrained are the third most common type in Oklahoma. From 2017 through 2021, nearly 55% of fatal crashes and serious injuries involving unrestrained occupants occurred on highways.

Two of the most effective vehicle safety devices involves the use of seatbelts and child safety seats, particularly when combined with modern vehicle airbags and structural strength. On February 1, 1987, the Oklahoma law requiring automobile drivers and front-seat passengers to buckle up became effective. Oklahoma lawmakers amended the law on February 1, 1989 to require drivers and front-seat passengers of pickup trucks and vans to also wear seat belts.

In 2020, there were 10,893 unrestrained passenger vehicle occupants killed in crashes in the United States. In 2021, 29 percent of U.S. traffic fatalities involved 12,522 unrestrained occupants of passenger vehicles who were killed in traffic crashes.



Source: ODOT

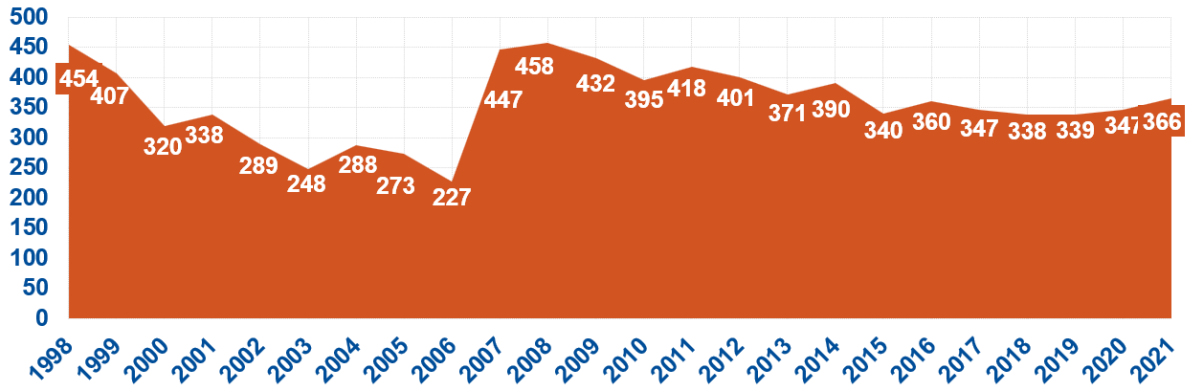
As of 2021, the NHTSA reported the nationwide usage rate for seat belts as 90.4%. Oklahoma ranks 43<sup>rd</sup> in the nation for seat belt usage.

The OHSO reports that the seat belt use rate in Oklahoma fell from 85.6% in 2018 to 84.7% in 2019. The Click it or Ticket program was released over 15 years ago, and had its greatest influence in 2006. Yet 9.6% of passengers nationwide still do not buckle up.

According to NHTSA, wearing a seat belt reduces the risk of a fatal injury in a crash by nearly 50%.



Unrestrained Occupant Fatal Crashes

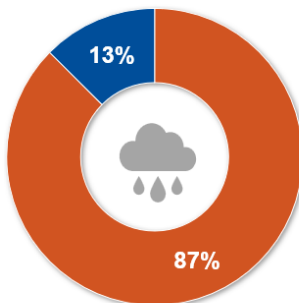


**36%** of fatalities and serious injuries involved a person who was not wearing a seatbelt.

Unrestrained Occupant Nighttime Crashes

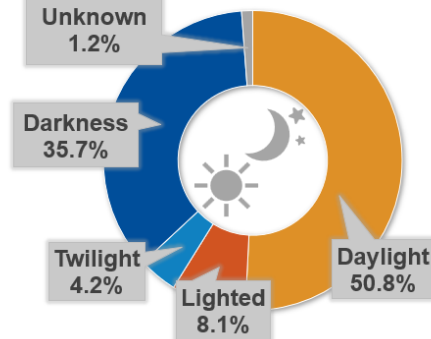


Unrestrained Fatal & Serious Injury Crashes by Precipitation Conditions

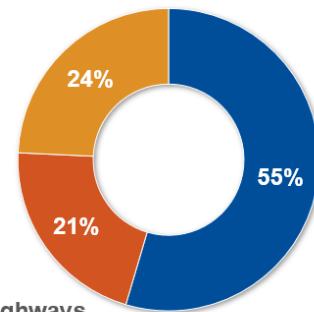


- Dry Road Conditions
- Wet or Other Road Conditions

Lighting Conditions of Impaired Driving Fatal Crashes



Unrestrained Fatal & Serious Injury Crashes by Road Type



- Highways
- City Streets
- County Roads



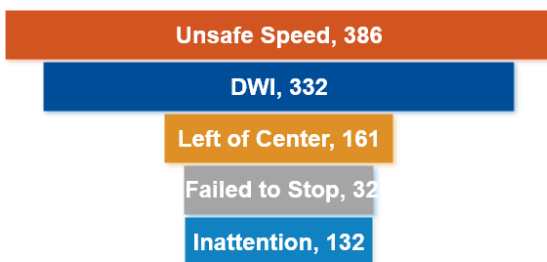
**41% of Unrestrained fatal crashes involved pickup truck drivers**



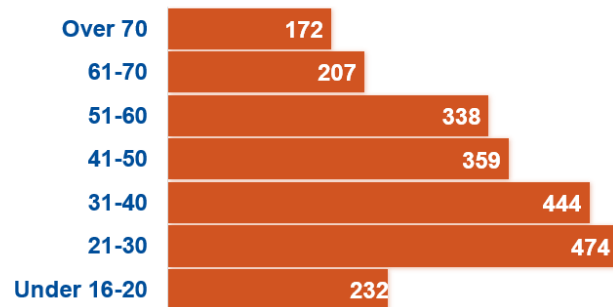
**1/3 of Unrestrained fatal crashes were Males under age 30**



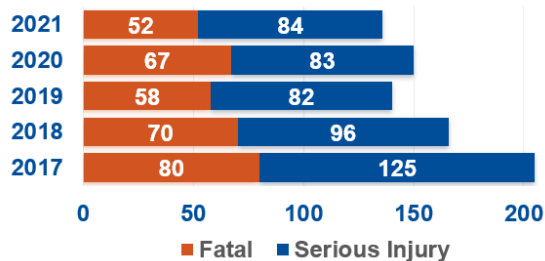
**Unrestrained Occupant Fatal Crashes due to Driver Behavior**



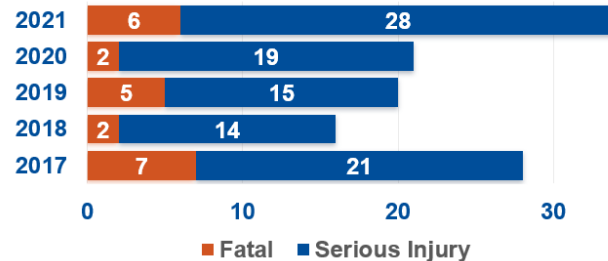
**Unrestrained Occupant Fatal Crashes by Age**



**Unrestrained Occupant DUI Crashes**



**Unrestrained Occupant Crashes Under Age 16**



Failing to wear a seat belt is a behavior that often overlaps with other behaviors that lead to similar severe crash outcomes (e.g., speeding, aggressive driving, and impaired driving).

As teens start driving and gradually gain independence, they may think they are invincible or believe they have the right to drive unbuckled. In 2019, 45% of teen drivers who died were unbuckled. When the teen driver involved in the fatal crash was unbuckled, 90% of the passengers who died were also unbuckled.

Nationwide, seat belt use during 2020 continued to be lower in rear seats (80.0%) than in front seats (90.3%). In 2020, 38% of children under 12 who were killed in crashes nationwide were unbuckled. At this time in Oklahoma, children over the age of 8 are not required to wear a seatbelt when riding in the back seat. Failure to wear a seatbelt or properly restrain young children is one of the most common risky behaviors that increases the severity of a crash.



Source: OHSO

The University of Central Oklahoma uses NHTSA's approved methods to conduct the State's annual occupant protection and child restraint survey. Both nationally and in Oklahoma, motor vehicle crashes are the leading cause of death for children. Most child safety seats are used improperly even though trained child passenger safety technicians are available statewide.

Eligible families may qualify for infant car seats and booster seats free of charge. Booster seats are for children over the age of four but under the age of eight. In the Fall of 2022, the Oklahoma Department of Health held a series of events with technicians throughout the state to evaluate infant car seats and booster seats for children and whether they are tall enough (4'9") to ride in the back seat without a booster seat.

The OHSO reports that proper use of child restraint systems is effective in reducing the number and severity of injuries to children in motor vehicle crashes. Safe Kids Coalitions lead Child Passenger Safety (CPS) efforts in the State of Oklahoma with locations primarily in Oklahoma City and in Tulsa.

As stated earlier, the 2020 - 2045 Oklahoma LRTP lists increasing seat belt usage as a goal. An important step in this direction is Senate Bill 681. The proposed law would require any passenger in the back seat of a car that is under the age of 16 to wear a seat belt.

The Center for Disease Control recommends seat belt laws as being most effective when they cover occupants in all seats of the vehicle. Children whose parents or caregivers buckle up are much more likely to buckle up themselves.

Increasing educational and enforcement strategies are critical to ensuring the current rate of seat belt and child restraint system usage and ensuring their use becomes a habit for the next generation.

An additional unsafe behavior is driving while intoxicated – between 2017 to 2021, seat belt usage for DWIs averaged 41%. In other words, for those who choose to drink and drive, 41% of those who suffer serious injuries or fatalities were unlikely to wear their seat belt.



In 2020, among young adults (nationwide) aged 18 to 34 killed in passenger vehicle crashes, 60% were completely unrestrained — one of the highest percentages for all age groups.

Compared with younger drivers, older drivers usually wear seat belts and do not drive impaired. Even so, due to the force in a crash, the aging driver is more susceptible to injury. Furthermore, fragility of older drivers makes surviving a crash more difficult.

Nationwide, women are more likely to wear seat belts than men. In Oklahoma, 72% of drivers under the age of 30 who chose to drive without a seatbelt were males involved in fatal crashes.

A common misconception is that the larger size of pickup trucks will protect occupants better in a crash. The numbers say otherwise: 62% of pickup truck occupants who were killed in 2020 were not wearing a seatbelt compared to 47% of passenger car occupants.

The OHSO recommends addressing the low usage rates among the occupants of pickup trucks. If more occupants of pickup trucks used their seatbelts, then the state's overall usage rate would significantly improve. Regardless of vehicle type, seat belt use is the single most effective way to stay alive in a crash.

As a proven strategy high-visibility enforcement (HVE) focuses on specific violations such as impaired driving, failure to wear seatbelts, and speeding. Additional HVE strategies may include the use of integrated enforcement during specific times of the day or night where more crashes are occurring as well as increased nighttime seat belt enforcement activities.

OK SAFE is a partnership between students, law enforcement, and traffic safety advocates designed to bring awareness to the importance of wearing seat belts among Oklahoma's high

school students. The project will maintain efforts already established with at least 20 Oklahoma schools and expand the program to new schools that are not currently participating.

Promoting and supporting occupant protection education and enforcement efforts means the OHSO emphasizes the increased risk of death or injury because of ejection from the vehicle. The OHSO oversees the Occupant Protection programs to determine if projected activity milestones are being met, funds are being utilized properly, and assist as needed to facilitate project activities and to meet performance targets.

Oklahoma Governor Kevin Stitt is supporting increased seat belt usage statewide as one of the state's Top Ten initiatives with a goal of increasing usage by 10 percent. Raising seat belt usage from today's 84 percent to 94 percent will bring Oklahoma into the Top Ten nationally, but more importantly it could significantly lower the loss of life on our highways. In March and October of 2021, the Oklahoma Transportation Cabinet emphasized "Seat Belt Safety" in their public education campaign.

Although seatbelts are of utmost importance, emerging technology includes improved safety features such as airbags and other vehicle structural features. Reaching the TZD goal means that everyone needs to buckle their seat belts whenever they drive. For Emphasis Area Action Plan strategies and performance measures, see Appendix A.



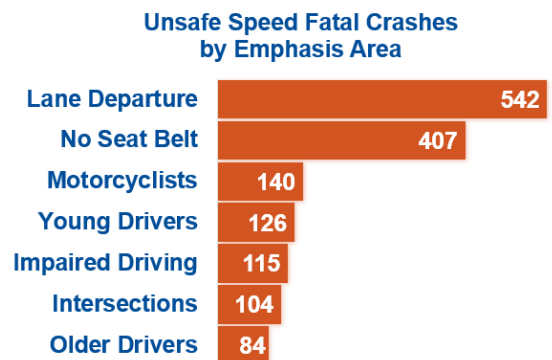
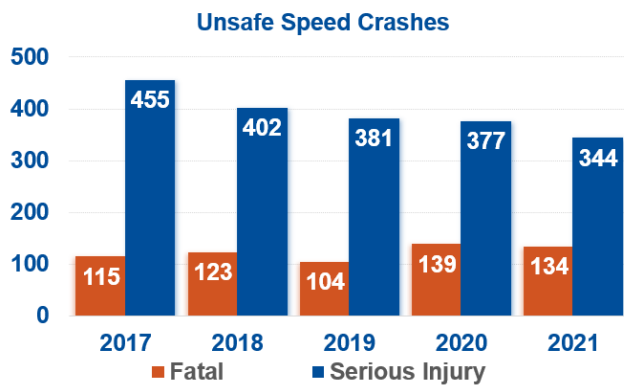
Source: <https://www.drivesafelyoklahoma.com/seat-belt-safety>

# Unsafe Speeds

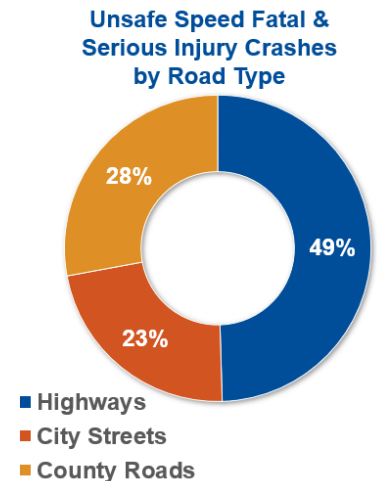
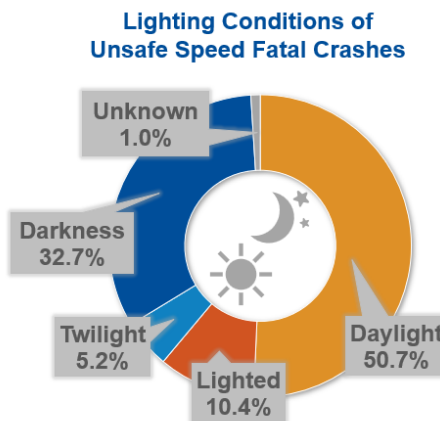
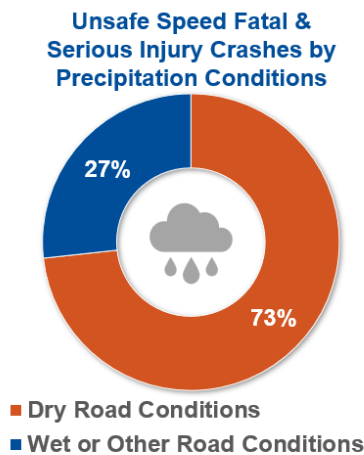


## Unsafe Speeds

Crashes involving unsafe speeds are the fourth most common type in Oklahoma. Yet the true impact of unsafe speeds is likely even greater, as unsafe speeds are often under-reported as a contributing factor of a crash. The greater a vehicle's speed, the greater the likelihood of a crash, and the greater the severity of that crash. Speeds can be influenced by enforcement, speed limit laws, engineering design, and education / culture. Each of these influences serve an important role in the outcome of a safe speed that the person driving chooses.

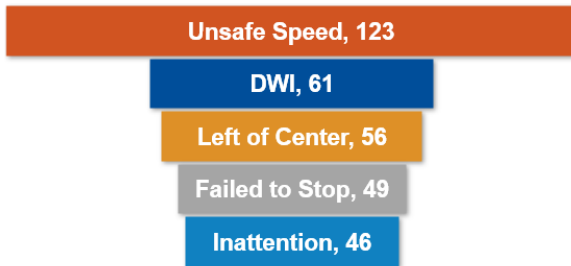


**615** of fatal collisions were due to Unsafe Speeds

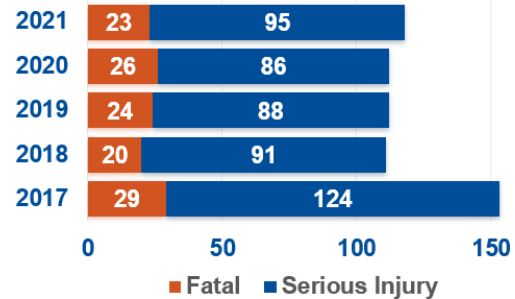




### Unsafe Speed Fatal Crashes due to Driver Behavior



### Unsafe Speed Crashes of Young Drivers



## 22% of teen fatal crashes were due to Unsafe Speeds



According to the NHTSA, speeding is defined as “exceeding the posted speed limit or driving too fast for conditions.” Higher vehicle speeds and aggressive driving habits pose an inherent safety risk to all users of Oklahoma’s transportation system.

Aggressive driving includes poor driving behaviors such as disregarding traffic signs, running a red light, exceeding the posted speed limit, driving too fast for conditions, improperly passing, following too close, or operating a vehicle in an erratic, reckless, or careless manner.

Speeding involves public attitudes, road user behavior, vehicle performance, roadway design and characteristics, posted speed limits, as well as enforcement strategies. For more than a decade, fatal crashes related to speed have remained at 32%.

Speed limits are usually regulated by state and local governments in the interest of public safety. Speeding violations are often the most common reason for traffic stops, enabling law enforcement officers to detect impaired drivers, identify occupant protection violations, and address other traffic safety and/or criminal issues.

Source: ODOT

Although speeding is an unsafe driving behavior, most people admit they speed at least some of the time. Nevertheless, speeding is an aggressive driving behavior that increases the chances of a crash becoming more severe.

Fatal crashes that involve very high speeds often occur on rural roads. Furthermore, states with high maximum speed limits tend to have higher per capita rates of fatalities on rural roads than states with lower maximum speed limits. When maximum interstate speed limits are high, even local roads show a higher proportion of rural road fatalities. Out of the 12 states that have the highest fatality rates per capita, 10 have maximum speed limits of at least 70 miles per hour. In Oklahoma, the maximum speed limit for rural roads is 75 mph.

Lane departure crashes often involve only one vehicle traveling at a high speed and result in fatalities or serious injuries. As drivers increase travel speed on rural roads, rates for single-vehicle crashes increase too.

Young drivers tend to have higher crash rates than older more experienced drivers. Inexperience, unsafe driving behaviors, and driving errors contribute to the high rate of collisions among young drivers. Data shows that younger drivers into their twenties are the highest age group to be killed on rural roads. Young and inexperienced drivers may underestimate the effects of speed on crash probability and severity.

According to NHTSA, speeding is a critical safety issue for teen drivers. In 2019, speeding was a factor in 27% of the fatal crashes that involved teen drivers (15-18 years old) of passenger vehicles. Inclement weather, traffic stops, and winding roads can be dangerous for teen drivers who choose to speed. In Oklahoma, 88% of young drivers who were charged with unsafe/unlawful behavior were driving at an unsafe speed.

Driving studies indicate that speeding behavior for teens increases over time, possibly as they gain confidence. As the leading cause of death among young drivers, motor vehicle crashes are recognized nationwide as a serious health issue for young people.

The NHTSA is committed to addressing the dangers of speeding and the importance of obeying posted speed limits by increasing public awareness. The NHTSA offers a Speed Management Program course that uses a multidisciplinary approach to reduce speeding-related fatalities and injuries.

Appropriate speeds are obtained by applying road design and engineering measures, setting speed limits that are safe and reasonable, enforcing them, and influencing culture where speeding is less socially acceptable. Each of these efforts alone is not enough, but together as a whole influence real change to affect safe speeds and save lives.



Source: ODOT

In August of 2021, the Oklahoma Transportation Cabinet emphasized “Hazards of Speeding School Zone Safety” in their public education campaign.

Emphasizing speeding and aggressive driving with the same intensity as seat belt use and impaired driving can contribute to achieving zero deaths and zero serious injuries on our nation's roadways. Ultimately, decisions about safe speed limits depend on societal risk tolerance, valuation of time, and willingness to ensure driver accountability.

A Safe System Approach underscores the important principle of safe travel speed. The Safe System Approach emphasizes that transportation system designers and engineers share responsibility for safe speeds for road users. Research and experience have shown that posted speed limits alone do not have a strong enough influence on drivers to reduce vehicle speeds. Implementing a Safe System Approach means:

- Setting safe speed limits
- Influencing drivers to slow down
- Mitigating crash angles to reduce impacts on the human body

As designers work to create safer roadways, encouraging road users to do their part means practicing safe driving behavior such as following posted speed limits and reducing traveling speeds in certain conditions. For Emphasis Area Action Plan strategies and performance measures, see Appendix A.





# Intersections

## Intersections

Intersections are a program focus area for the FHWA because each year nearly 25% of traffic fatalities and about 50% of all traffic injuries in the United States are attributed to intersections.

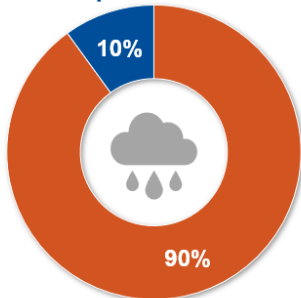
Intersection crashes are common in Oklahoma. From 2017 through 2021, there were 557 fatal crashes involving intersections; nearly 47% of fatal and serious injuries intersection crashes occurred on highway intersections.

Signalized and unsignalized intersections create an abundance of possible vehicle conflict points. Conflict points occur when vehicle paths merge, diverge, or cross within an intersection. Intersections include rail crossings.



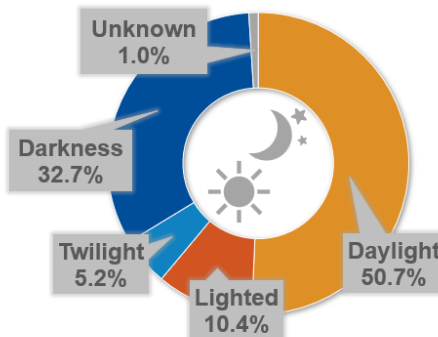
Source: ODOT

**Intersection Fatal & Serious Injury Crashes by Precipitation Conditions**

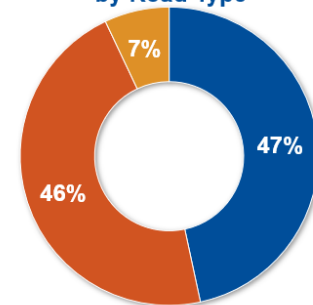


- Dry Road Conditions
- Wet or Other Road Conditions

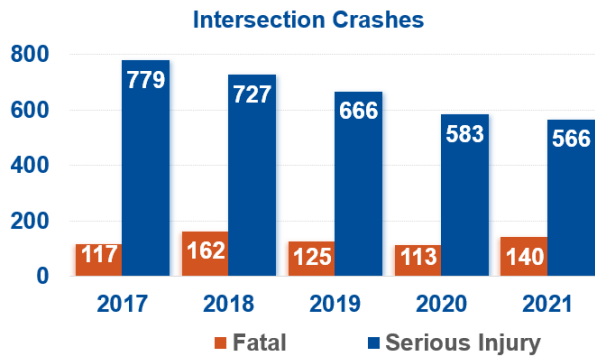
**Lighting Conditions of Intersection Fatal Crashes**



**Intersection Fatal & Serious Injury Crashes by Road Type**



- Highways
- City Streets
- County Roads



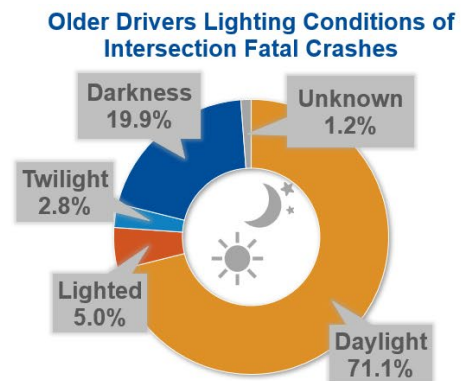
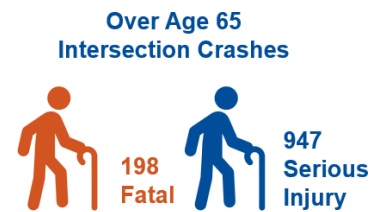
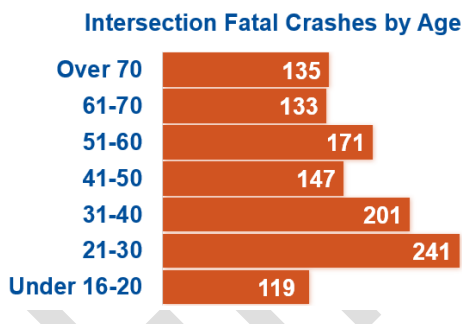
### Rail Crossing Crashes

**12 Fatal**  
**12 Serious Injury**

**55% of fatal crashes occurred in urban areas**



**68% of serious injury crashes occurred in rural areas**





Source: ODOT

Although traffic signals involve tradeoffs between safety and mobility, they are often chosen for operational reasons. Nationwide, signalized intersections represent about one-third of all intersection fatalities, including a large proportion that involve red-light running. As conflict points increase, driving conditions become more complex, and drivers are more likely to make mistakes such as failure to stop or failure to signal.

According to the GHSA, more Americans are outliving their ability to drive safely. Impairments such as vision, cognition and motor function affect older drivers who have a higher crash risk than middle aged adults. Secondary driving tasks may contribute to intersection crashes among older drivers.

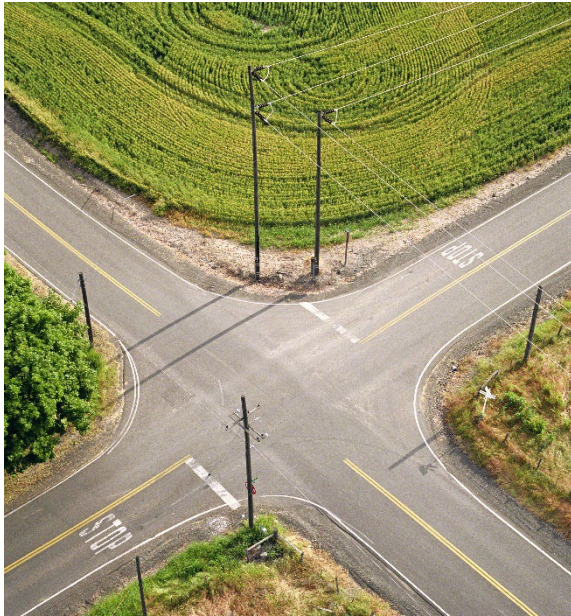
Older drivers are often cited for failure to yield the right-of-way. This means that older drivers are more likely to be involved in intersection crashes. Intersections are a problem for older drivers because aging often makes it difficult to judge the speed and distance of oncoming traffic when making a left turn or crossing a road. Declines in visual, cognitive, or physical abilities can make turning left, changing lanes, and navigating through intersections difficult for older drivers.

Fatalities often take place at intersections. Intersections should be evaluated based on traffic control and the predominant severe crash type to identify potential treatments. Like roadway departures, there are a variety of proven effective strategies for mitigating intersection-related fatalities and serious injuries.

As of 2018, ODOT implemented systemic and policy-driven intersection improvement strategies, including flashing beacons, retroreflective backplates for signals, intersection signalization, intersection traffic control modifications, intersection geometric modifications, and access modification.

A Safe System Approach emphasizes the design of an intersection, considering human behavior especially in terms of potential driver errors. Emphasizing the design of an intersection reduces

risk and, subsequently, death and serious injury related to traffic crashes (vehicle occupants, pedestrians, and bicyclists).



A Safe System Approach can be used to supplement a data-driven, performance-based framework called Intersection Control Evaluation (ICE) that means selecting the best intersection design for a specific location.

Since the Safe System Approach anticipates human errors, it can be used to enhance intersection safety for all road users. A Safe System Approach can include minimizing and modifying conflict points, reducing speed of vehicles, improving visibility at intersections, as well as providing space and protection for pedestrians and bicyclists.

Pursuing the TZD goal means preventing more crashes at intersections in Oklahoma. For Emphasis Area Action Plan strategies and performance measures, see Appendix A.

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# Commercial Motor Vehicles and Work Zones



Source: ODOT

## Commercial Motor Vehicles and Work Zones

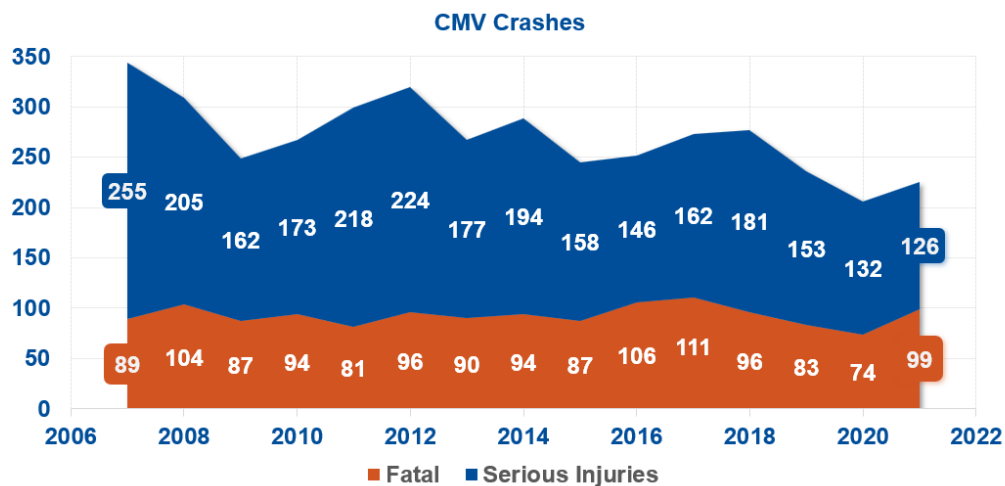
The FHWA, the NHTSA, and the Federal Motor Carrier Safety Administration (FMCSA), use the term Commercial Motor Vehicles (CMV) when referring to large trucks and buses with a gross vehicle weight or gross combination weight of 10,001 pounds or more.

The primary mission of the FMCSA is to reduce crashes, injuries, and fatalities involving large trucks and buses. Oklahoma is committed to FMCSA's traffic enforcement national priority and agrees that driver behavior is the leading cause of all traffic collisions including those involving CMV.

From 2017 through 2021, 85% of fatal crashes and serious injuries involving CMV crashes occurred on highways.

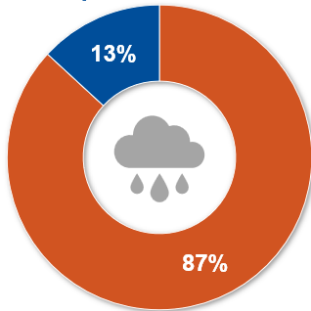
Collisions involving CMV result from CMV driver behavior as well as non-CMV driver behavior. Driver behavior issues include using cell phones, texting, inattention, speeding, unsafe lane changes, left of center, negligent driving and following too close. The State intends to conduct traffic enforcement activities when violations occur around CMV. Traffic enforcement activities will help educate drivers on how their behavior affects everyone around them.

Crashes involving CMV crashes in Oklahoma work zones are among the highest in the nation. A work zone is an area of a roadway where construction, maintenance, or utility work is occurring. During the past ten years, 5.8% of CMV fatal crashes took place within Oklahoma work zones.



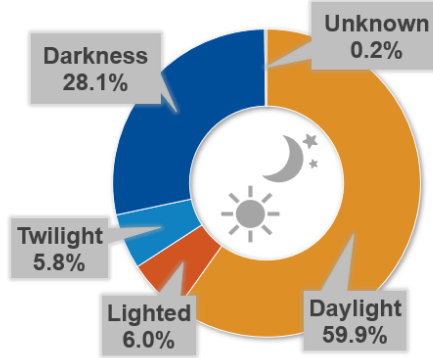


**CMV Fatal & Serious Injury Crashes by Precipitation Conditions**

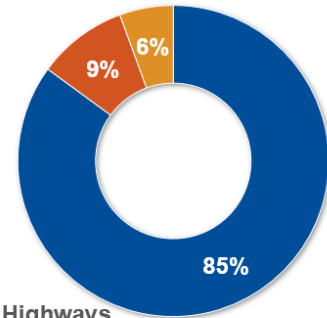


■ Dry Road Conditions  
■ Wet or Other Road Conditions

**Lighting Conditions of CMV Fatal Crashes**

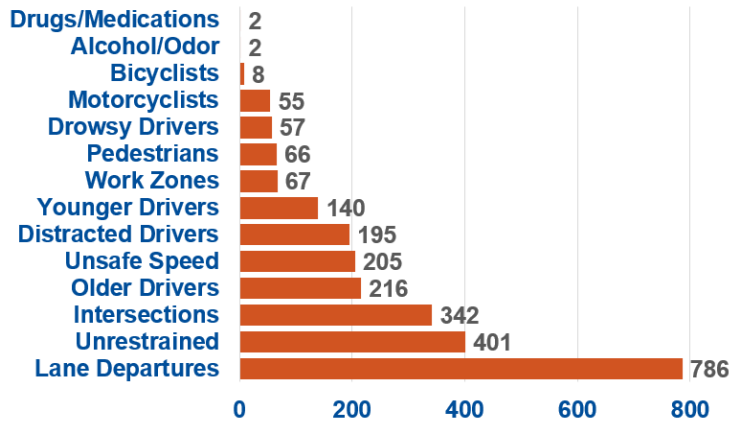


**CMV Fatal & Serious Injury Crashes by Road Type**



■ Highways  
■ City Streets  
■ Country Roads

**CMV Fatal & Serious Injury Crashes by Emphasis Area**

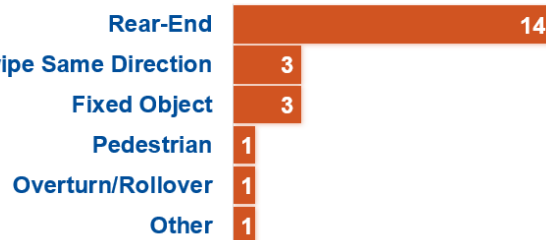


Source: ODOT

**25 Fatal & 42 Serious Injury CMV crashes occurred in work zones**



**Fatal CMV Workzone Crashes by Type of Collision**



Distracted driving resulting in fatal crashes remains a problem primarily within Oklahoma City limits and along I-35 south of the OKC Metro.

Between 2017 and 2021, there were three fatal crashes within work zones due to distracted driving within Oklahoma City limits.

Oklahoma's 2015 law prohibits texting while driving, but only novice drivers and bus drivers are prohibited from talking on cell phones while driving.

Other drivers will not be pulled over and ticketed for talking on cell phones or using its GPS navigation unless it is observed by law enforcement to impact the safe driving of the vehicle.

From 2017 through 2021, there were 516 fatal collisions involving young drivers. Fifteen fatal crashes involving young drivers occurred in work zones. The ODOT has implemented a program called Oklahoma Work Zone Safe to reach teen drivers aged 15-19 with three key principles in work zone safety: safe drivers, signs & laws, and the faces that serve us. Teen drivers who successfully complete the course receive a \$500 Oklahoma 529 Educational Scholarship from the Association of Oklahoma General Contractors.

In Oklahoma, a large volume of road construction means increased CMV collisions. Making safety a priority for work zones can be achieved through education of engineers who approve traffic planning on site. Monitoring this aspect of the SHSP can be achieved through the annual Action Plan.



Source: ODOT

The Oklahoma Highway Patrol (OHP) is dedicated to protecting the lives and property of the people of the State of Oklahoma. As part of the OHP, Troop S is dedicated to the goal of reducing the number of CMV collisions. Troop S:

- conducts six levels of roadside inspections
- focuses on CMV traffic enforcement

Troop S has a roadside inspection program with employees that are trained to inspect CMV at ports of entry located in the following counties: Beckham, Kay, Love, and Sequoyah. Troop S conducts education and outreach on a quarterly basis or upon request.

Troop S has set a multi-year goal of reducing collisions involving large trucks and passenger carriers by 2% each calendar year with an overall reduction of 6% at the end of FFY 2021.



Source: ODOT

Although Troop S has put forth a great deal of effort, the pandemic (less traffic led to unsafe speeds) may be a factor in the higher fatalities for 2021. The main culprit for CMV crashes in 2020 and 2021 were pickup trucks and trucks hauling trailers. Most of these collisions took place during the work week.

Troop S has determined to increase the total number of inspections initiated by traffic enforcement stops. Additional enforcement will help change driver behavior, reducing the number of CMV crashes statewide. A public education and outreach program has been designed to provide information on a variety of traffic safety issues related to CMVs and non-CMV that operate around large trucks and buses.

The Commercial Motor Vehicle Safety Plan (CMVSP) reflects the Motor Carrier Safety Assistance Program (MCSAP). The goal of the MCSAP federal grant program is to reduce CMV involved crashes, fatalities, and injuries through consistent, uniform, and effective CMV safety programs. The online CVSP tool (eCVSP) outlines the State's CMV safety objectives, strategies, activities and performance measures.

As emerging technologies, such as collision avoidance, electronic logging devices, advanced telematics, and increasing levels of driver assistance – are implemented, the number of collisions involving CMV crashes are expected to decrease.

Reaching the TZD goal means preventing as many CMV crashes as possible. For Emphasis Area Action Plan strategies and performance measures, see Appendix A.



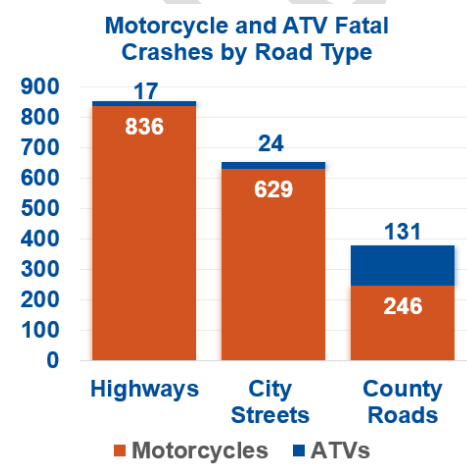
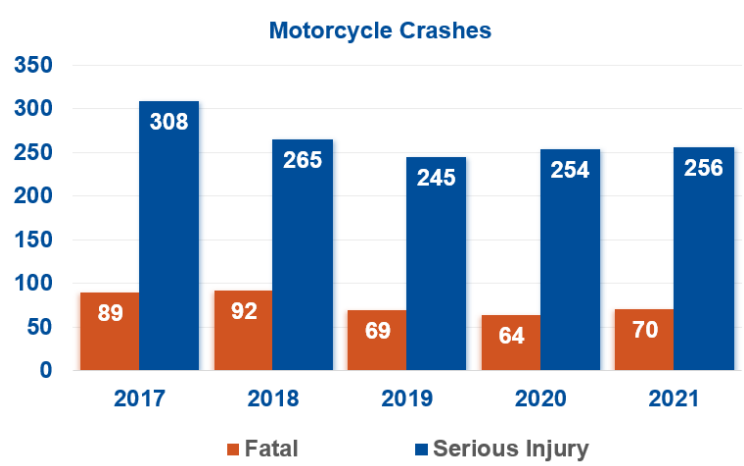


# Motorcycle and All-Terrain Vehicle Crashes

## Motorcycle and All-Terrain Vehicle Crashes

When it comes to crashes, motorcyclists are no match for cars, trucks, or even curves. Motorcyclists can avoid crashes by reducing speed when approaching curves, especially if the curve is sharp or the roads are wet.

From 2017 through 2021, there were 377 fatal collisions involving motorcyclists and 172 collisions involving ATVs on public roads. This data does not include the number of ATV crashes that occurred on private property.



**75%** of ATV crashes occurred on County Roads





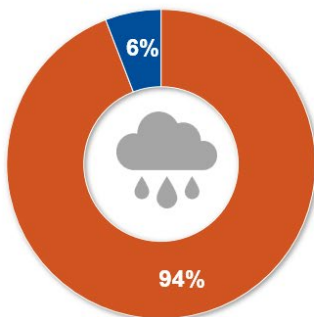
**70%**  
of motorcyclist  
fatalities were not  
wearing a helmet.



**ZERO**  
ATV drivers  
involved in fatal  
crashes were  
wearing helmets

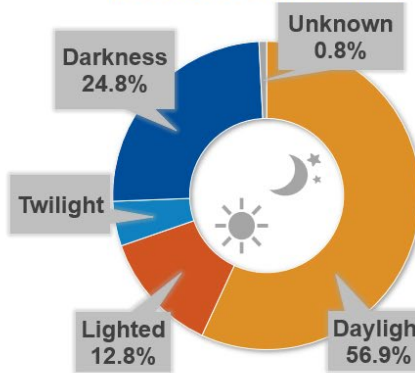


Motorcycle & ATV Fatal & Serious Injury Crashes by Precipitation Conditions

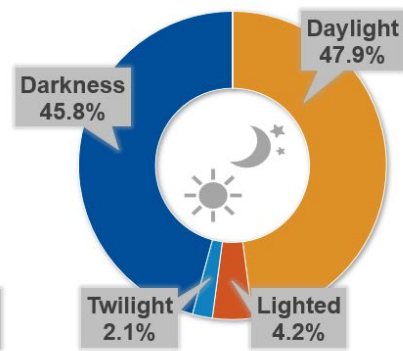


- Dry Road Conditions
- Wet or Other Road Conditions

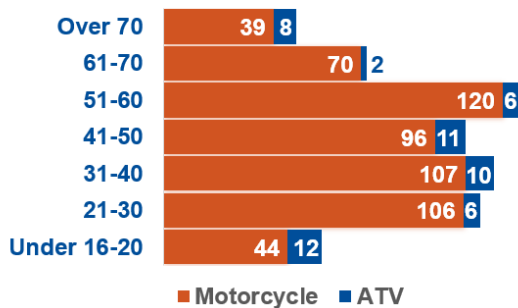
Lighting Conditions of Motorcycle Fatal Crashes



Lighting Conditions of ATV Fatal Crashes



Motorcycle & ATV Fatal Crashes by Age



Fatal crashes were  
highest for  
motorcyclists  
between the  
ages of 51 to 60

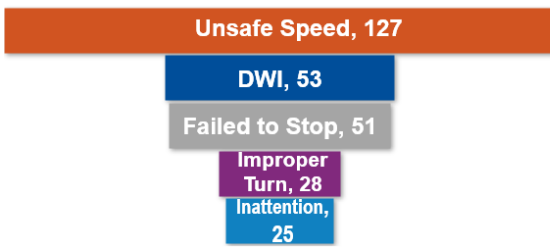


In 2011, OHP received a grant and entered into an agreement with the ODOT to promote Motorcycle Safety Education. The Motorcycle Division offers free classes to the public statewide. The OHSO has implemented motorcycle safety countermeasures through local police departments located in Broken Arrow, Edmond, and Tulsa. Technology centers located in Lawton, Ardmore, Altus, Elk City, and Norman also provide motorcycle rider training. An OHSO Program Manager oversees the selected Motorcycle Safety programs.



Source: OHSO

**Motorcycle Fatal Crashes Due to Driver Behavior**



**ATV Fatal Crashes Due to Driver Behavior**



Source: OHSO

In July of 2021, the Oklahoma Transportation Cabinet emphasized “Share the Road: Truck, Motorcycle Safety” in their public education campaign.

Reaching the TZD goal means preventing as many motorcyclist crashes and ATV crashes as possible. Unsafe speed is the number one factor for motorcyclists as well as ATVs.

For Emphasis Area Action Plan strategies and performance measures, see Appendix A.

# Vulnerable Road Users

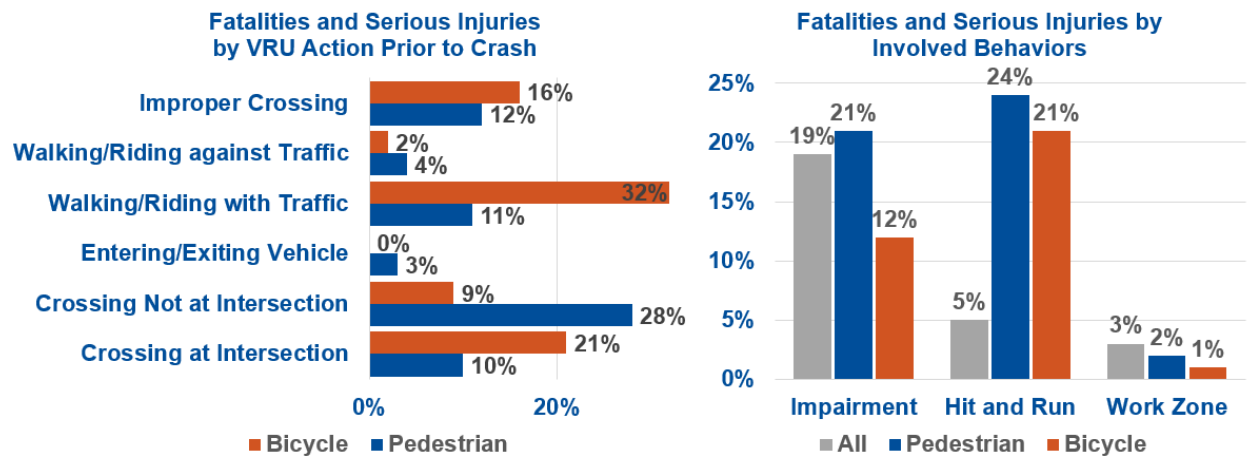


Source: Google Streetview

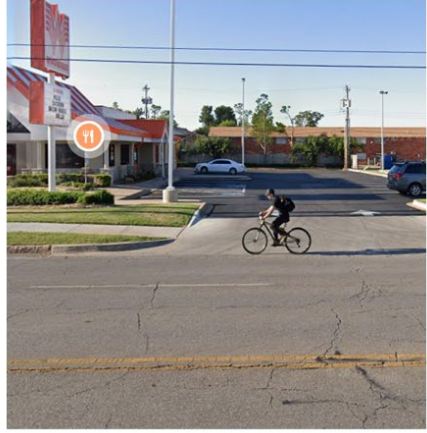
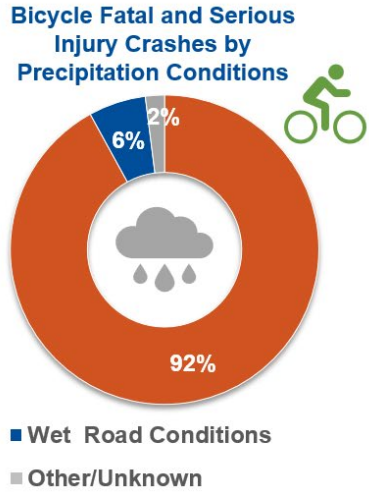
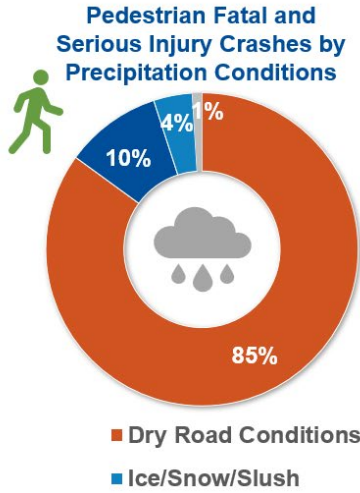
## Vulnerable Road Users

The National Safety Council describes VRU as “those unprotected by an outside shield, as they sustain a greater risk of injury in any collision with a vehicle and are therefore highly in need of protection against such collisions. This broad definition can include (but is not limited to): a pedestrian; a roadway worker; a person operating a wheelchair or other personal mobility device, whether motorized or not; a person operating an electric scooter or similar; and a person operating a bicycle or other nonmotorized means of transportation.”

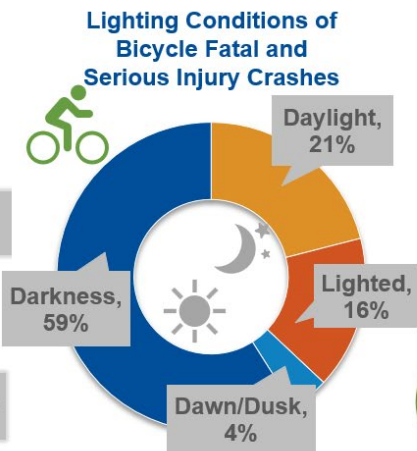
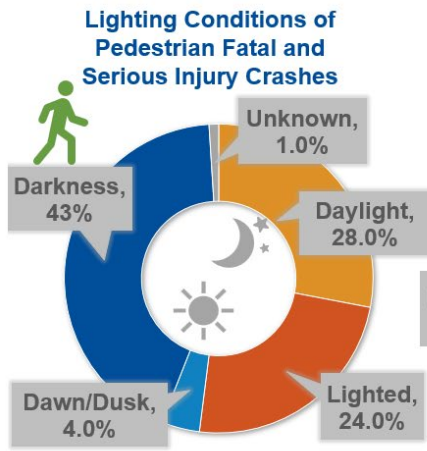
In Oklahoma, VRU deaths have increased and reached the highest number in the last decade. In 2021, alone, 115 people killed while walking, bicycling, or rolling. From 2017 through 2021, there were 476 people fatalities reported involving VRUs.



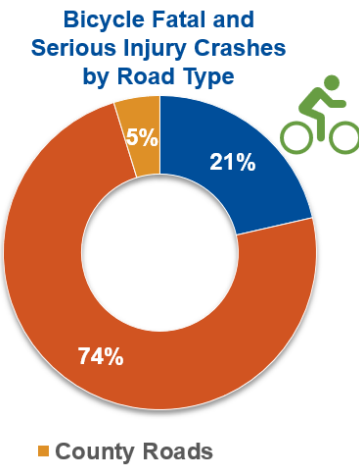
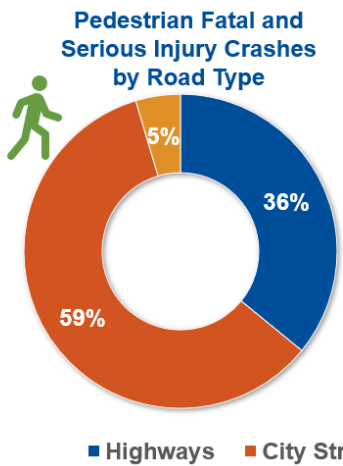
Between 2017 and 2021, pedestrian and bicycle fatalities and serious injuries were most prevalent in the early and late evening hours throughout the week and particularly over the weekend, when many crashes occur after midnight. This trend is consistent with other findings that show a high prevalence of severe pedestrian crashes in dark, unlit conditions. Additionally, an elevated rate of pedestrian crashes was seen during weekday commuting hours, especially in the evenings when many pedestrians will be commuting and dealing with elevated motorist volumes as well.



Source: Google Streetview



**Fatal and Serious Injury VRU crashes occur more often between 6:00 p.m. and 12:00 a.m.**



**...and more often on Wednesdays, Fridays, and Saturdays than other days of the week.**





Impairment involvement and hit and run crashes are a major issue for vulnerable road users in the state of Oklahoma. Of all pedestrian fatalities and serious injuries, 21% involved alcohol and/or drug impairment, and 24% of crashes were classified by the reporting officer as hit and run. Bicyclist fatalities and serious injuries exhibit similar but slightly less elevated patterns, with 12% involving impairment and 21% being hit and run. These patterns may relate to the elevated frequencies of vulnerable road user crashes occurring during late evening hours, when motorists may be more likely to be driving while intoxicated.

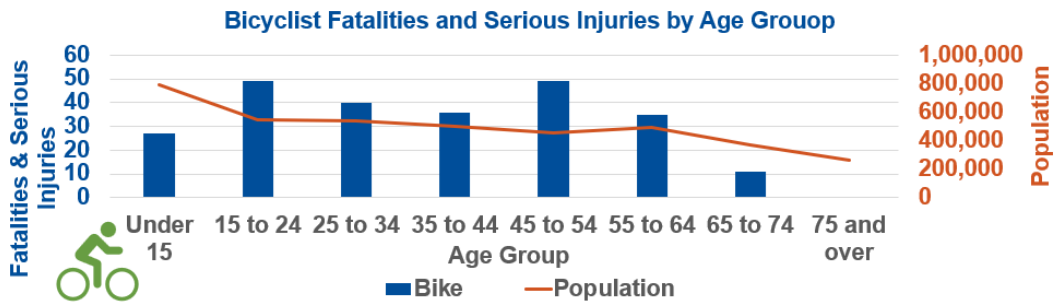
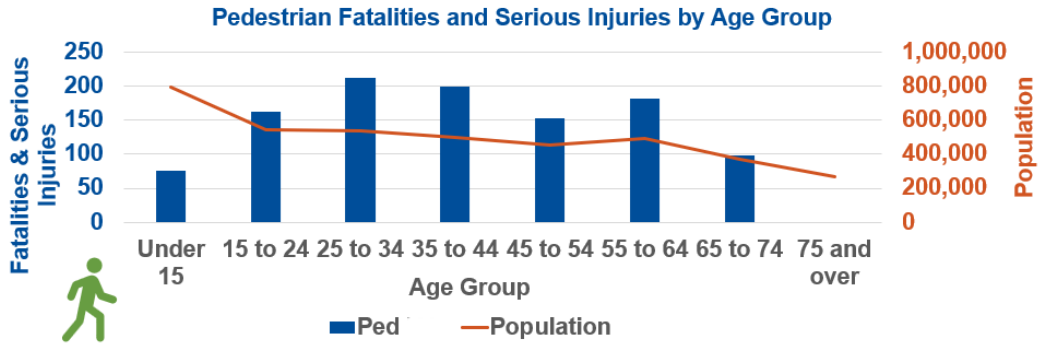
Fatalities and serious injuries occurring within defined work zones was also studied, noting approximately 2% and 1% of all pedestrian and bicyclist injuries occurring within work zones, respectively. Unusual traffic patterns in these work zones may contribute to these events, as well as the presence of workers, classified as pedestrians in the analyzed crash data, in vulnerable positions in work zones.

In Oklahoma, approximately 20% of the population is below the age of 15. Among these young residents, there were 76 pedestrian-related fatalities and serious injuries over the 2017-2021 study period, representing approximately 7% of fatalities and serious injuries across all ages. Though this is a relatively small proportion given their share of the population, it still represents a large number of children who are experiencing poor safety performance. Pedestrians aged 25-65 are consistently overrepresented in all age groups relative to their share of the population, likely reflecting higher numbers of trips traveled by these residents who may make frequent trips for daily commutes, errands, and more.

Similar to pedestrians, there were 27 bicyclist fatalities and serious injuries among children under the age of 15 over the 2017-2021 study period, representing approximately 11% of fatalities and serious injuries across all ages. Though this is a relatively small proportion given their share of the population, it still represents a large number of children who are experiencing poor safety performance as they ride their bikes. Bicyclists aged 45-54 are particularly overrepresented in terms of crash frequency, with 49 fatalities and serious injuries during the study period, making up 20% of all fatalities and serious injuries despite only representing about 11% of Oklahoma's population.

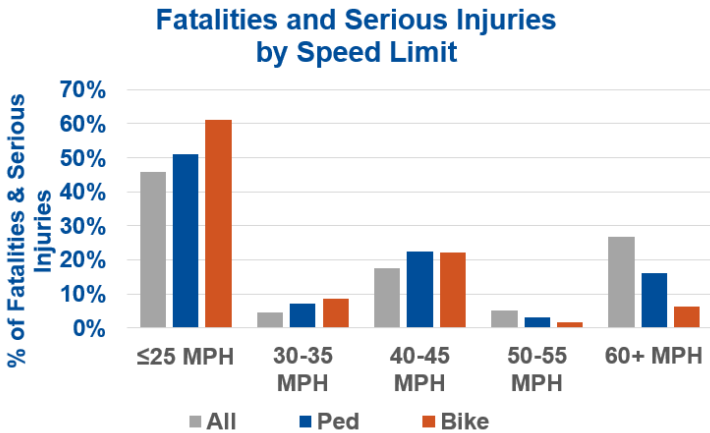


Source: ODOT



## SUVs and Pickup Trucks were involved in 53% of pedestrian and 48% of bicycle fatal and serious injury crashes.

The types of vehicles involved in vulnerable road user collisions can have a significant impact on outcomes. Larger, heavier vehicles tend to cause more severe injuries due to increased kinetic energy involved in collisions.



VRU crashes occur most frequently on facilities with speed limits of 25 MPH or lower. However, this represents a large portion of the state's roadway network, including many neighborhood streets that have pedestrian and bicycle facilities. Approximately 20% of pedestrian and bicyclist injuries are also occurring on mid-speed roads with speed limits of 40-45 MPH.

## Summary of Key VRU Findings

**Oklahoma is experiencing an increase in pedestrian fatalities.** Over the study period, a slight increase in pedestrian fatalities and serious injuries was noted, indicating a strong need for additional investment and effective planning. Bicycle fatalities and serious injury were found to be fairly study during the study period. Though this may appear less urgent than the pedestrian safety concern, it is still highly important to invest in improvements to bicycle safety across the state to ensure that the numbers begin decreasing.

**Opportunities to improve the safety of vulnerable road users in dark conditions.** Analyses found a large number of pedestrian and bicyclist crashes occurring at night, with many occurring in dark, unlit conditions. This points to a need to invest in infrastructure and policies that will help improve safety for these trips.

**Many vulnerable road users are killed or seriously injured during hit and run events.** Nearly a quarter of all vulnerable road user fatalities and serious injuries were found to involve hit and run crashes. This limits accountability for poor safety behaviors and may correlate to other unsafe behaviors leading up to the crash, such as impaired driving.

**Pedestrians are crossing roads at unsafe locations.** These unsafe behaviors may be indicative of roadway facilities which are not effectively serving vulnerable road users. Avoiding these behaviors may involve installation of additional crossing locations at busy pedestrian areas where the distance between crossing locations is long, improving motorist compliance with existing uncontrolled crossings, and providing traffic calming or reducing speed limits in pedestrian-heavy areas where these behaviors often occur to reduce the frequency and severity of these crashes when such crossings are made.

**Bicyclists are being injured while riding along with traffic.** Though this is generally the correct way to maneuver a bike in the presence of vehicular traffic, the prevalence of crashes under these conditions indicates a need for expanded bike facilities on roadways with histories of bicycle crashes or known popular routes.

**Pedestrian and bicyclist fatalities and serious injuries are highly overrepresented in disadvantaged communities.** Based on definitions in the Justice40 data set, disadvantaged communities represent higher frequencies of pedestrian and bicyclist fatalities and serious injuries. This may relate to lower rates of vehicle ownership and generally higher volumes of necessary active mode trips in these communities. This also means that the impacts of unsafe facilities may have stronger negative economic and social impacts on these communities which already experience other vulnerabilities.

Encouraging an increase in active transportation means addressing safety conditions that often are a deterrent to walking and cycling. An integrated approach that involves the 4 E's (Engineering, Enforcement, Education, and Emergency Medical Services) can improve pedestrian and bicyclist safety. Emerging technologies such as vehicle technology and design play an important role in a Safe System Approach for pedestrians and bicyclists.

In January of 2021, the ODOT and the Oklahoma Turnpike Authority launched a new, year-round safety education effort. The Make Safety Stick: Everybody Click initiative focused on a different highway safety topic each month. In May of 2021, the Oklahoma Transportation Cabinet included "Bicycle, Pedestrian Safety" in their public education campaign.



The OHSO sponsors programs through ACOG and INCOG to enhance safety for pedestrians and bicyclists. Oklahoma City uses the Watch for Me OKC program to provide:

- Information pertaining to laws and regulations for pedestrians and bicyclists
- Tips for driving, walking, and cycling in a safe manner
- Encouragement for increasing the number of people using active means of transportation

The OHSO also identifies Safe Kids Oklahoma (SKO) as a resource that uses qualified, experienced employees, contract labor and community partners to implement pedestrian and bicyclist safety education through events and activities such as:

- Walk This Way
- International Walk to School Day
- Spot the Tot
- Bike Rodeos
- Bike to School Day
- Other related events/activities targeting children who walk, or bike to school



In Oklahoma, the Transportation Alternatives program funds projects that prioritize the safety, comfort, and connectivity to destinations for pedestrians and bicyclists. An environment that separates people traveling at different speeds prevents the potential conflict that can lead to crashes and is in alignment with the Safe System Approach.

A VRU Assessment, compliant with the FHWA guidelines is provided in Appendix B.

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# IMPLEMENTATION

# 4



## IMPLEMENTATION

Implementation and evaluation of the SHSP means regarding the SHSP as a living document that evolves as goals, strategies, and safety data change. The FHWA determines policy guiding the implementation and evaluation of the SHSP.

The implementation process has been customized according to the needs of Oklahoma. SHSP implementation for Oklahoma is based upon the Safe System Approach and traffic safety culture with TZD as the final goal.



Source: ODOT

Implementation consists of four fundamental elements: leadership, collaboration, communication, as well as data collection and analysis.

- Establishing SHSP leadership through the Governor's office communicates the importance of highway safety for the public. (See Executive Summary)
- Collaboration between stakeholders and safety partners builds trust and understanding. (See Thank You to Safety Partners for Collaboration)
- Effective communication means identifying stakeholders dedicated to safety and transparency who support sharing information to facilitate decision-making.
- Data collection and analysis is essential because the SHSP is a data driven process critical for prioritizing countermeasures and for developing effective safety programs.

## Evaluation

The FHWA requires evaluation of the Strategic Highway Safety Plan to help confirm the validity of the emphasis areas, the effectiveness of strategies, and identify any issues related to the SHSP process, implementation, and progress.

Multidisciplinary stakeholders are necessary for evaluating results and updating the emphasis area action plans. Coordinating with stakeholders and safety partners for alignment of goals, objectives, and strategies strengthens SHSP implementation and evaluation efforts. These efforts lead to more efficient and effective road safety practices. An effective marketing strategy informs the public concerning transportation safety issues and encourages active participation among safety partners.

The FHWA developed the SHSP Evaluation Process Model (EPM) to assist States with conducting a program evaluation of their SHSP. An EPM helps answer important questions concerning the effectiveness of the SHSP. SHSP program evaluation is composed of two equally important components – process evaluation and performance evaluation.

## Process Evaluation

Process evaluation assesses the procedural, administrative, and managerial aspects of the SHSP (such as leadership, SHSP structure, partners, collaboration, and communication, etc.). Process evaluation identifies opportunities to improve the overall SHSP process.

The SHSP process reflects organizational structure, multidisciplinary collaboration, methods for setting goals and objectives, data driven emphasis areas, as well as aligned agency priorities. A memorandum of understanding can be useful for institutionalizing the collaborative multidisciplinary nature of the SHSP process. The evaluation process should be documented, serving as a reference for new staff members.

## Performance Evaluation

Performance evaluation measures progress and productivity, keeping the SHSP process open to feedback, change, and improvement. Performance evaluation examines the outputs and outcomes resulting from SHSP implementation. It tracks performance measures and assesses the degree to which the SHSP is meeting goals and objectives. Important methods of evaluating outcome are trend analysis, attitude and behavior analysis, benefit/cost analysis, survey, and other data.

For more information, see The Strategic Highway Safety Plan Implementation Process Model - Safety | Federal Highway Administration (dot.gov)

[https://safety.fhwa.dot.gov/shsp/epm/pdf/shsp\\_epm\\_report.pdf](https://safety.fhwa.dot.gov/shsp/epm/pdf/shsp_epm_report.pdf)

<https://safety.fhwa.dot.gov/shsp/guidebook/ch5.cfm#ch52>

Reviewing the previous year's accomplishments and determining the current years anticipated work plan will ensure continual implementation of strategies and completion of the various Emphasis Area action plans. Each year, the Action Plan will report progress. Annual federal reporting requirements such as the HSIP Annual Report and the HSP will also report progress.

Effective strategies and effective allocation of resources depend on continued evaluation of the SHSP. This means reviewing fatality and serious injury crash data on an annual basis. The data analysis will identify progress towards achieving SHSP objectives for each emphasis area.

Reviewing evaluation results mean staff members can identify and document ways to improve SHSP process and performance. Results of process and performance evaluation increases necessary commitment and improves the SHSP, laying the foundation for the new SHSP cycle.



## THANK YOU TO SAFETY PARTNERS FOR COLLABORATION

The 2023 SHSP coordinated the efforts of all agencies and stakeholders that have a role in highway safety. ODOT recognizes the agencies and organizations listed here for their contributions to this plan and continued commitment to improving traffic safety across Oklahoma. These include, but are not limited to:

### SHSP Executive Committee

ODOT- Secretary of Transportation Tim Gatz

Oklahoma DPS- Commissioner Tim Tipton

OHP- Chief of Highway Patrol Pat Mays

OHSO- Director Paul Harris

OTA- Deputy Director Joe Echelle

EMS- Program Manager Dale Adkerson

FHWA- Division Administrator Basharat Siddiqi

NHTSA- Region 6 Administrator Maggi Gunnels

FMCSA- OK Administrator Larry Ramsey

### SHSP Implementation Team Agencies

Association of Central Oklahoma Governments (ACOG)

Frontier Metropolitan Planning Organization (Frontier MPO)

Indian Nation Council of Governments (INCOG)

Lawton Metropolitan Planning Organization (Lawton MPO)

Local Technical Assistance Program (LTAP)

National Safety Council (NSC)

Northern Oklahoma Regional Transportation Planning Organization (NORTPO)

Oklahoma Association of County Commissioners

Oklahoma Association of County Engineers

Oklahoma Department of Health

Oklahoma Department of Public Safety (DPS)

Oklahoma Highway Patrol (OHP)

Oklahoma Turnpike Authority (OTA)

South Central Oklahoma Regional Transportation Planning Organization (SCORTPO)  
Southwest Oklahoma Regional Transportation Planning Organization (SORTPO)  
Tribal Technical Assistance Program (TTAP)

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## ACRONYMS

AASHTO	American Association of State Highway Transportation Officials
ATV	All-Terrain Vehicle
BAC	Breath Alcohol Content
BTD	Breath Test Device
CDL	Commercial Driver License
CMV	Commercial Motor Vehicle
CPS	Child Passenger Safety
CVSP	Commercial Vehicle Safety Plan
DPS	Department of Public Safety
DUI	Driving Under the Influence
DWI	Driving While Impaired
EMS	Emergency Medical Services
EPM	Evaluation Process Model
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
GHSA	Governors Highway Safety Association
HFST	High Friction Surface Treatment
HSIP	Highway Safety Improvement Program
HSP	Highway Safety Plan
HVE	High-Visibility Enforcement
ITS	Intelligent Transportation Systems
LRTP	Long Range Transportation Plan
LTAP	Local Technical Assistance Program
MPO	Metropolitan Planning Organization
NHTSA	National Highway Traffic Safety Administration
ODOT	Oklahoma Department of Transportation
OHP	Oklahoma Highway Patrol
OHSO	Oklahoma Highway Safety Office
RTPO	Regional Transportation Planning Organizations
SAFE-T	Statewide Analysis for Engineering & Technology
SHSP	Strategic Highway Safety Plan
SKO	Safe Kids Oklahoma
TZD	Toward Zero Deaths
VMT	Vehicle Miles Traveled
VRU	Vulnerable Road User



## REFERENCES

Connecticut Strategic Highway Safety Plan 2022-2026.

[https://www.cti.uconn.edu/images/cti/images/T2Center/qy/CT\\_SHSP\\_2022-2026\\_Final\\_single-page.pdf](https://www.cti.uconn.edu/images/cti/images/T2Center/qy/CT_SHSP_2022-2026_Final_single-page.pdf)

FHWA: Strategic Highway Safety Plans: A Champion's Guidebook to Saving Lives, Second Edition dated March 25, 2013. <https://safety.fhwa.dot.gov/shsp/guidebook/ch1.cfm#ch14>

National Academies of Sciences, Engineering, and Medicine 2004. A Guide for Increasing Seatbelt Use. Washington, DC: The National Academies Press. <https://doi.org/10.17226/23422>

National Academies of Sciences, Engineering, and Medicine 2018. A Strategic Approach to Transforming Traffic Safety Culture to Reduce Deaths and Injuries. Washington, DC: The National Academies Press. <https://doi.org/10.17226/25286>

National Road Safety Strategy, U.S. Department of Transportation (USDOT), February 2022, USDOT National Roadway Safety Strategy | US Department of Transportation

SHSP Process Approval Checklist, Federal Highway Administration, October 2016, [https://safety.fhwa.dot.gov/legislationandpolicy/fast/shsp\\_checklistOct2016.cfm](https://safety.fhwa.dot.gov/legislationandpolicy/fast/shsp_checklistOct2016.cfm)

Strategic Highway Safety Plan – Evaluation Process Model, Federal Highway Administration, March 2013, [https://safety.fhwa.dot.gov/shsp/epm/pdf/shsp\\_epm\\_report.pdf](https://safety.fhwa.dot.gov/shsp/epm/pdf/shsp_epm_report.pdf)

The Safe System Approach, Federal Highway Administration (FHWA), 2017, [https://safety.fhwa.dot.gov/zerodeaths/docs/FHWA\\_SafeSystem\\_Brochure\\_V9\\_508\\_200717.pdf](https://safety.fhwa.dot.gov/zerodeaths/docs/FHWA_SafeSystem_Brochure_V9_508_200717.pdf)

Traffic Safety Crash Facts: A Brief Summary, National Highway Traffic Safety Administration, May 2022, <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813298>



## APPENDICES – ACTION PLAN FOR EMPHASIS AREAS AND VULNERABLE ROAD USER ASSESSMENT

Action plans identify specific action steps for each countermeasure, responsible agency or agencies, timelines, etc. For the Oklahoma 2023 SHSP, the Action Plan is separate from the SHSP because Action Plans will be developed on an annual basis to facilitate modifications.

Emphasis Area Teams develop Action Plans to implement the SHSP. This includes developing interim goals, performance measures, measurable objectives, strategies, and countermeasures.

Oklahoma has identified SIX core implementation areas to ensure each Safe System principal is considered and each of the five elements are addressed in all projects that have an impact on safety. The action plans shown in the Appendix identify the primary implementation area for the listed strategies and actions.

- Engineering and Infrastructure
- Education and Communication
- Funding and Collaboration
- Enforcement and Legislation
- Data Collection and Analysis
- Emergency Response and Incident Management