



T E N N E S S E E

Strategic Highway SAFETY PLAN

2025 - 2029



TENNESSEE

2025 - 2029

STRATEGIC HIGHWAY SAFETY PLAN

The Tennessee Strategic Highway Safety Plan has been developed under the oversight of the Tennessee Strategic Highway Safety Steering Committee to reduce the number of lives lost, human suffering, and the economic costs associated with motor vehicle crashes in Tennessee. By signing this document, the signatories agree to support the vision, mission, and goals of the 2025 – 2029 Tennessee Strategic Highway Safety Plan.

APPROVAL



11/04/2024

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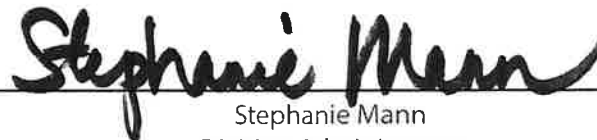


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Executive Summary

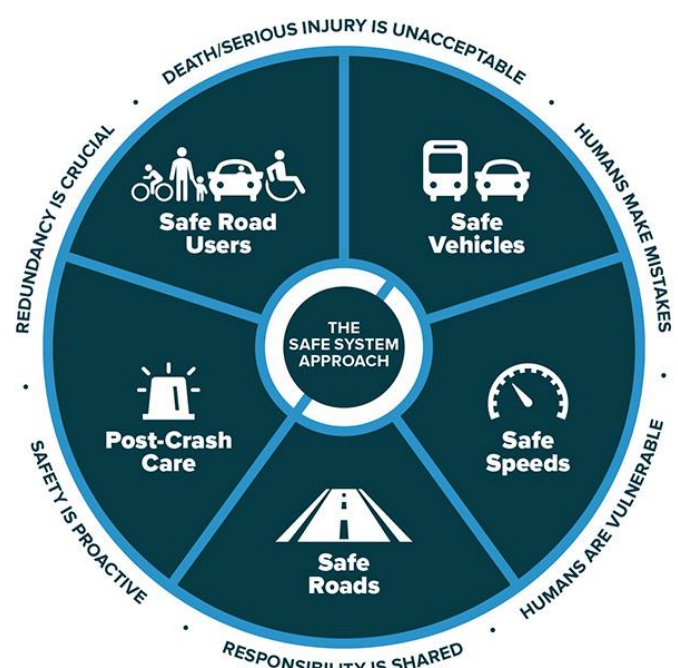
The Strategic Highway Safety Plan (SHSP) is a crucial component of the Highway Safety Improvement Program (HSIP), mandated to address statewide efforts aimed at reducing fatalities and serious injuries in transportation. This comprehensive framework employs data-driven analysis to identify key safety needs, guiding investment decisions towards strategies and countermeasures with the highest potential to save lives and prevent severe injuries. This SHSP follows Federal Highway Administration (FHWA) guidance and meets all current federal requirements needed for obligation of funds under the HSIP.

Purpose of the SHSP:

- Identify safety trends associated with fatal and serious injury crashes
- Determine appropriate countermeasures that can be strategically implemented statewide
- Develop a ‘progress tracking’ framework for each of the Emphasis Areas to follow and evaluate effectiveness using performance measures

The 2025-2029 SHSP integrates a concept that was adopted by U.S. Department of Transportation (USDOT) in January 2022 called the Safe System Approach (SSA). Although the SSA is a relatively new concept in the United States, it is a safety strategy that has been implemented in other countries since the 1990’s. The SSA aims to promote a culture of safety with 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 SSA is summarized in the following graphic, where the six (6) principles are shown on the outer ring of the figure while the inner ring depicts the five (5) elements. An important distinction of this approach is that while zero (0) fatalities and serious injuries is the ultimate goal, the focus should be on eliminating crashes that result in serious injuries and fatalities.

As part of the mandate included in the Bipartisan Infrastructure Law (BIL), states are required by law to develop a Vulnerable Road User (VRU) Safety Assessment as a component of the SHSP. The purpose is to systematically evaluate and propose solutions for enhancing the safety of pedestrians, cyclists, mobility device users, and transit riders. The VRU Safety Assessment is included as an Appendix of this report.



Source: FHWA.

In the spirit of continuation, the 2025-2029 SHSP bridges the gap between the former approach that focused on the Four E’s of Transportation Safety: Emergency Medical Services, Engineering, Education, and Enforcement with the new SSA. The safety Emphasis Areas for the SHSP remain the same, as the data indicates that there is still need for improvement. Through contributions from the safety stakeholders, a multifaceted set of strategies and actions were developed that relate to the Four (4) E’s of Transportation and the elements of the SSA within each Emphasis Area. In each of these sections are Action Items that list the relevant E’s as well as the relevant elements of the Safe System Approach.

SHSP Emphasis Areas

- Data Collection and Analysis
- Driver Behavior
- Infrastructure Improvements
- Vulnerable Road Users
- Operational Improvements
- Motor Carrier Safety

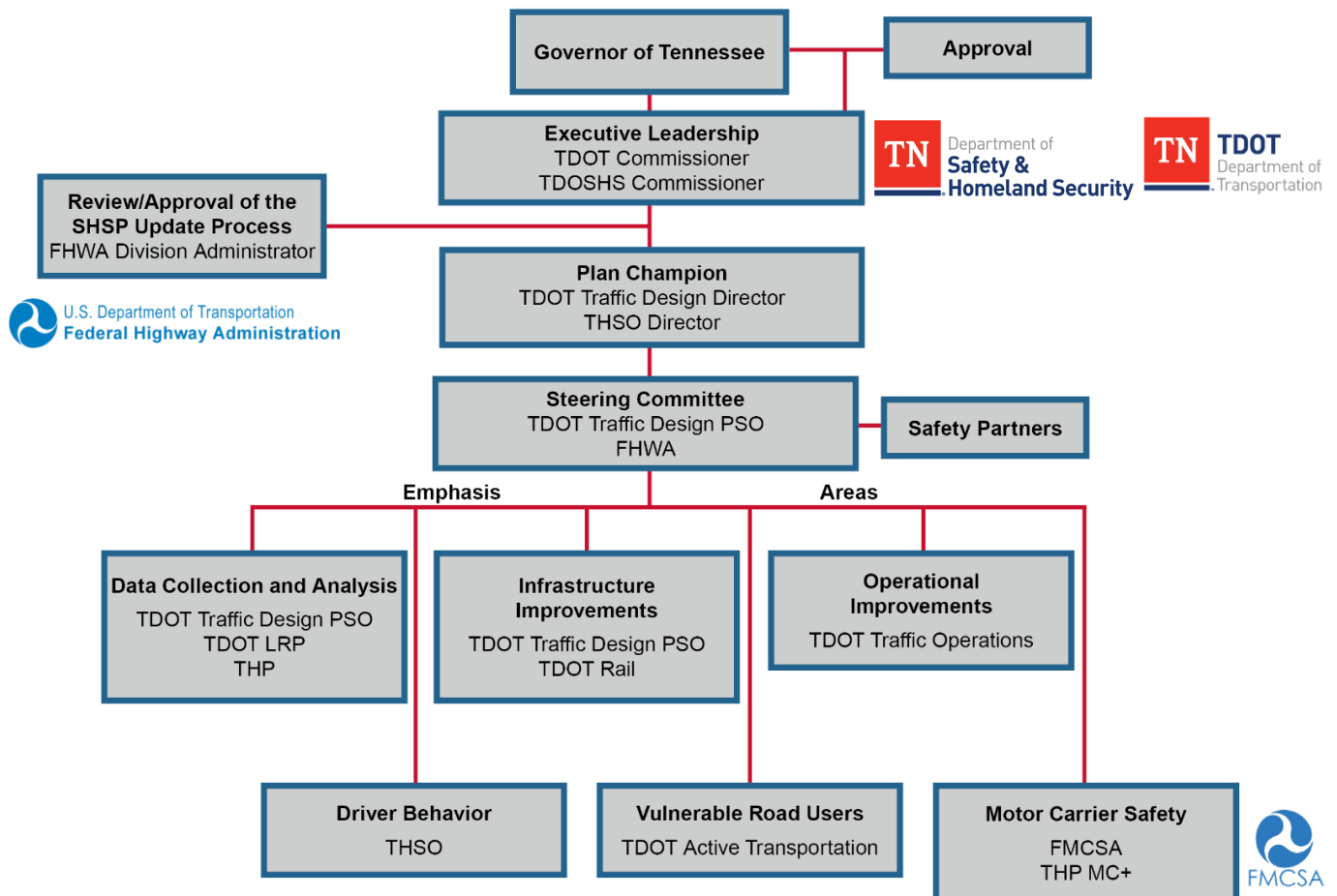
The COVID-19 pandemic altered traffic patterns, disrupted the transportation of goods and services, and reduced traffic volumes, which led to riskier driving behaviors due mainly to emptier roads.



Steering Committee

The Strategic Highway Safety Steering Committee oversaw the development of the SHSP update along with the Action Items that serve as a safety road map for the State of Tennessee. This committee comprises professionals from federal, state, and local agencies and advocacy groups responsible for transportation and safety, all with various backgrounds related to the Four E's. In addition, the update effort is bolstered through contribution from other safety partners on topics specific to their areas of interest and expertise. This level of inclusion allows for collaboration among various entities within Tennessee and the SSA.

Safety partners include the National Highway Traffic and Safety Administration (NHTSA), Memphis Metropolitan Planning Organization (MPO), Greater Nashville Regional Council, other MPOs, Regional Planning Organizations (RPOs), Bike Walk Tennessee, Bike Walk Knoxville, the Traffic Records Coordinating Committee, Mothers Against Drunk Driving (MADD), Tennessee Transportation Assistance Program (TTAP), and many others.



See the Appendix for the contact list at time of approval.

Please see the Glossary for the definitions and explanations of acronyms used throughout the report.



Vision, Mission, and Goal

Vision

Federal, state, local agencies, civic groups, public and private industries unified as safety partners and are all working together to achieve zero (0) fatalities and serious injuries on Tennessee roadways.

Mission

Using the Safe System Approach to work toward zero (0) deaths and serious injuries by reducing the number and severity of crashes on Tennessee's roadways.

Goal

The goal of the 2025-2029 Tennessee SHSP is to reduce fatalities and serious injuries below the historic trend by taking a proactive approach towards zero (0) deaths.

The period for evaluation of the Plan's overall performance will be five (5) years, which is the planned interval for updating the Plan. Recognizing that statistics will vary due to atypical seasonal weather, economy, and isolated catastrophic events, this evaluation will be based on a five (5) year rolling average of available data. The goal will be discussed during the SHSP quarterly meetings as new information is made available and a mid-period reevaluation may be considered.





Introduction and Background

From 2018 to 2022, an average of 193,553 reported traffic crashes occurred in Tennessee annually, a slight increase from the previous five (5) year average of 192,340¹. As shown in **Table 1**, crashes statewide resulted in 6,034 fatalities and 28,732 serious injuries in the most recent five (5) year analysis period.

Using the data in **Table 1** along with the previous SHSP data, the trends for fatalities, serious injuries, and their rates were reviewed to determine predominant factors. For determination of the trend, the five (5) year rolling average was used. **This is the average of the sum of the subject year and the values of the four (4) previous years.** The rolling average provides a more consistent look at the data by removing random anomalies that occur due to a unique condition or event that is not characteristic of the normal traveling conditions on Tennessee’s roadways. The resulting data points provide a consistent picture that is representative of the overall trend and are readily represented by traditional trend lines.

Fatalities and Serious Injuries

For the purposes of this report, the analysis considers the total number of fatalities and serious injuries that result from crashes within the analysis period. It’s important to note that a single fatal crash can result in multiple fatalities, and similarly, a serious injury crash can lead to multiple serious injuries.

Figure 1 provides the five (5) year rolling averages of fatalities from the period of 2018-2022. In addition to the historic averages, the projected serious injury trend, targets from the first three (3) performance cycles of the Safety Performance Measures (SPM) reported in the state’s annual HSIP Report, and the SHSP trend line are shown.

The historic data points and SPM targets are considered to have a “good fit” with the fatality trend as all values fall along or are close to the projected trendline. Additionally, the overall trend is still increasing, which is consistent with recent historic fatality numbers. Therefore, the projected trend line was used to establish an upper limit of the fatality five (5) year rolling average. This corresponds to a trend leading to 1,637 for the five (5) year rolling average for fatalities in 2027.

Table 1 - Yearly Fatality and Serious Injury Statistics (2018-2022)

	2018	2019	2020	2021	2022	Total
Number of Fatalities	1,040	1,136	1,217	1,327	1,314	6,034
Number of Serious Injuries	5,742	5,555	5,536	6,016	5,883	28,732

Figure 1 - Fatalities: Trend

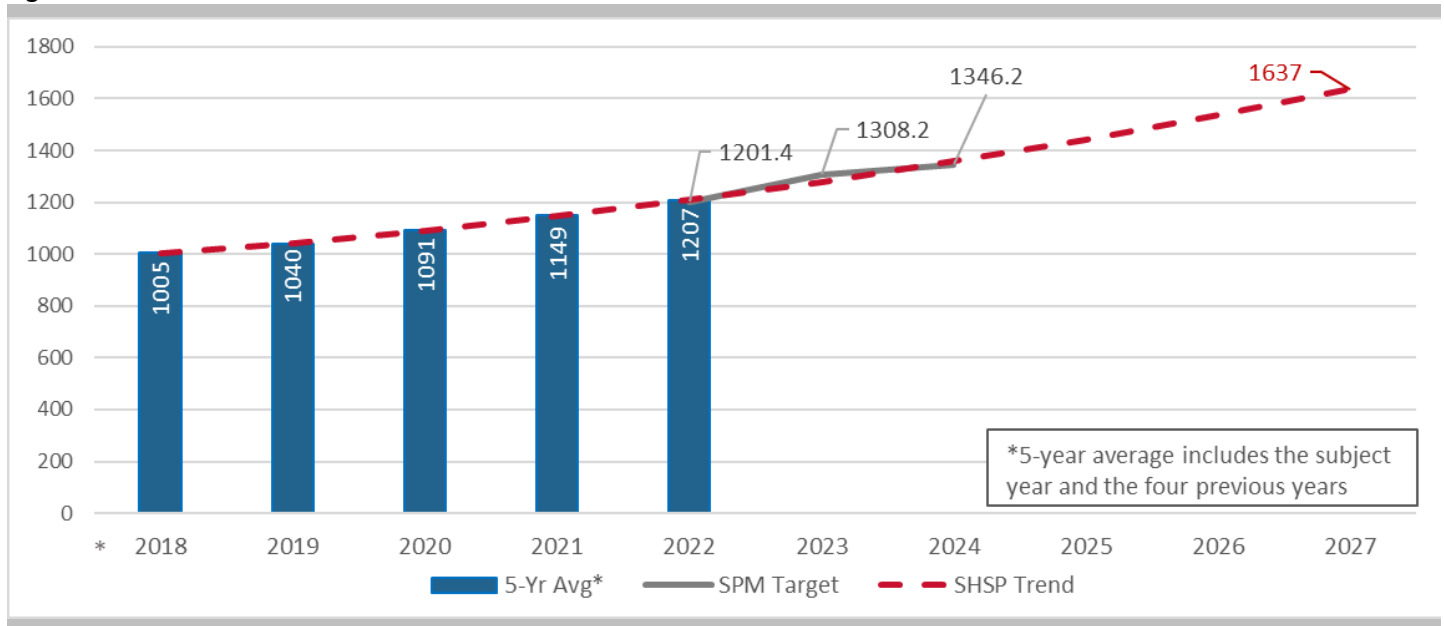




Figure 2 provides the five (5) year rolling average for statewide serious injuries for the period of 2018-2022. In addition to the historic averages, the first three (3) of Tennessee’s SPM targets are shown along with the SHSP trend line.

Unlike fatalities, the 2023 and 2024 SPM targets for serious injuries are higher than the historic trend. In lieu of using the historic trend to project the serious injuries number, the trend was revised by considering the SPM serious injuries targets. The historic data points and SPM targets are considered to have a “good fit” with the serious injuries trend as all values fall along or close to the projected trendline. With prior SPM targets falling above and below the projected trend line, the 2027 number was set using the trend line based on both historic five (5) year rolling average and SPM targets. This results in a projected five (5) year rolling average of 5,221 serious injuries in 2027, a 9% reduction over the 2022 value of 5,746.

Population in the state grew 8.6% from 2013-2022, but annual vehicle miles traveled (VMT) increased by 17.2%. While the state’s population has certainly increased, it is suspected the VMT has increased twice as much in the same period due to increased economic activity, both inside and outside of Tennessee. To account for the surge of travel on Tennessee’s roadways, fatalities and serious injuries are considered in relation to the annual VMT. This is accomplished through the calculation of fatality and serious injury exposure rates.

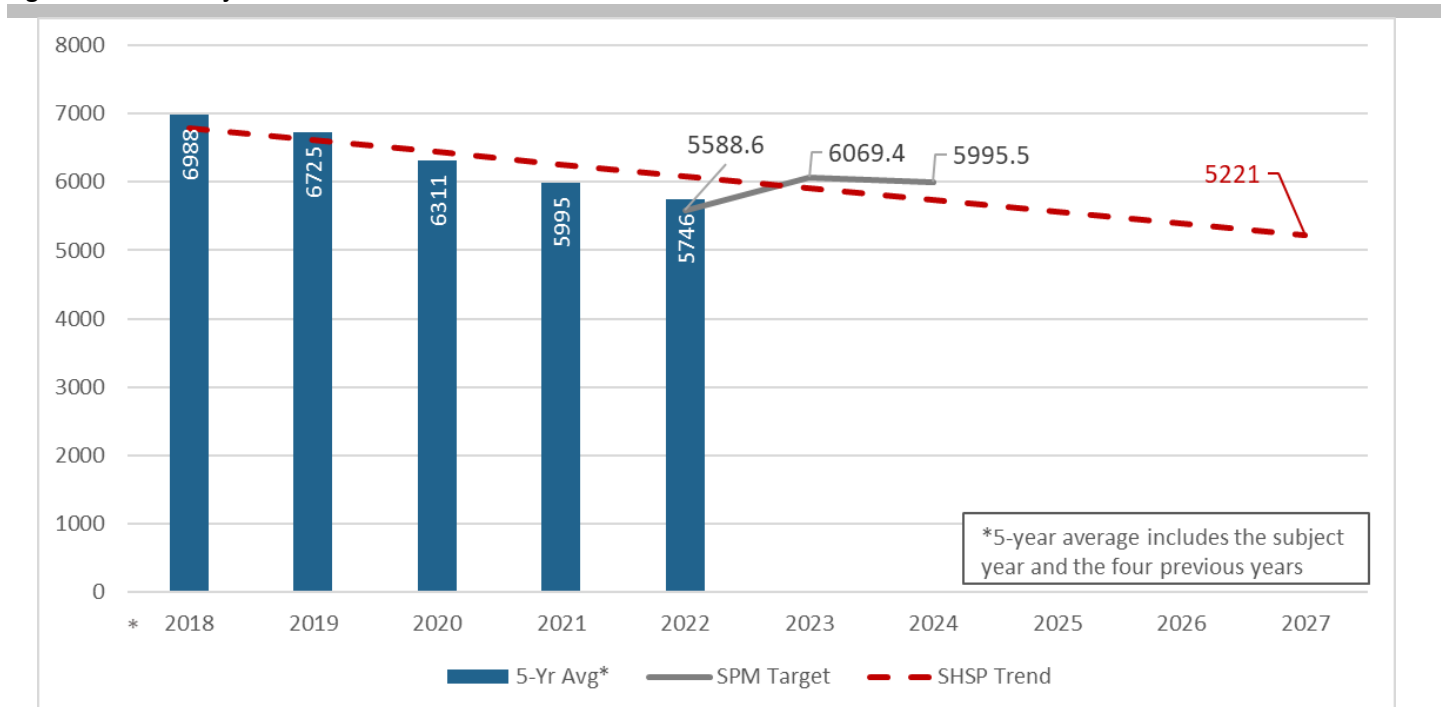
Fatality and Serious Injury Rates

To develop a better assessment of roadway safety from previous analysis periods, it is important to consider crash rates that are based on the level of exposure. Exposure rates are used to account for increases in vehicle miles travel (VMT) between analysis periods. The goal of the crash rate screening is to be able to identify low volume, high crash risk locations that do not necessarily experience a high total number of crashes. As discussed previously, rates normalize the fatal and serious injury numbers through consideration of the number of VMT on Tennessee’s roadways for the same year. The formula for the rate calculations is shown below. A summary of the fatal and serious injury rates for Tennessee over the SHSP assessment period is provided in **Table 2**.

$$\text{Fatality Rate} = \frac{\text{Number of Fatalities}}{\text{Number of Vehicles Miles Traveled}}$$

$$\text{Serious Injury Rate} = \frac{\text{Number of Serious Injuries}}{\text{Number of Vehicles Miles Traveled}}$$

Figure 2 - Serious Injuries: Trend





Introduction and Background

Table 2 - Yearly Fatal and Serious Injury Rates (2018-2022)

	2018	2019	2020	2021	2022
Number Fatalities	1,040	1,136	1,217	1,327	1,314
Number Serious Injuries	5,742	5,555	5,536	6,016	5,883
Vehicle Miles Traveled (100MVM)	813.55	828.92	763.93	825.96	832.20
Fatality Rate	1.28	1.37	1.59	1.61	1.58
Serious Injury Rate	7.06	6.70	7.25	7.28	7.07

As shown in **Table 2**, The number of fatalities and serious injuries generally increased from 2018 to 2021, peaking at 1,327 before slightly decreasing in 2022. Similarly, an increasing trend peaking in 2021 was observed for the fatality and serious injury rate over the same period. The increased fatalities and serious injuries are suspected to be associated with motorists' additional exposure due to higher VMT.

The trends for both the rates and VMT were examined to determine anticipated future performance. For the trend analysis, VMT data from 2003 to 2022 was used. The resulting graph and trend line is shown in **Figure 3**. As shown in the figure, increasing VMT is expected to continue through the current SHSP evaluation period.



Source: NASH Today

Figure 3 - Vehicle Miles Traveled (per 100 million vehicle miles) (2003-2029)

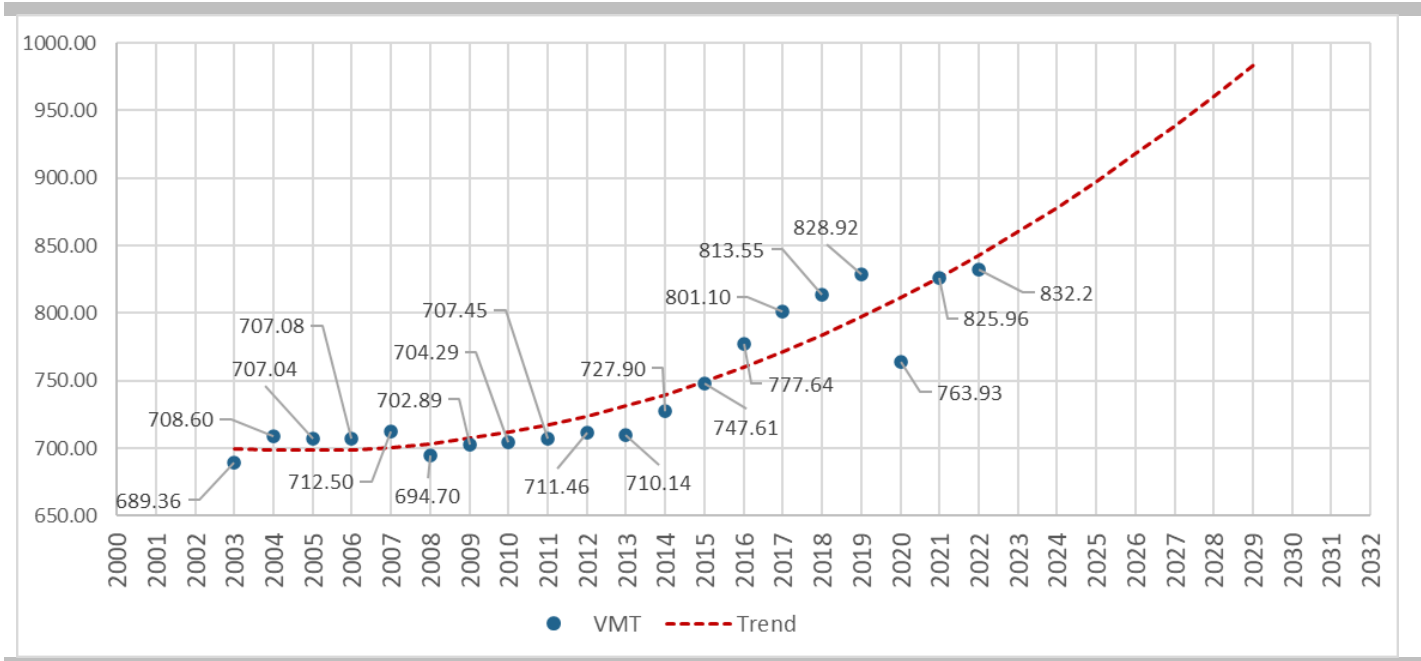




Figure 4 summarizes the five (5) year rolling average for fatality rates during 2018-2022. In addition to the historic averages, the historic trend and the first three (3) of Tennessee’s SPM for fatality rate targets are shown with the SHSP trend line.

Figure 5 provides the five (5) year rolling average for statewide serious injury rates. Like serious injuries, the SPM targets along with the historic data were used to develop the

projected trend shown in the figure. This trend provides the best fit for both historic data and SPM targets.

As exhibited by the serious injuries trend, the serious injury rate trend line has an acceptable fit within the historic data points and SPM targets. As with serious injury rates, consideration of the SPM targets in developing the trend did not impact the overall positive or negative trend exhibited by the historic data.

Figure 4 - Fatality Rates (2018-2022)

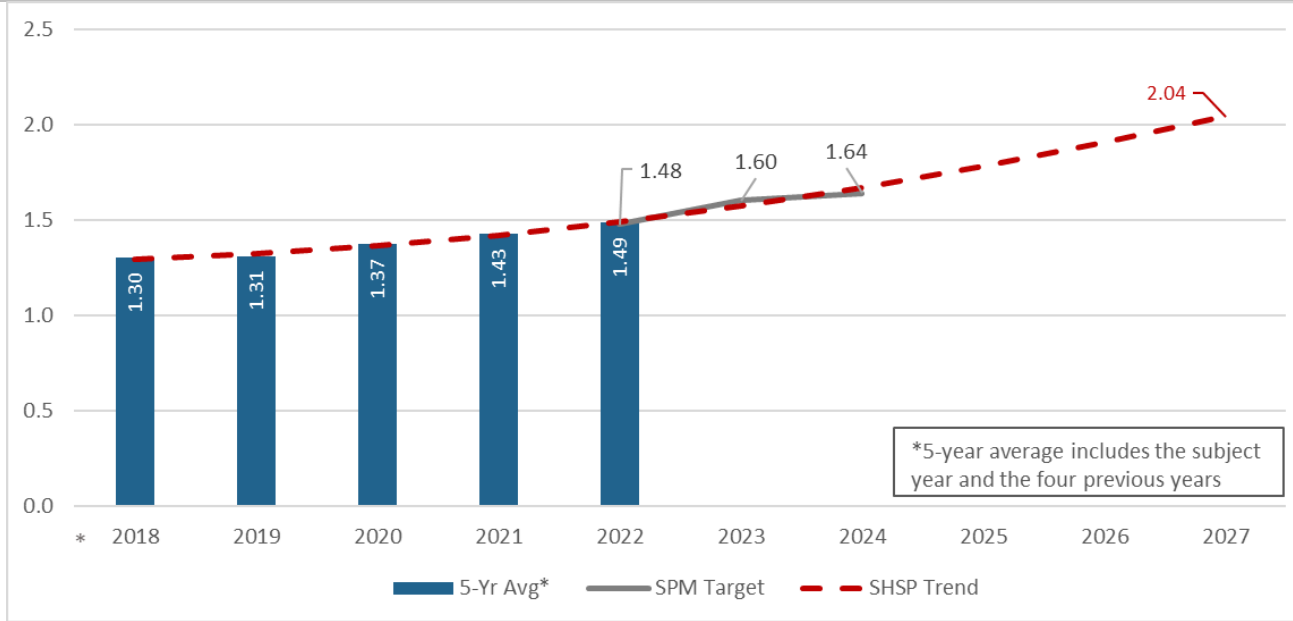
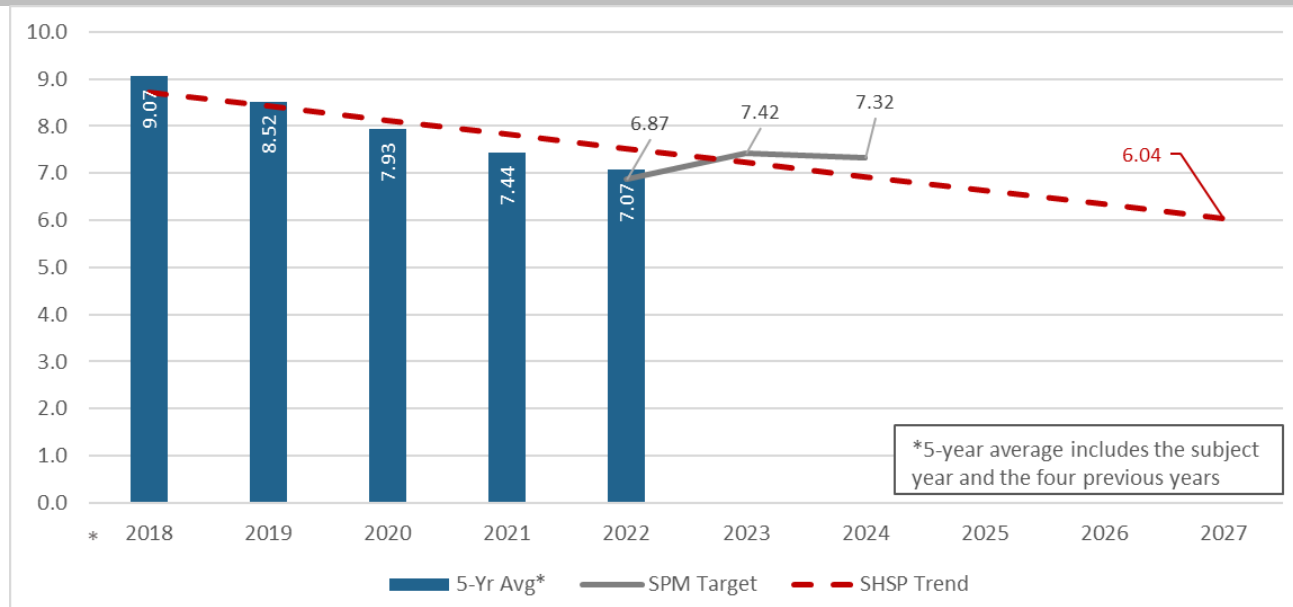


Figure 5 - Serious Injury Rates (2018-2022)





Non-Motorized Road User Fatalities and Serious Injuries

Figure 6 provides the five (5) year rolling average of fatalities and serious injuries for non-motorized road users (bicyclists and pedestrians) from the period of 2018 - 2022. In addition to the historic averages, the projected serious injury trend, related SPM targets, and the SHSP trend line are shown.

As shown in the figure, the number of non-motorized severe

injuries and fatalities are anticipated to increase over the evaluation period.

Past Performance

The previous SHSP (2020-2024) set five (5) goals relating to both the number and reduction rate of fatalities and serious injures reduction. A summary of previous SHSP goals and assessment of achievement of each goal is provided in **Table 3**.

Figure 6 - Non-Motorized Fatalities and Serious Injuries (2018-2022)

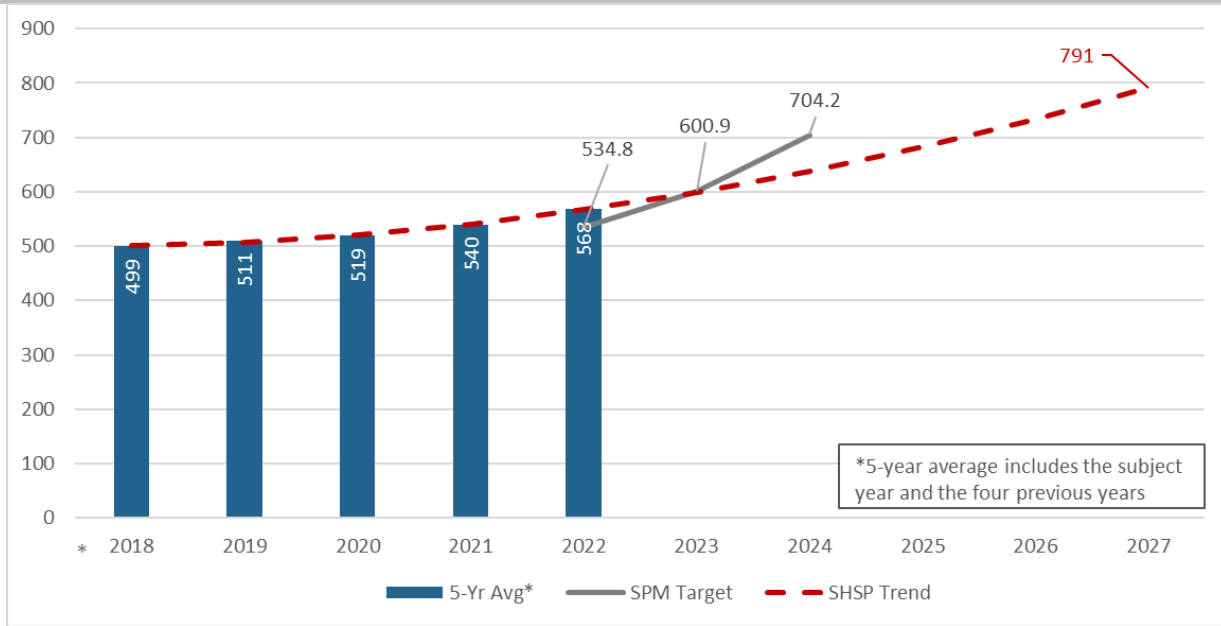


Table 3 - Assessment of 2018 SHSP Goals

Goal	2017 five (5) year rolling average	Goal Target/ Threshold	2022 five (5) year rolling average	Δ 2017 vs. 2022	Goal Met?
Reduce the trend of increasing fatalities by not exceeding the 2022 five (5) year projected rolling average of 1,165	996	1,165	1,207	21%	✗
Reduce the five (5) year rolling average of fatality rate to 1.14 in 2022 (13.6 reduction over 2017 value)	1.32	1.14	1.49	13%	✗
Reduce the five (5) year rolling average of serious injuries to 6,205 in 2022 (14.1% reduction over 2017 value)	7,227	6,205	5,746	- 20%	✓
Reduce the five (5) year rolling average of serious injury rate to 6.16 in 2022 (35.9% reduction over 2017 value)	9.61	6.16	7.07	- 26.4%	✗
Reduce the trend of increasing non-motorized fatalities and serious injuries by not exceeding the 2022 five (5) year projected rolling average of 716	470	716	568	21%	✓



As seen in **Table 3**, Tennessee achieved two out of five goals set by the previous SHSP: reducing serious injuries and severe non-motorized crashes. It's important to note that while the goal for reducing the number of serious injuries was met, the target for reducing the serious injury rate was not achieved. This discrepancy is because the serious injury rate goal was set more aggressively, requiring a 35.6% reduction, compared to the 14.1% reduction target for the number of serious injuries. As discussed previously, increases in occurrences of fatalities can be attributed in part to the increased exposure on Tennessee's roadways over the assessment period. Since the previous SHSP update, the five (5) year average fatalities increased 21% from 996 (2013-2017) to 1,207 (2018-2022); the five (5) year average fatality rate increased 12% from 1.32 (2013-2017) to 1.49 (2018-2022).

In compliance with FHWA's Safety Performance Management Measures Final Rule (23 CFR 490), Tennessee revised crash reports in December 2017 to reflect the Model Minimum Uniform Crash Criteria 4th Edition (MMUCC) "Suspected Serious Injury (A)" attribute found in the "Injury Status" element¹. The change from this rule accounts for a 19.4% reduction in the count of serious injuries from 2017 to 2018, indicating that the actual decrease in serious injuries may not be as significant as it appears.

Also, a three (3) year decline in serious injuries (2018-2020) ended in 2021 with an 8.65% increase from 2020. From 2021 to 2022, there's another 2% decline of serious injuries.

While Tennessee had a 13% reduction in work zone fatalities, the increase in fatalities in several other key areas is concerning. The dramatic rise in fatalities among teen drivers (113%) and pedestrians (66%), along with the significant increases associated with distracted (61%), impaired (32%), and aggressive driving (32%), highlight the need for targeted safety interventions. Addressing these issues through a combination of enforcement, education, and infrastructure improvements will be essential in reversing these trends and enhancing overall road safety in Tennessee.

Over the past five (5) years, Tennessee has had many accomplishments related to transportation safety, such as:

- In 2019, Tennessee achieved a seat belt usage rate of 91.8%. This study is conducted annually by the University of Tennessee Knoxville, Center for Transportation Research.
- Tennessee Highway Safety Office (THSO) has a seat belt convincer device in all four (4) regions of the state. This device is taken to over 250 events every year to simulate a crash and show the protection provided by a seat belt.

- Tennessee Technological University and THSO partner on the Ollie the Otter Booster Seat and Seat Belt Safety Program. The program's objective is to educate children in pre-K through 4th grade on seat belt and booster seat importance



- In August 2024, the THSO hosted its 36th annual Lifesavers Conference in Murfreesboro and 20th Annual Law Enforcement Challenge.
- THSO works with over twenty organizations and law enforcement partners, such as Drug Free Dickson and the Cookeville Police Department, to address youth alcohol and drug issues.
- The University of Tennessee Knoxville and Vanderbilt University developed a research report "Addressing Traffic Safety to Reduce Pedestrian Injuries and Fatalities in Tennessee," sponsored by TDOT.
- TDOT implemented the Integrated Program Delivery (IPD) and Empowering People, Influencing Culture (EPIC) which will lead to greater collaboration and efficiency on all TDOT projects.
- TTAP offered 149 classes related to road safety, including Work Zone and Worker Safety related classes. There were over 6000 participants.
- In 2023, TDOT rebuilt the Multimodal Priority Tool, a VRU crash screening tool designed to facilitate a deep dive into the characteristics of high-risk areas. See the VRU Safety Assessment in the Appendix for more information.
- TDOT developed Congestion Action Plans with the four largest cities in the state: Chattanooga, Knoxville, Memphis, and Nashville. The plans build on previous efforts to identify and prioritize congestion reduction investments.



- In 2018, TDOT began the implementation of the Interstate 24 (I-24) SMART Corridor Project, which takes a comprehensive approach to managing the existing infrastructure and improving travel time reliability between Rutherford and Davidson counties. The project began with the lane control gantry system and the integrated corridor management system launched in June 2023.
- In 2023, the Commercial Vehicle Enforcement division of Tennessee Highway Patrol (THP) was reorganized as the Motor Carrier Plus (MC+) Unit. All scale facilities and personnel are now under the supervision of MC+.
- TDOT implemented the AASHTOWare Safety software for crash analysis. Almost 500 users across the state have access. Users include TDOT, TDOSHS, MPOs, RPOs, consultants, local governments, universities, and FHWA.
- In 2022, TDOT, in partnership with the University of Tennessee at Knoxville and Tennessee State University, developed localized SPFs and calibration for freeways, intersections, segments, and multilane rural roadways.
- The City of Knoxville Police Department developed Safety City to teach elementary school children about vehicular, pedestrian, and bicycle safety. The concept of Safety City is to provide "hands-on" safety education within a child-size setting complete with buildings, paved streets and sidewalks, working traffic signals and traffic signs.
- TDOT and Tennessee State University partnered on a research project regarding the before and after safety effectiveness of median cable barriers. The evaluations revealed that fatalities and serious injuries from median crossovers were reduced by up to 86%. Head on collisions were reduced by 96%.
- TDOT continued to host the Tennessee Operations and Safety Conference. The annual conference brings together various safety partners from all Four E's to inform participants on issues, innovations, and trends relevant to transportation safety and operations. This conference has been ongoing since 2005.

Statewide Transportation Improvement Program

In 2015 TDOT completed the 25-Year Policy Plan to provide consistency between plans, programs and policies through the linkage of the Plan and the Statewide Transportation Improvement Program (STIP). The STIP is the programming document that prioritizes and schedules projects. The STIP is developed every three (3) years to provide a statewide listing of transportation projects covering a period of four (4) years. The STIP is developed in cooperation with a variety of transportation partners including the MPOs, TPO, and RPOs. The projects are consistent with the direction ultimately laid out in the 25-Year Policy Plan as well as the metropolitan transportation plans for which TDOT intends to provide funding. HSIP projects are included in the STIP and target Emphasis Areas included in this document. The STIP has a goal to maximize safety and reduce injuries and fatalities in all modes of transportation.

COVID-19 Pandemic

The Governor issued a Safer at Home executive order to combat the COVID-19 pandemic that was in effect from March 31, 2020, to April 30, 2020, though many businesses chose to close or have employees work from home prior to and after the order expired. The COVID-19 pandemic caused changes in fatal and serious injury crashes. During 2020, Tennessee saw a reduction in VMT but increases in many types of fatality crashes over 2019. Most notably, fatalities with large trucks involved increased by 33%, which was likely due to increased freight volumes. Further, fatality crashes in urban areas increased by almost 14% while rural fatality crashes remained consistent with 2019. These changes increased uncertainty about future fatal and serious injury crash totals as Tennessee continued to recover and traffic patterns and trends shifted. Also, the SHSP quarterly meetings were suspended starting in 2020.



Update Process

Created in November 2004, the Tennessee SHSP defines a system, organization, and process for managing the attributes of the road, the users, and the modes to achieve the highest level of highway safety by integrating the work of disciplines and agencies involved. These disciplines include planning, design, construction, operation, and maintenance of the roadway infrastructure (engineering); injury prevention and control (law enforcement, emergency response, and health education); those involved in modifying road user behaviors (education and enforcement); and the design and maintenance of vehicles.

The federal Bipartisan Infrastructure Law (BIL) requires states to regularly update their plans in order to utilize HSIP funds. Current guidance is provided by the “Strategic Highway Safety Plan Guidance,” which is published by the Federal Highway Administration. This update to the Tennessee SHSP was based on the principles established in 2004 and updated in 2016 and the guidelines of the current legislation. This update also includes the SSA.

Safe System Approach

The [Safe System Approach](#) (SSA) is a shift from a conventional safety approach because it focuses on human mistakes and vulnerability to design a system with redundancies to provide greater protection for all road users. It requires a culture that places safety first and foremost in road system investment decisions. This new safety strategy is based on six core principles and five elements:

1. Deaths and serious injuries are unacceptable

While no crashes are desirable, the SSA emphasizes a focus on crashes that result in death and serious injuries.

2. Humans make mistakes

Road users will inevitably make mistakes, and those mistakes can lead to crashes. The expectation of the SSA is for the road system to be planned, designed, and operated to be forgiving of inevitable human mistakes, so that fatal and serious injury outcomes are unlikely to occur.

3. Humans are vulnerable

Humans have limited ability to tolerate crash impacts before serious harm occurs. Although the exchange of kinetic energy in collisions among vehicles, objects, and road users has multiple determinants, applying the SSA involves managing and reducing the kinetic energy of crashes to avoid fatal and serious injury outcomes.

4. Responsibility is shared

All stakeholders must work collaboratively to ensure that crashes don't lead to fatal or serious injuries.

5. Safety is proactive

Transportation agencies should use proactive and data-driven tools to identify and mitigate underlying risks in the system, rather than waiting for crashes to occur and reacting afterwards.

6. Redundancy is crucial

Reducing the risk of severe crash outcomes requires all parts of the system to be strengthened, so that if one element fails, the others still protect road users.

The SSA considers five elements of a safe transportation system in an integrated and holistic approach.²

Safe Road Users	Safe Vehicles	Safe Speeds	Safe Roads	Post-Crash Care
The safety of all road users is equitably addressed, including those who walk, bike, drive, ride transit, or travel by other modes.	These are designed and regulated to minimize the frequency and severity of crashes using integrated safety technology.	Reducing speeds can accommodate human-injury tolerances in three ways: reducing impact forces, providing additional time for drivers to stop, and improving visibility.	Designing transportation infrastructure to accommodate human mistakes and injury tolerances can greatly reduce the severity of crashes that do occur.	People who suffer injuries as a result of crashes rely on emergency first responders to quickly locate them, stabilize their injuries, and transport them to medical facilities.



As part of the update process, the SSA elements have been integrated into the safety Emphasis Areas. The Strategies and Action Items will be linked to one of the Four E's as well as any of the relevant SSA elements.

With over 42,514 fatalities on the nation's streets and highways in 2024, roadway safety remains one of the most challenging issues facing the United States. Toward Zero Deaths (TZD) is a previously adopted national strategy aimed at eliminating serious injuries and fatalities on U.S. roadways. Although the SSA and TZD share common fundamental principles, the new safety strategy delves into a sense of shared responsibility, redundancy in the system, and a proactive approach.



Source: FHWA

Another important distinction from the SSA and 'Vision Zero' safety campaigns is that while zero (0) crashes is the ultimate goal, the focus should be on reducing the number of fatalities and serious injuries. The road towards zero (0) deaths and serious injuries should be focused on reducing the kinetic energy exchange to a tolerable limit for the human body. This important principle is at the core of successful implementation of the SSA as it relies on those responsible for designing and operating the road system. Human error is to be expected so the road infrastructure and vehicle technology must be designed and operated so that the risk of death or serious injury can be eliminated or significantly lessened. Achieving zero (0) traffic deaths and serious injuries requires strengthening all five elements of the SSA.

Equity considerations have become an integral part of the transportation safety conversation. Part of the new approach that SSA brings into the culture of safety is to look at safety solutions through an equity lens. In every state, there are portions of the population that live, reside, or travel through areas that have been historically underserved with resources or infrastructure or that experience persistent poverty. An equity focused approach seeks to elevate the level of safety for all road users regardless of where they live or work, what their mode of transportation is, or their socio-economic background. The advancement of the implementation of the SSA depends on the consideration of its five elements and the application of its six principles while addressing infrastructure inequalities. By analyzing safety data in relation to demographic factors, many agencies have discovered that crash death risks are disproportionately higher in lower-income neighborhoods.

These areas often experience greater traffic exposure and have historically received less investment in safety programs and infrastructure. Focusing on these communities can significantly enhance safety, reduce the disparity between well-served and underserved neighborhoods, and make a true impact on reducing the number of serious injuries and fatalities. Refer to the Equity Analysis section of this report and the VRU Safety Assessment in the Appendix for more details on equity analysis.

Steering Committee Collaboration

During the update process, early consultation and coordination within the Steering Committee began with email and phone conversations regarding the progress since the last SHSP update and the updates to relevant strategic plans. A survey was developed and emailed to all steering committee members and other relevant safety partners; see sample question shown on the following page.

Meetings were held to discuss six (6) Emphasis Areas, including:

- Data Collection and Analysis
- Driver Behavior
- Infrastructure Improvement
- Vulnerable Road Users
- Operational Improvement
- Motor Carrier Safety

During each meeting, the following items were addressed:

- Review of the previous SHSP content
- Review of 2018-2022 data relevant to contributing factors associated with the Emphasis Area
- Discussion of actions (projects, initiatives, etc.) currently ongoing or planned
- Discussion of known constraints and challenges

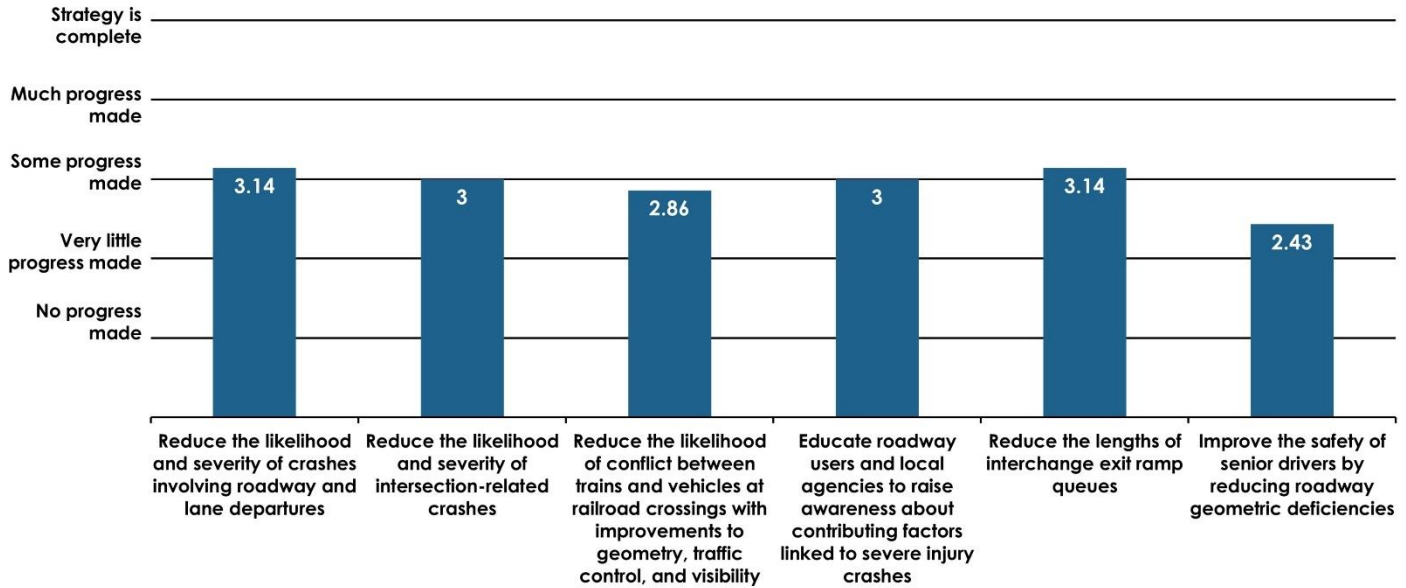
Data Analysis

Determination of the Emphasis Areas and contributing factors adopted for the SHSP is based on a data-driven approach. The analysis uses crash data from 2018-2022. The 2018-2022 period represents the most recent five (5) year period of crash data with fatality statistics that have been finalized by NHTSA through the Fatality Analysis Reporting System (FARS) at the time of the update process.

Utilizing the 2018-2022 crash data, the number of fatalities and serious injuries associated with top contributing factors from the previous SHSP was obtained.



Q4. The previous SHSP included six strategies for Infrastructure Improvements. For each strategy, rate how much progress you think was made toward completing all action items:



Their combined total was used to determine the candidates to be considered for inclusion in the SHSP. A fatality or serious injury can be attributed to multiple contributing factors. This means that more than one factor is often cited in incidents involving fatalities or serious injuries, leading to the total percentage of contributing factors exceeding 100%. The primary data sources used in the assessment are provided in **Table 4**.

(TDOSHS) developed the queries and provided the number of fatalities and serious injuries based on contributing factors. This collaboration ensured the accurate extraction of data, aligning with the annual Highway Safety Improvement Plan (HSIP). Additional queries for each contributing factor were developed through AASHTOWare Safety to help establish relationships between the factor’s occurrence and other conditions (urban/rural, road conditions, time, age cohorts, etc.). Significant findings resulting from inspection of this data are mentioned in each Emphasis Area discussion.

Methodology

The Tennessee Department of Safety and Homeland Security

Table 4 - Fatal and Serious Injury Statistics Data Sources

Source	Provider	Usage
Tennessee’s Integrated Traffic Analysis Network (TITAN)	TDOSHS	Primary source of crash data including contributing factors, person attributes, date, time, conditions, etc.
Fatality Analysis Reporting System (FARS)	NHTSA	Source for fatality related statistics
2020 Tennessee Strategic Highway Safety Plan	TDOT	Previous plan statistics used for performance comparison
Tennessee Department of Transportation Highway Performance Monitoring System	TDOT	VMT data for fatality and serious injury rate statistics
AASHTOWare Safety	TDOT	Relationships between the contributing factor’s occurrence and other conditions



Emphasis Areas and Contributing Factors

Determination of the Emphasis Areas and contributing factors to include in the SHSP is based on crash data analysis. Utilizing the 2018-2022 crash data, the numbers of fatalities and serious injuries associated with all contributing factors were determined. Their combined total established the candidates considered for inclusion in the SHSP. **Table 5** presents the top contributing factors, ranked by their total fatalities and serious injuries. **It should be noted that a fatality or serious injury could count toward more than one (1) contributing factor as it is common for more than one (1) of the factors to be cited with a fatality or serious injury.** All factors shown in the table were allocated to the Emphasis Area most closely related to the factor.

In addition to contributing factors, the overall fatality and serious injury data was evaluated with respect to age and location to gain a better understanding of any predominant age groups or locations overrepresented in the severe injury statistics. **Figure 7** shows a summary of fatalities and serious injuries per age group over the period assessed (2018-2022). As shown in the figure, younger drivers aged 25 to 29 accounted for the largest share of severe injuries.

Table 5 – Fatalities and Serious Injuries by Contributing Factors (2018-2022)

Contributing Factors Involved	# Fatalities	# Serious Injuries	Total (#Fatalities + #Serious Injures)
All Severe Crashes	6,034	28,732	34,766
Lane and Roadway Departure	3,296	14,494	17,790
Intersections	1,349	8,205	9,554
Teen Drivers (13-19)	985	6,169	7,154
Unrestrained Occupants	1,854	4,927	6,781
Older Drivers (65+)	1,352	5,337	6,689
Impaired Drivers	1,572	3,832	5,404
Inattentive, Distracted, and Drowsy Drivers	545	4,201	4,746
Motorcycle	805	3,602	4,407
Aggressive Drivers/Speeding	1,033	3,186	4,219
Large Trucks	734	2,170	2,904
Pedestrians	843	1,666	2,509
Wrong Way Driving	296	1,044	1,340
Secondary Crashes	64	342	406
Work Zones	65	250	315
Bicycles	50	279	329
Train-vehicle Crashes	17	17	34

Figure 7 - Severe Crashes by Age Group (2018-2022)

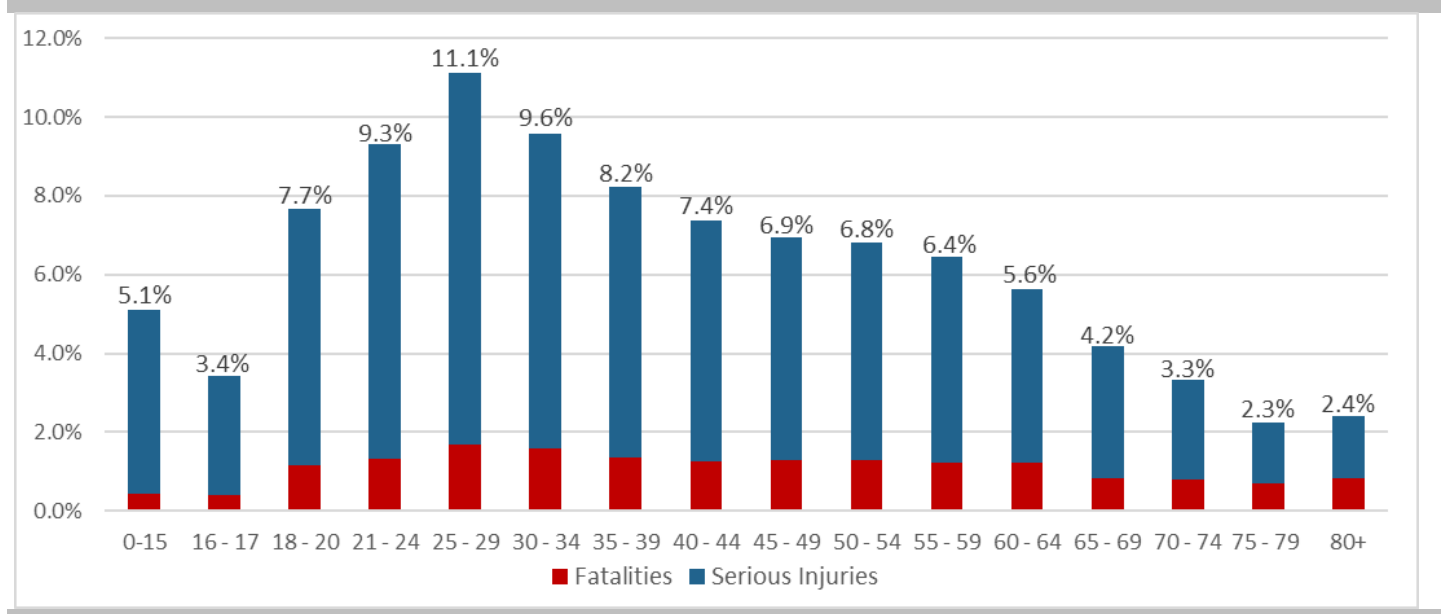




Figure 8 shows the distribution of fatal crashes by roadway classification from 2018 to 2022. The top three (3) facility types — urban arterials, rural arterials, and rural collectors — are consistent with the findings of the previous SHSP. The total percentage of crashes on rural arterials and collectors has been reduced by a combined 3.4%, while the percentage on urban arterials has reduced by 3.3% over the previous SHSP data. Further investigation into fatalities by facility using the fatal crash rate paints a slightly different picture than what is shown in **Figure 9**.

As shown in **Figure 9**, when the number of fatal crashes is normalized with respect to VMT, rural collectors and rural local roads have the highest rates of fatal crashes per 100 million vehicle miles traveled, surpassing all other facilities analyzed. The rate of fatal crashes on urban collectors has decreased, resulting in a lower ranking. This data underscores the importance of focusing safety improvements on rural roads, especially collectors, local roads, and arterials, as these areas still show significant potential for enhancing user safety.

Figure 8 - Severe Crashes by Roadway Classification (2018-2022)

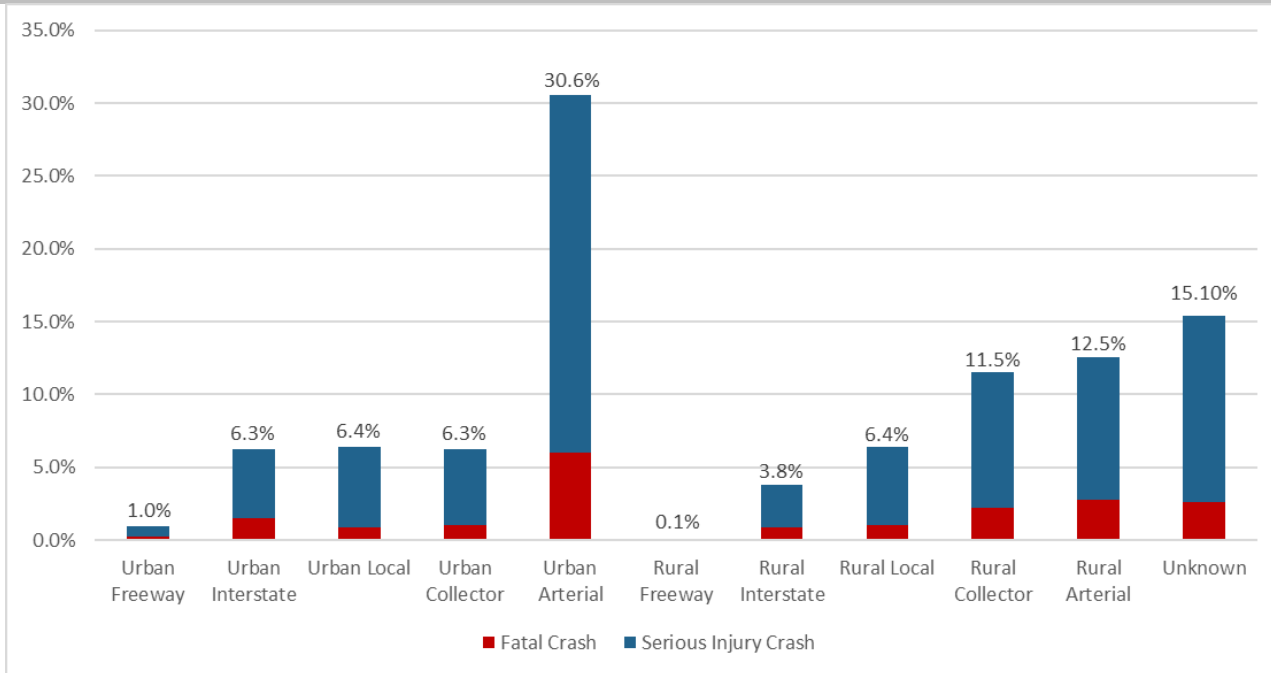
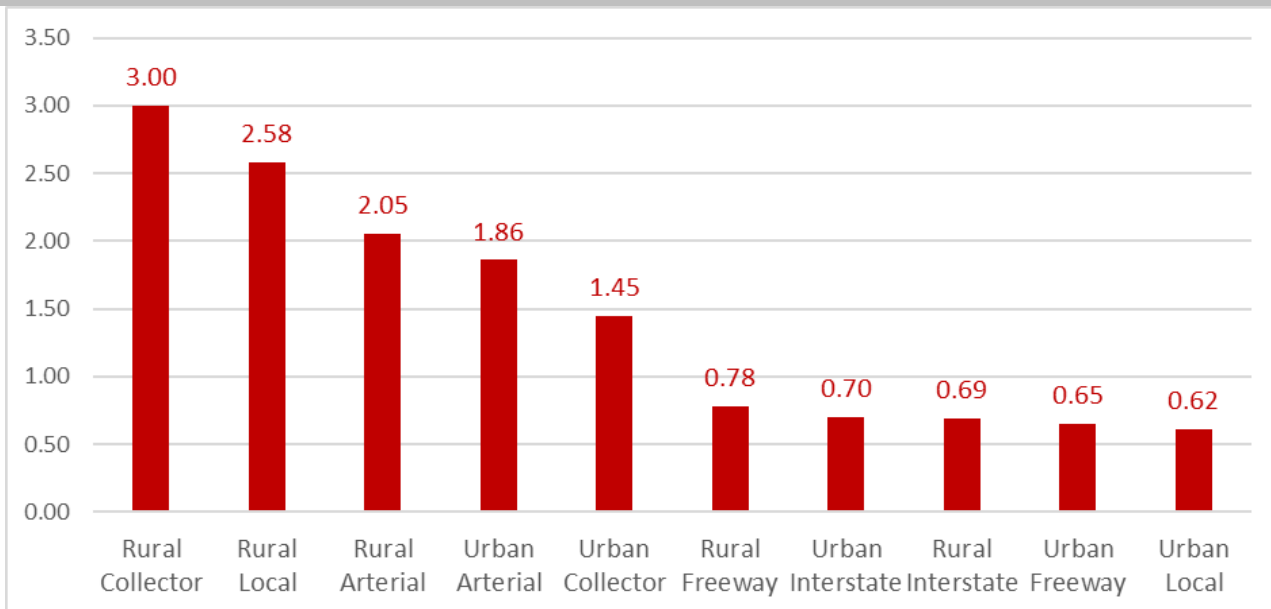


Figure 9 - Fatal Crashes with respect to VMT (2018-2022)





Equity Analysis

Consideration of demographics and income is essential in all aspects of the SHSP and should be integrated into the Emphasis Area Action Items. **Figure 10** shows serious injuries and fatalities by race/ethnicity and **Figure 11** shows a comparison of fatality rate by race/ethnicity compared to white. **Figure 11** indicates that the Black population is disproportionately represented in severe crashes in Tennessee. The rising trend of severe crashes involving Black individuals over the years emphasizes the need to consider equity in transportation safety measures and conduct focused investigations using safety tools to address and mitigate these disparities. Understanding the underlying factors contributing to this overrepresentation and taking targeted actions is crucial to improving road safety for all population groups.

The USDOT has introduced a new tool, the Equitable Transportation Community (ETC) Explorer, to support

equitable outreach and safety analysis. This free, interactive web application utilizes 2020 census tracts and data to examine the cumulative burden experienced by communities due to underinvestment in transportation across five key components: Transportation Insecurity, Climate and Disaster Risk Burden, Environmental Burden, Health Vulnerability, and Social Vulnerability.

Transportation insecurity is a crucial aspect of transportation disadvantage. It occurs when individuals are unable to regularly, reliably, and safely reach destinations necessary for their daily lives. While there are well-established policies and programs addressing food and housing insecurity nationally, transportation insecurity has not received the same level of attention. The DOT is working to change this, as growing research indicates transportation insecurity significantly contributes to persistent poverty.

Figure 10 - Serious Injuries and Fatalities by Race/Ethnicity

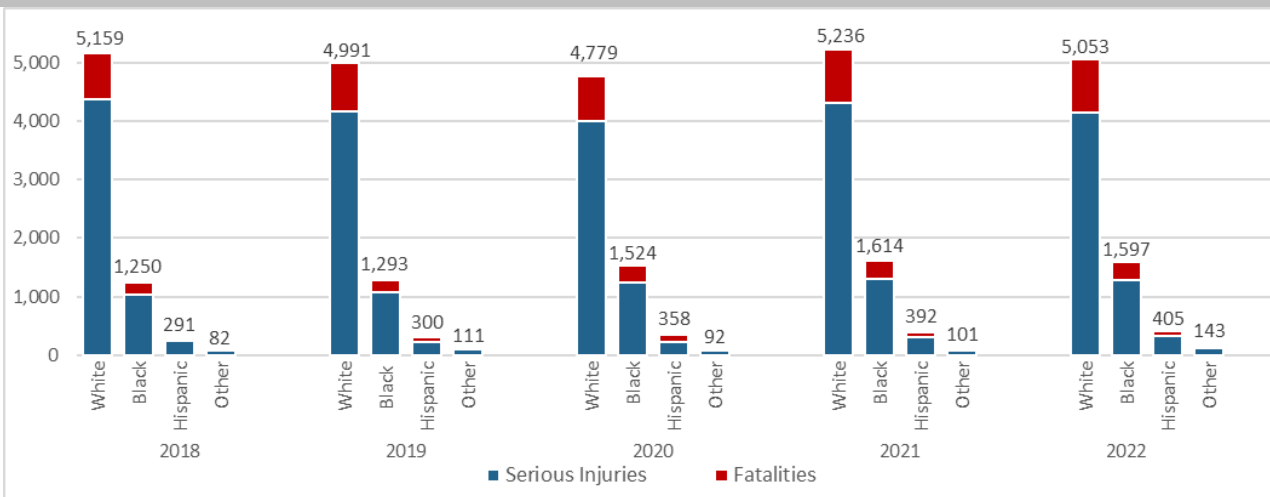


Figure 11 - Comparison of Fatality Rate (per million population) by Race/Ethnicity

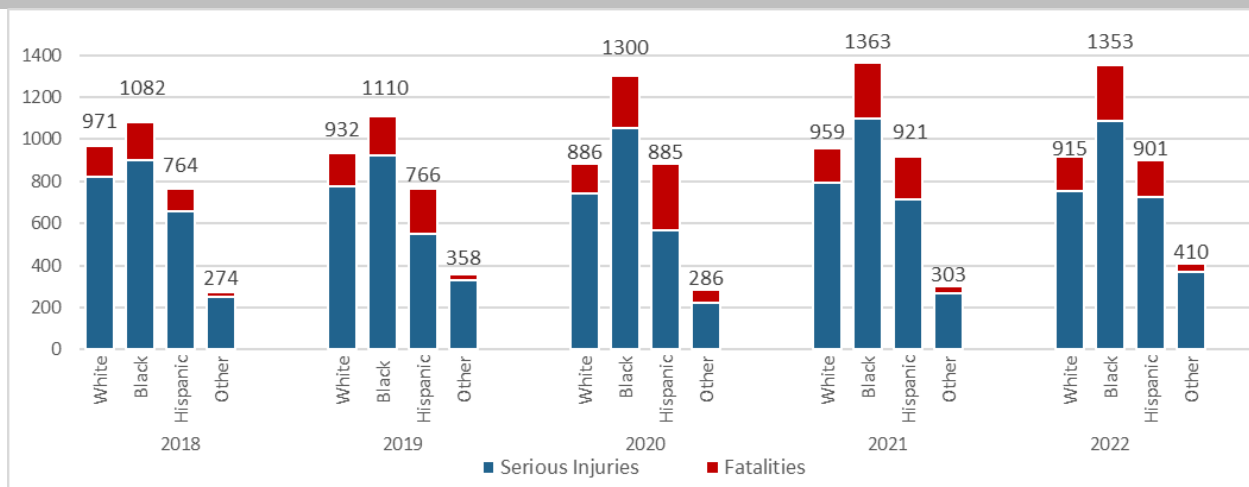




Figure 12 - USDOT Equitable Transportation Community Explorer – Example from Clarksville, TN

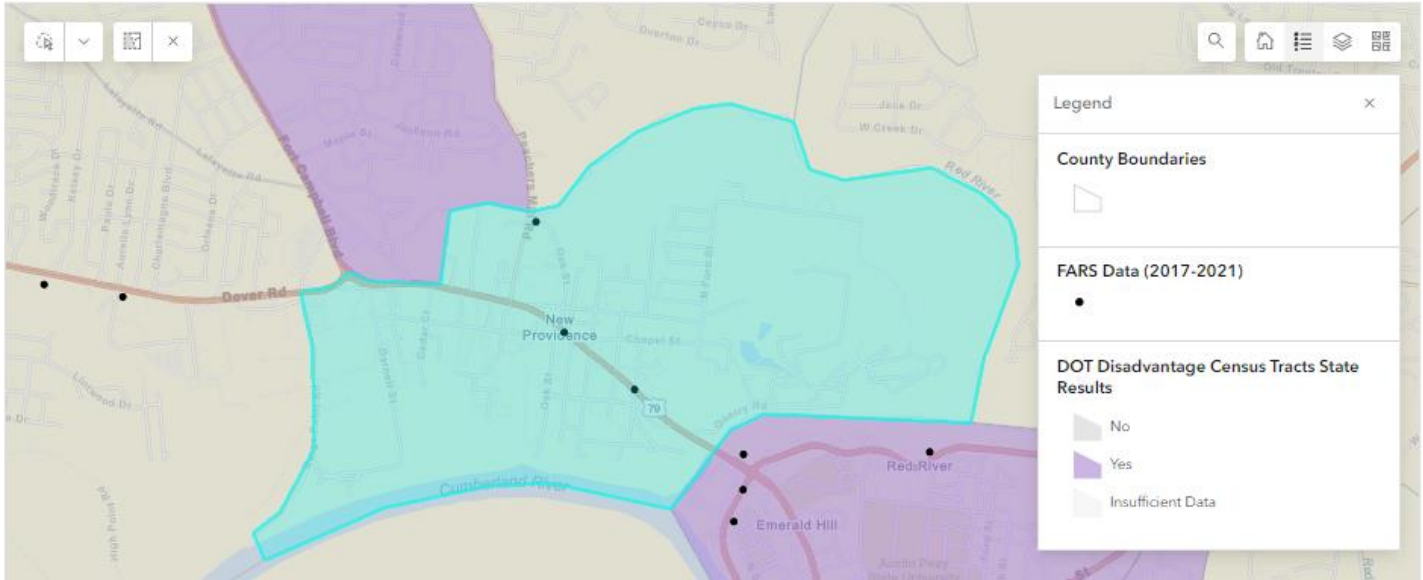
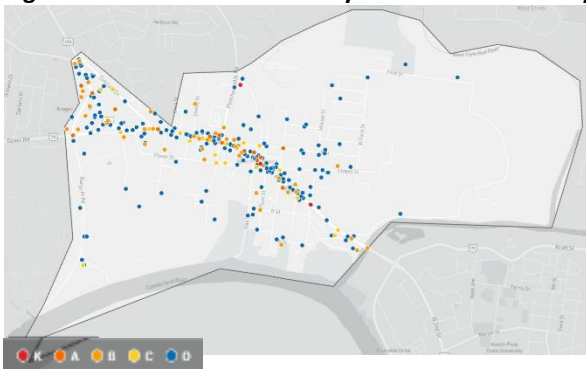


Figure 13 - AASHTOWare Safety Tool – Crash Severity Distribution – Example from Clarksville, TN



Summary	Crash	
Total Crashes	1,200	100.00%
Distracted Driver Involved	226	18.83%
Truck/Bus Involved	75	6.25%
Alcohol Involved	29	2.42%
Motorcycle Involved	24	2.00%
Pedestrian Involved	19	1.58%

Understanding transportation insecurity through safety measurement is crucial, as it highlights disadvantaged areas with unsafe conditions and high crash rates that could be improved with enhanced infrastructure. Sixty-two percent (62%) of communities in the top 20% of roadway fatalities are disadvantaged, and 22% of all fatal crashes in these communities result in pedestrian deaths³ Given these statistics, integrating equity is essential to address the disparate fatal and serious injury crash outcomes impacting underserved communities and vulnerable road users. The USDOT encourages transportation agencies to adopt the SSA, which anticipates human mistakes and accommodates vulnerabilities by designing and operating roadways to be safe for everyone.

The ETC and AASHTOWare Safety can be effectively utilized together for safety projects. The ETC provides detailed insights into community vulnerabilities, while AASHTOWare Safety is a powerful safety software that analyzes crash data to identify high-risk locations for all crash severity levels. See above figures for an example from Clarksville, Tennessee.

By integrating these tools, transportation agencies can better anticipate and mitigate adverse conditions, ensuring safer and more reliable transportation for all users. Some examples of effective safety countermeasures include the following:

- **Enhanced Pedestrian Crossings:** Installing more visible and safer pedestrian crossings in disadvantaged areas.
- **Improved Lighting:** Increasing pedestrian-scaled street lighting to enhance visibility and safety for pedestrians and street lighting to enhance visibility and safety for drivers.
- **Public Transit Improvements:** Expanding and improving public transportation options as well as the access and the quality of transit stops.



Combining the use of both tools can inform the selection and implementation of these countermeasures. Safety projects can more effectively address and reduce insecurity, ultimately leading to safer and more equitable outcomes for all communities.

Specified Safety Projects

The BIL allows a State to use up to 10% of its HSIP funding for specified safety projects. Specified safety projects may include projects that:

- Promote public awareness and informs the public regarding highway safety matters
- Facilitate enforcement of traffic safety laws
- Provide infrastructure and infrastructure-related equipment to support emergency services
- Conduct safety-related research to evaluate experimental safety countermeasures or equipment
- Support safe routes to school non-infrastructure-related activities

See the Emphasis Areas for specific items such as the Yellow Dot Program and the Tennessee Operations and Safety Conference.

Plan Update

Based on review of the safety data and criteria above, the Steering Committee confirmed continued inclusion of the Emphasis Areas previously identified during the last SHSP update. Goals, objectives, and key strategies were selected for each of the Emphasis Areas.

Because crashes can involve multiple contributing factors (human, infrastructure, environment, etc.), key strategies related to more than one of the five elements of the SSA were utilized to provide a comprehensive solution that mitigates identified safety concerns. This basic strategy is a basis of the SHSP's mission statement.

The Plan was further refined by distributing it to organizations and agencies with specific interest in highway safety in Tennessee. This group included the MPOs, RPOs, Bike Walk Tennessee, and many others. Safety partners received a copy of the plan with a request for comments. Comments received were incorporated into the SHSP update.

Another component of the update process was the integration of the Vulnerable Road User (VRU) Safety Assessment, which TDOT completed in 2023, as a requirement of the BIL. The VRU Safety Assessment is an extensive initiative designed to understand the factors behind the rising number of VRU crashes in the state. For more information about the VRU Safety Assessment, see the Special Rules section of the plan; the complete assessment is included in the Appendix of this document.

Performance-Based Approach

Included in the strategy tables in each Emphasis Area are the components of each Action Item, detailed with a numbered Action Item, which includes a brief description of the action, a referenced plan that supports it, and the lead agency responsible for its implementation. All goals, strategies, and Action Items are performance-based with performance measure for each Action Item to assess the action's success, identifies the involved "E" (Engineering, Emergency Response, Enforcement, or Education) and specifies the relevant SSA elements. Unless otherwise specified in the Performance Measure, each Action shall be completed or designated to continue by end of year 2029. The performance of the strategies and the overall goals shall be evaluated in the SHSP quarterly meetings.

See the SHSP Implementation and Evaluation section near the end of this report for more details and information on stakeholder coordination, emphasis area strategic plans, and plan monitoring.



Special Rules

Per legislative requirements, three (3) special requirements must be addressed by the SHSP update. Discussion of each of the requirements and related analysis is provided in the sections below.

High Risk Rural Roads

Inclusion of the definition of “High Risk Rural Roads” in the SHSP update became a requirement under MAP-21 and was continued by the FAST Act and the BIL. Tennessee defines a High-Risk Rural Road (HRRR) as “any roadway functionally classified as a rural major or minor collector or a rural local road with significant safety risks.”

Specific to the SHSP update, no statistical data or calculation is required to accompany the definition. However, it should be noted that an annual assessment of fatalities and serious injuries on these roadways is currently conducted to determine if the HRRR Special Rule established under the FAST Act is triggered. If it is found that the HRRR Special Rule applies to a State, legislation requires the State obligate an amount equal to 200 percent of its Fiscal Year (FY) 2009 high risk rural roads set-aside for high-risk rural roads, as defined in their State SHSP.

Vulnerable Road User Safety Assessment

In 2023, TDOT completed the VRU Safety Assessment, a requirement of the BIL. The VRU Safety Assessment is an extensive initiative designed to understand the factors behind the rising number of VRU crashes in the state. VRUs include pedestrians, cyclists, and non-motorized transportation users, whose increased vulnerability calls for focused safety measures. The assessment is a comprehensive initiative aimed at understanding the factors contributing to the increasing number of VRU crashes. This assessment aligns with the SSA, which prioritizes the elimination of roadway fatalities and serious injuries among all road users. It aims to identify high-risk areas, infrastructure deficiencies, and existing programs impacting VRUs to propose evidence-based recommendations for Tennessee's SHSP.

Beyond reducing VRU crashes, the assessment promotes sustainable and active transportation, addresses social equity concerns, and aims to create a safer, more inclusive transportation network. The VRU Safety Assessment is included in the Appendix of this document and aligns with and expands upon the Vulnerable Road Users Emphasis Area.

Older Driver and Pedestrian Safety

A statute, originally enacted by MAP-21 and continued by the FAST Act and the BIL, focuses on the fatalities and serious injuries per capita incurred by drivers and pedestrians over the age of sixty-five (65). The related required assessment is conducted on the two most recent 5-year periods of available data (2016-2020, and 2018-2022). If an increase is found to have occurred during the assessment period, the State shall be required to include, in the subsequent SHSP of the State, strategies to address the increases in those rates, considering the recommendations included in the publication of the FHWA’s *Handbook for Designing Roadways for the Aging Population*.

The analysis conducted to satisfy this requirement for Tennessee utilized data from 2016-2022. A summary of the analysis is provided in **Table 6**.

Table 6 - Per Capita Older Road Users (Age 65+) Calculation Summary

Year	Older Driver and Pedestrian Fatalities	Population (1,000s)	Older Fatality Rate (per 1,000 seniors)	5 Year Average
2016	172	1,045	0.20	2016-2020
2017	176	1,077	0.16	
2018	157	1,110	0.14	
2019	187	1,143	0.16	2018-2022
2020	160	1,181	0.14	
2021	186	1,185	0.16	
2022	222	1,221	0.18	

As shown in **Table 6**, the 2018-2022 five (5) year average for older user fatality rates remains consistent with that for 2016-2020. Therefore, the mandate set forth by this rule will not apply to the SHSP update.



Data Collection and Analysis Emphasis Area

Background and Overview

Accurate and comprehensive data provides the basis of a successful traffic safety program. During the SHSP update process, data pertaining to crash records, roadway inventories, and demographics are essential to determine safety concerns, underlying factors related to crashes, and relationships of demographics and locations to overrepresented numbers of fatalities and serious injuries.

Following development of the SHSP, the same data becomes a valuable project tool allowing engineering professionals to identify safety concerns, law enforcement to focus attention on high-risk areas, and all safety partners to focus on the goal of reducing severe crashes on Tennessee's roadways. Analysis of the data, both through historic and predictive analysis, offers safety partners the ability to determine benefit (both potential and actual) of a given countermeasure and to be proactive with decision making pertaining to projects and programs related to safety.

Current Data Collections

Crash Records

The Tennessee Integrated Traffic Analysis Network (TITAN) is a suite of tools developed for the electronic collection, submission, and management of all traffic safety-related data in Tennessee. It consists of a centralized data and document repository for public safety information managed by the Department of Safety & Homeland Security.

TITAN was designed to accept reports submitted by law enforcement agencies, validate the data contained within the report for completeness and accuracy, and then store the information for analysis. The TITAN repository also creates document images of submitted reports and retains them for future access and records retention requirements. This information is used to make data-driven decisions and help make Tennessee a safe and secure place in which to live, work, and travel.⁴



Meeting the goal of the previous SHSP update, the state mandates and requires all law enforcement in the state to electronically submit crash reports to the TITAN database. This, along with efforts to manually log paper crash reports previously recorded, allows the TITAN database to become a comprehensive, real-time repository for crash records statewide. Through use and inspection of the resulting datasets, both TDOSHS and TDOT recognize the need for the following improvements to TITAN and analysis of its data:

- Improve the quality of the data provided by the crash reports
- Improve the consistency of the crash reporting with all agencies statewide
- Establish a method to perform quality assurance and quality control on the data received
- Improve crash data on unreportable crashes (e.g. bicycle being hit by a car door opening in the bike lane)

Roadway Network Data

Correlating roadway network data (geometry, volumes, etc.) with crash records is an essential element for safety issue identification. TDOT developed and maintains the Enhanced Tennessee Roadway Information Management System (ETRIMS), a web-based application, which serves as a repository for roadway characteristics including but not limited to traffic volumes, horizontal geometry, functional classification, and roadway section information. TDOT is transitioning from ETRIMS to Esri Roads and Highways.

TDOT began implementing AASHTOWare Safety in 2021 to replace the crash component of ETRIMS. AASHTOWare Safety is a valuable tool for practitioners conducting crash analysis. The data contained within the repository is routinely used by TDOT to consider locations as candidate projects under the HSIP. TDOT's Project Safety Office uses AASHTOWare data along with crash information imported from TITAN to determine crash rates of candidate locations. During project development, ETRIMS provides information such as current signing installed, guardrail locations, log mile references, speed limits, and the cross section of the roadway at the project location. TITAN crash reports have been directly integrated into AASHTOWare Safety.

Another application of AASHTOWare Safety is network screening, which allows users to rank and identify sites for further investigation and potential treatment along the entire roadway network in an easy-to-use interface.



Work Zone Data

The Work Zone Safety and Mobility Rule (23 CFR 630 Subpart J), effective since October 12, 2007, requires the development and implementation of an overarching policy for state and local agencies using federal funding aimed at the reduction of crashes and congestion in work zones. This translates into an agency making use of field observations coupled with relevant data (crash records, speed data, traffic volumes, etc.) to assess and analyze any potential safety or operational concern. At a project level, this process allows for mitigation of a specific concern in a timely fashion.

Collectively, the data, concerns identified, and mitigations used can help shape an agency's policies and create a best practice that mitigates known issues and fosters safe and efficient mobility through the work zone.

Efforts to combat safety concerns spawning from work zones will be addressed in the Operational Improvements Emphasis Area. To support these efforts, accurate identification of severe crashes occurring in active work zones during crash reporting is essential. The responsibility of proper identification rests with the law enforcement officer conducting the crash investigation. Additionally, maintaining the location, start, end, and duration of a work zone in TDOT 360 would give analysts the ability to pull crashes in the active work zone to assess issues.

Data Analysis

As evidenced in the previous discussion, the State requires an effective data gathering and processing procedure that coordinates independent data sets to achieve statistical consistency. Historically, relevant data sources were used and linked using the crash case number as common data forming a crash database. This database provides safety practitioners with the statistical data needed for identification of crash-related trends and issues.

Beyond the SHSP update, the need for analysis of crash data remains, whether it be for countermeasure evaluation or assessment at the project level. Aside from statistical development, crash analysis focuses on two primary calculations: crash rate analysis using historic crash data, and predictive calculation of crash frequency using methodologies set forth by the Highway Safety Manual (HSM).

Crash Analysis Using Historic Data

Development of crash rates based on historic data is a commonly used method to determine if a location qualifies for HSIP funding and to determine the safety impact of a project through comparison of pre- and post- improvement implementation. The analysis conducted under this method produces crash rates expressed in crashes per one hundred million vehicle miles for segments and crashes per one million vehicles entering for intersections. While this method does not allow for prediction of how a location will perform based on a proposed improvement, it does allow for an accurate account of how the location currently performs as it uses actual crash experience as a factor. It is anticipated that this method will continue to be utilized by safety professionals (engineers, law enforcement, etc.) for these functions.

Predictive Analysis

In 2010, the HSM was published, providing a means to quantitatively predict the impact on the number of crashes based on the improvements or modifications proposed to a roadway segment or intersection. The impact realized by the improvements is determined through comparison of the calculated crash frequency of the current conditions versus that of the roadway with the improvements implemented. For the calculation, the HSM methodology utilizes Crash Modification Factors (CMFs) to adjust crash prediction to reflect the current or proposed field conditions. Additionally, a calibration factor is typically applied in the equation to adjust for regional conditions. The resulting crash frequencies calculated for existing and proposed conditions are compared to provide a quantitative measure of anticipated safety benefit. It should be noted that the calculated benefit is an estimate and is considered a useful tool during the planning process for the purpose of alternatives comparison or justification of a design exception. AASHTOWare Safety is developing a predictive analysis tool that will be available to all users.

Before and After Studies

The Project Safety Office staff will develop a program for RSAs and LRSIs for evaluating crash data from three (3) years before a safety project was developed and after the safety project has been constructed for three (3) years. See Infrastructure Improvements Emphasis Area Action Items 1.5 and 2.6



Evaluation Data












Real-time, accurate, and comprehensive data also provides the ability to create statistics that will aid in the evaluation of a specific countermeasure. All actions (projects, campaigns, initiatives, etc.) associated with a given strategy need a measurement of effectiveness (MOE) to determine success or failure of the action. As the data becomes more accurate and robust, conducting a quantitative assessment using meaningful MOEs for a given action will become easier. For this, the need to establish logical MOEs for countermeasures based on data availability and development of a consistent procedure for the extraction and analysis of the identified MOE is paramount to effective evaluation of countermeasures.

Strategies

Strategies relevant to this Emphasis Area will differ from ones identified in other Emphasis Areas as they do not focus on directly driving down the number of fatalities and serious injuries. The strategies cited below are geared toward improving the data that support other Emphasis Areas, aiding in problem identification, and providing for evaluation of countermeasures. Unless otherwise specified in the Performance Measure, each Action shall be completed or designated to continue by end of year 2029.










See page 11 for the SSA Element legend.

1. Improve traffic data collection systems, hardware, and technology to provide data in a more timely and efficient manner.















Action Item ID	Action Item	Plan	Agency/Champion	Performance Measure	E's Involved	SSA Element
1.1	Expand TITAN to improve timeliness and accuracy of data collection, analysis processes, and consistency with FARS data and other traffic safety data systems including the linkage of crash, roadway, driver, medical-injury surveillance system and ambulance and trauma system, enforcement, conviction, criminal, and homeland security data.	TRSP	TDOSHS	<ul style="list-style-type: none"> Number of completed linkages of TITAN to other State datasets 	 Enforcement	
1.2	Conduct periodic training for officers to improve the operational readiness of the THP and all local law enforcement agencies investigating crashes that occur on Tennessee roadways. Include training on data collection, submission, analysis, definitions, importance, and appropriate uses for traffic safety data.	HSP	TDOSHS	<ul style="list-style-type: none"> Number of trainings provided 	 Education  Enforcement	
1.3	Establish a post-acceptance quality control program for data uploaded to TITAN.	HSIP	TDOSHS	<ul style="list-style-type: none"> Establishment of program by end of year 2025 	 Enforcement	
1.4	Integrate Esri R&H/ETRIMS Database with TITAN for efficient and consistent analysis of current data by TDOT for safety analysis conducted by TDOT and TDOSHS.	HSIP	TDOT	<ul style="list-style-type: none"> Uniform reporting with TITAN database 	 Engineering	
1.5	Continue work to update the TDOT Linear Reference System (LRS) for locating crashes, improving crash data recorded locations, and identifying potential safety projects.	HSIP	TDOT	<ul style="list-style-type: none"> Integration of map-based location capture for crash reporting Percent of incorrectly located crashes Availability of Esri R&H/ETRIMS data for integration to TITAN to integrate LM reference in crash reports 	 Engineering	



1. Continued - Improve traffic data collection systems, hardware, and technology to provide data in a more timely and efficient manner.

Action Item ID	Action Item	Plan	Agency/Champion	Performance Measure	E's Involved	SSA Element
1.6	Continue to expand local partner agencies' participation in the collection and use of crash information with focus on rural county law enforcement and highway officials through promotion and education of LRSI R&H, ETRIMS, TITAN, and MAP-IT by TDOSHS and TDOT.	HSP LRTP	TDOSHS TDOT	<ul style="list-style-type: none"> Number of agencies educated 	 Engineering  Enforcement  Education	 Post Crash Care  Roads
1.7	Complete collection of mandatory fundamental data elements (FDE) for Model Inventory of Roadway Elements (MIRE).	HSIP	TDOT	<ul style="list-style-type: none"> Completed collection of FDE by end of year 2029 	 Engineering	 Roads
1.8	Begin using One.Network to allow multiple divisions within TDOT and external agencies to plan work zones in advance and to manage work zones in real time.	HSIP	TDOT	<ul style="list-style-type: none"> Begin using software by the end of 2025 	 Engineering	 Roads

2. Improve data collection in the field and data distribution to expedite and improve delivery of relevant data for safety analysis, infrastructure improvements, and law enforcement.

Action Item ID	Action Item	Plan	Agency/Champion	Performance Measure	E's Involved	SSA Element
2.1	Update the online crash instructional manual with data definitions defined by Model Minimum Uniform Crash Criteria (MMUCC) and ANSI D-16.	HSP	TDOSHS	<ul style="list-style-type: none"> Updated manual available via the internet 	 Enforcement  Education	 Post Crash Care
2.2	Complete integration and upgrade of crash related databases with other relevant state databases.	HSIP	TDOT	<ul style="list-style-type: none"> Completion of integration and upgrade of databases 	 Engineering	 Post Crash Care
2.3	Conduct an annual supervision and leadership class for all new supervisors and selected troopers on developing and using enforcement plans utilizing traffic records data.	HSIP	TDOSHS	<ul style="list-style-type: none"> Completion of yearly class 	 Enforcement  Education	 Post Crash Care
2.4	Expand data collection of work zone related crashes in TDOT 360, integrate work zone crashes in AASHTOWare Safety and TITAN.	HSIP	TDOT	<ul style="list-style-type: none"> Successful integration of TDOT 360 and work zone crash data in AASHTOWare Safety 	 Engineering	 Post Crash Care  Roads
2.5	Develop process for "TMP Significant Projects" crash analysis.	HSIP	TDOT	<ul style="list-style-type: none"> Number and type of pre-work zone vs. work zone crashes on designated time intervals 	 Engineering	 Roads  Post Crash Care



Data Collection and Analysis Emphasis Area

2. Continued - Improve data collection in the field and data distribution to expedite and improve delivery of relevant data for safety analysis, infrastructure improvements, and law enforcement.

Action Item ID	Action Item	Plan	Agency/Champion	Performance Measure	E's Involved	SSA Element
2.6	Develop SHSP Dashboard with AASHTOWare Safety for efficient reports on the performance of Action Items.	HSIP	TDOT	<ul style="list-style-type: none"> Completion of dashboard by end of year 2026 	 Engineering	 Post Crash Care

3. Enhance the ability of and encourage the use of predictive safety analysis for Tennessee roadway projects.

Action Item ID	Action Item	Plan	Agency/Champion	Performance Measure	E's Involved	SSA Element
3.1	Continue to support research projects for the purpose of developing CMF specific to Tennessee.	HSIP	TDOT	<ul style="list-style-type: none"> Number of CMFs developed 	 Engineering	 Roads
3.2	Conduct outreach and training opportunities for safety practitioners for proper use and development of quantitative safety analysis using the HSM methodology and its role in project development.	HSIP	TDOT TTAP	<ul style="list-style-type: none"> Number of training and outreach opportunities conducted 	 Engineering Education	 Roads
3.3	Deployment of AASHTOWare Safety, which utilizes HSM methodologies, to allow safety practitioner to conduct quantitative safety assessment of roadways.	HSIP L RTP	TDOT	<ul style="list-style-type: none"> Continued deployment of Software 	 Engineering	 Roads





Driver Behavior Emphasis Area

Background and Overview

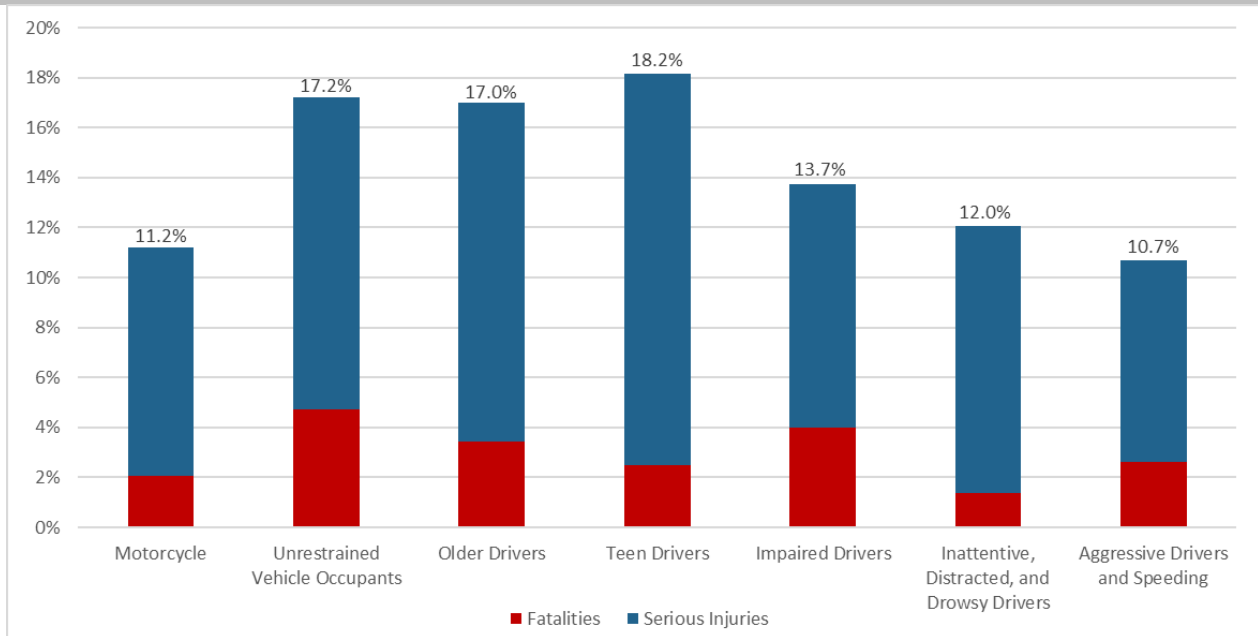
A holistic approach to safety must consider environment, vehicle, and driver. This includes understanding how drivers interact with the roadway environment, their mode of transportation, and other road users. Ultimately the behavior that drivers display can make a substantial difference on how they control, navigate, and guide the vehicle. NHTSA's publication "Traffic Safety Facts, A Brief Statistical Summary" (February 2015) cites that the drivers were cited as the critical reason in 94% of assessed crashes⁵. Critical reasons are defined as the immediate reason for the critical pre-crash event and is often the last failure in the causal chain of events leading up to the crash. Although the critical reason is an important part of the description of the events that led up to the crash, it is not intended to be interpreted as the cause of the crash nor as the assignment of fault to the driver, vehicle, or environment. Driver related critical reasons are classified

into recognition, decisions errors, performance errors, and non-performance errors.

The NHTSA survey found that recognition error was the most frequently (41%) assigned the critical reason. This common error involves driver's inattention, internal and external distractions, and inadequate surveillance. Decision error (e.g. driving too fast for conditions, driving too fast for the curve, false assumption of others' actions, illegal maneuver, and misjudgment of gap or others' speed) accounted for about 33% of the crashes. In approximately 11% of the cases, the critical reason was performance error such as overcompensation, poor directional control, etc. Sleep was the most common critical reason among non-performance errors with 7% of the cases studied.⁵

The percentage of fatalities and serious injuries in Tennessee crashes where a given factor was cited for the data assessed is provided in **Figure 14**.

Figure 14 - Fatalities and Serious Injuries by Driver Behavior (2018-2022)





Motorcycles

Operation of a motorcycle contributes to increased risks compared to operation of a passenger car. According to the NHTSA, motorcyclist fatalities occurred nearly 22 times more frequently than passenger car occupant fatalities in traffic crashes.⁵ Nationally, motorcyclists accounted for 15% of all traffic fatalities despite only accounting for an estimated 0.7 percent of VMT.

Figure 15 shows the fatalities and serious injuries involving motorcycles from 2018 to 2022, with an increase exhibited by the annual number of serious injuries over the period assessed. During this period, there were 805 fatalities and 3,602 serious injuries involving motorcycles statewide, accounting for 13% of the total fatalities and injuries. In comparison to the previous SHSP, motorcycle fatalities increased by 22% and serious injuries decreased by 3%.

An additional investigation of these crashes was conducted to determine any notable trends or over-representations. Notable statistics in the motorcycle-involved crash data include:

- Crash statistics are slightly higher for urban roadways (57% urban, 43% rural)
- Single vehicle crashes (lane departures and roadway departures) and angle crashes were cited as the manner of collision for approximately 77% of the related crashes
- Approximately 82% of the motorcycle-related severe crashes occur from April to October when temperature conditions are more favorable.

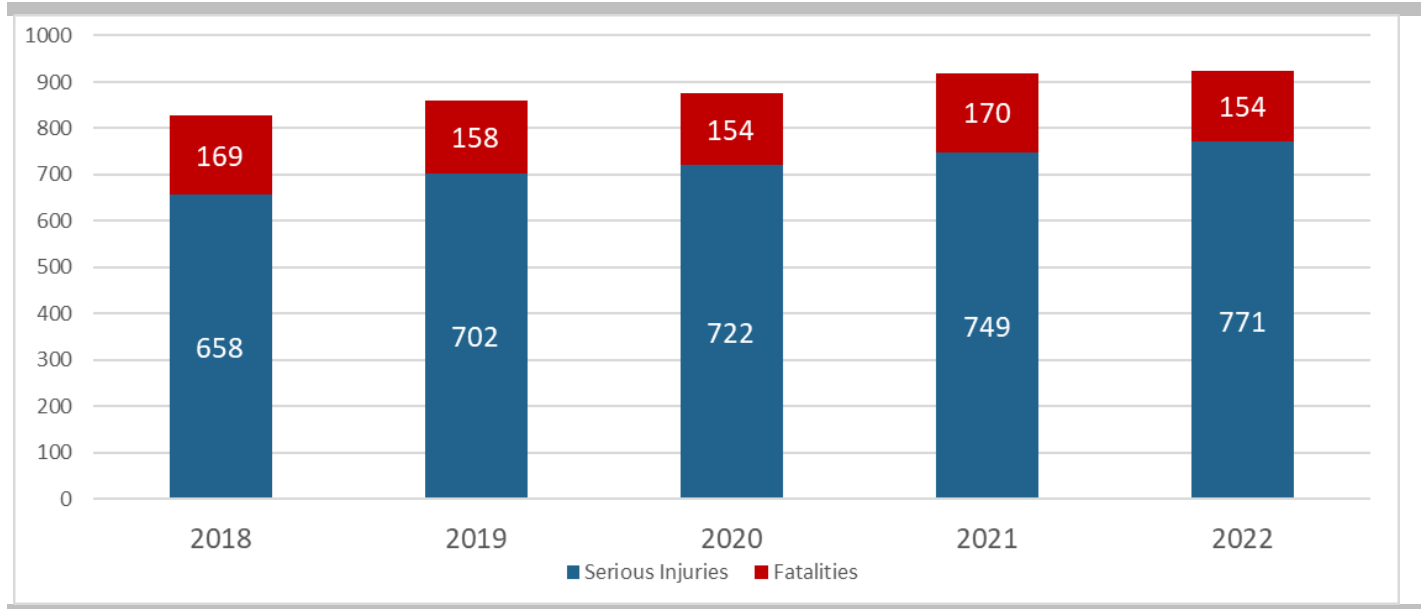


In addition to the local statistics, several national statistics below illuminate further challenges to consider when identifying motorcycle-related severe crashes.

- Approximately 35% of motorcycle riders involved in fatal crashes in 2022 were riding without a valid motorcycle license.
- In 2022, a higher percentage (28%) of motorcycle users involved in a fatal crash were operating under the influence of alcohol compared to operators of other modes (25% for passenger cars, 21% for light trucks, and 3% for large trucks).
- Motorcycle riders killed in traffic crashes at night were three (3) times more frequently alcohol-impaired than those killed during the day in 2022.⁶

While these statistics focus on motorcyclists, it is crucial that motorists are educated and maintain awareness of sharing the road with motorcycles. For example, in 2022, for 44% (1,436) of the 3,268 two-vehicle fatal crashes involving a motorcycle and another type of vehicle, the other vehicles were turning left while the motorcycles were going straight, passing, or overtaking other vehicles.⁶

Figure 15 - Fatalities and Serious Injuries Involving Motorcycles (2018-2022)





Unrestrained Occupants

Figure 16 shows the fatalities and serious injuries attributed to unrestrained vehicle occupants from 2018 to 2022. During this period, 1,854 fatalities (31%) and 5,621 serious injuries (17%) involved unrestrained occupants statewide. Since the previous period (2013-2017), unrestrained occupant fatalities have increased by 7%. Nationally, the percentage of crash-related fatalities linked to unrestrained vehicle occupants was 50% in 2022.⁷

A statewide observational survey was conducted to determine restraint usage rate. The survey's findings revealed an occupant restraint user rate of 91% in 2022, slightly lower than the national average of 91.6%.⁷ **Figure 17** shows the seatbelt usage rate from 2018 to 2022.⁸ Since the previous period (2013-2017), the seatbelt usage rate increased by 2.3%. The Survey was not conducted in 2020 due to Covid-19.

Figure 16 - Unrestrained Vehicle Occupants-Related Fatalities and Serious Injuries (2018-2022)

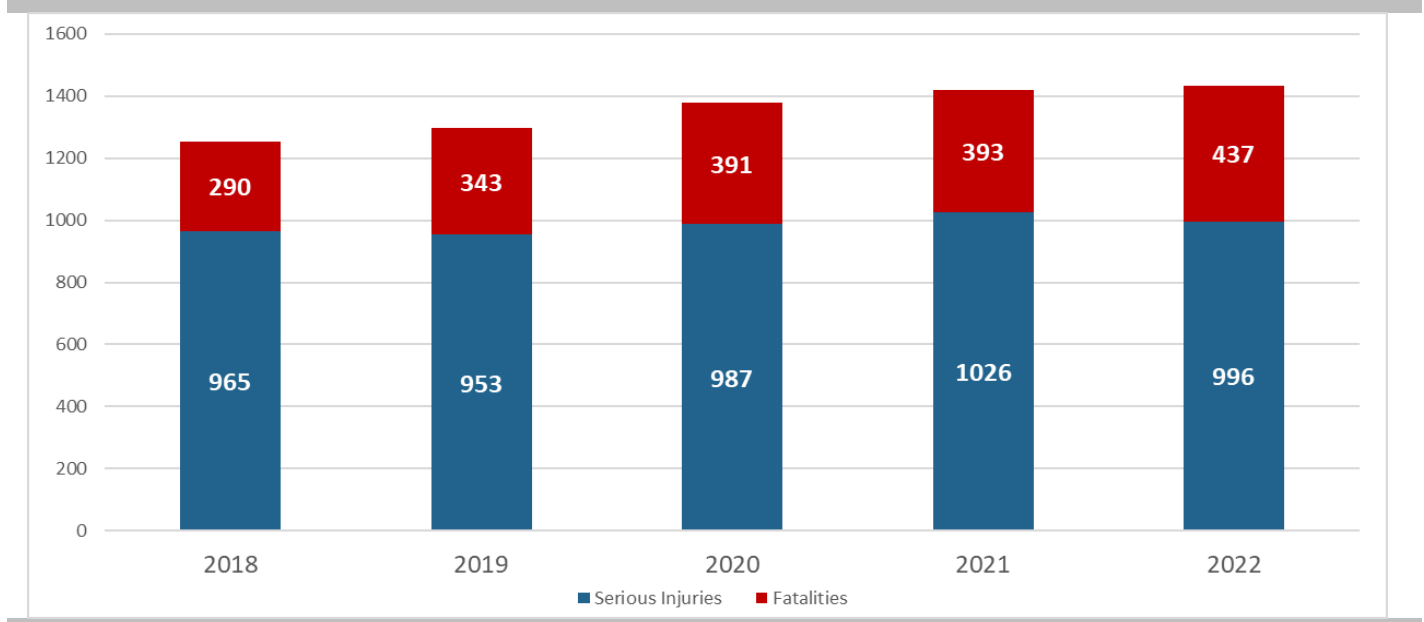
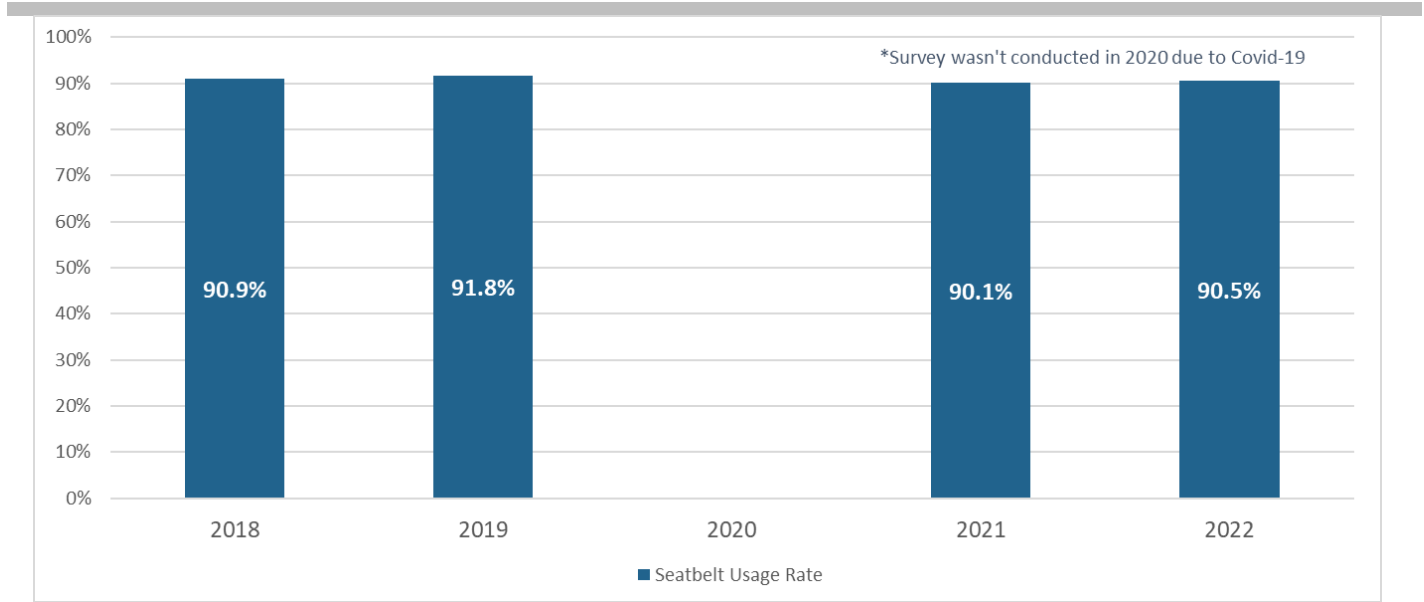


Figure 17 - Seatbelt Usage Rate (2018-2022)





Additional investigation was performed to determine any significant trends. Notable observations include the following with regard to unrestrained occupant related severe crashes:

- Approximately 45% of the people involved in severe crashes citing unrestrained occupants were between the ages of 16 and 25
- Severe crashes are split nearly evenly between rural and urban roadways (48% rural, 52% urban)
- Approximately 61% of the severe crashes were cited as single vehicle crashes (lane and roadway departures)
- Approximately 53% of fatalities and serious injuries occur from noon to 10 p.m. with the highest frequency occurring from 4 p.m. to 6 p.m.

Current crash records do not include information on occupant seating position with regard to fatal and serious injuries. It is worth noting that drivers, front-seat passengers, and children under 18 are legally required to use seatbelts. However, the law does not require the use of seatbelts for adults in the back seats, which would still allow for the possibility of unrestrained occupants being involved in crashes.

Impaired Driving

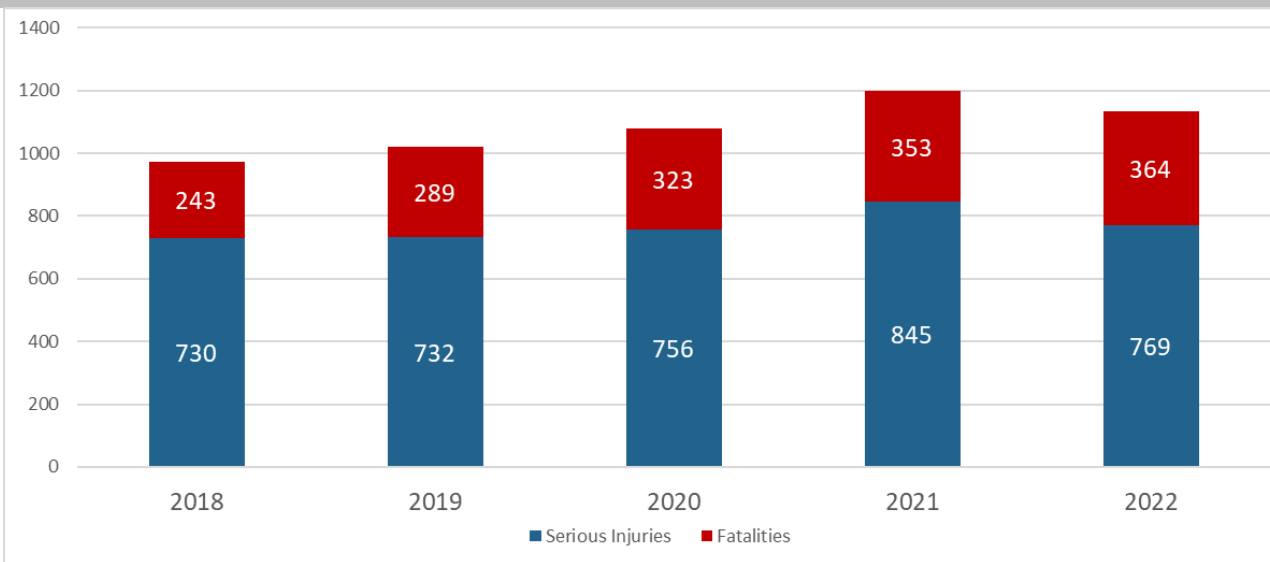
Per the Tennessee Impaired Driving Strategic Plan, drivers are considered impaired when they operate a motor vehicle under the influence of alcohol and/or other drugs. These substances can include alcohol, cannabis, and other drugs such as over-the-counter, prescription, and illicit drugs that can affect a person's brain function, judgment, vision, coordination, reaction times, reflexes, and muscle control.

Figure 18 shows the fatalities and serious injuries where alcohol impaired driving was a contributing factor from 2018 to 2022. As seen in the figure, the numbers shown an increasing trend during the study period: 1,572 (26%) of the total fatalities and 3,832 (13%) of the total serious injuries involved impaired driving. Since the previous study period (2013-2017), impaired driving fatalities have increased by 32%. In 2022, the national percentage of fatalities due to alcohol impaired driving was 32%, well above the statewide average.⁷





Figure 18 - Alcohol Impaired Driving Fatalities and Serious Injuries (2018-2022)



Additional observations from review of the impaired driving-related crash data include the following:

- Severe crashes are split nearly evenly between rural and urban roadways (47% rural, 53% urban)
- Approximately 70% of severe crashes occur during nighttime (6 p.m. to 4 a.m.)
- Approximately 61% of the severe crashes were cited as single vehicle crashes (lane and roadway departures)

Older Drivers

Older drivers are defined in this report as any driver that is 65 years of age or older. In Tennessee, one (1) of every five (5) fatal crashes involve a licensed driver over the age of 65. By 2030, Tennessee’s older population is projected to be 22% of the state’s population, higher than the national average.

The 2019 report from the Tennessee Commission on Aging and Disability estimates that seniors 65 and over will represent 20 to 30% of the population in 65 of the 95 Tennessee counties.

Fatal crash rates increase noticeably among drivers aged 70-74 and are highest among drivers 85 and older. The increased fatal crash risk among older drivers is largely due to their increased susceptibility to injury rather than an increased tendency to get into crashes. Considering the aging population is expected to increase significantly over the next decade, the number of older drivers who will be involved in fatal crashes will also increase. One of the many strategies suited to decrease roadway related fatalities and serious injuries in older populations is the Yellow DOT program, which TDOT currently sponsors.





Figure 19 shows the fatalities and serious injuries involving older drivers from 2018 to 2022. During this period, 1,352 fatalities (22%) and 5,337 serious injuries (19%) involved older drivers statewide. Since the previous period (2013-2017), older driver-related fatalities increased 21%.

Further assessment of the crash data related to older driver-involved crashes provided the following insights:

- Approximately 58% of the older driver-related severe crashes occurred on urban roadways
- Approximately 34% percent of the severe crashes involving older drivers occurred at an intersection
- Approximately 36% of all severe crashes were angle crashes
- Approximately 56% of the severe crashes were

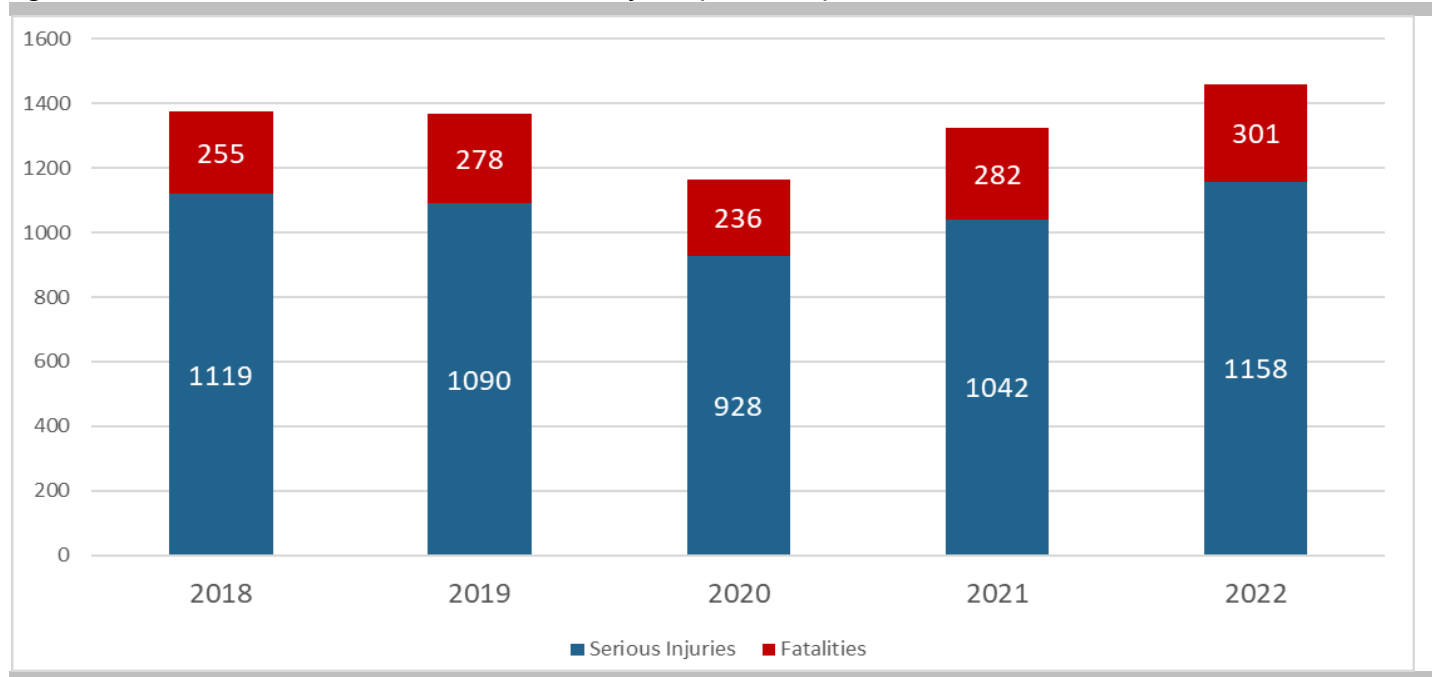
cited as two-vehicle crashes

- Approximately 73% of severe crashes occur between 8 a.m. and 6 p.m.

The Highway Safety Plan suggests that older drivers are now outliving their ability to drive safely by an average of seven (7) to ten (10) years. When older drivers experience decreased physical or cognitive abilities, they are often left to make the decision to retire from driving on their own.

In Tennessee, the driver’s license renewal process limits the government’s capacity to assess drivers’ ability over time. Renewals are generally due every eight (8) years but require no re-testing and can be completed by mail or online. In addition, the state does not require a vision test during the renewal process, which can put both older drivers and other drivers at risk.⁸

Figure 19 - Older Driver-Related Fatalities and Serious Injuries (2018-2022)





Aggressive Driving and Speeding

Aggressive driving is defined by the American Automobile Association (AAA) as “any unsafe driving behavior, performed deliberately and with ill intention or disregard for safety.” Additional examples of aggressive driving behaviors include:

- Speeding in heavy traffic
- Tailgating
- Cutting in front of another driver and then slowing down
- Running red lights
- Weaving in and out of traffic
- Changing lanes without signaling
- Blocking cars attempting to pass or change lanes
- Using headlights or brakes to “punish” other drivers.¹⁰

Combined, speeding and aggressive driving-related fatalities have increased by 26% when compared to the previous SHSP statistics. Current analysis shows that speeding and aggressive driving are linked to approximately 16% of all fatalities and 11% of all serious injuries.

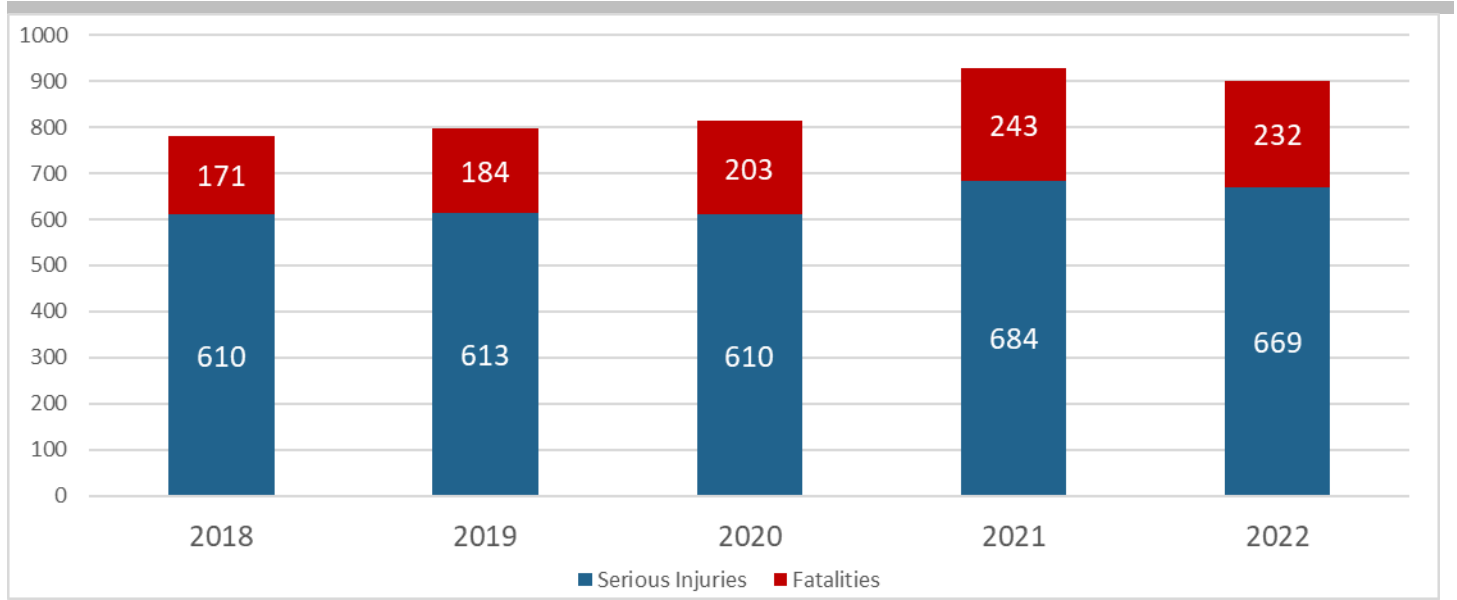
Figure 20 shows the fatalities and serious injuries attributed to aggressive driving and speeding from 2018 to 2022. During this period, 987 of the total fatalities (16%) and 3,041 of the total serious injuries (11%) involved aggressive driving and speeding statewide. Nationally, speeding was related to 29% of all traffic fatalities.⁷

Similar to the previous update, speeding remains the biggest contributing factor when analyzing severe crashes due to aggressive driving. Per data received from TDOSHS, speeding accounts for 95.6% of aggressive driving related fatal crashes.

Additional statistics related to severe crashes where speeding and aggressive driving were factors include the following:

- Approximately 65% of fatalities and serious injuries occurred on urban roadways. For rural routes, 31% of fatalities and serious injuries occurred on locally classified roadways
- Approximately 33% of severe crashes involved drivers aged 16 to 25
- Male drivers are approximately two (2) times more likely to be involved in an aggressive driving- or speeding-related severe crash
- Approximately 58% of the severe crashes were cited as single vehicle crashes (lane and roadway departures)
- Approximately 64% of the severe crashes occurred between noon and midnight with an increase in frequency during the 2 p.m. to 10 p.m. time frame
- Approximately 23% of the severe crashes occurred during nighttime hours in areas that were not lit by street lighting

Figure 20 - Speeding and Aggressive Driving-Related Fatalities and Serious Injuries (2018-2022)





Teen Drivers

Teen drivers are defined as drivers that are between the ages of 13 and 19 years old. The number of fatalities and serious injuries involving teen drivers increased approximately 17% since the previous SHSP update. Notably that the number of fatalities of teen driver related crashes doubled. While texting and driving is a safety concern for all drivers, it has only been linked to 6% of fatal crashes involving teen drivers nationwide.¹¹

The Center for Disease Control referred to teen crashes and fatalities as an epidemic in 2020. Teenagers have significantly higher crash rates than any other demographic. Crash risk is exceptionally high during the first months that teen drivers have their licenses.



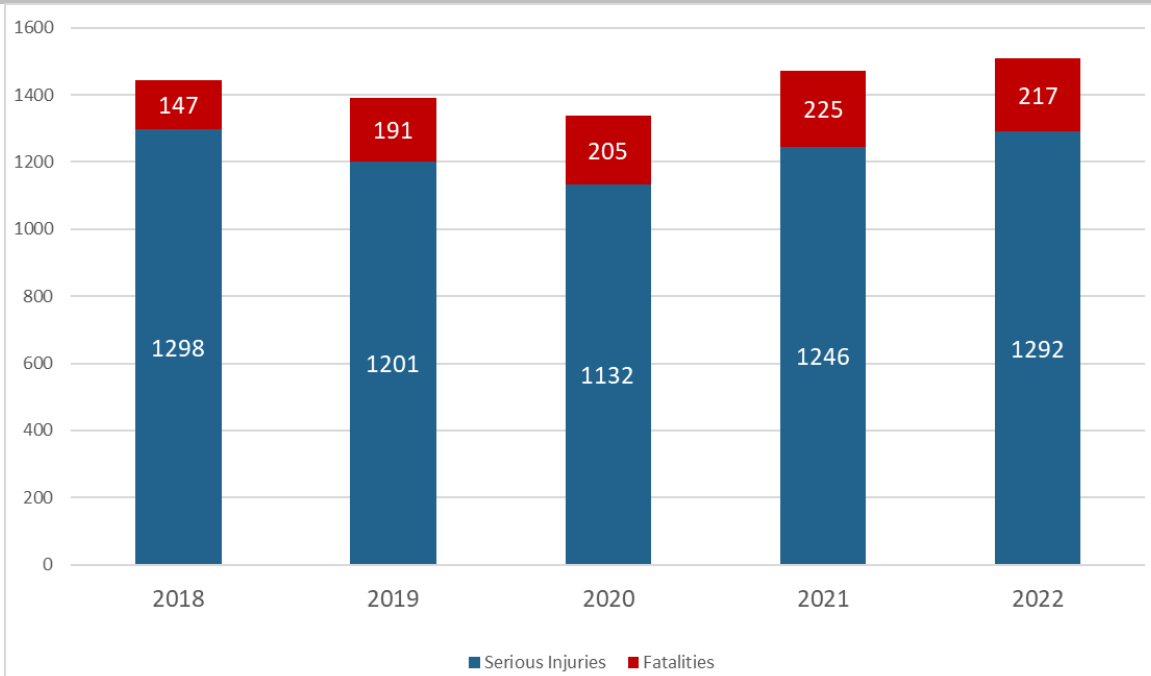
Other social factors such as immaturity can lead to speeding and other risky habits. The lack of experience while driving in a risky manner can also translate into inexperience in terms of an appropriate and safe reaction to road hazards.

Teen drivers and passengers are particularly vulnerable on roadways due to many causative factors:

- Driver inexperience
- Driving with a teen or young adult passenger
- Nighttime driving
- Not utilizing seat belts
- Distracted driving
- Drowsy driving
- Reckless driving
- Impaired driving
- Lack of driver education in schools and communities

Teen driver related crashes accounted for 21% of severe crashes over the period assessed for the SHSP update. **Figure 21** below shows the fatalities and serious injuries attributed to teen drivers from 2018 to 2022, with an increasing trend of fatalities. During this period, 985 fatalities (16%) and 6,169 serious injuries (21%) involved teen drivers statewide.

Figure 21 - Teen Driver-Related Fatalities and Serious Injuries (2018-2022)





An initial evaluation of the crashes involving young drivers was conducted to identify trends. The statistics created for the evaluation are provided in the Supplemental Data. Through this investigation, the following observations were made:

- Less than 10% of teens involved in severe crashes were impaired
- Approximately 64% of fatalities and serious injuries occurred on urban roadways. For rural routes, 25% of fatalities and serious injuries occurred on routes classified as local roadways
- Over half of the fatalities and serious injuries occur from 2 p.m. to 9 p.m. with the highest frequency occurring from 4 p.m. to 6 p.m. This aligns with the typical school dismissal time and afternoon peak traffic conditions
- Approximately 30% of the severe crashes occur at an intersection
- Angle crashes account for 30% of the severe crashes involving teens
- Approximately 42% of the severe crashes were cited as single vehicle crashes (lane and roadway departures)
- Young male drivers have almost three (3) times more fatalities than young female drivers and almost two (2) times more serious injuries than young female drivers

Inattentive, Distracted, and Drowsy Drivers

NHTSA defines distracted driving as anything that diverts the driver's attention away from the primary task of navigating the vehicle and responding to critical events.

While inattentive, distracted, and drowsy drivers (IDDs) only accounted for 7% of fatalities from 2018 to 2022, these issues are worth addressing due to the prevalence of digital communication devices. The determination of IDDs is hard to assess given that enforcement of these can be challenging, more specifically during fatal or serious injury crashes.

Changes in policy and legislation over the years have had a substantial impact on deterring drivers from using electronic

devices while operating a vehicle. These changes allow enforcement officers to issue citations to drivers that are holding a cell phone with any part of their body, and it also prohibits sending or reading text messages, reaching for a cell phone, where it requires the driver's body to leave the seat or remove the seat belt. Strategic and innovative enforcement practices have been implemented by THSO with their "Operation Hands Free" Bus Tour where THP and officers inside the bus observed traffic for distracted drivers from a vantage point then radioed patrol vehicles to execute enforcement action.

Figure 22 on the next page shows the fatalities and serious injuries attributed to IDDs from 2018 to 2022. During this study period, 483 fatalities (9%) and 3,321 serious injuries (15%) involved inattentive, distracted and drowsy drivers statewide. Since the previous period (2013-2017), inattentive, distracted and drowsy driving fatalities increased 61%.



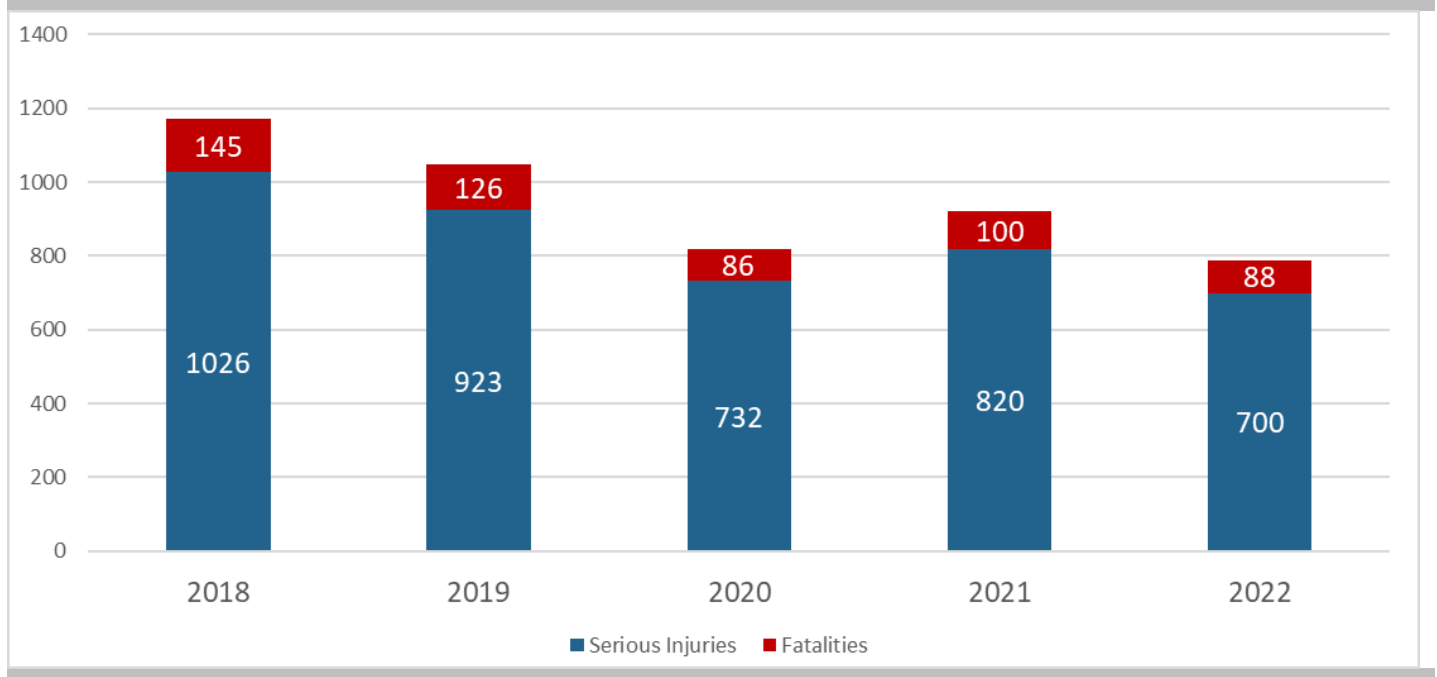
Further review of the statistical information from the IDD crashes provided the following observations:

- Approximately 70% of the severe crashes occurred on urban roadways
- Approximately 27% of the severe crashes occurred at an intersection
- Approximately 27% of the severe crashes involved drivers ages 16 to 25
- Approximately 49% of the severe crashes involved two (2) cars, 37% of the severe crashes were cited as single vehicle crashes (lane and roadway departures)
- Approximately 28% of severe crashes were rear end collisions



Driver Behavior Emphasis Area

Figure 22 - Distracted, Inattentive, and Drowsy Driver-Related Fatalities and Serious Injuries (2018-2022)



Goal and Objectives

Emphasis Area Goal:	To provide a safer environment for all modes of transportation in Tennessee through education of Tennessee’s driver population and improvement of law enforcement efforts.
Emphasis Area Objective(s):	Reduce the number of fatalities and serious injuries linked to driver behavioral factors. Promote safer driving practices through a combination of education and enforcement activities.

Strategies

















The following strategies target driver behavior and improve roadway safety. While these strategies will be applied statewide, additional data analysis and agency coordination will be performed to identify ways to target these focus areas under this plan. Unless otherwise specified in the Performance Measure, each Action Item shall be completed or designated to continue by end of year 2029.

See page 11 for the SSA Element legend.







1. Reduce the number of impaired drivers on Tennessee's roadways.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
1.1	Coordinate conference and training programs for enforcement agencies pertaining to detection, arrest, and conviction of impaired drivers, including Standard Field Sobriety Testing (SFST), Advanced Roadside Impaired Driving Enforcement (ARIDE), and Drug Recognition Expert (DRE).	HSP	TDOSHS	<ul style="list-style-type: none"> Number of conferences held Number of trainings held 	 Enforcement  Education	
1.2	Coordinate DUI enforcement projects, such as saturations and check points, which provide highly visible patrols, selective enforcement methods utilizing current field sobriety techniques and target areas with high impaired driving arrests and crashes through data-driven analysis.	HSP	TDOSHS	<ul style="list-style-type: none"> Number of enforcement campaigns 	 Enforcement	
1.3	Establish statewide tracking system for Blood Alcohol Content (BAC) levels of offenders.	HSP	TDOSHS	<ul style="list-style-type: none"> Establishment of tracking system 	 Enforcement	
1.4	Reduce minors' access to alcohol and other drugs through vendor education and enforcement of underage sales laws.	HSP	TDOSHS	<ul style="list-style-type: none"> Number of vendors engaged Citations for possession by minor 	 Enforcement  Education	
1.5	Provide high-risk driver education programs targeting drivers aged 15-21 with a focus on impaired driving. Continue an increased level of enforcement in college campus areas where there are impaired driving and other high risk transportation related behavior issues.	HSP	TDOSHS TDH	<ul style="list-style-type: none"> Number of drivers in target age group that received education Citations for impaired driving by target group in areas where education programs are conducted 	 Enforcement  Education	
1.6	Collaborate with organizations to address youth alcohol and drug problems i.e., select Committee on Children and Youth and Tennessee Council of Juvenile and Family Court Judges.	HSP	TDOSHS TDH THP	<ul style="list-style-type: none"> Number of organizations actively collaborating Number of initiatives developed 	 Enforcement  Education	







2. Reduce aggressive driving practices among motorized road users.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
2.1	Develop and implement enforcement programs aimed at aggressive driving in high frequency areas.	HSP	TDOSHS	<ul style="list-style-type: none"> Number of related citations Number of related severe crashes Number of campaigns developed 	 Enforcement	












Driver Behavior Emphasis Area

2. Continued - Reduce aggressive driving practices among motorized road users.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
2.2	Evaluate the adoption of a statutory traffic law through the legislative process to clearly define aggressive driving for enhanced enforcement efforts.	HSP	TDOSHS	<ul style="list-style-type: none"> Number of outreaches to safety stakeholders Number of outreaches to legislature 	 Enforcement	 Road Users
2.3	Evaluate the adoption of a uniform citation for enforcement that will serve as a tracking mechanism for courts and traffic records analysis.	HSP	THP	<ul style="list-style-type: none"> Evaluation completed 	 Enforcement	 Road Users
2.4	Use engineering measures to effectively manage speeds through design and safety improvements.	HSIP	TDOT	<ul style="list-style-type: none"> Number of projects implemented Number of citations pre- and post-improvements Number of related severe crashes 	 Engineering	 Roads Speeds

3. Increase the usage of proper vehicle occupant restraint.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
3.1	Continue to coordinate and promote child passenger safety initiatives.	HSP	TDOSHS TN OP Center	<ul style="list-style-type: none"> Number of outreach activities conducted Number of partner agency participation Number of individual seat checks completed 	 Education	 Road Users
3.2	Provide checklist forms to be utilized to provide the Tennessee Occupant Protection Center better information detecting reasons for child safety seat misuse.	HSP	TDOSHS TN OP Center	<ul style="list-style-type: none"> Development of checklist 	 Education	 Road Users
3.3	Increase target enforcement campaigns of seat belt usage for Commercial Motor Vehicle drivers.	HSP	TDOSHS TN OP Center	<ul style="list-style-type: none"> Number of identified employers with seat belt use policy Number of related citations 	 Enforcement  Education	 Road Users Vehicles
3.4	Provide high-risk driver-education programs and defensive driving programs targeting drivers aged 15-21 focusing on seatbelt usage such as Buckle Up in your Truck Campaign and Click it or Ticket.	HSP	TDOSHS TDH	<ul style="list-style-type: none"> Number of outreach activities Number of program providers Number of community participants 	 Education	 Road Users



3. Continued - Increase the usage of proper vehicle occupant restraint.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
3.5	Coordinate conference and training programs for law enforcements officers, prosecutors, and judges to be aware and implement the Child Passenger Restraint Law.	HSP	TDOSHS	<ul style="list-style-type: none"> Number of trainings provided 	Education	Road Users
3.6	Pursue legislation changes that further proper use of restraints for all vehicle occupants.	HSP	TDOSHS	<ul style="list-style-type: none"> Engagement of legislature 	Enforcement	Road Users
3.7	Support TN Occupant Protection Center transition to National Digital Check Form (NDCF) child passenger safety data collection tool to identify opportunities for education and marketing campaigns.	HSP	TN OP Center	<ul style="list-style-type: none"> Number of Agencies with established accounts on NDCF platform Number of CPS Technicians with active accounts Misuse rate 	Education	Road Users

4. Increase Education & Enforcement Targeted at Reducing Distracted Driving.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
4.1	Continue to educate drivers on the danger of distracted driving.	HSP	TDOSHS TDH	<ul style="list-style-type: none"> Number of education opportunities provided 	Education	Road Users
4.2	Continue to conduct Hands Free Law enforcement. Integrate special enforcement campaigns with high visibility to combat distracted driving such as the Statewide Distracted Driving Enforcement Bus Tour.	HSP THP	TDOSHS	<ul style="list-style-type: none"> Number of citations and warnings given Number of related severe crashes Number of related severe crashes in special enforcement location 	Enforcement	Road Users
4.3	Continue outreach and communications through various campaigns such as its Thumbs Down to Texting and Driving and support of the Distracted Driving Awareness Month.	HSP	TDOSHS	<ul style="list-style-type: none"> Number of campaigns Number of community education events Number of community participants 	Education	Road Users







5. Reduce Crashes Involving Teen Drivers.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
5.1	Provide high-risk driver education programs targeting drivers aged 15-21 with a focus on impaired, distracted, and reckless driving. Continue to address college campus impaired driving and other high risk transportation related behavior issues.	HSP	TDOSHS TDH	<ul style="list-style-type: none"> Number of Secondary and Post Secondary schools participating Number of education and outreach events conducted at participating schools 	Enforcement Education	Road Users





Driver Behavior Emphasis Area

6. Pursue programs in accordance with NHTSA Highway Safety Program Guideline No. 13 to reduce the frequency and severity of crashes involving older and medically at-risk drivers and pedestrians.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
6.1	Pursue legislation to require in-person driver license renewal and vision testing for older drivers every five years starting at age 75.	HSP	TDOSHS	<ul style="list-style-type: none"> Number of activities to pursue legislation 	 Enforcement	 Road Users
6.2	Encourage efforts to link seniors to transit systems with infrastructure for adequate accessibility and increased awareness of public, nonprofit, and private transportation alternatives to driving.	HSIP	TDOT	<ul style="list-style-type: none"> Seniors' use of public transportation/ride-sharing 	 Engineering	 Road Users
6.3	Support education programs for older drivers including Yellow Dot, AAA Driver Improvement Program, and Car Fit check events	HSIP HSP	TDOT TDOSHS TDH	<ul style="list-style-type: none"> Number of outreach events, program partners, and participants 	 Education	 Road Users

7. Reduce Motorcycle Related Fatalities and Serious Injuries.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
7.1	Update the Tennessee Motorcycle Safety Strategic Plan	TMSSP	TDOSHS	<ul style="list-style-type: none"> Number of severe crashes involving motorcycles Update the TMSSP by end of year 2027 	 Education	 Road Users



Infrastructure Improvements Emphasis Area

Background and Overview

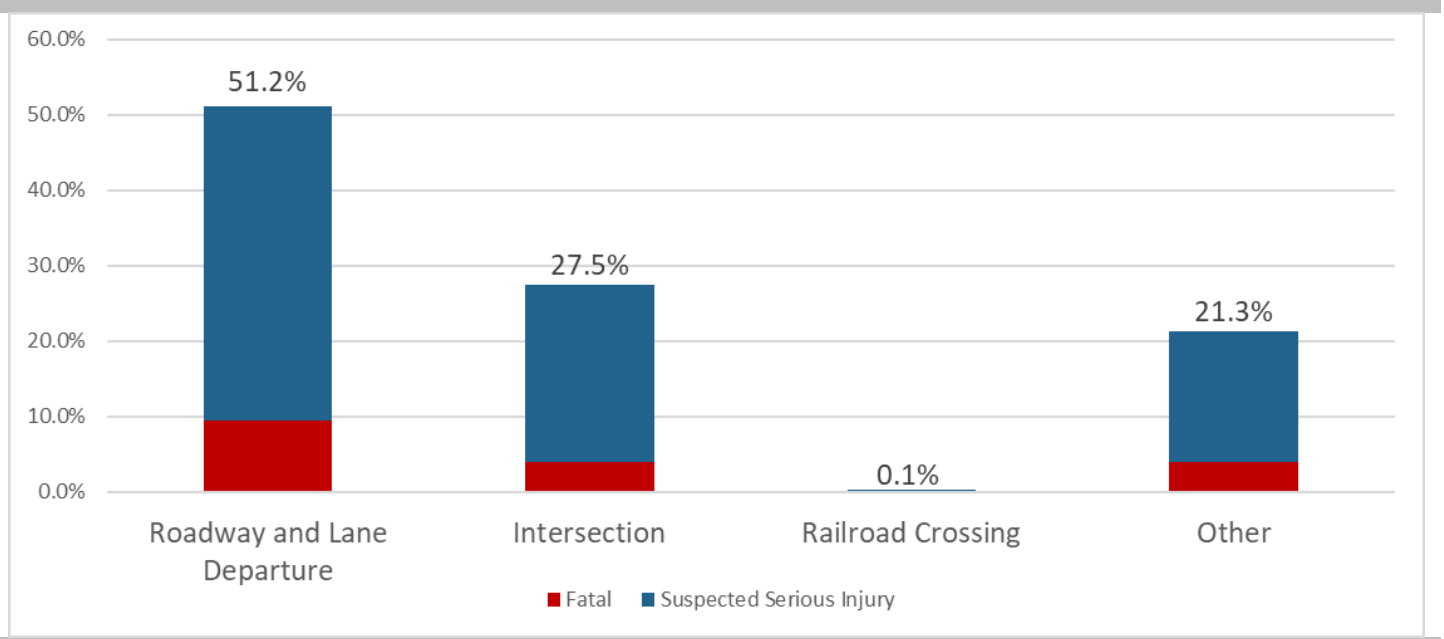
There are over 96,417 miles of roadway statewide. Of the total mileage, 67% is classified as rural. Approximately 70% of the total roadway miles are local roadways that are owned and maintained by local jurisdictions. As these roadways age and new ones are constructed, establishment and maintenance of safe facilities is a key component in combating severe crashes, particularly in areas with a significant crash history.

The Infrastructure Improvements Emphasis Area focuses on improving safety performance of specific locations or features along the state’s roadways that are associated with higher occurrences of fatal and serious injury crashes. This Emphasis Area focuses primarily on roadway departures, lane departures, intersections, and railroad crossings. Roadway departures, lane departures, and intersections were selected based on reported crash data. Combined, they were identified in 77% of fatalities (4,645 of 6,034) and 79% of serious injuries (22,699 of 28,732) reported from 2018 to 2022 in Tennessee. Railroad crossings, while statistically insignificant compared to other locations or features, are required to be addressed per BIL requirements. **Figure 23** summarizes the statewide percentage of fatalities and serious injuries from 2018 to 2022 attributed to each.

Collectively, “other” makes up 21% of roadway locations or features reported in fatal and serious injury crashes. This category includes locations such as freeway ramp terminals and atypical roadway configurations that introduce conflict or encourage wrong way movements. High crash rates at these locations indicate a safety risk in the roadway infrastructure that can be mitigated through safety improvements to the location. The selection and design of the proposed improvements should consider the needs and challenges of older drivers. Where appropriate, education and enforcement strategies should be considered to supplement any engineering improvements. These measures will help to address any driver behavior issue(s) observed to be a safety concern that cannot be solved through infrastructure improvement alone.



Figure 23 - Fatalities and Serious Injuries by Infrastructure Type (2018-2022)





Due to the commitments made in previous SHSPs, Tennessee made significant efforts to improve the safety performance of its roadway network through installation of infrastructure improvements. These improvements were implemented through a variety of projects, programs, and initiatives, which include:

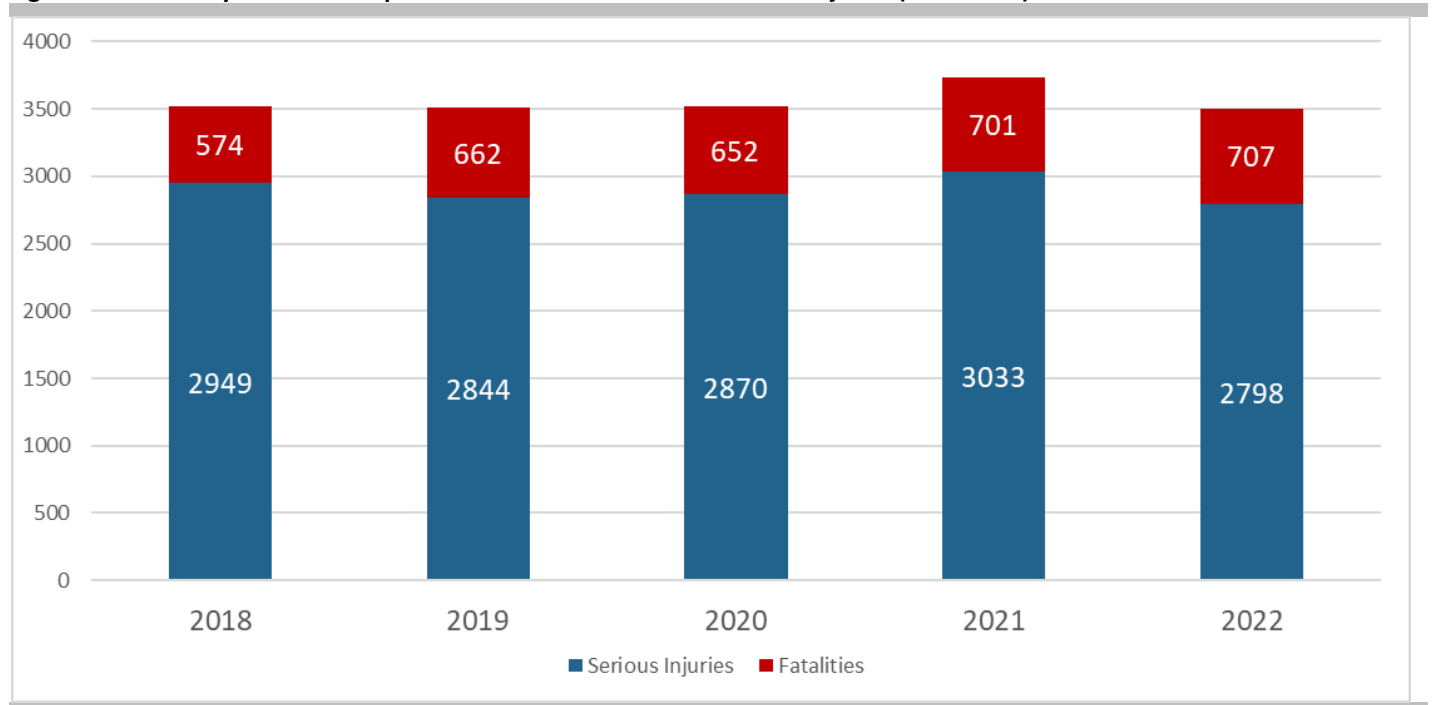
- Road Safety Audits (RSA) - RSA projects address various safety concerns along routes with a crash history that meets or exceeds the state’s criteria for inclusion under HSIP funding. Safety concerns are mitigated through a combination of low-cost safety improvements and higher cost design improvements.
- Ramp Queue Programs - Projects under the Ramp Queue Program address potential safety risks of observed excessive ramp queues that spill back onto the main travel lanes of the freeway. These projects generally involve addition of ramp lane storage and various operational improvements at the ramp terminal intersection.
- Local Roads Safety Initiatives (LRSI) - LRSI projects address safety concerns on a group of local roadways within a county through the implementation of low-cost safety improvements on routes located outside of Metropolitan Planning Organization (MPO) and Transportation Planning Organization (TPO) planning areas.

Roadway and Lane Departures

FHWA defines roadway departure crashes as “a non-intersection crash which occurs after a vehicle crosses an edge line or a center line, or otherwise leaves the traveled way.” Often, these types of crashes occur when a driver loses control of their vehicle and departs the travel lane, resulting in the vehicle colliding with either a fixed object or another vehicle. In Tennessee, this type of crash is defined as either a lane departure or a roadway departure, depending on how the crash occurred. A lane departure crash occurs when a driver fails to remain in the proper lane or conducts an improper lane change, and a roadway departure crash occurs when a vehicle crosses an edge line or a center line, or otherwise leaves the traveled way.

Figure 24 illustrates the fatalities and serious injuries attributed to roadway and lane departures from 2018 to 2022, with no significant change during the study period. During this period, 3,296 of the total fatalities (55%) and 14,494 of the total serious injuries (50%) involved roadway and lane departures statewide. Since the previous period (2013-2017), roadway and lane departure-related fatalities increased by 9%.

Figure 24 - Roadway- and Lane Departure-Related Fatalities and Serious Injuries (2018-2022)





Additional investigation of roadway and lane departure crashes was conducted to determine any notable trends or over-representations. Notable statistics in the severe crash data include:

- Approximately 67% of the crashes occurred on rural roadways
- Combined, 18% of the crashes occurred on urban and rural local roadways
- Approximately 73% of the crashes were cited as single vehicle crashes
- Dark conditions without lighting were noted in approximately 30% of the crashes
- Drivers ages sixteen (16) to twenty-five (25) were involved in 22% of the crashes



Intersections

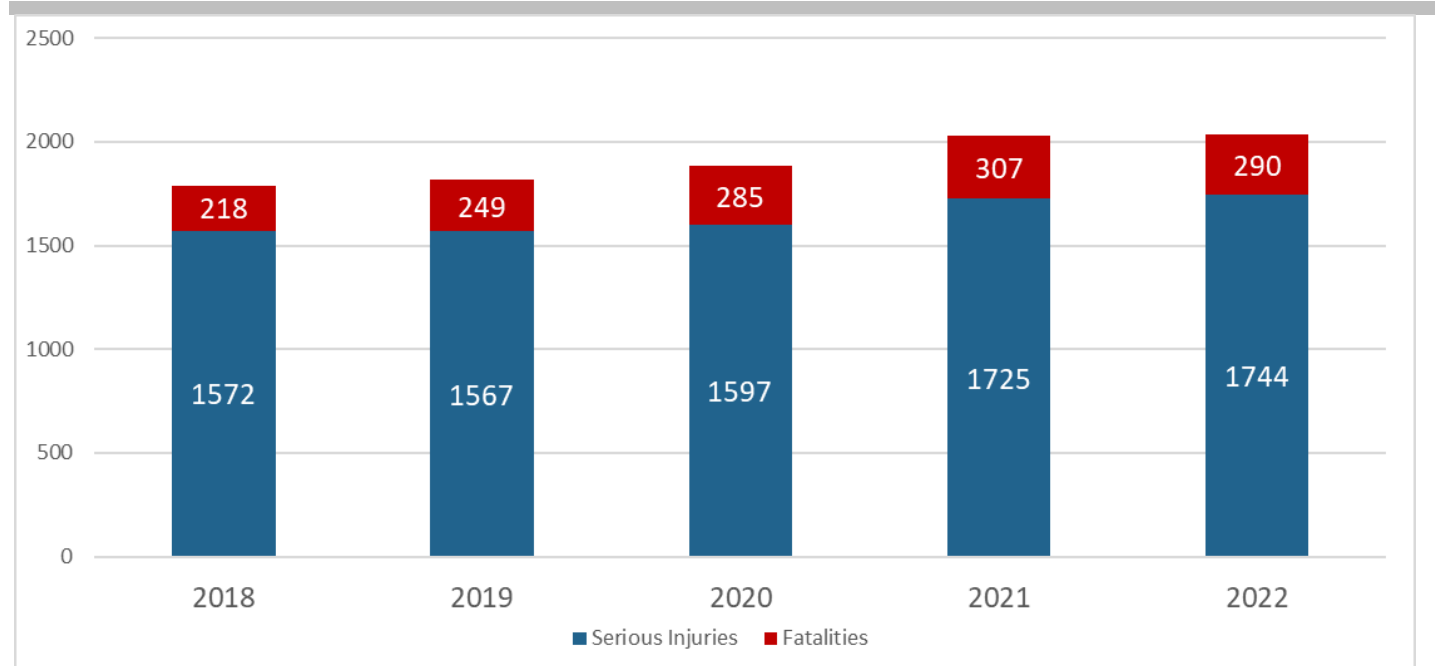
Intersection related crashes include stop-controlled, signal-controlled, and alternative intersections such as roundabouts, traffic circles, diverging diamond interchanges, and J-turns. In the United States, over the last several years, an average of one-quarter of traffic fatalities and roughly half of all traffic injuries are attributed to intersectional crashes.¹²

Figure 25 shows the fatalities and serious injuries at intersections in Tennessee from 2018 to 2022, with a slightly increasing trend during the study period. During this period, 1,349 of the total fatalities (22%) and 8,205 of the total serious injuries (29%) statewide occurred either at an intersection or were related to an intersection. Since the previous period (2013-2017), intersection-related fatalities have increased by 27%.

Further assessment of the intersection-related severe crash data provided the following insights:

- Approximately 79% of crashes occurred on urban roadways
- Approximately 29% of crashes occurred between 2 p.m. and 6 p.m.
- Motorcycles were involved in 14% of the crashes
- Angle crashes accounted for 55% of the crashes
- Drivers under thirty-five (35) were involved in approximately 40% of the crashes

Figure 25 - Intersection Related Fatalities and Serious Injuries (2018-2022)





Railroad Crossings

Railroad crossing-related crashes have a higher potential for fatalities compared to other crash types due to their involvement with trains. Fortunately, severe crashes occurring at railroad-highway grade crossings only account for 0.1% of roadway fatalities in Tennessee. Nationally, 0.63% (271) of total crash-related fatalities occurred at highway-railroad grade crossings in 2022.

Figure 26 summarizes the fatalities and serious injuries at railroad crossings from 2018 to 2022, with no consistent trend during the study period. During this period, seventeen (17) of the total fatalities and seventeen (17) of the total serious injuries involved railroad crossings statewide.

Further assessment of the severe crash data from highway-railroad grade crossings provided the following insights:

- Approximately 65% of the crashes occurred on urban roadways
- Drivers ages 26 to 35 were involved in 29% of the crashes
- Large trucks were involved in 4% of crashes
- Approximately 48% of the crashes occurred between 12 p.m. and 6 p.m.

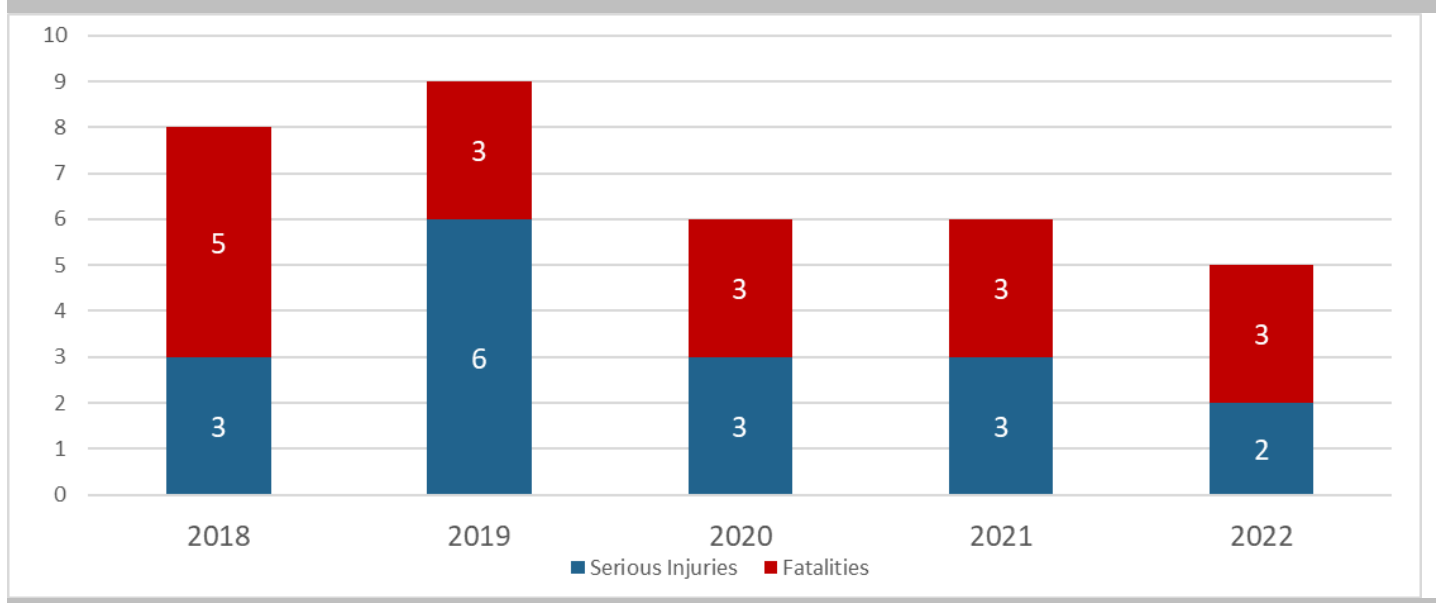


Other Infrastructure Considerations

Freeway Ramp Terminals

Tennessee’s interstate and freeway systems have experienced increases in volume and congestion in recent years. In 2022, interstate highways and freeways accounted for approximately 1.46% of the State’s total road mileage. However, approximately 30% of the total vehicle miles traveled occurred on interstates.¹³ The increased demand on interstates and freeways, especially in urban areas, leads to extensive queue lengths at highway interchange areas, ultimately encroaching into the adjacent interstate through lanes. Excessive queue lengths can increase the likelihood of crashes during peak hours of traffic.

Figure 26 - Railroad Crossing-Related Fatalities and Serious Injuries (2018-2022)





Older Drivers

Unfamiliarity with alternative roadway geometry can prove challenging for older drivers along with deteriorating mobility and slower perception and reaction times. The statewide population is aging, with approximately 17.3% of the state’s population 65 years or older per 2022 census data. This is equal to the national average of 17.3%.¹⁴ The proportion of seniors in Tennessee has increased by 13% since 2017, and seniors are projected to be 20% of the U.S. population by 2030.¹⁵ As noted in the Driver Behavior Emphasis Area, older driver fatalities have increased by 21% since the previous SHSP study period (2013-2017) and account for 22% of all roadway fatalities. To combat this issue, infrastructure modifications are critical to address the specific needs older drivers experience related to changes in vision, flexibility, and reaction times.

Rural Roadways

Nearly 40% of severe crashes in Tennessee occur on rural roads, even though they account for 32% of vehicle miles traveled (VMTs).¹³ Data from AASHTOWARE Safety shows that 33% of fatal and serious injury crashes involving alcohol impaired drivers occurred on rural roads from 2018-2022. With historic data indicating that severe crashes are more likely to occur on rural roads, mitigating safety concerns at high-risk areas in rural communities is a priority. To date, this effort has been addressed through TDOT’s Local Roads Safety Initiative (LRSI) and Road Safety Audit (RSA) programs, which identify segments of local and rural roads with a recurring history of fatal and serious injury crashes and address them with infrastructure improvements. Additional resources are available through the National Center for Rural Road Safety to help mitigate roadway safety deficiencies in rural environments.

Other Safety Programs

Across the state, funds are being spent in many ways to improve roadway safety. Cities, counties, and planning organizations are utilizing their own funds as well as grants such as Safe Streets and Roads for All (SS4A) and bike/walk grants.

Wrong Way Driving

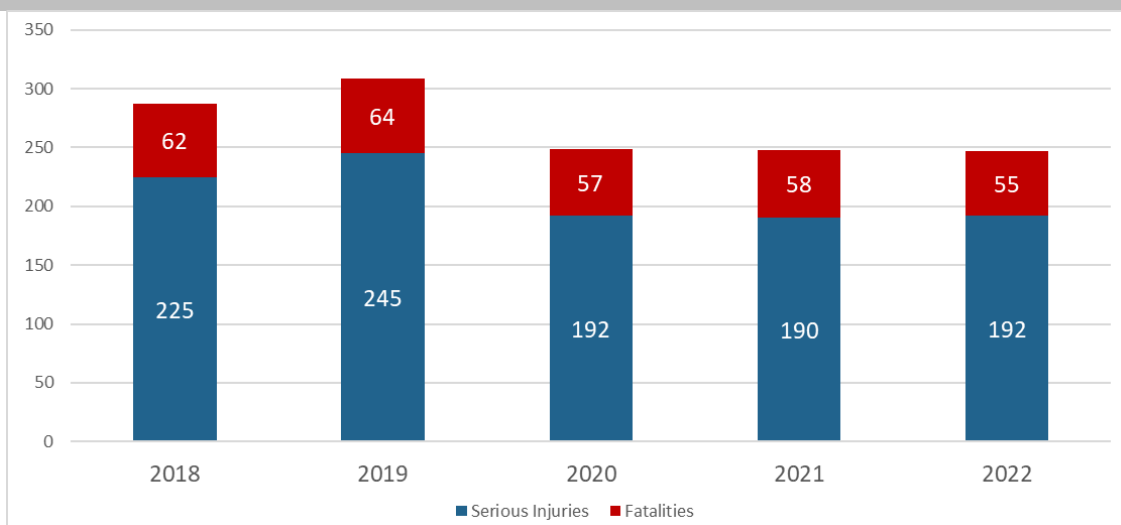
Wrong way driving crashes are particularly high risk due to the high likelihood of head-on collisions, which often result in severe injuries or fatalities. Although these incidents are relatively rare, their severity makes them a significant concern for roadway safety. In Tennessee, wrong way driving crashes account for 3.9% of total severe crashes statewide.

Figure 27 illustrates the fatalities and serious injuries resulting from wrong way driving from 2018 to 2022. During this period, 296 of the total fatalities and 1044 of the total serious injuries involved wrong way driving crashes statewide.

Further assessment of the severe crash data provided the following insights concerning wrong way crashes:

- Approximately 75% of the crashes occurred on urban roadways
- Approximately 51% of the crashes occurred between 8 p.m. to 4 a.m.
- Drivers ages 16 to 25 were involved in 23% of the crashes
- Approximately 44% of the crashes occurred under dark-not-lighted conditions

Figure 27 - Wrong-Way Driving Fatalities and Serious Injuries (2018-2022)





Infrastructure Improvements Emphasis Area

Goal and Objectives

Emphasis Area Goal:	To provide a safer roadway network for Tennessee's driver population through the implementation of both low-cost safety improvements and design improvements.
Emphasis Area Objective(s):	Reduce the number of fatalities and serious injuries linked to roadway infrastructure.

Strategies













The following strategies target the implementation of roadway improvements to foster a safer driving

environment in Tennessee. While these strategies will be applied statewide, additional data analysis and agency coordination will be performed to identify ways to target these focus areas under this plan.

On all countermeasure related Action Items, the use of CMFs and the HSM are expected to be used and documented in project reports. The FHWA Proven Safety Countermeasures shall be used on applicable projects. Project locations should be assessed with an equity lens, ensuring all communities benefit from improved safety facilities. Unless otherwise specified in the Performance Measure, each Action shall be completed or designated to continue by end of year 2029.

See page 11 for the SSA Element legend.

1. Reduce the likelihood and severity of crashes involving roadway and lane departures

Action Item ID	Action Item	Plan	Agency/Champion	Performance Measure	E's Involved	SSA Element
1.1	Road Safety Audits (RSA) - Identify and review roadway segments with disproportionate occurrences of roadway departure related crashes. Fund and prioritize improvements to these segments through federal-aid and state-aid roadway departure safety programs based on the number and severity of fatal and injury crashes on interstate, state, and local routes. Common low-cost countermeasures include pavement markings, signing, guardrail/delineation, flexible delineators, roadside obstacle delineation, raised snowplowable pavement markers, rumble strips, resurfacing. High Friction Surface Treatment is also an option.	HSIP	TDOT	<ul style="list-style-type: none"> Number of Severe Crashes Number of RSAs completed Number of RSAs constructed 	 Engineering  Enforcement	 Roads  Speeds
1.2	Local Road Safety Initiative (LRSI) - Identify and review roadway segments of local non-state routes in counties or sections of counties not represented by a MPO or TPO with disproportionate occurrences of fatal and serious injury crashes per mile. Fund and prioritize safety improvements to these segments through federal-aid safety programs based on the number and severity of fatal and injury crashes per mile on these routes. Common low-cost countermeasures include pavement markings, signing, guardrail, guardrail delineation, flexible delineators, roadside obstacle delineation, raised snow plowable pavement markers.	HSIP	TDOT	<ul style="list-style-type: none"> Number of Severe Crashes Number of LRSIs completed Number of LRSIs constructed 	 Engineering  Enforcement	 Roads  Speeds
1.3	Implement targeted enforcement campaigns at locations with a high occurrence of severe crashes. See Driver Behavior emphasis area for more information.	HSP	TDOSHS	<ul style="list-style-type: none"> Number of Severe Crashes Number of Relevant Citations 	 Enforcement	 Speeds
1.4	Develop a program to inventory and comply to the MUTCD standards the shape, color, dimensions, legends, borders, and minimum retroreflectivity or illumination of roadway regulatory, warning, and guide signs on Tennessee roadways.	HSIP	TDOT	<ul style="list-style-type: none"> Establish program and guidelines 	 Engineering	 Roads



1. Continued - Reduce the likelihood and severity of intersection-related crashes

Action Item ID	Action Item	Plan	Agency/Champion	Performance Measure	E's Involved	SSA Element
1.5	The Project Safety Office staff will develop a program for RSAs and LRSIs for evaluating crash data from three (3) years before a safety project was developed and after the safety project has been constructed for three (3) years.	HSIP	TDOT	<ul style="list-style-type: none"> Percent reduction in serious injuries and fatalities before/after completion 	 Engineering	 Roads Post Crash Care





2. Reduce the likelihood and severity of intersection-related crashes

Action Item ID	Action Item	Plan	Agency/Champion	Performance Measure	E's Involved	SSA Element
2.1	Road Safety Audits (RSAs) - Identify and review intersections at local and state routes with disproportionate occurrences of fatal and injury crashes. Fund and prioritize such intersections based on the number and severity of these crashes; and develop plans to reduce conflicts in traffic flow by improving geometry, traffic control, roadway lighting, pedestrian accommodations, and other appropriate measures.	HSIP	TDOT	<ul style="list-style-type: none"> Number of Severe Crashes Number of RSAs completed Number of RSAs constructed Percent reduction in serious injuries and fatalities before/after completion 	 Engineering Enforcement	 Roads Speeds
2.2	Spot Safety Program - Initiate safety studies of state route intersections. Develop limited-cost safety projects for eligible sites to install a traffic signal, fix a sight distance problem, add turn lanes with or without a traffic signal, install a flashing beacon, or install school flashing signals.	HSIP	TDOT	<ul style="list-style-type: none"> Number of Severe Crashes Number of Spot Safety Projects completed Number of Spot Safety Projects constructed 	 Engineering	 Roads Speeds
2.3	Incorporate countermeasures from intersection safety programs into the TDOT Traffic Design Manual and TDOT Roadway Design Standard Drawings as appropriate.	HSIP	TDOT	<ul style="list-style-type: none"> Review and completion of incorporation of recommendations 	 Engineering	 Roads
2.5	See Action Item 1.4	HSIP	TDOT	<ul style="list-style-type: none"> Establish program and guidelines 	 Engineering	 Roads
2.6	See Action Item 1.5.	HSIP	TDOT	<ul style="list-style-type: none"> Percent reduction in serious injuries and fatalities before/after completion 	 Engineering	 Roads Post Crash Care










Infrastructure Improvements Emphasis Area

3. Reduce the likelihood of conflict between trains and road users at railroad crossings with improvements to geometry, traffic control, and visibility.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
3.1	Section 130 Program - Select railroad crossing safety improvement projects based on crash prediction. Consideration will be given to past crash experiences, number of trains, train speeds, number of cars at crossings, and other data. Projects may include flashing lights, gates, signal warning time adjustments, geometric improvements, regulatory and warning signs, pavement markings, and other safety measures.	HSIP	TDOT	<ul style="list-style-type: none"> Number of Railroad Crossing Related Severe Crashes 	 Engineering	 Roads
3.2	23 CFR 646 Investigations - Review railroad crossings within the limits or near federal-aid highway projects for compliance with 23 CFR 646.214(b)(2) for minimum adequate warning devices. Provide recommendations to such projects which may include flashing lights, gates, signal warning time adjustments, regulatory and warning signs, pavement markings, and other safety measures.	HSIP	TDOT	<ul style="list-style-type: none"> Number of Railroad Crossing Related Severe Crashes 	 Engineering	 Roads

4. Educate roadway users and local agencies to raise awareness about contributing factors linked to severe injury crashes.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
4.1	Utilize the Tennessee Transportation Assistance Programs (TTAP) to train local agencies and practitioners on identification of safety concerns and improvement options at roadway intersections, railroad crossings, and roadway segments. Encourage certification in the Road Safety Champion Program.	HSIP	TTAP	<ul style="list-style-type: none"> Number of Relevant Courses Conducted Number of Road Safety Champion certifications 	 Education	 Roads
4.2	Develop and provide educational programs to motorists with focus on increasing safety awareness at intersections, roadway segments, and railroad crossings.	HSP	TDOSHS	<ul style="list-style-type: none"> Number of Relevant Courses Conducted 	 Education	 Road Users
4.3	Conduct the annual Tennessee Highway Safety and Operations Conference to train TDOT and TDOSHS staff and partners on transportation safety. This Action Item also applies to the Operational Improvements Emphasis Area.	HSIP	TDOT TDOSHS	<ul style="list-style-type: none"> Conduct the annual conference 	 Education	 Post Crash Care  Roads



5. Develop a Freeway Safety Program

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
5.1	Ramp Queue Program – Identify safety and capacity improvements to interchange exit ramps on interstate highways and freeways where ramp queue lengths are excessive during peak traffic times.	HSIP	TDOT	<ul style="list-style-type: none"> Interchange/ Intersection Operational Performance of the Ramp 	 Engineering	 Roads
5.2	Cable Median Barrier Program – Address locations for installation to reduce the number and severity of cross-median crashes. Location selection is based on median width and relevant crash history.	HSIP	TDOT	<ul style="list-style-type: none"> Number of projects completed Number of relevant severe crashes 	 Engineering	 Roads
5.3	Wrong Way Program – Address locations for installation of technology to notify the wrong way driver with flashing lights on signs that are actuated by the wrong way movement. The system will also notify law enforcement if driver does not turn around.	HSIP	TDOT	<ul style="list-style-type: none"> Number of projects completed Number of relevant severe crashes 	 Engineering Enforcement	 Roads
5.4	High Friction Surface Treatment – Address horizontal curve locations related to the high rate of roadway departure crashes experienced by the location.	HSIP	TDOT	<ul style="list-style-type: none"> Number of projects completed Number of relevant severe crashes 	 Engineering	 Roads

6. Reduce the likelihood and severity of crashes involving older drivers

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
6.1	Road Safety Audits - Address locations with geometric and visual deficiencies with improvements recommended in the Handbook for Designing Roadways for the Aging Population. Countermeasures may include reducing the skew of an intersection, intersection lighting, high-visibility crosswalks, high friction surface treatments.	HSIP	TDOT	<ul style="list-style-type: none"> Number of Older Related Severe Crashes Number of RSAs completed Number of RSAs constructed 	 Engineering	 Roads
6.2	Local Road Safety Initiative - Address locations with geometric and visual deficiencies with improvements recommended in the Handbook for Designing Roadways for the Aging Population. Countermeasures may include highly retroreflective pavement markings, flexible delineators.	HSIP	TDOT	<ul style="list-style-type: none"> Number of Older Related Severe Crashes Number of LRSIs completed Number of LRSIs constructed 	 Engineering	 Roads
6.3	Continue to review TDOT Standard Drawings and guidelines and incorporate recommendations contained in the Handbook for Designing Roadways for the Aging Population and other recommendations.	HSIP	TDOT	<ul style="list-style-type: none"> Completion of incorporation of recommendations 	 Engineering	 Roads
6.4	Incorporate replacement of roadway signage with signs conforming to recommendations set forth by the Handbook for Designing Roadways for the Aging Population for all safety projects.	HSIP	TDOT	<ul style="list-style-type: none"> Number of projects completed Number of projects constructed 	 Engineering	 Roads



Vulnerable Road Users Emphasis Area

Background and Overview

All road users are at risk of suffering either a serious injury or fatality when involved in a crash. However, the risk of such an outcome for certain groups of road users is greater due to factors such as age, type of vehicle occupied, or mode of transportation.

A VRU is defined per FHWA as a non-motorist with a FARS person attribute code for pedestrian, bicyclist, other cyclist, and person on personal conveyance or an injured person that is, or is equivalent to, a pedestrian or pedalcyclist as defined in the ANSI D16.1-2007. (See 23 U.S.C. 148(a)(15) and 23 CFR 490.205). A VRU may include people walking, biking, or rolling. This definition includes highway workers on foot in a work zone, given they are considered a pedestrian, and it excludes motorcyclists.

From 2018 to 2022, 8,948 VRU crashes were reported on Tennessee public roadways. During this period, fatal and seriously injured pedestrian crashes increased by over 44%, while fatal and serious injury cyclist-related crashes rose by 18%. **Figure 28** details the fatalities and serious injuries attributed to each vulnerable road user group during this period as a percentage of the total.

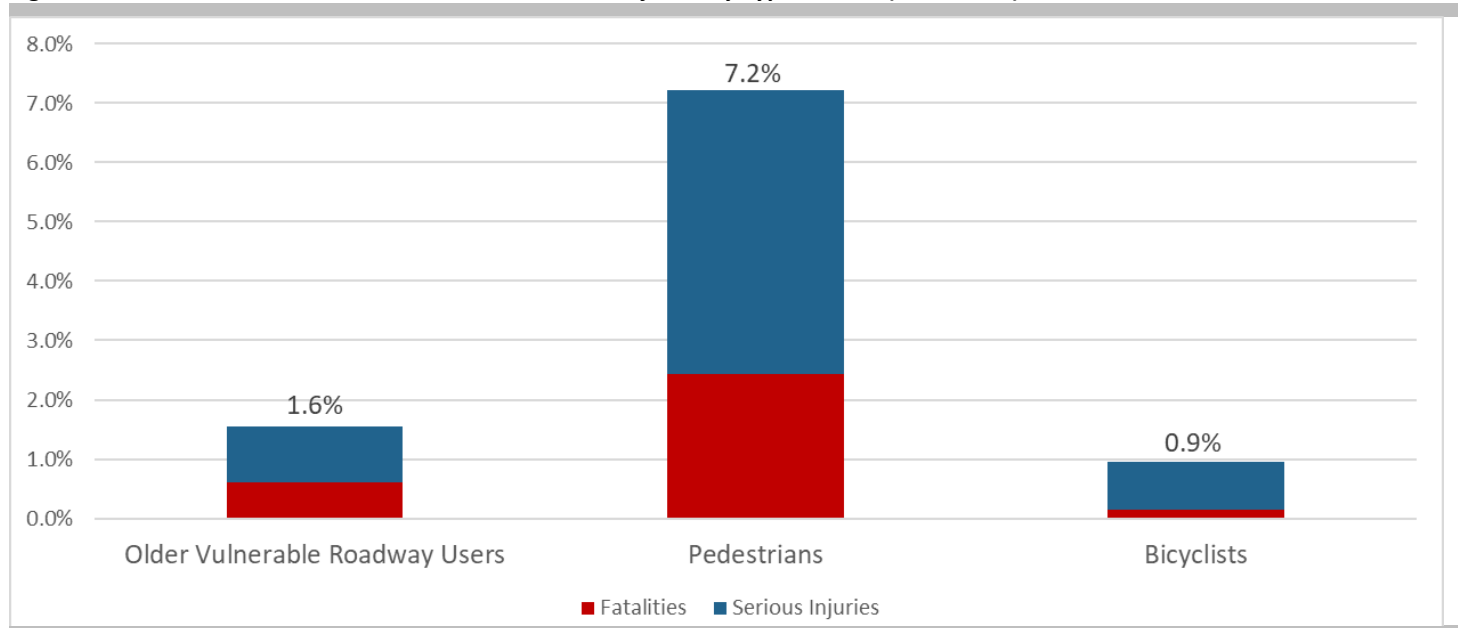
TDOT completed the VRU Safety Assessment, a requirement of the BIL. As discussed in the Update Process section of this report, the Vulnerable Road User Safety Assessment is an assessment of the safety performance of a State with respect

to vulnerable road users and the plan of the State to improve the safety of vulnerable road users as described under 23 U.S.C. 148(1). The assessment is a comprehensive initiative aimed at understanding the factors contributing to the increasing number of VRU crashes in Tennessee. The assessment aligns with the SSA and is data-driven to systemically approach and equitably reduce VRU related fatalities and serious injuries. The VRU Safety Assessment is included in the Appendix of this document and aligns with and expands upon this Emphasis Area.

The total number of fatalities and serious injuries involving vulnerable road users increased by 13% over the 2013-2017 study period, with fatalities alone rising by 40%. To combat this increasing trend, Tennessee has implemented past SHSP strategies to improve safety for VRUs through various programs and initiatives. These include:

- Road Safety Audits (RSA) - RSA projects address various safety concerns along routes with a crash history that meets or exceeds the state’s criteria for inclusion under HSIP funding. Safety concerns are mitigated through a combination of low-cost safety improvements and more complex, longer-term improvements.
- Pedestrian Road Safety Initiative (PRSI) - The PRSI was created to address severe crashes involving pedestrians on qualified corridors and intersections statewide. Projects under the PRSI addressed identified safety concerns with countermeasures consistent with FHWA’s Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE).

Figure 28 - Vulnerable Road User Fatalities and Serious Injuries by Type of User (2018-2022)





Variety of Vulnerable Road Users

Public transit, sidewalks, bikeways, and multi-use paths are important components of Tennessee’s transportation system and provide access to opportunity for people of all ages, income and abilities. They also provide health, environmental, safety, and cost benefits. The public health benefits of walking and bicycling for transportation are well known. Additionally, reducing VMT reduces congestion, reduces crashes, and improves air quality. People who walk or bicycle, however, are the most vulnerable members of our transportation network and are more likely to perish if involved in a crash with a motor vehicle.

According to USDOT, Complete Streets are streets designed and operated to enable safe mobility for all users. Those include people of all ages and abilities, regardless of whether they are traveling as drivers, pedestrians, bicyclists, or public transportation riders.¹⁶ See the VRU Safety Assessment for more information on Complete Streets. Tennessee can improve safety for VRU by enforcing protective laws on motorists, but, more importantly, the state can increase funding for safe and accessible pedestrian and bicycle infrastructure as well as public transit.

Bicyclists

In Tennessee, a bicycle is legally defined as a vehicle when on a highway, road, bicycle path, or other public right of way with full rights on the roadway and is subject to regulations governing the operation of a motor vehicle.¹⁷ Motorists are required by law to exercise due care when in the presence of

pedestrians and cyclists, whether they are on the roadway, sidewalks or bike paths. This includes caution when opening a car door.

Figure 29 shows the fatalities and serious injuries involving bicyclists from 2018 to 2022. During this period, 50 fatalities (1%) and 279 serious injuries (1%) were bicyclists. In comparison to the previous SHSP, bicyclist fatalities increased by 25% and serious injuries decreased by 17%.

Further assessment of the bicycle crash data is provided in the VRU Safety Assessment in the Appendix.

Pedestrians

Pedestrians have the right-of-way at all intersections and driveways regardless of the presence of a marked crosswalk.¹⁸

Other crucial regulations aimed at strengthening pedestrian safety include:

- Every pedestrian crossing a roadway at any point other than within a marked crosswalk or within an unmarked crosswalk at an intersection shall yield the right-of-way to all vehicles upon the roadway. TCA 55-8-135
- It is unlawful for any pedestrian to walk or use a wheelchair upon a roadway when sidewalks are present. In the event of a sidewalk being obstructed or inaccessible, use the roadway or shoulder is permitted. TCA 55-8-138

Figure 29 - Fatalities and Serious Injuries Involving Bicyclists (2018-2022)

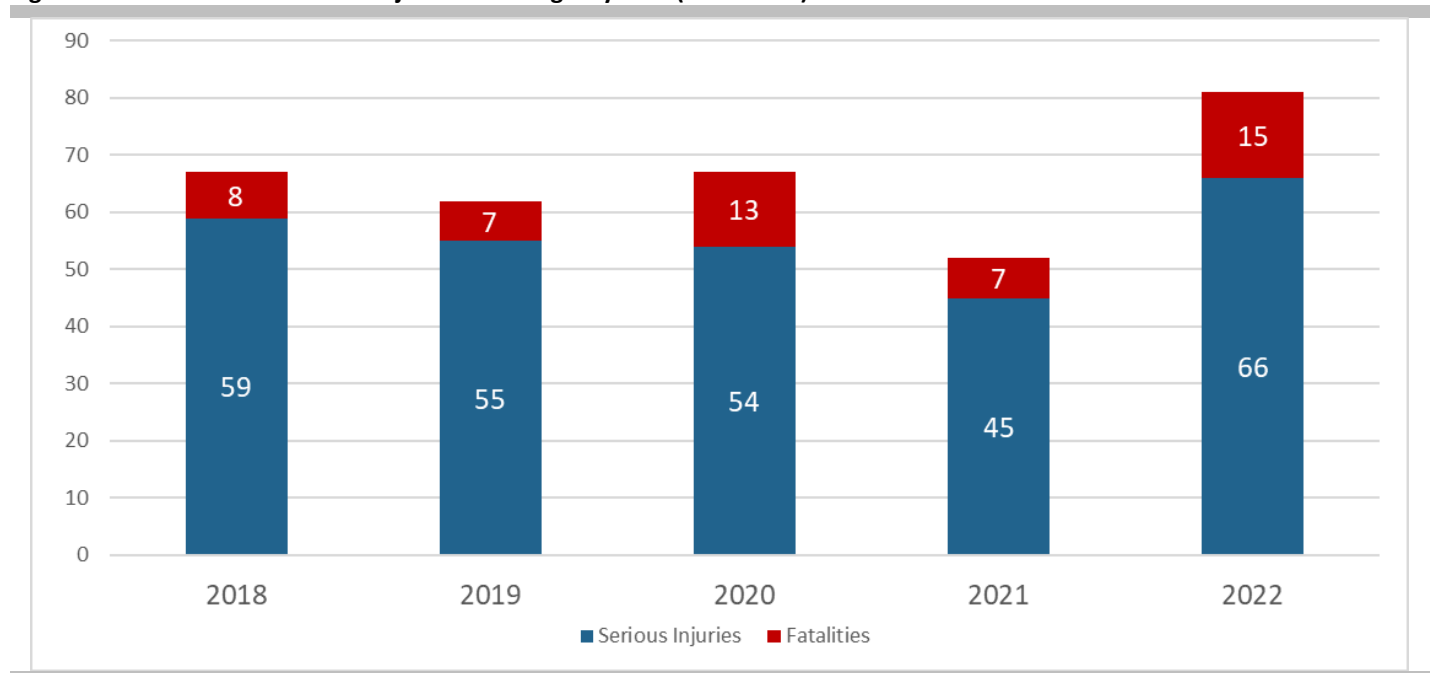
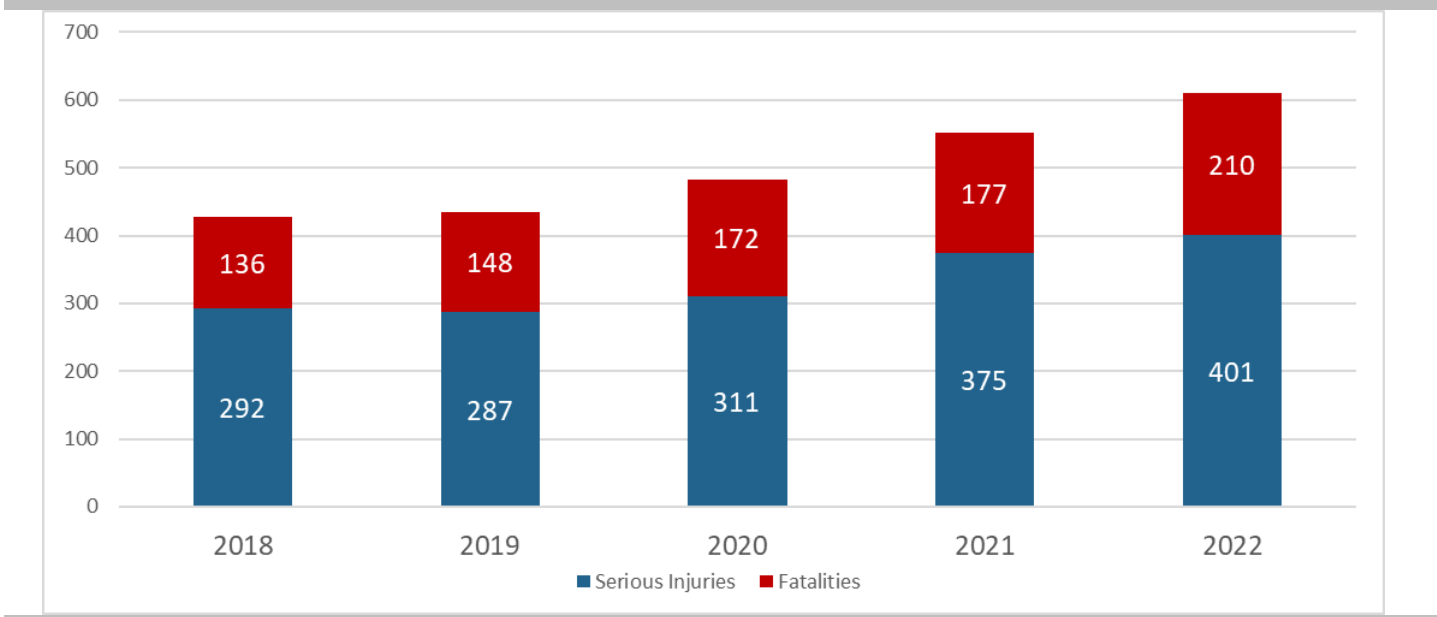




Figure 30 shows the fatalities and serious injuries involving pedestrians from 2018 to 2022, with a steady increase in both fatalities and serious injuries during the study period. During this period, 843 of the total fatalities (14%) and 1,666 of the total serious injuries (6%) involved pedestrians statewide. Since the previous period (2013-2017), pedestrian fatalities increased by 66% and serious injuries increased by 10%. Further consideration of the pedestrian crash data is provided in the VRU Safety Assessment in the Appendix.

Figure 30 - Fatalities and Serious Injuries Involving Pedestrians (2018-2022)



Older Vulnerable Road Users

NHTSA estimates that by 2025, 40% of fatal crashes will be due to age-related difficulties, with visual and cognitive impairments as major contributing factors.¹⁵ Coupled with the anticipated growth of Tennessee’s senior population, the potential for severe injury crashes involving our senior aged pedestrians, bicyclists, and drivers will increase.

This section focuses on older VRUs as in-depth discussion of severe crashes, factors contributing to these crashes, and challenges involving older drivers in general are provided in the Driver Behavior Emphasis Area.

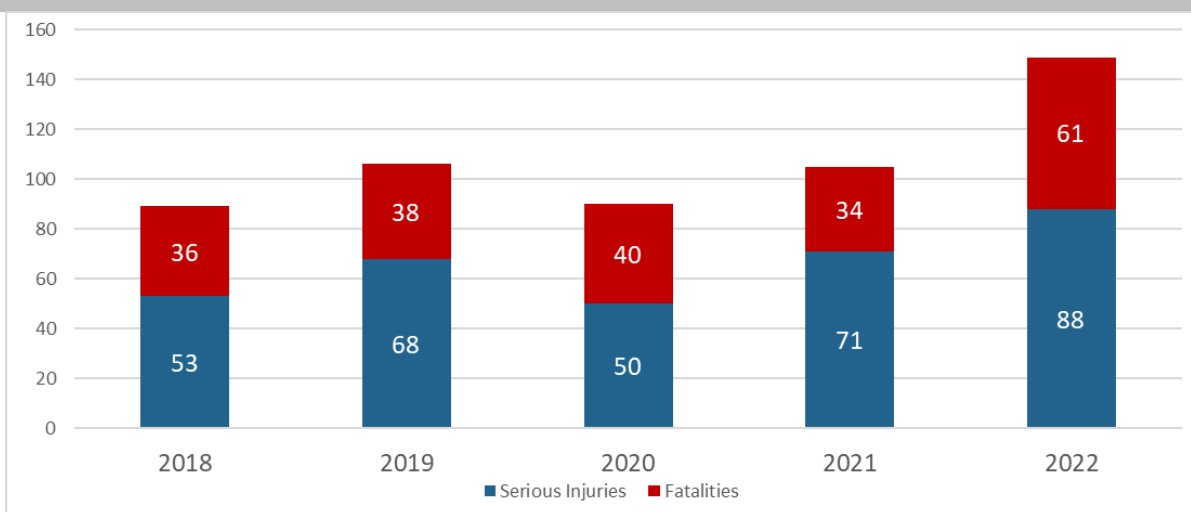
In addition to the age-related difficulties mentioned previously, older VRUs face the same challenges as pedestrians and bicyclists previously discussed. Figure 31 shows the fatalities and serious injuries involving older VRU

senior road users from 2018 to 2022. During this period, 209 fatalities (3%) and 330 serious injuries (1%) involved older aged vulnerable road users. The notable statistics found through further analysis of the severe injury data include:

- Approximately 79% of severe older VRU crashes were reported as pedestrian involved.
- Approximately 3% of severe older VRU crashes were reported above the age of 85.
- Approximately 68% of severe older VRU crashes happened along a roadway, approximately 31% happened at an intersection.
- Approximately 48% of severe older VRU crashes happened during daylight hours, 27% happened at dark-lighted conditions, and 19% happened at dark-not lighted conditions.



Figure 31 - Fatalities and Serious Injuries Involving Older Vulnerable Road Users (2018-2022)



In recent years, urban areas in Tennessee have experienced the emergence of micromobility in their downtown areas. Micromobility refers to modes of transportation that are provided by small vehicles such as scooters, Segways, and electric skateboards. Regardless of the specific small vehicle used, persons operating any of these vehicles are considered vulnerable road users for the purposes of this report.

Integration of these types of transportation in downtown areas has presented its own set of challenges. Micromobility introduces an additional mode of transportation. These conveyances can cause new conflicts with pedestrians, for example, having to share the sidewalk where safe infrastructure for micromobility users is not otherwise present. The presence and impact of using personal protection equipment (PPE), while not legally required for micromobility users, has yet to be substantiated in these relatively new modes.

While detailed statistics are currently unavailable to determine trends or similarities in related severe crashes, Tennessee is currently working toward uniform identification of micromobility vehicles in crash reports to provide accurate data for future assessment.

Goal and Objectives

Emphasis Area Goal:	Create safer roadway environments for travel by VRUs.
Emphasis Area Objective(s):	Reduce the number of fatalities and serious injuries involving VRUs.

Strategies

Many safety partners have their own safety related plans. For example, Memphis has the Mid-South Safety Action Plan which enabled municipalities to apply for implementation grants through the SS4A program. Many cities have their own bike and pedestrian plans to improve multimodal connectivity such as the WalknBike Plan in Nashville.

See the VRU Safety Assessment in the Appendix for further details on the Actions.

On all countermeasure-related Action Items, the use of CMFs and the HSM are expected to be used and documented in project reports. Project locations should be assessed with an equity lens, ensuring all communities benefit from improved safety facilities. Unless otherwise specified in the Performance Measure, each Action shall be completed or designated to continue by end of year 2029.













See page 11 for the SSA Element legend.

























Vulnerable Road Users Emphasis Area

1. Improve infrastructure for bicyclists and pedestrians.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
1.1	Maintain, improve, and install bicycle and pedestrian facilities through bicycle and pedestrian specific projects and in conjunction with other roadway and safety improvement projects. Install more pedestrian-scale lighting infrastructure on urban arterials.	HSIP HSP VRU SATP	TDOT TDOSHS	<ul style="list-style-type: none"> Number of PRSI projects let to construction Number of Quick-Build projects let to construction Number of MMAG projects let to construction Number of TAP projects let to construction Number of PHBs installed in non-PRSI projects Miles of bike lanes on SR Miles of sidewalk on SR Number of marked crosswalks across SR Percent reduction in serious VRU injuries and fatalities before/after PRSI, MMAG, TAP, or Quick-Build project. 	 Engineering	 Roads
1.2	Develop risk-based analysis and STEP countermeasure guidance for high potential crash corridors and intersections based on areas with high pedestrian and bicyclist crash rates using TDOT's Multimodal Priority Tool.	HSIP	TDOT	<ul style="list-style-type: none"> Develop TN STEP Plan by 2029. 	 Engineering	 Roads
1.3	Develop the Tennessee Safe Transportation for Every Pedestrian Implementation Plan.	TSTEP	TDOT	<ul style="list-style-type: none"> Develop TN STEP Plan by 2029 	 Engineering	 Roads
1.4	Design and construct bicycle and pedestrian facilities in accordance with current applicable laws and regulations, utilizing best practices, guidance, and standards published by TDOT, such as the Multimodal Design Guidelines and Project Scoping Guide, FHWA Safe Transportation for Every Pedestrian (STEP) countermeasure, and other appropriate governmental agency guidelines.	HSIP VRU SATP	TDOT	<ul style="list-style-type: none"> Miles of bike lanes Miles of sidewalk Number of marked crosswalks Percent reduction in serious VRU injuries and fatalities before/after PRSI, MMAG, TAP, or Quick-Build project 	 Engineering	 Roads
1.5	Coordinate with MPOs, RPOs, cities, and counties across the state to ensure that roadway policies and projects prioritize safety for all modes, especially bicyclists and pedestrians. Encourage the adoption and utilization of Complete Streets policies.	HSIP	TDOT	<ul style="list-style-type: none"> Complete survey within TN STEP before next SHSP to ask how VRU facilities are integrated in projects. Complete survey within TN STEP before next SHSP to ask about complete street policy and how the approach is implemented 	 Education  Engineering	 Speeds  Roads



1. Continued - Improve infrastructure for bicyclists and pedestrians.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
1.6	Identify location and corridor with a history of high pedestrian crashes and implement improvements through the Pedestrian Road Safety Initiative.	HSIP VRU	TDOT	<ul style="list-style-type: none"> Number of PRSI projects let to construction Percent reduction in serious VRU injuries and fatalities before/after PRSI 	 Engineering	 Roads
1.7	Develop more detailed policies, guidelines, and standards to include pedestrians, bicyclists, and other low-speed users across all project types and all 5 context classifications.	SATP VRU	TDOT	<ul style="list-style-type: none"> Update the Multimodal Access Policy Update the Project Scoping Guide Expand roadway classifications 	 Engineering	 Roads
1.8	Establish a standard set of multimodal measures to evaluate different options in all planning studies (e.g., consistency with local plans and public input, level of traffic stress, accessibility, and safety).	SATP VRU	TDOT	<ul style="list-style-type: none"> Develop standards for evaluation Use Stage 0 of PDN Add land use to MPT Update MPT yearly 	 Education  Engineering	 Roads
1.9	Expand in-house opportunities to plan, design, and construct pedestrian and bicycle infrastructure beyond typical applications.	SATP VRU	TDOT	<ul style="list-style-type: none"> Continue to develop programs Yearly outline of bicycle and pedestrian planning tasks 	 Engineering	 Roads
1.10	Improve roadway safety for all users through 3R projects (rehabilitation, resurfacing, and reconstruction) by updating road diet procedures and thresholds.	SATP VRU	TDOT	<ul style="list-style-type: none"> Update and communicate road diet thresholds and procedures Consider road diet on resurfacing cycles 	 Education  Engineering	 Roads
1.11	Implement a 'do no harm' philosophy for pedestrians, bicyclists, and other low-speed users on roadway projects and establish clearly defined countermeasures to offset any negative impacts.	SATP VRU	TDOT	<ul style="list-style-type: none"> Incorporate the Level of Stress Tool into the MPT 	 Engineering	 Roads
1.12	Establish a complete streets program that develops projects for TDOT's 3-year work program.	SATP VRU	TDOT	<ul style="list-style-type: none"> Engagement of legislature to increase resources Develop program with quick build guides Develop MPT department wide 	 Engineering	 Roads
1.13	Create a quick-build pilot program to implement safety countermeasures at high-crash locations for pedestrians, bicyclists, and other low-speed users.	SATP VRU	TDOT	<ul style="list-style-type: none"> Develop program using research project Develop training program 	 Engineering	 Roads
1.14	Determine appropriate design speeds and on target speeds utilizing the Project Scoping Guide.	HSIP	TDOT	<ul style="list-style-type: none"> Update TDOT design standards Communicate standard changes with local agencies 	 Engineering	 Speeds



Vulnerable Road Users Emphasis Area

2. Increase awareness of vulnerable road users.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
2.1	Enhance driver awareness of bicyclists and pedestrians on the roads through communication efforts on social media and websites.	HSP HSIP	TDOSHS TDOT	<ul style="list-style-type: none"> Number and frequency of communications 	Education	Road Users
2.2	Promote bicycle and pedestrian laws such as: Share the Road, Give 3 Feet When Passing, Bicycles May Use Full Lane, and Yield to Pedestrians in Crosswalks. Develop public information and education campaigns targeting all drivers as well as continuing ongoing campaigns for sharing the road with VRUs and other highway safety issues.	HSP HSIP	TDOSHS TDOT	<ul style="list-style-type: none"> Number of campaigns conducted Funds dedicated 	Education	Road Users
2.3	Continue to offer, encourage, and endorse bicycle and pedestrian safety education through written materials, web-based information, social media, training courses, and pre-established initiatives.	HSP HSIP	TDOT	<ul style="list-style-type: none"> Number of education opportunities provided Number of media hits 	Education	Road Users

3. Improve safety of vulnerable road users on existing routes.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
3.1	Engage transit agencies during the planning phases of projects to ensure that pedestrians have safe access to transit stops at intersections and follow design principles that best protects people walking or bicycling to transit stops.	HSIP VRUA	TDOT	<ul style="list-style-type: none"> Number of projects that transit agencies are invited to participate during Stage 0 and Stage 1 within PDN. 	Engineering	Roads Speeds
3.2	Ensure that all modes have safe alternative routes during construction, including routes for bicyclists and pedestrians. Utilize the TDOT Work Zone Manual as applicable.	HSIP VRU	TDOT	<ul style="list-style-type: none"> Number of projects that included temporary pedestrian access routes and/or temporary bicycle lanes 	Engineering	Roads

4. Increase the effectiveness of enforcing current laws protecting vulnerable road users.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
4.1	Conduct high visibility enforcement campaigns in areas with a high volume of vulnerable road users with focus on low-speed limit compliance, high frequency of right turn on red, and low yield compliance at mid-block pedestrian/bicycle crossings.	HSP	TDOSHS	<ul style="list-style-type: none"> Number of related citations Engagement of legislature to increase resources for enforcement 	Enforcement	Speeds Roads

Vulnerable Road Users Emphasis Area



4. Continued - Increase the effectiveness of enforcing current laws protecting vulnerable road users.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
4.2	Provide law enforcement agencies training about the laws that apply to bicyclists and pedestrians and sharing the road with bicyclists and pedestrians. Include information on ticketing and the adjudication process.	HSP	TDOSHS	<ul style="list-style-type: none"> Number of trainings conducted 		
4.3	Enforce school zone speed limits.	HSP VRU	TDOSHS	<ul style="list-style-type: none"> Engagement of legislature to increase resources for enforcement 		











5. Assess growing needs and concerns of vulnerable road users.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
5.1	Conduct bicycle and pedestrian count programs as part of turning movement count collections and other count efforts to contribute to the knowledge base of bicycle and pedestrian usage in the state and to assist with bicycle and pedestrian crash rate calculation.	HSIP SATP	TDOT	<ul style="list-style-type: none"> Require bicycle and pedestrian counts on all safety related projects by end of 2025 		
5.2	Support research of bicycle and pedestrian safety issues in Tennessee.	HSP VRU	TDOT	<ul style="list-style-type: none"> Report progress on active research projects and development of new ideas using the Research Roadmap 		
5.3	Analyze bicycle and pedestrian crash data, especially on state routes, associated with a nearby transit stop to determine if specific improvements may be needed for safe access to transit facilities.	HSIP VRU	TDOT	<ul style="list-style-type: none"> Report on crash analysis results during MPT update 		
5.4	Assess new safety concerns for emerging alternative modes of transportation (i.e. electric scooters, ATVs, etc.).	HSIP	TDOT	<ul style="list-style-type: none"> Report on research projects progress 		



Vulnerable Road Users Emphasis Area

6. Improve and strengthen laws pertaining to vulnerable road users.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
6.1	Strengthen the Due Care law to ensure that careless driving against VRU is illegal and enforceable.	Bike Walk TN	TDOSHS Bike Walk TN	<ul style="list-style-type: none"> Engagement of legislature to increase resources for enforcement 	 Enforcement	 Road Users
6.2	Issue citations in school zones for speeding and use fines for bicycle and pedestrian safety education in school zones.	HSP	TDOSHS	<ul style="list-style-type: none"> Engagement of legislature to increase resources for enforcement 	 Enforcement	 Speeds
6.3	Amend legislation so that bicyclists may use either the left or right hand to signal a right turn.	HSP	TDOSHS	<ul style="list-style-type: none"> Engagement of legislature 	 Enforcement	 Road Users
6.4	Strengthen the 3-Foot law (Jeff Roth and Brian Brown Bicycle Protection Act) to make it easier for law enforcement to cite and enforce the law.	HSP	TDOSHS	<ul style="list-style-type: none"> Engagement of legislature 	 Enforcement	 Road Users
6.5	Pursue legislation to allow restricted licenses for medically at-risk drivers.	HSP	TDOSHS	<ul style="list-style-type: none"> Engagement of legislature 	 Enforcement	 Road Users



Operational Improvements Emphasis Area

Background and Overview

According to the FHWA, about half of congestion is caused by temporary disruptions that take away part of the roadway from use – or “nonrecurring” congestion. The three main causes of nonrecurring congestion are incidents, work zones, and weather.¹⁹ Aggressive management of temporary disruptions, such as incidents, work zones, weather, and special events can reduce the impacts of these disruptions and return the system to “full capacity.” Aside from the increase in motorists’ delay, congestion negatively impacts air quality, drivers’ health, and introduces elevated safety concerns as the traveling speed decreases drastically and cars slow and queue on the roadway.

Past SHSP strategies implemented by TDOT to improve safety where operational challenges exist include the following:

- Move Over Law Enforcement
- Installation of Emergency Response Markers (ERM)
- Protect the Queue

Work Zone Safety

Growing urban populations, maintenance of existing roadways, and construction of new facilities require more

work zones and increase the opportunity for workers to be injured on the job. Roadway work zones must be effectively managed and protected to improve the safety of both workers and motorists as well as reduce traffic delays.

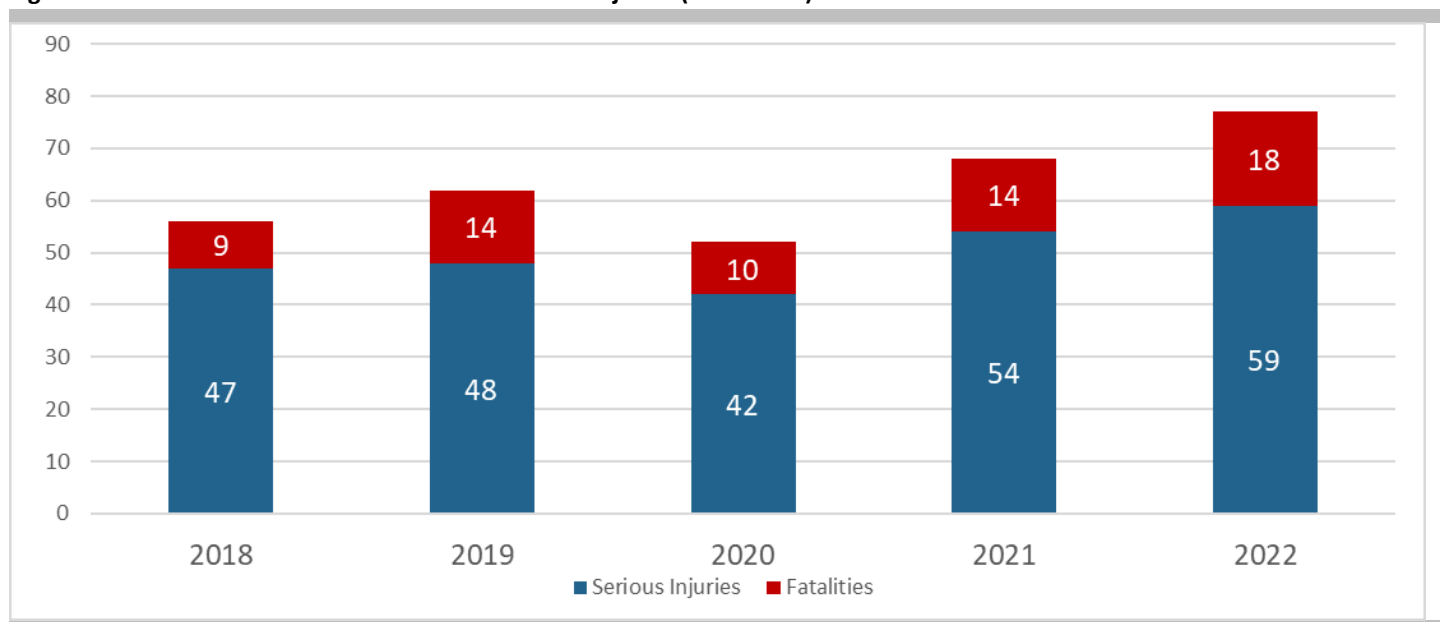
Figure 32 shows fatalities and serious injuries at work zones in Tennessee from 2018 to 2022, with a slight increasing trend in fatalities and serious injuries. Since the previous period (2013-2017), work zone fatalities decreased by 13%.

Further assessment of the crash data provided the following insights:

- Approximately 67% of work zone severe crashes occurred on urban roadways
- Approximately 41% of the severe crashes occurred on interstates
- Approximately 58% of the severe crashes occur between 8 a.m. and 6 p.m.
- Rear end collisions were cited in approximately 26% of the severe crashes
- Large trucks were involved in approximately 21% of work zone severe crashes

As discussed in the Data Collection and Analysis Emphasis Area, there is a need to verify that an active work zone is properly identified on the crash record to capture all relevant incidents.

Figure 32 - Work Zone Related Fatalities and Serious Injuries (2018-2022)





Aside from providing an accurate representation of relevant fatalities and serious injuries, a complete and real-time capture of work zone-related crashes allows professionals the ability to identify a work zone concern and address any traffic control issues that may contribute to the occurrences.

The TDOT Work Zone Safety and Mobility Manual defines the processes by which major aspects of applicable work zones are established. The manual promotes coordination among all organizations involved in work zone development and provides guidance for implementation of the requirements set forth in The Final Rule on Work Zone Safety and Mobility.

The Work Zone Safety and Mobility Manual will be updated upon adoption of the 11th Edition of the Manual of Uniform Traffic Control Devices (MUTCD).

In addition to the Work Zone Safety and Mobility Manual, TDOT dedicated staff to focus on work zone safety and operations. This group developed both a field manual and design manual specific to work zones. These resources are geared to provide guidance for the proper setup of work zones and establish a “toolbox” of resources to utilize when designing traffic control plans.

Incident Management

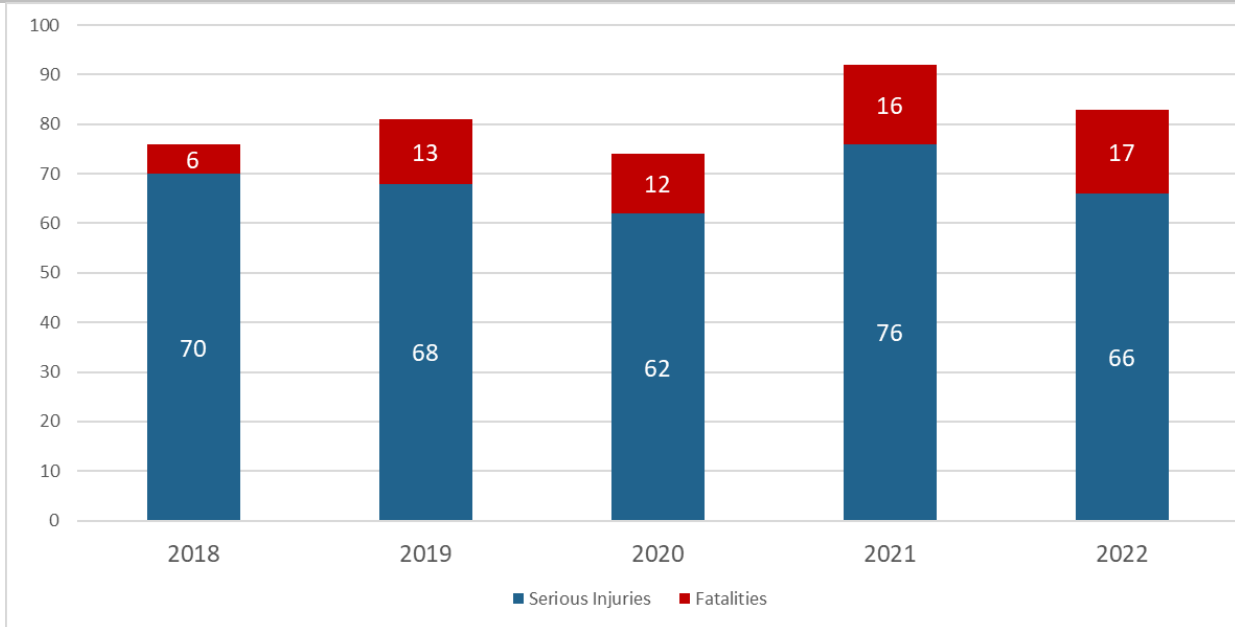
Disabled vehicles, highway facility failures, and adverse weather conditions can endanger roadway travelers. Mitigating these incidents can lead to extensive delays and long queues, increasing the probability of a crash upstream of the incident (secondary crash). Secondary crashes are formally defined as the number of crashes beginning with the time of detection of the primary incident where the collision occurs either

- within the incident scene or
- within the queue, including the opposite direction, resulting from the original incident.

The likelihood of a secondary crash increases by 2.8% for each minute the primary incident continues to be a hazard, increasing the risk to driver and responder lives, and making it even more difficult for responders to get to and from the scene.²⁰

Figure 33 shows fatalities and serious injuries occurring because of secondary crashes from 2018 to 2022.

Figure 33 - Secondary Crash Fatalities and Serious Injuries (2018-2022)





Since the previous period (2018-2022), secondary crash fatalities have increased by 8%, and serious injuries remain the same.

Improving emergency response to highway incidents has become essential in Tennessee, with emphasis on safe, quick clearance of lane closing and road closing crashes. Physical installations, specifically ERM, help pinpoint the location of an incident. In addition to physical installations, quick clearance practices adopted by law enforcement, fire departments, EMS, rescue squads, and transportation agencies can reduce the time emergency personnel are exposed to highway conditions during rescue activities. Swift action and coordination from all first responders are key to minimizing injury and potential fatalities.

Improved emergency response is accomplished through partnerships and coordination among agencies from transportation, law enforcement, fire and rescue, EMS, and the towing and recovery industry using the established Traffic Incident Management (TIM) process. As shown in **Figure 34**, the TIM timeline encompasses all aspects of incident response from the occurrence of the incident to the return of normal conditions to the incident affected area. Milestones are set within the timeline to isolate certain activities and analyze the efficiency and effectiveness of methods used. Incident response partners are continually developing methods to improve emergency response to reduce fatalities and provide safe working conditions for responders and a safe environment for motorists.

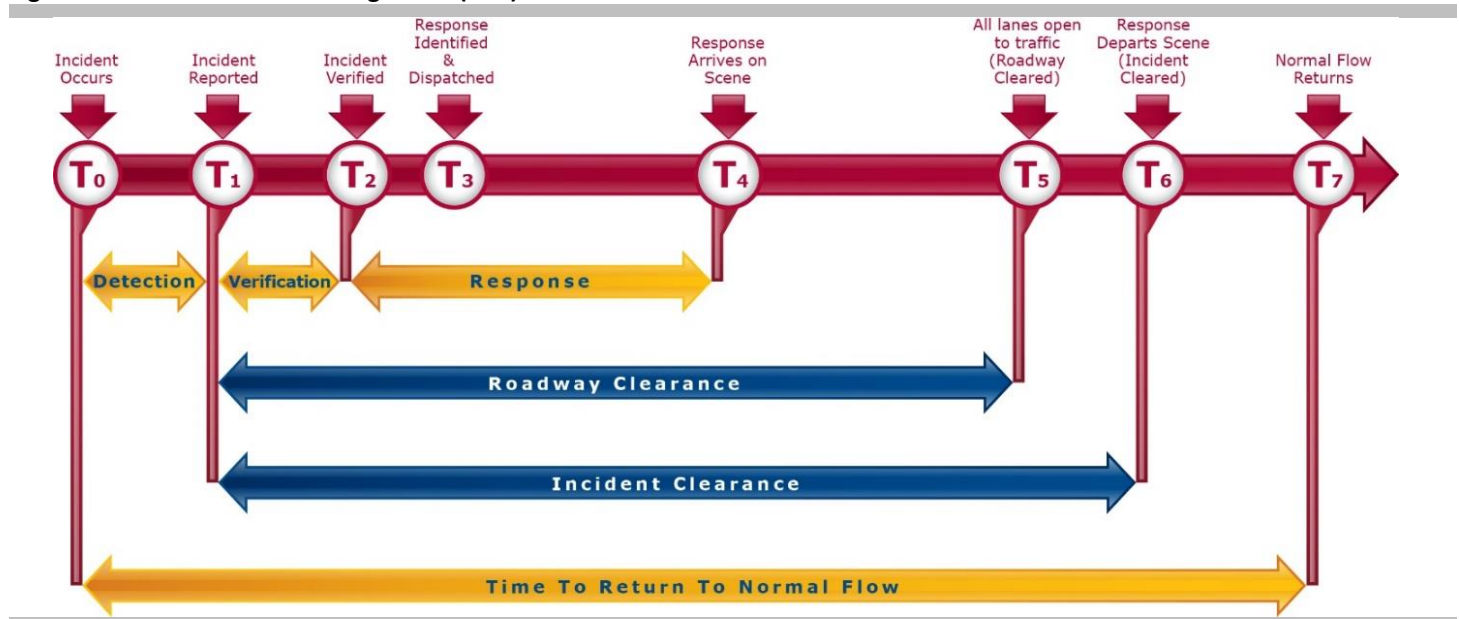
TDOT places emphasis on developing partnerships with local, state, and federal agencies to improve communication, cooperation, and coordination during major highway

incidents. These collaborations have led to the adoption of FHWA’s training and program enhancements derived from the Strategic Highway Research Program – Part 2 (SHRP2) initiatives.

“The Tennessee Advanced Communications Network (TACN) is a statewide radio system that provides communication connectivity infrastructure for local, state, and federal first responders. With TACN, first responders, including law enforcement, fire, EMS, and healthcare providers, have reliable communications capabilities for daily operations and the ability to talk to each other to coordinate at the local, regional, and statewide level to respond in the event of an emergency or disaster.”²¹ In 2022 and 2023, the second and third implementation phases added over 250 state and local TACN tower sites, including State Parks, each of the 95 county seats, and all interstates and major highways.

The TDOT HELP program began in 1999 and operates in Chattanooga, Knoxville, Memphis, and Nashville. The purpose of HELP is to reduce traffic congestion, improve safety, and assist motorists. In addition to servicing the major metropolitan areas during routine congestion, HELP trucks are dispatched to provide operational assistance for special events statewide. HELP supervisors and operators work closely with local towing and recovery companies to provide assistance to the public, which is their first priority, and to implement quick clearance of the roadways. According to a myTDOT social media post in July 2024, since the inception, HELP operators have responded to nearly 3 million events with an average clearance time of 29.2 minutes.

Figure 34 - Traffic Incident Management (TIM) Timeline²²





To assist first responders in their job of saving lives in the event of an emergency on Tennessee’s roadways, the Tennessee General Assembly passed a bill in 2012 creating a Tennessee Yellow DOT program (HB 2296). Tennessee is currently one (1) of twenty-two (22) states whose Department of Transportation is affiliated with a Yellow DOT program. This program is geared toward mature and older drivers (ages 55 or older); however, anyone can participate in this program. The Tennessee Yellow DOT program is designed to supply first responders with the participant’s medical information in the event of an emergency. The information in the yellow packet can mean the difference between life and death in the “Golden Hour” immediately following a serious incident or emergency. Because the program is focused on older drivers, it is an important countermeasure to help address the increased number of fatalities and serious injuries in this age group as required by this plan.

Technology

The ability to collect data by an agency for the purpose of incident mitigation and to disseminate useful information to drivers can be a powerful tool when combating congestion. TDOT and many municipalities within the state have made great efforts to develop and expand their Intelligent Transportation Systems (ITS) assets to allow for better management of their roadway networks and active work

zones. The use of ITS assets provides agencies capabilities to:

- Monitor roadway speeds
- Actively manage transportation demand through strategies such as dynamic speed control, managed lanes, and ramp metering
- Remotely identify incidents
- Alert system(s) for road workers
- Provide travel time and incident-related messaging to motorists
- Modify signal timing plans to better fit an instance of non-reoccurring congestion

Specifically in major urban centers, technology is a needed tool to help combat potential safety concerns by aiding in the easing of congestion on roadways where major infrastructure projects are not feasible.



Goal and Objectives

Emphasis Area Goal:	<p>Increase safety of Tennessee’s road users in areas of reoccurring and non- reoccurring congestion through effective facility management, technology improvements, and timely emergency response.</p> <p>Improve the safety of roadway work zones and traffic incident sites for drivers and workers.</p>
Emphasis Area Objective(s):	<p>Reduce the number of fatalities and serious injuries linked to work zones and congested roadway conditions.</p>
















Strategies








On all countermeasure-related Action Items, CMFs and the HSM are expected to be used and documented in project reports. Project locations should be assessed with an equity lens, ensuring all communities benefit from improved safety facilities. Unless otherwise specified in the Performance Measure, each Action shall be completed or designated to continue by end of year 2029.

See page 11 for the SSA Element legend.

1. Reduce the number and severity of secondary roadway crashes by effective emergency response.

Action Item ID	Action Item	Plan	Agency/Champion	Performance Measure	E's Involved	SSA Element
1.1	TIM Responder Training Program - Equip incident responders such as TDOT's HELP operators and supervisors with a common set of core competencies as part of the TDOT internal training program and the FHWA SHRP2 program.	TIM	TDOT	<ul style="list-style-type: none"> Number of trainings conducted 	 Education  EMS  Enforcement	 Post Crash Care
1.2	TIM Strategic Plan - Maintain the incident response plan as part of the Transportation Systems Management and Operations (TSMO) strategic plan to promote safe and efficient management and operation on highways to serve the mobility needs of people and freight.	TIM L RTP	TDOT	<ul style="list-style-type: none"> Plan Updated 	 EMS  Enforcement	 Post Crash Care
1.3	TDOT Protect the Queue Program - Place emphasis on this program to provide queue warning and protection strategies.	TIM TSMO	TDOT	<ul style="list-style-type: none"> Number of secondary crashes 	 EMS  Enforcement  Engineering	 Roads
1.4	Explore technology-based solutions to improve safety for motorists and road workers in active temporary work zones.	TIM L RTP	TDOT	<ul style="list-style-type: none"> Impacts on queue length and congested conditions after installation of technology Number of severe crashes in temporary work zone while devices deployed 	 Engineering	 Roads

2. Improve incident response and reduce the clearance time for crashes.

Action Item ID	Action Item	Plan	Agency/Champion	Performance Measure	E's Involved	SSA Element
2.1	Improve communications procedures between 911 centers and first responders.	TIM	TDOSHS	<ul style="list-style-type: none"> Decrease in response time to incident 	 EMS  Enforcement	 Post Crash Care
2.2	Maintain and utilize the incident management test track for the training of first responders to handle a variety of crash scenarios.	HSIP	TDOT	<ul style="list-style-type: none"> Number of trainings conducted Maintenance of test track 	 Education	 Post Crash Care
2.3	Expand installation of Enhanced Reference Markers (ERM) and expand coverage of TDOT's HELP program on controlled access highways.	HSIP	TDOT	<ul style="list-style-type: none"> Percent of access-controlled highway with ERMs 	 Engineering	 Roads



Operational Improvements Emphasis Area

2. Continued - Improve incident response and reduce the clearance time for crashes.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
2.4	Expand HELP program into rural areas.	HSIP	TDOT	<ul style="list-style-type: none"> Creation of rural service patrols 	 Engineering	 Roads Post Crash Care
2.5	Implement the use of unmanned aerial vehicles on the HELP vehicles for TIM to provide real-time video feedback to Traffic Management Centers in rural areas where existing CCTV infrastructure is lacking.	HSIP	TDOT	<ul style="list-style-type: none"> Develop pilot program 	 Engineering	 Roads
2.6	Partner with all state and local jurisdictions to improve emergency response, to provide quick clearance of incidents, and to enhance inter-agency communication.	TIM L RTP	TDOT	<ul style="list-style-type: none"> Number of active partner agencies 	 EMS Enforcement	 Post Crash Care
2.7	Develop inter-disciplinary training and joint exercises through participation in the FHWA SHRP2 training curriculum.	HSIP	TDOT	<ul style="list-style-type: none"> Number of trainings conducted Number of agencies involved in training 	 Education EMS Enforcement	 Post Crash Care

3. Reduce the severity and number of crashes occurring in work zones.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
3.1	Refine procedures to comply with the Final Rule on Work Zones (23 CFR 630 Subpart J) and the Final Rule on Temporary Traffic Control (23 CFR 630 Subpart K).	HSIP	TDOT	<ul style="list-style-type: none"> Number of work zone related severe crashes 	 Engineering	 Roads Speeds
3.2	Install truck and trailer mounted attenuators within work zones by project policy.	HSIP	TDOT	<ul style="list-style-type: none"> Number of projects with attenuators Number of incidents of attenuator use 	 Engineering	 Roads
3.3	Refine standardized procedures for the use of law enforcement in work zones.	HSIP	TDOT TDOSHS	<ul style="list-style-type: none"> Procedures updated 	 Enforcement	 Roads
3.4	Continue training program for TDOT staff and related partners with focus on Tennessee procedures.	HSIP	TDOT	<ul style="list-style-type: none"> Number of employees trained 	 Education	 Roads
3.5	Continue to provide measures for assisting older drivers through work zones as recommended in the Handbook for Designing Roadways for the Aging Population.	HSIP	TDOT	<ul style="list-style-type: none"> Number of older driver related crashes in work zones 	 Engineering	 Roads



3. Continued - Reduce the severity and number of crashes occurring in work zones.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
3.6	Continue to explore technology-based solutions to improve safety for motorists and road workers in active construction zones, such as Zipper Merge and Queue Warning.	HSIP	TDOT	<ul style="list-style-type: none"> Comparison of the number of crashes pre- and post- installation of device 	 Engineering	 Roads Speeds
3.7	Coordinate with local jurisdiction to establish traffic control policies and procedures.	HSIP LRTP	TDOT	<ul style="list-style-type: none"> Number of local agencies coordinated 	 Engineering	 Roads Speeds

4. Mitigate regular and non-reoccurring congestion to decrease the likelihood of severe crashes.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
4.1	Continue to identify, refine, and utilize procedures and tools (i.e. night-work procedures, lane closure decision tool, etc.) to help reduce congestion.	HSIP TSMO	TDOT	<ul style="list-style-type: none"> Travel time reliability Number of nighttime severe crashes in active work zones 	 Engineering	 Roads
4.2	Continue improvement of communication of important work zone information and current/ upcoming construction work to the public through the use of the 511 system, TDOT web site, and other public information strategies.	HSIP TSMO	TDOT	<ul style="list-style-type: none"> Travel time through work zone 	 EMS Enforcement	 Roads
4.3	Explore various ITS strategies to make travel through and around work zones and congested areas safer and more efficient.	HSIP TSMO	TDOT	<ul style="list-style-type: none"> Travel delay Number of secondary crashes 	 Engineering	 Roads Speeds
4.4	Continue efforts such as expanded coverage of TDOT's HELP program to reduce the amount and time duration of lane closures when possible.	HSIP TSMO	TDOT	<ul style="list-style-type: none"> HELP response time Travel delay 	 Engineering	 Roads

5. Reduce the severity of crashes involving older drivers.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
5.1	Train first responders and law enforcement on implementation of the Yellow DOT Program.	HSIP	TDOT	<ul style="list-style-type: none"> Number of officers trained 	 Education	 Post Crash Care
5.2	Educate drivers on the benefits and use of the Yellow DOT Program.	HSIP	TDOT	<ul style="list-style-type: none"> Number of outreach campaigns conducted Number of drivers enrolled 	 Education	 Post Crash Care



Motor Carrier Safety Emphasis Area

Background and Overview

Tennessee is known as a “Bridge State,” meaning many trucks are not loading or delivering in Tennessee but are passing through due to the seven main interstates which run through the state. While Tennessee’s “bridge state” position fosters economically favorable conditions and is an important component of the state’s freight network, the added exposure due to truck traffic introduces a greater potential for severe crashes involving commercial motor vehicles (CMVs). Tennessee now has over 249,000 workers employed by over 15,200 distribution and logistics establishments.²³

Severe crashes involving large trucks accounted for 8% of all fatalities and serious injuries in Tennessee from 2018 to 2022.

Figure 35 shows large truck-related fatalities and serious injuries from 2018 to 2022, with an increasing trend in fatalities and a slight increasing trend in serious injuries. Further assessment of the crash data provided the following insights:

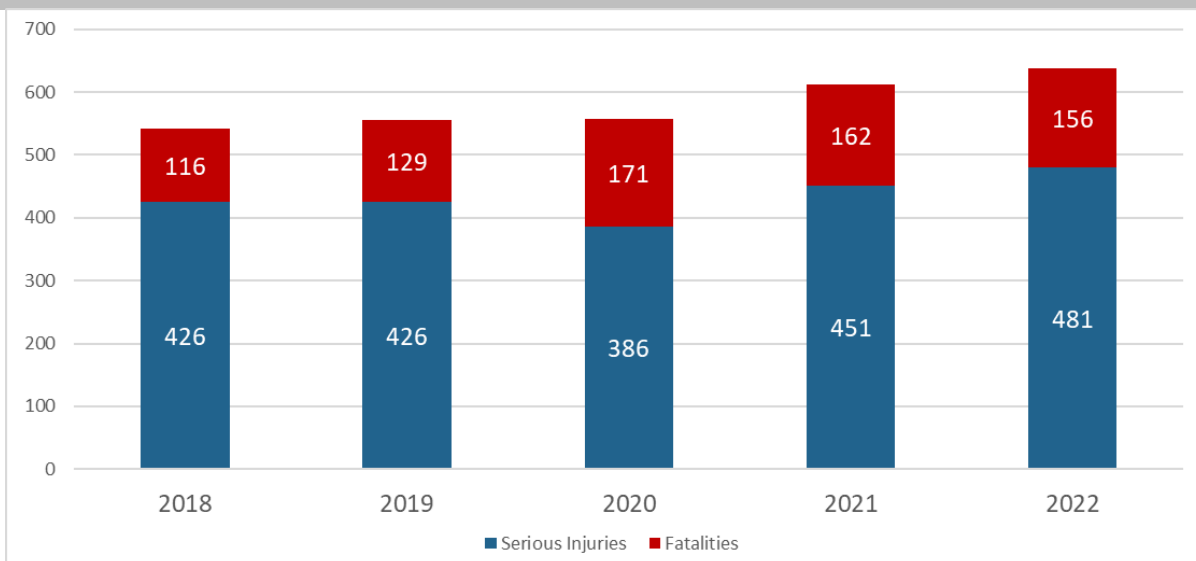
- Approximately 54% of the severe crashes occurred on urban roadways
- Lane and roadway departures were cited in 19% of large truck-related severe crashes
- Rear ends (28%), angle (27%), and single vehicle (23%) were the top three (3) manners of collision cited
- Approximately 19% percent of severe crashes occurred at an intersection

The THP of the TDOSHS is the sole agency in the State responsible for enforcing laws related to size, weight, and safety regulations for CMVs. THP is the State’s lead agency for the Motor Carrier Safety Assistance Program, FMCSA’s largest grant program aimed at preventing crashes, fatalities, and injuries involving CMVs. The Motor Carrier Plus (MC+) unit of the THP is responsible for pursuing the Department’s mission with respect to CMVs. The MC+ unit carries out this mission through its regular law enforcement and educational activities and via the implementation of special initiatives targeting CMV safety issues. These activities include:

- Enforcement of motor vehicle and criminal laws focusing on commercial motor vehicles
- Regulation of commercial motor vehicles and motor carriers per Title 49 CFR
- Public education and awareness
- Driver/vehicle inspections
- Carrier investigations and New Entrant Safety Audits
- Data collection
- Crash investigations

The THP has troopers certified to conduct all levels of the North American Standard (NAS) inspections, including inspections of passenger carriers, cargo tanks, and hazardous materials. The THP in partnership with FMCSA conducts CMV-targeted enforcement and utilizes public relations and educational programs geared toward both the industry and the public to increase awareness of CMV safety issues.

Figure 35 - Large Truck Related Fatalities and Serious Injuries (2018-2022)





The THP supervisors will approve overtime to conduct targeted enforcement based on data on the CVE Dashboard. The CVE Dashboard provides monthly snapshots of large truck crash data for each district based on day of week, time of day, functional route, lane use (urban/rural), driver factors, large truck- related fatalities and serious injuries, and the number of NAS inspections performed.

Inspections decreased in 2020 due to COVID-19 but have begun to increase again:

- 2018 - 78,010
- 2019 - 78,625
- 2020 - 60,793
- 2021 - 72,764
- 2022 - 73,856

Despite current efforts, the state faces many challenges when combating safety issues related to large trucks. These include but are not limited to the following:

- Aggressive or distracted driver behavior of passenger car operators around large trucks
- Significant industry growth within the state has increased demand for truck drivers. This resulted in the pool of drivers becoming younger and less experienced
- Penalties associated with convictions of motor carrier violations remove drivers from the workforce

Goal and Objective

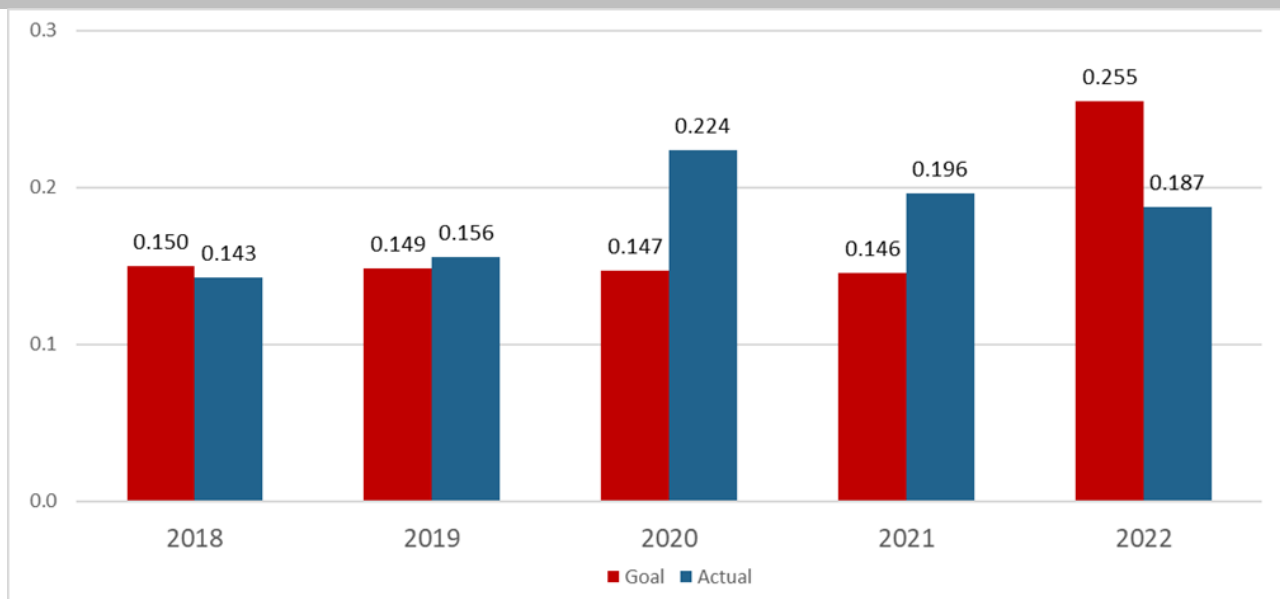
Since 2016, the fatal crash rate for commercial motor vehicle-related traffic incidents in Tennessee has been on the rise, with the most significant increase occurring from 2019 to 2020. This spike is attributed in part to the COVID-19 pandemic. During this period, inspection stations were closed for some time, and strict social distancing protocols were enforced. Additionally, there was a notable reduction in non-commercial vehicles on the road, allowing large trucks to travel on less crowded highways with minimal enforcement.²³

From 2019 - 2021, Tennessee has been just short of the goal each calendar year. However, it is shown that the Tennessee CMV fatality rate has shown decline since 2020.

Tennessee has historically developed goals and activities designed to not only reduce fatalities within the state related to CMV crashes, but also to reduce the rate of crashes themselves. While the state rate for CMV fatalities has declined, the rate of Tennessee large truck crashes has steadily increased.²⁴ **Figure 36** shows the crash reduction goals and results for CMV crashes.

“The Tennessee fatal crash rate for CMV related traffic incidents has increased since 2016. The largest increase was between 2019 and 2020. It is believed that part of the reason for this increase was due to the COVID 19 pandemic and increased civil unrest within the country. Inspection stations were closed for part of the year and strict social distance protocols were put in place. There was also a sharp decline in non-commercial vehicles on the road, giving large trucks open roadways with little or no enforcement.” THP has set a goal to lower the large truck fatality rate by 1% for each year.²⁴

Figure 36 - Large Truck Fatalities per 100 Million TN VMT (2018-2022)






















Motor Carrier Safety Emphasis Area








Strategies

Unless otherwise specified in the Performance Measure, each Action shall be completed or designated to continue by end of year 2029. See page 11 for the SSA Element legend.








1. Reduce occurrence of CMV crashes.						
Action Item ID	Action Item	Plan	Agency/Champion	Performance Measure	E's Involved	SSA Element
1.1	Conduct enforcement by troopers emphasizing targeted locations and times based on large truck crash locations, times, and driver factors identified in the most recent CVE Dashboard.	HSIP	TDOSHS	<ul style="list-style-type: none"> Number of contacts Number of large truck related severe crashes 	 Enforcement	 Vehicles
1.2	Make contacts with commercial vehicles and passenger vehicles driving dangerously in the vicinity of commercial vehicles. Emphasize public campaigns such as the "Teens and Trucks" program alerting of the dangers of aggressive driving in the vicinity of commercial vehicles.	HSIP	TDOSHS	<ul style="list-style-type: none"> Number of drivers of passenger vehicles engaged Number of truck related severe crashes involving aggressive driving 	 Education  Enforcement	 Road Users
1.3	Installation of No Parking signs along entrance ramps to deter heavy vehicle parking. TDOT has developed a standard drawing and there is a statewide initiative by Region.	HSIP	TDOT	<ul style="list-style-type: none"> Number of ramps signed 	 Engineering	 Roads
1.4	Conduct enforcement by troopers emphasizing work zones.	HSIP	TDOSHS	<ul style="list-style-type: none"> Number of contacts Number of large truck related severe crashes 	 Enforcement	 Road Users
2. Improve CMV safety inspections.						
Action Item ID	Action Item	Plan	Agency/Champion	Performance Measure	E's Involved	SSA Element
2.1	Install Smart Roadside Inspection Systems (SRIS) at more inspection stations. IRIS devices use infrared measurements of tires, wheels, and brake and axle assemblies to assist troopers in identifying vehicles that may need a North American Standard Level I inspection.	CVSP	TDOSHS	<ul style="list-style-type: none"> Number of devices installed Number of Vehicle Out of Service Rate 	 Enforcement	 Vehicles
2.2	Improve and update scales located at interstate weigh stations.	CVSP	TDOSHS	<ul style="list-style-type: none"> Number of weigh stations updated 	 Enforcement	 Vehicles  Roads
2.3	Increase use of portable scales	CVSP	TDOSHS	<ul style="list-style-type: none"> Number of uses 	 Enforcement	 Vehicles  Roads



3. Increase inspections and training for CMV hazardous material safety.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
3.1	Conduct yearly intrastate/interstate hazardous material bulk/non-bulk inspection strike forces on commercial motor vehicles (trucks) by the THP at each of the following locations: Nashville, Memphis, Knoxville, Chattanooga, and Department of Energy/Oak Ridge. Place emphasis on such inspections around holiday periods such as Independence Day, Labor Day, Memorial Day, and other holidays or special events to check for fireworks or other undeclared explosives.	HSIP	TDOSHS	<ul style="list-style-type: none"> Number of violations issued 	 Enforcement	 Vehicles
3.2	Provide on-the-job training to certified inspectors, by conducting hazardous material inspections on bulk and non-bulk transporters during hazardous material strike forces. Provide a refresher course for all certified hazardous material troopers during calendar year. Provide a refresher course for the North American Standard Inspection Level VI certified troopers during calendar year.	HSIP	TDOSHS	<ul style="list-style-type: none"> Number of inspectors trained 	 Education  Enforcement	 Vehicles
3.3	Conduct North American Standard Level I hazardous materials inspections statewide on rental trucks and intermodal containers for undeclared fireworks.	HSIP	TDOSHS	<ul style="list-style-type: none"> Number of rental trucks and intermodal containers inspected 	 Enforcement	 Vehicles










4. Ensure that the activities that the state will execute to meet the requirements of 49 CFR 350.213(b) - All troopers receive training to detect drivers under the influence.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
4.1	Activities aimed at removing impaired CMV drivers from the highways through adequate enforcement of restrictions on the use of alcohol and controlled substances and by ensuring ready roadside access to alcohol detection and measuring equipment.	CVSP	TDOSHS	<ul style="list-style-type: none"> Number of citations given Number of large truck severe crashes involving an impaired CMV driver 	 Enforcement	 Road Users
4.2	Provide basic training for roadside officers and inspectors to detect drivers impaired by alcohol or controlled substance.	CVSP	TDOSHS	<ul style="list-style-type: none"> Number of officers trained Number of citations given 	 Education  Enforcement	 Road Users
4.3	Breath testers are readily accessible to roadside officers and inspectors either at roadside or a fixed facility location.	CVSP	TDOSHS	<ul style="list-style-type: none"> Number of officers trained to perform Standardized Field Sobriety Tests 	 Enforcement	 Road Users



Motor Carrier Safety Emphasis Area

4. Continued - Ensure that the activities that the state will execute to meet the requirements of 49 CFR 350.213(b) - All troopers receive training to detect drivers under the influence.

Action Item ID	Action Item	Plan	Agency/ Champion	Performance Measure	E's Involved	SSA Element
4.4	Criminal interdiction activities, in conjunction with an appropriate CMV inspection, including human trafficking and activities affecting the transportation of controlled substances by any occupant of a CMV, and training on appropriate strategies for carrying out those interdiction activities.	CVSP	TDOSHS	<ul style="list-style-type: none"> Number of persons trained 	 Enforcement	 Road Users
4.5	Provide training for roadside officers and inspectors to detect indicators of controlled substance trafficking.	CVSP	TDOSHS	<ul style="list-style-type: none"> Number of officers trained Number of citations given 	 Education  Enforcement	 Road Users
4.6	Ensure drug interdiction officers are available as a resource if an officer/inspector suspects controlled substance trafficking.	CVSP	TDOSHS	<ul style="list-style-type: none"> Determine and fill the numerical need of officers 	 Enforcement	 Road Users
4.7	Engage in drug interdiction activities in conjunction with inspections including interdiction activities that affect the transportation of controlled substances.	CVSP	TDOSHS	<ul style="list-style-type: none"> Incorporation in inspection activities 	 Enforcement	 Road Users





SHSP Implementation and Evaluation

Effective implementation of the SHSP strategy is anticipated to accomplish the following steps:

- Establishment of sustained, regular coordination and collaboration among safety stakeholders
- Development of data-driven Emphasis Area Action Items
- Development and execution of a marketing strategy
- Monitoring and evaluation of the SHSP and related actions

The time frame for the associated programs, projects, and initiatives (actions) related to each strategy is expected to be an on-going process with all actions to be completed by the end of 2029, prior to the next SHSP update period. All actions will be subject to a quarterly evaluation to determine effectiveness and viability based on their cited performance measures.



Consultation and Collaboration

Effective implementation of the SHSP will require continual participation and collaboration of all safety stakeholders across Tennessee. At a minimum, regular coordination will occur quarterly through the SHSP Steering Committee meetings.

Emphasis Area Action Plans

For each Emphasis Area as described in the SHSP, a comprehensive list of countermeasures (projects, programs, initiatives, etc.) that support the cited Emphasis Area strategies and are currently either planned or ongoing by state and local safety partners was compiled. For each countermeasure listed, the following was identified:

- Description of countermeasure
- Association with appropriate SHSP strategy
- Indication of inclusion of countermeasure in a current state or local safety plan
- Agency and/or individual responsible for countermeasure
- Establishment of a performance metric for evaluating each countermeasure
- Identification of which “E” the countermeasure corresponds to
- Identification of the corresponding Safe System Approach element for each countermeasure

The resulting list was developed to be the Action Plan for the related Emphasis Area. The purpose of the Action Item is to provide a complete listing of relevant countermeasures and allow the entity or individual in responsible charge of that countermeasure the method and means to conduct a regular performance evaluation on the countermeasure to determine successful impact.

It should be noted that the Action Items provide safety stakeholders the opportunities to align with other relevant safety programs and plans. Through regular assessments of these programs and plans, linkages between strategies and actions of a specific plan can be correlated to the SHSP.



Marketing and Communication

Marketing benefits implementation of the SHSP in many ways. It increases awareness of the vision, mission, and goal of the Plan, which is directed at reducing fatalities and serious injuries on state roadways. It is a useful tool to educate community leaders on their role in saving lives. Marketing can change the attitudes and behaviors of roadway users by recruiting them into the effort of saving lives as a team.

Upon approval of the SHSP, the following action items will be implemented to provide awareness of the existence of the updated SHSP and effectively communicate the principles of the Plan.

- Press releases shall be issued to provide information regarding the updated SHSP and its availability
- A copy of the updated SHSP will be conveyed to the MPOs, TPOs, and RPOs for their use and distribution to local municipalities and agencies
- A page dedicated to the SHSP will be provided on TDOT's website



Monitor and Evaluate

To obligate funds under the HSIP, Tennessee must evaluate the SHSP on a regular and recurring basis to ensure the accuracy of data and priority of chosen strategies. To meet this requirement, the SHSP includes a two-tiered approach.

- Evaluate and Update the SHSP – Periodically, the Steering Committee will meet to review current safety data and to evaluate Emphasis Areas for past performance and future goals. The Plan will be updated at each review period, which will be no greater than five (5) years following adoption of the most current plan. If changes in legislation, plan performance, or crash data warrant, the Plan's Executive Leadership will direct an update to the SHSP, regardless of the planned update schedule.
- Monitor Action Items Quarterly – During interim years between scheduled plan updates, the Steering Committee will monitor the performance of each Action Item. To make tracking and reporting current crash statistics easier, Tennessee will develop an AASHTOWare dashboard to summarize the performance of the Action Items. A summary of Action Item reports provided by Emphasis Area leaders will be distributed to Executive Leadership and the Steering Committee for comment. Any necessary revisions to Action Items may be requested at that time. This structured quarterly monitoring plan will also satisfy the terms of the current stewardship agreement between TDOT and FHWA, which requires a two (2) year plan interval.

The Plan's success will be measured at the time of evaluation and updated by a statistical comparison of actual data to the Plan's Goal Statement and the goals and objectives of each Emphasis Area. Performance metrics will be tied directly to specific strategies and countermeasures as appropriate. This will illustrate how targeting safety improvements with specific strategies can yield positive results and will be the basis for future strategies to maximize results. In some instances, it may reveal strategies or countermeasures that are not effective and should be eliminated from future plans. In order to perpetuate lessons learned, results of the evaluation will be reported in the subsequent plan update.



List of Sources

All images provided by FHWA, TDOSHS, TDOT, or THP unless otherwise noted.

Introduction and Background

1. TDOT. (2020). Tennessee Strategic Highway Safety Plan. Retrieved from (<https://www.tn.gov/content/dam/tn/tdot/strategic/SHSP-2020.pdf>)

Update Process

2. FHWA. (2022). Public Roads Magazine. Making our Roads Safer through a Safe System Approach (<https://highways.dot.gov/public-roads/winter-2022/01>)
3. FHWA. (2023). ETC Explorer (<https://www.transportation.gov/priorities/equity/justice40/etc-explorer>)
4. TDOT. (2024). TITAN. Retrieved from (<https://tn.gov/safety/stats/titan.html>)

Driver Behavior

5. NHTSA. (2015). Traffic Facts 2015. (<https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812115>)
6. NHTSA. (2022). Traffic Safety Facts: Motorcycles. Retrieved from (<https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813589>)
7. NHTSA. (2023). Quick Facts 2022. Retrieved from (<https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813563>)
8. THSO. (2023). Highway Safety Plan FY 2022 Tennessee. Retrieved from State Highway Safety Plans and Annual Reports: (https://www.nhtsa.gov/sites/nhtsa.gov/files/2023-05/TN_FY2022HSPAR-v2%20tag.pdf)
9. TDOT (2024). TN Impaired driving strategic plan. (https://tntrafficsafety.org/sites/default/files/tn_impair ed_driving_strategic_plan_ffy2024-2026_final.pdf)
10. AAA. (2024). Aggressive Driving. Retrieved from: (<https://exchange.aaa.com/safety/driving-advice/aggressive-driving/#.Xh3z1mZYboo>)
11. NHTSA. (2022). Teen Distracted Driver Data. Retrieved from: (<https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813558>)

Infrastructure Improvements

12. FHWA. (2024, March 29). Intersection Safety. Retrieved from (<https://highways.dot.gov/safety/intersection-safety/>)

13. TDOT. (2022). Miles and Vehicle Miles of Travel in Tennessee 2022. Retrieved from (<https://www.tn.gov/tdot/long-range-planning-home/longrange-road-inventory/longrange-road-inventory-highway-performance-monitoring-system.html>)

14. TDH. (2022). Age and Sex. Retrieved from (<https://www.tn.gov/health/health-program-areas/statistics/health-data/population.html>)

15. Bureau, U. S. (2017). Age and Sex. Retrieved from (<https://www.census.gov/topics/population/age-andsex/data/tables.2017.html>)

Vulnerable Road Users

16. USDOT. (2015). Complete Streets. Retrieved from (<https://www.transportation.gov/mission/health/compl ete-streets>)

17. TNHSO. (2024). BICYCLE & PEDESTRIAN SAFETY. Retrieved from (<https://tntrafficsafety.org/bike-ped>)

18. TDOT. (2024) Tennessee Pedestrian Laws. Retrieved from (<https://www.tn.gov/tdot/multimodal-transportati on-resources/bicycle-and-pedestrian-program/resource s11/tennesse-pedestrian-laws.html>)

Operational Improvements

19. FHWA. (2024). Reducing Non-Recurring Congestion. Retrieved from (https://ops.fhwa.dot.gov/_program areas/reduce-non-cong.html)

20. FHWA. (2024, February 13). Traffic Incident Management Performance Measures. Retrieved from (ops.fhwa.dot.gov/publications/fhwahop10010/present ation.htm)

21. TNSHS. (2024) Tennessee Advanced Communications Network. (<https://www.tn.gov/safety/tacn.html>)

22. FHWA SHRP2 training brochure. Retrieved from (<https://www.fhwa.dot.gov/goshrp2/Resources/PrintMaterialsM otor Carriers>)

Motor Carrier Safety

23. TNECD. Distribution and logistics (<https://tnecd.com/industries/distribution-and-logistics>)

24. FMCSA. (2023). Commercial Vehicle Safety Plan for the Federal Motor Carrier Safety Administration's Motor Carrier Safety Assistance Program. Retrieved from (<https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/2023-09/Tennessee%20FY23%20CVSP%20Final.pdf>)



Glossary of Acronyms and Terms

A

AAA (American Automobile Association)

AASHTO (American Association of State Highway and Transportation Officials)

Action Item: SHSP Emphasis Area Action Items provide a road map to give stakeholders and partners direction. While Emphasis Areas may be defined differently, all can be supported by Action Items that provide specifics such as performance measures, funding sources, project-level detail, and evaluation criteria for assessing outcomes. Action Items turn SHSP concepts and ideas into a reality that saves lives and prevents injuries.

ANSI (American National Standards Institute): ANSI is a private, nonprofit organization that oversees the voluntary consensus standards for products, services, processes, systems, and personnel in the United States, and the organization coordinates U.S. standards with international standards so that American products can be used worldwide.

ARIDE (Advanced Roadside Impaired Driving Enforcement)

B

BAC (Blood Alcohol Concentration): BAC is the amount of alcohol in a person's body measured by grams of alcohol per deciliter or 100 milliliters blood, or grams of alcohol per 210 liters of breath. A positive BAC level (0.01 g/ml and higher) indicates that alcohol was consumed by the person tested. In Tennessee, a BAC level of 0.08 g/ml or more indicates that the person was intoxicated.

BIL (Bipartisan Infrastructure Law): BIL establishes the new Safe Streets and Roads for All (SS4A) discretionary grant program, which supports local initiatives to prevent death and serious injury on roads and streets, commonly referred to as "Vision Zero" or "Toward Zero Deaths" initiatives. The SS4A program supports the U.S. Department of Transportation's (DOT) National Roadway Safety Strategy and a goal of zero (0) deaths and serious injuries on our nation's roadways.

C

CARD (Comprehensive Alcohol Risk reduction)

CFR (Code of Federal Regulations)

Citation: A written order issued, in lieu of a physical arrest or issuance of a warrant, for a violation of law, ordinance, or regulation, which requires the accused person's signature. The order also requires the person to appear in a designated court or government office at a specified date and time. (See also Uniform Citation)

CMV (Commercial Motor Vehicle): CMV is a vehicle used in commerce to transport passengers or property, such as a motor coach/bus, semi-truck, or trailer.

Collision: A road vehicle crash other than an overturning crash in which the first harmful event is a collision of a road vehicle in transport with another road vehicle, other property (including the highway), animal, or pedestrian.

Complete Streets: A Complete Street is safe, and feels safe, for all users. The majority of States and hundreds of local jurisdictions have adopted Complete Streets Policies, and FHWA is supporting these transportation agencies to plan, implement and evaluate equitable streets and networks that prioritize safety, comfort, and connectivity to destinations for all people who use the street network. Complete Streets serve pedestrians, bicyclists, public transportation users, children, older individuals, individuals with disabilities, motorists, and freight vehicles

Construction, Maintenance, or Event Zone: An area, usually marked by signs, barricades, or other devices, indicating that construction, maintenance, or event activities are occurring either on or near the highway.

Crash: An event that produces property damage, injury, or fatality, involves a motor vehicle in transport, and occurs on a traffic way or while the vehicle is still in motion after running off the traffic way.

CMF (Crash Modification Factor): CMF is a multiplicative factor used in quantitative safety analysis to compute the expected number of crashes after implementing a given countermeasure at a specific site.

CPS (Child Passenger Safety)

Crash Rate: The number of crashes per million vehicle miles traveled in a given year. A crash rate may be calculated for non-motorized modes using alternate methodologies.

CVE (Commercial Vehicle Enforcement)

CVE Dashboard: A report on large truck crashes generated by the Tennessee Department of Safety and Homeland Security (TDOSHS) Records and Statistical Management team, which shows crashes by day of the week, time, location, causation factor, and inspection data for each Tennessee Highway Patrol (THP) district.

CVSP (Commercial Vehicle Safety Plan): CVSP is a performance-based annual plan that outlines a state's CMV safety objectives, strategies, activities, and performance measures. The CVSP aims to improve motor carrier, CMV, and driver safety and to reduce the number and severity of crashes and fatalities resulting from crashes involving a CMV.



D

D-16: A reference to the Manual on Classification of Motor Vehicle Traffic Accidents, which promotes uniformity and comparability of motor vehicle traffic accident statistics that are being developed in federal, state, and local jurisdictions.

Defensive Driving: Driving to save lives, time, and money in spite of the conditions around us and the actions of others.

DRE (Drug Recognition Expert)

DTR (Diagnostic Team Review)

DUI (Driving Under the Influence): DUI is operating a vehicle while the alcohol and/or drug concentration in the blood or breath, as determined by chemical or other tests, equals or exceeds the level established by the State, or is equivalent to the standard offense, for driving under the influence of alcohol or drugs in the State.

E

Economic Loss: The total monetary cost of a motor vehicle crash, including continuing or future expenses to be incurred because of the crash. Included in these losses are lost productivity, medical costs, legal and court costs, emergency service costs, insurance administration costs, travel delay, property damage, and workplace losses.

EMS (Emergency Medical Services)

EPIC (Empowering People, Influencing Culture): EPIC puts a matrix organization into place, which allows teams to work across disciplines to gain new skills and experience.

ERM (Enhanced Reference Markers): ERM (also referred to as Emergency Reference Markers) are signs placed along access-controlled facilities every 0.2 of the mile displaying the direction of travel and mile marker location.

ETRIMS (Enhanced Tennessee Roadway Information Management System): E-TRIMS is TDOT's main portal for transportation-related data. It is an Oracle and web-based platform which is managed by the Road Inventory Office, and it supports the easy retrieval of roadway information to assist in proper decision making.

Esri R&H (Esri Roads and Highways): Esri R&H is a road network management system that enables the user to efficiently manage route and event data from multiple LRSs on a common geographic basis.

F

FARS (Fatality Analysis Reporting System): FARS is a national database providing NHTSA, Congress, and the American public with yearly data regarding fatal injuries suffered in motor vehicle traffic crashes since 1975. The system provides detailed analysis of the driver, vehicle, involved persons, and crash.

Fatal Crash: A police-reported crash involving a motor vehicle in transport on a traffic way in which at least one person dies within 30 days of the crash.

Fatal Injury: Any injury that results in death within 30 days of the crash.

Fatality: Any death resulting from a fatal injury.

Fatality Rate: The ratio of the number of fatalities to the number of vehicle miles traveled (VMT) (expressed in 100 million VMT) in a calendar year, based on the data reported by the FARS database.

Five (5) Year Rolling Average: The average of five individual points of data from five consecutive calendar years (e.g., the 5-year rolling average of the annual fatality rate). This methodology reduces the effects of isolated catastrophic events, weather, and other random influences.

FMCSA (Federal Motor Carrier Safety Administration): FMCSA is an agency within the U.S. Department of Transportation that regulates and provides safety oversight of large trucks and buses within the United States, and its mission is to prevent commercial vehicle-related crashes, fatalities, and injuries.

FHWA (Federal Highway Administration): FHWA is an agency within the U.S. Department of Transportation that supports state and local governments in the design, construction, and maintenance of the nation's highway system (Federal Aid Highway Program) and various federally and tribal owned lands (Federal Lands Highway Program).

Four E's (Four E's of Transportation Safety): Categories that define the broad stakeholders and partners that care about safety and are responsible for making the roads safe for all users. These stakeholders are typically from engineering, enforcement, emergency response, and education.

FY: Fiscal Year

G

GIS (Geographic Information System): GIS is a collection of computer software, hardware, data, and personnel used to store, manipulate, analyze, and present geographically referenced information.

Golden Hour: the first hour following a traumatic injury.

Gross Vehicle Weight Rating: The maximum rated capacity of a vehicle, including the weight of the base vehicle, all added equipment, driver and passengers, and all cargo loaded into or on the vehicle.



H

HB (House Bill): Bill of the Tennessee General Assembly.

High-Risk Driver: A driver persistently engaging in a range of behaviors such as impaired driving, non-use of seatbelts, speeding, and running red lights that increase their probability of being involved in collisions resulting in fatalities and/or serious injuries.

High Risk Rural Road (HRRR): Any roadway functionally classified as a rural major or minor collector or a rural local road with significant safety risks.

HSIP (Highway Safety Improvement Program): A core Federal-aid program administered by the Federal Highway Administration (FHWA) with the purpose to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned roads and roads on tribal land. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads with a focus on performance. The HSIP consists of three main components, the Strategic Highway Safety Plan (SHSP), State HSIP or program of highway safety improvement projects and the Railway-Highway Crossing Program (RHCP). 23 CFR Part 924

HSM (Highway Safety Manual): Published by the American Association of State Highway Transportation Officials (AASHTO) is the recognized source of information and methods for quantitatively evaluating traffic safety performance on existing or proposed roadways. The HSM provides a science-based, technical approach to facilitate consideration of safety in roadway planning, design, operations, and maintenance decisions. This allows safety to be quantitatively evaluated alongside other transportation performance measures such as traffic operations, environmental impacts, pavement durability, and construction costs.

HSP (Highway Safety Plan): An annual state plan identifying program activities supported by federal funds that target identified behavioral safety problems. These activities typically support traffic safety law enforcement, media and public education, prosecution and adjudication, training, and other actions designed to reduce crash-related injuries and fatalities. HSPs address behavioral safety areas, such as occupant protection (e.g., safety belts, child safety seats, motorcycle and bicycle helmets), impaired driving, police traffic services, emergency medical services, motorcycle safety, and other program areas.

I

IDD (Inattentive, distracted, and drowsy drivers)

Ignition Interlock: A device that renders a vehicle inoperative unless one or more preconditions are met. In DUI driver-

control programs, the typical ignition interlock device requires the driver to give a breath sample, which is then analyzed for the presence of alcohol. If there is alcohol present (above some minimum threshold value), the vehicle will not start. Other variations are used to ensure that an individual either does not operate the vehicle or is the only operator of a vehicle.

Injury: Bodily harm to a person.

Injury Crash: A police-reported crash that involves a motor vehicle in transport on a travel way in which no one died but at least one person was reported to have: (1) an incapacitating injury; (2) a visible but not incapacitating injury; (3) a possible, not visible injury; or (4) an injury of unknown severity.

Intersection: An area that contains a crossing or connection of two or more roadways not classified as driveway access and within the prolongation of the lateral curb lines. If no curb exists, it is the area within the extension of the lateral boundary lines of the roadway of two joined traffic ways.

Interstates: Limited access divided facilities of at least four lanes designated by the Federal Highway Administration as part of the Interstate System.

IPD (Integrated Program Delivery): IPD is a routine of delivering programs and projects that integrates project teams, systems and business structures to leverage resources, including insights and innovation, to improve efficiency and maximize outcomes.

ITS (Intelligent transportation system)

L

Lane Departure Crash: A crash caused by a driver failing to keep in their proper lane or conducting an improper lane change.

Large Trucks: Trucks (single unit trucks and truck tractors) over 10,000 pounds gross vehicle weight rating.

Level of Street Tool: A roadway scoring methodology to evaluate the level of stress (discomfort) an average bicyclist might encounter on either an on- or off-road bicycle facility as it relates to the adjacent volume and speed of traffic.

LRS (Linear Reference System): A method of spatial referencing in which the locations of features are described in terms of measurements along a linear element from a defined starting point.

LRSI (Local Roads Safety Initiative): An initiative whose projects identify and address safety concerns on local, non-state route segments located outside of an urban boundary and not represented by Tennessee Metropolitan Planning Organizations (MPOs). Routes considered under this



program are classified as rural major collectors, rural minor collectors, or rural local routes. All candidate locations for this program are selected using a data driven process with set qualification criteria.

LTRP (Long Range Transportation Plan): The 25-Year Long-Range Transportation Policy Plan provides the foundation for prioritizing transportation investments across the State. This plan will aid in accomplishing TDOT's mission to serve the public by providing the best multimodal transportation system in the nation.

M

MADD (Mothers Against Drunk Driving.)

Managed Lanes: A highway facility or set of lanes where operational strategies are proactively implemented and managed in response to changing conditions.

MC+ (Motor Carrier Plus): The Commercial Vehicle Enforcement division of THP was reorganized and now operates as the Motor Carrier Plus (MC+) Unit.

Medically at-risk Driver: A driver who has recognizable cognitive (mental) or functional (physical) impairments that can limit one's ability to safely operate a motor vehicle without compensating for or controlling such impairments through medication or adaptive devices.

MMUCC (Model Minimum Uniform Crash Criteria): MMUCC is a minimum set of crash data elements with standardized definitions that are relevant to injury control, highway, and traffic safety.

MOE (Measurement of Effectiveness)

Motor Carrier: An individual, association, corporation, or other legal entity that controls, operates, or directs the operation of one or more commercial motor vehicles that transport persons or cargo over a road or highway in this state.

MPO (Metropolitan Planning Organization): MPOs are created for each "urbanized area" with a population of more than 50,000 people to carry out the transportation planning process required by federal laws and regulations (Title 23 USC 134). MPOs, which include representatives of local governments, have been established in eleven (11) urbanized areas in Tennessee — Bristol, Chattanooga, Clarksville, Cleveland, Jackson, Johnson City, Kingsport, Lakeway, Morristown, Knoxville, Memphis, and Nashville.

MPT (Multimodal Priority Tool): MPT is a VRU crash screening tool designed to facilitate a deep dive into the characteristics of high-risk areas.

MVM (Million Vehicles Miles)

MUTCD (Manual of Uniform Traffic Control Devices): The MUTCD defines the standards used by road managers nationwide to install and maintain traffic control devices on all streets and highways.

N

NDCF (National Digital Check Form)

NHTSA (National Highway Traffic Safety Administration): An agency of the U.S. DOT whose mission is to promote safer vehicles and safer driving practices to reduce deaths, injuries, medical costs and other economic losses resulting from motor vehicle crashes.

North American Standard Inspection Level I: An inspection by qualified commercial vehicle enforcement officers that includes examinations of a commercial driver's license; medical examiner's certificate and Skill Performance Evaluation (SPE) Certificate (if applicable); alcohol and drugs; driver's record of duty status as required; hours of service; seatbelts; vehicle inspection reports(s) (if applicable); brake systems; coupling devices; exhaust systems; frames; fuel systems; lighting devices (headlamps, tail lamps, stop lamps, turn signals, and lamps/flags on projecting loads); securement of cargo; steering mechanisms; suspensions; tires; van and open-top trailer bodies; wheels, rims, and hubs; windshield wipers; emergency exits and/or electrical cables and systems in engine and battery compartments (buses); and Hazardous Materials/Dangerous Goods (HM/DG) requirements as applicable. HM/DG-required inspection items will be inspected by certified HM/DG inspectors.

North American Standard Inspection Level III (Driver/Credential Inspection): An examination by commercial vehicle enforcement officers that includes as minimum requirements, where applicable, examinations of the driver's license; medical examiner's certificate and Skill Performance Evaluation (SPE) Certificate; record of duty status; hours of service; seatbelts; vehicle inspection report; and requirements for Hazardous Materials/ Dangerous Goods (HM/DG). Those items not indicated in this inspection procedure shall not be included on this level of inspection.

O

OPC (Occupant Protection Coalition)

Older Drivers: Drivers licensed or unlicensed, that are of age 65 and older (synonymous with Senior Drivers).

P

PEDSAFE (Pedestrian Safety Guide and Countermeasure Selection System).



PDN: Project Delivery Network

PSO: Project Safety Office

Property Damage-Only Crash: A police-reported crash involving a motor vehicle in transport on a trafficway in which no one involved in the crash suffered any injuries nor were there any fatalities.

Protect the Queue: Program that stresses the importance of protecting motorists caught in traffic queues through the provision of education and training to state and local agencies on effective queue management techniques

PRSI (Pedestrian Road Safety Initiative)

PSO (Project Safety Office)

Q

Queue: A line (backup) of vehicles awaiting their turn to proceed.

R

Ramp Metering: An operational strategy used to control the frequency of traffic flow of an on-ramp onto the travel lanes of a controlled access facility through use of a signal installed on the ramp.

Research Roadmap: A research specific plan on which topics already identified in the SATP need to be addressed and in what order.

RSA (Road Safety Audit): A formal safety performance examination of an existing or future road or intersection by an independent, multidisciplinary team. It qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvements in safety for all road users. The FHWA works with State and local jurisdictions and Tribal Governments to integrate RSAs into the project development process for new roads and intersections, and also encourages RSAs on existing roads and intersections.

RSCP (Road Safety Champion Program): RSCP is a nationally recognized certificate program designed to build a knowledgeable, safety minded workforce, responsible for operating, maintaining, and designing local roads. Road Safety Champions prioritize safety and are motivated to implement safety improvements that reduce fatalities and serious injuries on rural and local roadways.

Roadway Departure Crash: A vehicle crash resulting from any departure of a vehicle from a travel lane (left or right) and the roadway.

ROW (Right-of-Way)

RPM (Raised Pavement Marker)

RPO (Rural Planning Organizations): RPOs are created under the Tennessee Department of Transportation's Long Range Transportation Plan to assist in identifying and evaluating regional transportation priorities in Tennessee's rural areas.

Twelve RPOs, which involve local officials in the areas they represent, are established throughout the rural areas of Tennessee. These RPOs are identified as Center Hill, Dale Hollow, East Tennessee North, East Tennessee South, First Tennessee, Middle Tennessee, West Tennessee, Northwest Tennessee, South Central East, South Central West, Southeast Tennessee, and Southwest Tennessee.

Rumble Strips: Raised or grooved patterns typically located along the highway edge line or centerline and sometimes in advance of a highway element that drivers may not expect (e.g. a rural traffic control device). The rumble strips provide both an audible warning and a physical vibration to alert drivers that they are leaving their lane or approaching something that will need their attention.

Rural Area: The areas located outside of cities and towns are termed "rural." Rural areas have low population density. Rural areas often have a lot of undeveloped land, farmland or forest.

S

SATP (Statewide Active Transportation Plan): The SATP is the first plan focused on improving walking, bicycling, and rolling (i.e., personal mobility devices) in Tennessee since 2005. The SATP defines a vision for active transportation and draw a map for how to get there.

Secondary Crash: A highway crash that occurs as a result of traffic conditions, events, or activities related to an earlier crash, incident, or other event. The crash could occur in the original crash or incident area, within the

Serious Injury: Until April 15, 2019, injuries classified as "A" on the KABCO scale through the use of the conversion tables developed by NHTSA, and thereafter, "suspected serious injury (A)" as defined in the Model Minimum Uniform Crash Criteria (MMUCC) Guideline, 4th Edition.

Serious Injury Rate: The number of persons seriously injured per 100 million vehicle miles traveled.

Severe Crash: A vehicular crash that results in a fatality or serious injury.

Severe Injury: Any serious injury that occurs as a result of a crash.



SS4A (Safe Streets and Roads for All): Established by BIL, the SS4A program funds regional, local, and Tribal initiatives through grants to prevent roadway deaths and serious injuries.

SSA (Safe System Approach)

SFST (Standard Field Sobriety Testing)

STEP (Safe Transportation for Every Pedestrian): A FHWA program that provides guidance through resources (FHWA Publication Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations) on safety countermeasures and case studies.

SPFs (Safety Performance Functions)

SPM (Safety Performance Measures): Five safety-related measurements of effectiveness used to assess fatalities and serious injuries on all public roads. The measures include: the number of fatalities, fatality rate, number of serious injuries, serious injury rate, and number of non-motorized fatalities and serious injuries. Yearly estimated projections of each SPM are required to be included as part of a state's HSIP report.

SHRP2 (Second Strategic Highway Research Program): A program created by Congress to address the challenges of moving people and goods efficiently and safely on the nation's highways. This research program addresses four strategic focus areas: Safety, Renewal, Reliability, and Capacity.

Section 130 Program: A program that provides funds for the elimination of hazards at railway-highway crossings. The candidate locations must meet eligibility and program requirements set forth by 23 USC 130.

Spot Safety Program: A program whose projects address safety concerns at a location that failed to qualify for HSIP funding under the other programs currently active with PSO. The formal request to PSO for a location's consideration under this program is provided by the TDOT Regional Traffic Engineers (RTE). The origination of the request comes from a TDOT Region.

SHSP (Strategic Highway Safety Plan): A statewide-coordinated safety plan that provides a comprehensive framework for reducing highway fatalities and serious injuries on all public roads.

STIP (Statewide Transportation Improvement Program)

T

TACN (Tennessee Advanced Communications Network)

TDH (Tennessee Department of Health)

TDOSHS (Tennessee Department of Safety and Homeland Security)

TDOT (Tennessee Department of Transportation)

Teen Driver: Drivers, licensed or unlicensed, that are of age 15 through 19.

THP (Tennessee Highway Patrol)

THSO (Tennessee Highway Safety Office)

TITAN (Tennessee Integrated Traffic Analysis Network): TITAN is a suite of tools developed for the electronic collection, submission, and management of all crash data in Tennessee. It consists of a centralized data and document repository for public safety information managed by the Tennessee Department of Safety.

TMSSP (Tennessee Motorcycle Safety Strategic Plan): a safety plan developed by the THSO addressing safety concerns, challenges, and proposed strategies specific to motorcycle safety.

TN OP Center (Tennessee Occupant Protection Center): The OP Center operates under a grant funded by the Tennessee Highway Safety Office to promote and support education and awareness to decrease traffic safety injuries and deaths in motor vehicles.

TTAP (Tennessee Transportation Assistance Program): The State's Local Technical Assistance Program (LTAP) center.

TIM (Traffic Incident Management): The planned and coordinated program process to detect, respond to, and remove traffic incidents and restore traffic capacity as safely and quickly as possible. This coordinated process involves a number of public and private sector partners including: Law Enforcement, Fire and Rescue, Emergency Medical Services, Transportation, Public Safety Communications, Emergency Management, Towing and Recovery, Hazardous Materials Contractors, and Traffic Information Media.

TRSP (Traffic Records Strategic Plan): The Tennessee Traffic Records Strategic Plan describes the goals, strategies, and desired outcomes for improving Tennessee's traffic records core data systems. This plan includes projects that will implement these improvements as selected by the Tennessee Traffic Records Coordinating Committee.

TSMO (Transportation Systems Management and Operations)

TMP (Transportation Management Plan) Significant Project: A construction project that requires careful consideration of work zone impact mitigation.

TPO: Transportation Planning Organization An organization that has the same functions as a Metropolitan Planning Organization (MPO). The Knoxville Urban Area MPO, for example, is now known as the Knoxville Regional TPO.

TZD (Toward Zero Deaths)



U

Uniform Citation: A form promulgated by the Tennessee Department of Safety as authorized by Tennessee Code Annotated (T.C.A.) §55-10-208, which may be issued by all law enforcement officers in Tennessee.

Urban Area: The Census Bureau defines urban areas as densely developed territories encompassing residential, commercial, and other non-residential urban land uses. The Census Bureau identifies two types of urban areas: Urbanized Areas of 50,000 or more people and Urban Clusters of at least 2,500 and less than 50,000 people. All other areas are deemed rural.

USDOT (U.S. Department of Transportation)

V

VMT: Vehicle Miles Traveled represents the total number of vehicle miles traveled by motor vehicles on all public roadways within Tennessee.

W

Work Zone: The area between the first advance warning sign and the point beyond the utility or construction zone where traffic is no longer affected. See construction/ maintenance zone.

Y

Yellow DOT Program - The Yellow DOT Program assists first responders at the scene of an emergency on Tennessee's roadways by providing participants' vital medical information. This program can greatly benefit older drivers who are involved in severe crashes and potentially reduce fatalities.

Young Driver: Drivers, licensed or unlicensed, that are of age 15 through 20.



Appendix

SHSP Contact List
VRU Safety Assessment



SHSP Contact List at time of Approval, November 2024.

Plan Champions

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VRU Safety Assessment

For the full document titled “Tennessee Vulnerable Road User Safety Assessment (November 15, 2023)” please refer to the TDOT website.

