



SD2022-06

Reduce Fatal & Serious Injury Crashes

Study SD2022-06

Final Report

Appendices

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A RESULTS OF LITERATURE REVIEW

A.1 Transportation Safety Plans

The planning of road safety in the United States is centered around SHSPs, introduced by the American Association of State Highway and Transportation Officials (AASHTO) in 1997. AASHTO encouraged states to develop SHSPs based on data and evidence that addressed important areas outlined in the AASHTO plan (AASHTO, 1997). While some states had already created their SHSPs before the AASHTO Strategic Highway Safety Plan was released, others began afterward. By 2005, all states were required to establish SHSPs in accordance with the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), and today, each state has completed an SHSP and is actively implementing it.

The literature review indicates that the implementation of SHSPs is a means to uphold the principle of zero fatalities, a prevailing principle that pre-dates modern zero-fatality initiatives. SHSPs offer an effective method for putting this philosophy into action by providing a data-driven framework that enables better integration of safety and planning documents. SHSPs also provide the necessary leadership, advocates, partners, stakeholders, action plans, and resources for the agency. As SHSPs tend to become more refined and strategic with time, incorporating a safe system approach into the existing structure becomes easier. Because SHSPs are already actively implemented by every state, it is the instrument that most easily integrates the safe system approach rather than starting from nothing.

The Minnesota SHSP, for example, presents data-driven focus areas and actionable strategies aimed at reducing fatalities and severe injuries on Minnesota roadways. These strategies align with the *Four Es* of traffic safety (engineering, enforcement, education, and emergency response), and many employs multidisciplinary approaches that address multiple aspects of the *Four Es*. The identified focus areas are prioritized into four groups: core, strategic, support solutions, and connected. The core areas, which include inattentive drivers, impaired roadway users, intersections, speed, lane departure, and unbelted vehicle occupants, are given the highest degree of emphasis. While the connected focus areas (unlicensed drivers, bicyclists, and trains) account for a smaller proportion of crashes than other areas of focus, most crashes are interconnected with other focus areas. Consequently, strategies and tactics within the core and strategic focus areas also address crashes occurring within the connected focus areas. Support solutions encompass a broad range of measures that are essential components integrated within other focus areas, including traffic safety education and awareness, EMS and trauma systems, vehicle safety enhancements, data management, and management systems. MnDOT develops action-oriented strategies for the core and connected focus areas with input from the Minnesota Safety Council and experts from the Minnesota Department of Health (MDH), the Department of Public Safety (DPS), and MnDOT. After implementing the plan, the state evaluates its outcomes. Despite MnDOT's active implementation of the strategies and countermeasures outlined in the SHSP, Minnesota experienced a surge of severe injuries and deaths in 2020, even though overall crashes were decreasing. In 2021, there was a 26% increase in fatalities, and one-third of those crashes were speed-related. To negate the crashes, MnDOT's Office of Traffic Safety started discussing the holistic Safe System Approach, which emphasizes building and reinforcing multiple layers of protection—including safe roads, safe speeds, and post-crash care—to prevent crashes from happening and minimize harm when they do occur. MnDOT discusses safe vehicles as one of the key elements of Safe Systems, as upgrading the roadways can often be costly.

They believe that as the vehicle fleet turns over about every 12 years, it possibly will improve safety faster. While they also mentioned the adaptation of speed limiters and vehicles with automatic braking systems, they acknowledged that high-end cars might not be accessible for all road users due to their high cost.

Michigan's SHSP is a comprehensive endeavor that prioritized public outreach, offered strategic guidance for other plans, relied on data-driven approaches, and built upon the foundations of previous SHSPs. Michigan revised its mission, vision, and goals to incorporate the Safe System approach in its recent 2023-2026 SHSP. One of the key steps for developing and updating Michigan's SHSP was to engage various stakeholders, including elected officials, federally-recognized Tribes, action teams, and the public. While updating SHSP for the year 2023-2026, a survey was conducted and the participants identified the primary areas of concern, including distracted driving, impaired driving, and the need for roadway safety improvements. Additionally, there was a growing recognition of the importance of pedestrian and bicycle safety and addressing the challenges associated with inexperienced drivers. After getting the stakeholder response, the Governor's Traffic Safety Advisory Commission (GTSAC) identified the four emphasis areas, including high-risk behaviors, at-risk road users, engineering infrastructures, and system administration. Action teams were created for the identified emphasis areas and they developed their own action plan with goals, strategies, objectives, and activities. Michigan uses its state-of-the-art Traffic Crash Reporting System (TCRS). It includes an Information System Action Team that enhances the timeliness, accuracy, completeness, uniformity, integration, and accessibility of crash data. This improvement empowers stakeholders and partners to effectively identify and implement countermeasures to address traffic safety issues across Michigan. It also applied the *Four Es* of traffic safety (engineering, education, enforcement, and emergency services) and added a fifth *E*, Equity, which serves as a significant guiding principle in the shift toward adopting the Safe System Approach (SSA) by addressing the disproportionate crash risk and helps ensure safe mobility for all. Each element within the Safe System can encompass one or more of the *Five Es*. For instance, the strategies of engineering and education among the 5 *Es* can align with three distinct Safe System elements: Safe road users, safe vehicles, and safe roads. SHSP (2023-2026) concentrates on the elements of the Safe System and the *Five E* strategies that directly impact the focus areas of the SHSP. Successful implementation of the plan requires leadership, collaboration among agencies, effective communication to transform the safety culture, and a continuous data-driven approach. Michigan establishes annual goals to measure the program's progress and conducts annual evaluations.

The Iowa Strategic Highway Safety Plan is a comprehensive plan developed in partnership with the Iowa DOT and other safety organizations to improve highway safety in the state. The plan focuses on key safety issues such as older drivers, impaired driving, distracted driving, speeding, and seat belt use. It includes data on crash trends, locations, and characteristics to guide safety improvements. The plan outlines specific goals, objectives, and strategies for addressing the issues listed in each safety emphasis area through improvements in the *Es of safety* (i.e., engineering, education, enforcement, and emergency response, as well as data collection and analysis). The safety emphasis areas are unprotected people, younger drivers, intersections, impaired driving, older drivers, motorcycles, distracted driving, heavy trucks, bike/peds and work zones. The Iowa SHSP includes a team responsible for implementing the strategies and programs described in the plan. The plan will be evaluated at multiple levels, including the strategy, safety emphasis, and plan levels, and will be

reviewed regularly. SHSP is updated every five years to help ensure it effectively reduces fatalities and injuries on Iowa's roads.

Nebraska's SHSP is developed by the Nebraska Interagency Safety Committee (IASC), whose member agencies include the Nebraska Department of Transportation, Nebraska State Patrol, Nebraska Department of Motor Vehicles, Nebraska Department of Health & Human Services, Nebraska Local Technical Assistance Program, League of Nebraska Municipalities, and the Nebraska Association of County Officials. Nebraska identified seven Critical Emphasis Areas (CEA). The areas include seat belt usage, roadway/lane departure, impaired driving, intersections, young drivers, older drivers, and non-motorist crashes. The IASC team keeps working on improving the SHSP by periodically reviewing crash data trends, including fatalities, serious injuries, visible injuries, previously identified CEAs, and additional areas of concern. The additional areas included speed-related, distracted driving, commercial motor vehicle, motorcycle, work zone, and bicycle and pedestrian crashes. Additionally, the safety partners, safety advocates, and the public across the state are surveyed and asked if any new areas of concern need to be addressed. The IASC and a wide variety of safety partners continue to seek potential safety strategies for new and innovative ways to help achieve the state's overall goals. Along with the state initiatives for reducing traffic fatalities and injuries, the City of Omaha started its journey for a Vision Zero Program. The city faced a lack of funding to implement strategies for reducing crashes, but they created temporary protected bike lanes and placed dozens of roundabouts on the street grid. The city plans to continue working toward achieving the larger victory of safer streets.

The Wyoming Department of Transportation, along with a committee of local, state, federal, and private-sector partners, follow the process of coordination, implementation, evaluation, and revision for the development of SHSP to make it a successful endeavor of reducing critical crashes in the roads of Wyoming. The SHSP serves as an implementation plan to achieve the goal of "Towards Zero Deaths", providing a framework that outlines strategies for both the initial stages and the intermediate journey. The plan also identifies the emphasis areas, the challenges associated with them, and key strategies for improving them, including the *Four Es* of safety: enforcement, engineering, education, emergency medical services, and everything else measures. The critical emphasis areas are lane or road departure crashes, use of safety restraints, impaired driving, speeding, or driving too fast for conditions, curve crashes, and young drivers. The focus areas are identified as areas of secondary priority for critical crash prevention treatment, including intersections, active transportation: pedestrian and bicycle modes, distracted driving, icy/snowy roads, commercial motor vehicles, motorcycles, older drivers, wildlife, and work zone safety. The key highway safety strategies are to increase seatbelt use with risky behavior groups, increase law enforcement coordination, evaluate appropriate infrastructure improvements, change in safety culture, reduce substance abuse/impaired crashes, improve roadway visibility, improve safety of the roadway segments that have increased speed limits, align the legal system on traffic safety, use of communication channels effectively and provide up-to-date, reliable, and actionable information to drivers.

Montana's Comprehensive Highway Safety Plan (CHSP) is a data-driven plan that addresses the *Four Es* of safety: enforcement, engineering, education, and emergency medical services. Montana made progress on reducing fatalities and injuries in identified emphasis areas by implementing safety programs and involvement of partners who are experts in transportation safety and in reducing motor vehicle fatalities and serious injuries. The emphasis areas are roadway departure and

intersection-related crashes, impaired driving, unrestrained vehicle occupants, and emergency response-after crash care. In addition to identifying the areas of emphasis, the CHSP specifies the objectives and strategies associated with each emphasis area including implementing the Highway Safety Improvement Program, implementing speed enforcement campaigns, implementing the Intersection Safety Plan, supporting and implementing the Roadway Departure Plan, implementing speed enforcement campaigns, promoting driver skills training refresher courses, etc.

The North Dakota 2022 highway safety plan incorporates crash data from a 5-year period and includes data such as crash severity and location. The most recent SHSP identifies non-seat belt use, impaired driving, and speed as primary factors in the severity of motor vehicle crashes. To reduce fatal and serious injury crashes at a statewide level, enforcement resources have been deployed to conduct high-visibility enforcement (HVE). HVE is an evidence-based, proven strategy that has been shown to reduce motor vehicle crashes that result in serious injury and death and deter this type of dangerous driving behavior. HVE is established at locations with historically high frequencies of serious injury crashes due to impaired driving, speed, and aggressive driving. HVE specific to distracted driving has been conducted statewide during the month of April, which is National Distracted Driving Awareness Month. Participating agencies will conduct educational activities and non-saturation enforcement of North Dakota's underage drinking laws to prohibit the sale and consumption of alcoholic beverages for those under the age of 21. A media plan has also been incorporated in conjunction with each enforcement event. NHTSA and State Core Performance measures were used to determine the effectiveness of the safety measures in each area.

NDDOT SHSP Update for the period 2018-2023, is the outcome of a comprehensive and coordinated endeavor involving North Dakota state agencies and over 200 safety partners. These partners consist of local and tribal governments as well as private organizations, all united in their commitment to decreasing the number of motor vehicle crash fatalities on both state and local roads. This plan is meticulously driven by data, employing an analysis of North Dakota crash data to identify and prioritize crash types, safety strategies, and specific roadway facilities that are deemed the most suitable for safety investments. The success of the North Dakota Vision Zero plan relies, in part, on the establishment of a capable leadership structure. This structure plays a crucial role in facilitating and overseeing the plan's development, implementation, monitoring, and periodic updating. The leadership team identifies the Priority Emphasis Areas after analyzing North Dakota's serious crash data that points to the most prevalent crash types and their contributing factors. The priority emphasis areas are lane departure, intersections, alcohol and/or drug related, unbelted vehicle occupants, speeding/aggressive driving, and young drivers. Before commencing with the development of the Vision Zero Plan, the state organized two informational webinars and six regional Vision Zero workshops to involve over 200 safety partners. These stakeholders came from various fields, including education, enforcement, engineering, emergency medical services (the *Four Es of Safety*), courts, health care, and community safety advocates. Their valuable input provided the essential safety perspectives required to advance toward the goal of achieving zero deaths and serious injuries on North Dakota roads.

Colorado's Strategic Transportation Safety Plan (STSP) is led by the CDOT, Colorado Department of Health and Environment (CDPHE), Colorado State Patrol (CSP), and Colorado Department of Revenue (CDOR). The four emphasis areas are high-risk behaviors, vulnerable road users, severe crash mitigation, and programmatic. In accordance with the emphasis areas, stakeholders have identified 15 Tier I Strategies that hold the highest priority. These strategies emphasize the utilization of

established countermeasures, targeted deployment, incorporation of current technologies, and the clear assignment of roles and responsibilities for effective implementation. The stakeholders also identify Tier II and III strategies. The Tier I strategies are to name a safety champion to lead a proactive safety program, build a safety advocacy coalition, institutionalize safety roles and responsibilities, coordinate with existing safety programs, promote consistent safety messaging, develop education campaigns for high-risk behaviors, provide transportation safety education to students and families, prioritize transportation safety funding, prioritize safety in transportation planning, facility design, and project selection, educate decision-makers on the effectiveness of occupant protection laws, increase requirements for new and renewal driver licensing, establish a framework for streamlining data management, prioritize and promote proven safety toolbox strategies, implement systemic infrastructure safety improvement strategies and increase education on and implementation of data-driven and automated enforcement. Apart from identifying the safety strategies, the STSP also identifies the safety targets and implementation plans.

U.S. road safety management has historically been shaped by a myriad of federal directives, legislations, and nationally coordinated information. The overarching goal of these efforts is to help ensure safety on the roads, reduce fatalities, and foster an environment where all stakeholders have a shared understanding of best practices. However, despite its rising popularity and proven success in various global contexts, the application of TZD and similar systems concepts in the U.S. remains inconsistent. They are yet to be thoroughly, widely, or consistently applied. This discrepancy suggests that while the U.S. has a strong foundational approach to road safety, there is potential for further integration of modern, holistic strategies

A.2 Transportation Safety Planning and the Zero Deaths Vision: A Guide for Metropolitan Planning Organizations and Local Communities

The US Department of Transportation developed a guide to aid Metropolitan Planning Organizations (MPOs), local communities, affiliated transportation agencies, and stakeholders in utilizing the safety planning process to make progress toward achieving the vision of zero deaths. The guide offers a comprehensive step-by-step process for creating, executing, and assessing a regional or local safety plan, while also showcasing exemplary approaches. It emphasizes the essential safety considerations required to achieve the zero deaths objective within the safety planning process. It further demonstrates how safety practitioners actively participate in safety planning initiatives by analyzing data, establishing goals and targets through a performance-based planning approach, identifying strategies to tackle safety challenges, developing a documented plan, and evaluating its effectiveness. While this document is developed for MPOs and local communities, the strategies mentioned in this guide can also be adapted for the states.

The guide outlines the benefits of safety planning that an organization can adapt to engage its safety partners in the planning process, introduces the performance-based planning process, discusses the importance of establishing and fostering a culture of safety, and demonstrates the steps for establishing a safety planning process for success. This guide highlights the ‘Towards Zero Deaths National Strategy’, a resource that introduces a traffic safety culture (TSC) model. This guide lists the key components for developing a safety plan that includes establishing leadership, communication, and culture, using a data-driven process, setting performance measures and targets, selecting strategies and countermeasures, preparing, and implementing the safety plan, and finally evaluating

and updating it. The guide also provides a bibliography of resources that are useful for safety planning.

A.3 Strategies to Coordinate Zero Deaths Efforts for State and Local Agencies

The guide developed by FHWA highlights the significance of ongoing communication and collaborative problem-solving between state and local traffic safety stakeholders. It emphasizes the importance of focusing on key areas for improvement, such as speed management, fostering a safety culture, and utilizing data to prioritize safety initiatives. This ambitious goal of ensuring safe transportation for all road users is shared across various levels of government and will be advanced through continuous communication and collaboration efforts.

A.4 Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices

The National Highway Traffic Safety Administration developed the guide to help the State Highway Safety Offices (SHSOs) select effective, evidence-based countermeasures for traffic safety problem areas. The concentration areas include alcohol-and drug-impaired driving, seat belts and child restraints, speeding and speed management, distracted driving, motorcycle safety, young drivers, older drivers, pedestrian safety, bicycle safety, and drowsy driving. This guide lists countermeasures associated with each traffic safety problem area and provided information on its effectiveness, costs, and implementation time.

B INTERVIEW METHODOLOGY AND SCOPE

B.1 Interview Data Collection

A semi-structured interview process was designed to understand the build-up and implementation of zero-fatality initiatives, based on the Strategic Highway Safety Plan (SHSP) action framework. Initially, the Governor's Highway Safety Representative and/or SHSP lead were contacted to confirm the appropriate principal contact for understanding SHSP implementation. It is anticipated that most information will be collected in this primary interview. Ancillary interviews to address specific features and/or questions may be considered as snowball-type additions to the interview pool.

The interview framework was drawn largely from questions posed by the technical panel in conjunction to a safe system environmental scan. States' safety initiatives were also reviewed prior to interviews. Together, this information provided the context to refine questions aimed at gaining insight for a future statewide zero fatalities initiative. The FHWA SHSP Implementation Process Model (FHWA, 2010) was specifically considered in zero fatality initiatives interviews.

FHWA Implementation Process Model (FHWA, 2010)

1. Elements Underlying the SHSP Implementation: Leadership, primary agencies, and collaborators; public involvement.
2. Steps
 - Emphasis area action plans
 - Linkages to existing plans
 - Marketing
 - Monitoring, evaluation, and feedback

B.2 Surrounding State Peer Agencies

Five neighboring states were selected from peers based on resources available to conduct and analyze interviews in a timely manner. Technical panel preferences for neighboring states and similar traffic environments were considered in presenting a draft peer state interviewee list. Figure 1 depicts the percentage change in fatalities from 2013-2015 to 2018-2020 in the candidate and neighboring states, while Figure 2 presents the rural fatality numbers for adjacent states. The SDDOT Approved Zero-Fatality Initiative Implementation State Interview Candidates included:

- North Dakota
- Minnesota
- Nebraska
- Wyoming
- Montana

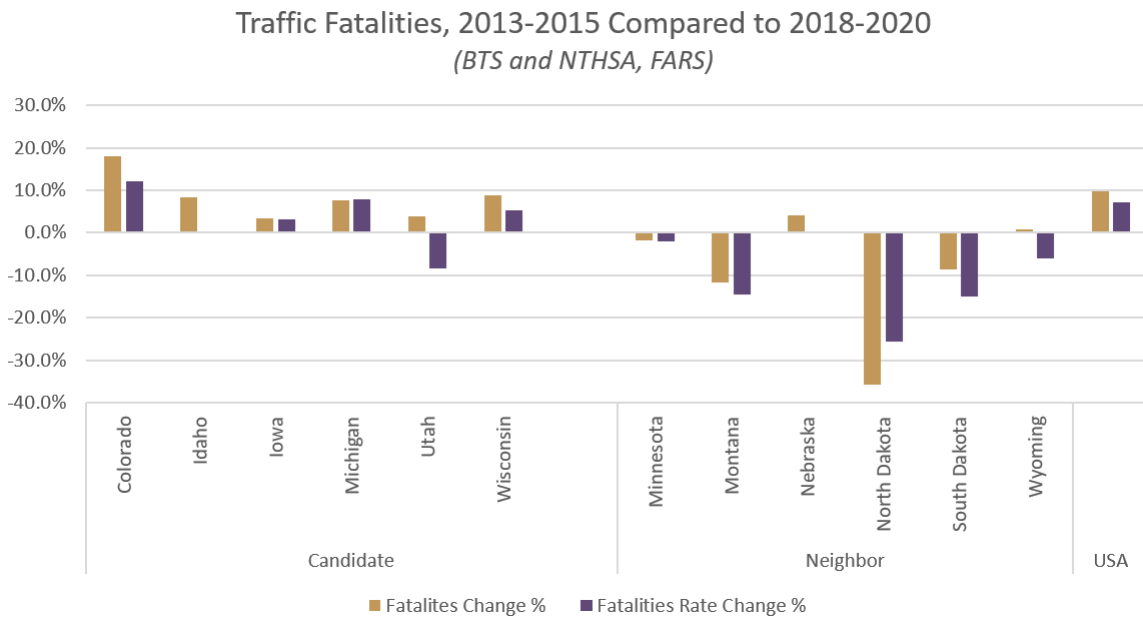


Figure 1: Traffic Fatalities, 2013-2015 Compared to 2018-2020 (BTS and NHTSA, FARS)

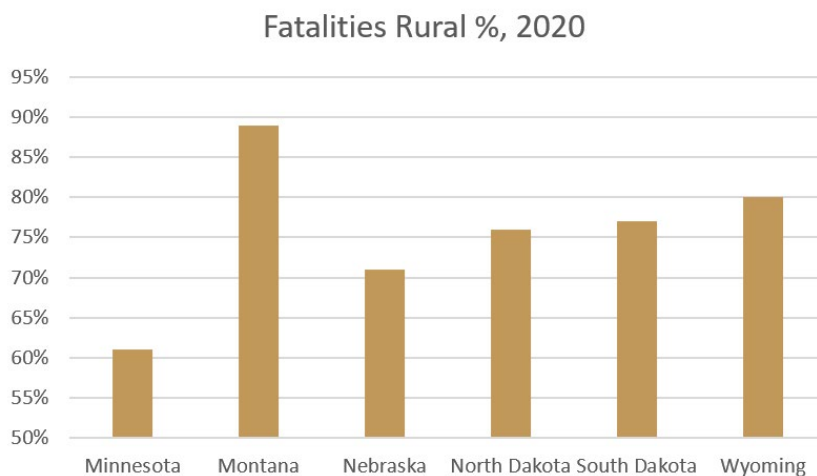


Figure 2: Fatalities Rural %, 2020

B.3 Interview Focus Areas

Interview Focus Areas (per the FHWA Implementation Process Model):

- SHSP leadership
- Implementation framework
- Zero-Fatality Initiative insight
- Define safe system lens/any current activity
- Media/public engagement
- Implementation progress monitoring/collaborations, metric(s), etc.
- Continuous improvement processes
- Special Interest: Tribal Nations, local roads

The technical panel provided an initial set of questions of interest. Draft questions were designed to incorporate these questions in an interview framework to address the FHWA model. The draft interview focus areas and questions were developed and shared with the study team. The team discussed and modified the questions to best generate discussion of topic areas of most interest to the technical panel. The questions were revised based on the technical panel feedback and finalized for the interview exercise.

Sample questions shared by the technical panel to initiate the interview exercise:

- When did your state start the zero-fatality initiative implementation?
- What were the reasons for selecting your chosen zero-fatality initiative?
- What challenges did you encounter during the early stages of implementation?
- Was it decided to implement the initiative across all of the state government agencies?
- What do you consider to be the key steps/processes to successful implementation?
- If you could go back and start the process again, what would you do differently?
- How do you measure the current state of implementation?
- How do you measure the success of implementation?
- Have you incorporated FHWA's Safe System Approach into your zero-fatality initiative?
- If so, would you consider this process successful?
- If the Office of Highway Safety (OHS) is located under a Department of Public Safety or another Department, how were roles and responsibilities divided between the OHS and the Department of Transportation?
- Does your state have scheduled check-in meetings to report on various initiatives or projects? Monthly, quarterly, bi-annually, or annually?
- Does your state have dedicated staff or partners that focus solely on implementing zero-fatality initiatives?

B.4 Final Interview Questions

1. Is the Department of Transportation the lead agency with your *Zero-Fatality Initiative Implementation* plan development and implementation?
 - a. Is the SHSP the primary or leading document with this *Zero-Fatality Initiative Implementation*?
 - b. If yes, which DOT division has the primary role to manage the periodic SHSP update? How are other divisions involved?
 - c. If no, which agency leads the SHSP? How were roles and responsibilities divided between the lead agency and the Department of Transportation, and potentially other agencies?
2. What were the reasons for selecting your chosen zero-fatality initiative?
 - a. Were you involved with the SHSP, or other primary planning documents, at that time?
 - b. If yes, in the same role? Another role?
3. When did your state start the zero-fatality initiative implementation?
 - a. How is your implementation framework structured?
 - b. How are projects, programs, and/or strategies selected?
 - c. Has it changed since first formed?
 - d. What challenges did you encounter during the early stages of implementation?
4. Was it decided to implement the initiative across all of the state government agencies?
 - a. How was this determined?
 - b. Do the HSIP, HSP, and MCSAP contain SHSP bilateral/multilateral linkage?
 - c. What type of accountability/active role does each agency have in implementation?
5. What do you consider to be the key steps/processes to successful implementation?
 - a. How do you measure the state of implementation?
 - b. How do you measure the success of implementation?
 - c. If you could go back and start the process again, what would you do differently?
6. Have you incorporated FHWA's Safe System Approach into your zero-fatality initiative?
 - a. Please summarize your understanding of the Safe System Approach.
 - b. How was it incorporated, organizationally or perhaps in terms of a crash risk area?
 - c. If so, what process/metric(s) will you use to determine this process successful?
7. What role does media have in your *Zero-Fatality Initiative Implementation*?
8. Please describe public engagement during early to recent implementation efforts.
9. Does your state have scheduled check-in meetings to report on various *Zero-Fatality Initiative Implementation* or projects?
 - a. Who is the lead in organizing and documenting these meetings?
 - b. Frequency? E.g., Monthly, quarterly, bi-annually, or annually?
10. Does your state have dedicated staff or partners that focus solely on implementing zero-fatality initiatives?
11. Based on relevance as a safety priority in your own state, do you have experiences and/or recommendations regarding tribal engagement as a minority, relatively high-risk population?
12. Based on relevance as a safety priority in your own state, do you have experiences and/or recommendations regarding local road safety awareness and engagement?
 - a. Specifically, how have you engaged local governments, local law enforcement, and communities/coalitions in the *Zero-Fatality Initiative Implementation*?

- b. Did you design *Zero-Fatality Initiative Implementation* to include Champions with specific responsibilities? If yes, how? If no, why?
- 13. What would you share as key(s) in 'best practices' for *Zero-Fatality Initiative Implementation*?
- 14. Knowing what you know now, would you have selected a different zero-fatality initiative?
- 15. Do you have any questions you'd like to ask peers about their *Zero-Fatality Initiative Implementation*?

B.5 Interview Synopses

The research team arranged and conducted five peer state interviews between July 20, 2023, and September 6, 2023. The primary contact with the zero fatalities initiative in each of the peer states was identified. Phone calls were made to each of the five peer states to confirm the appropriate individual(s) for an invitation to the interview pool. In some cases, multiple attempts were needed to identify and confirm this individual. An email and Microsoft Teams virtual meeting invitation were sent to the interviewees to reiterate introductory South Dakota zero fatalities initiative interview information and share a copy of the interview questions. Each interview was approximately one hour. Research team interview notes were transcribed into a spreadsheet file organized around themes in the eight FHWA implementation process model areas. The interview summary is arranged by date in sequence.

The interviews provided invaluable insights that extend beyond the quantitative realm of traffic safety statistics and data. These interviews not only help solidify foundational understanding but also introduced nuanced challenges and effective strategies employed across different states.

B.5.1 North Dakota

The North Dakota Department of Transportation (NDDOT) is the lead agency with the state's Vision Zero initiative, beginning in 2018 after significant planning. They initially wanted to launch the program earlier, but the planning process took longer than anticipated. The SHSP encompasses their Vision Zero Plan. A combination of traffic operations and traffic design engineers manage the HSIP project-related content in the SHSP while the programming division manages day-to-day and annual reporting for infrastructure perspectives. The Highway Safety Division provides the human behavior counterpart with the SHSP planning, programs, and reporting. Both the Highway Safety Division Director and the Programming Division Director, who were interviewed, are tasked as leads in developing the SHSP along with others and consultants.

The zero-fatality framework was structured with an executive leadership team that included cabinet-level agencies, the NDDOT, North Dakota Highway Patrol (NDHP), and North Dakota Department of Health and Human Services (DHHS), among others. A steering committee composed of mid-level management meets semi-annually and works in priority emphasis area teams. An internal team works together to select projects, programs, and specific strategies. The team consists of programming, planning, asset management, and local government. They also worked initially with consultants; and have continued to invite consultant roles with some periodic updates. All of the initial consultant-led decisions are now made by the in-house team, which meets every other week to guide the initiative.

The Vision Zero initiative was first implemented in collaboration with the NDHP and the DHHS. The success of implementation has been seen through legislative changes that resulted from initiatives led not by state agencies, but rather champion stakeholders in the emphasis areas teams. Utilizing

20/20 hindsight, major industries such as oil and gas, the Department of Agriculture, and others would have been included in the initial planning process.

The FHWA's Safe System approach is at the forefront of the SHSP update which is scheduled to be completed in September 2023. This will include structured priority emphasis area teams that will be consistent with the Safe System approach.

The media's role with the zero-fatality initiative has been significant. The state contracts a full-time media firm hired with a combination of NHTSA and state funding. They actively promote campaigns with various topics including occupant protection and "click-it or ticket" among others that usually change on a monthly basis. They synchronize their media plan with regional Vision Zero coordinators to conduct education and outreach activities within local communities. They promote certain corridors at different times of the year based on local needs. More recently, infrastructure safety strategies have been featured as well. For instance, they have used Alaska Department of Transportation & Public Facilities safety footage in the past to promote winter roundabout safety.

Rather than a state safety engineer position, an agency-wide safety emphasis is present in a combination of traffic operation engineers and core responsibility that everyone has a role in the Vision Zero initiative.

Specific to rural outreach, Vision Zero Coordinators are located in the four quadrants of the state. These safety champions have taken a lead in engaging tribal communities in the Vision Zero initiative. The VZ Coordinators are supervised through the ND Association of Counties; with support from the NDDOT. Their offices are in a country road department or sheriff's office within their region.

The tribes had difficulty hiring consultants to implement projects, so the state now leads the process. The state regularly uses STIP meetings to keep tribes involved with HSIP projects. The NDDOT has a tribal liaison on its Local Roads Division.

The NDDOT recommends significant outreach to reach underrepresented populations. They recognized that they still need to do a better job in North Dakota with public outreach and engagement to motivate local community leaders.

B.5.2 Minnesota

The MN Department of Safety leads its Toward Zero Deaths initiative along with MnDOT and the DOH. They began meeting and planning the initiative in 2003 and held their first workshop in 2005. It was modeled after Sweden's Vision Zero program from 1997.

State leadership teams, along with liaisons work within eight different state regions, to coordinate projects along with two metro area regions. Projects are based on specific needs and trends; usually identified at a regional level to target appropriate issues. Questions are often raised when analyzing EMS crash data and local engineers need to understand what the reality looks like in order to fix relevant problems.

MnDOT is currently working on Toward Zero Deaths (TZD) 2.0. They feel that a lack of communication among various implementation teams hindered the execution of the initial TZD and are focused on improving the messaging with the new initiative moving forward.

Overall, the initial zero fatality initiative “got people talking” as relevant crash data including seat belt use rates was sent to specific regions. Local media outlets were also notified about unbelted crash injuries and reported on them as well. Available crash trend data is used to measure the status of implementation throughout the state. They found that regions that operated the initiative the longest have seen the largest amount of crash reduction. If they could start again, MnDOT would work with other states to develop strategies targeting particular high-risk groups.

They hold a statewide conference every fall and spring along with eight smaller workshops with 70-200 attendees each. The traffic safety advisory council, along with eight regional steering committees, meet monthly. The University of Minnesota Center for Transportation Studies (CTS) schedules these meetings.

They’ve found tribal engagement to be difficult with the Council for Tribal Transportation (CTT). When asked about issues they would quiz other state DOTs about for experience and best practices, they highlighted driving safety risk associated with legalized marijuana use.

B.5.3 Nebraska

The Nebraska Department of Transportation (NDOT) leads the state Towards Zero Deaths initiative. The primary roles to manage the initiative and periodic SHSP updates are handled in-house as well. The Department of Motor Vehicles (DMV), along with other agencies, provides feedback related to updates and changes to the SHSP. Their *Buckle Up / Phone Down* safety message was developed internally; it is used often in their messaging and social media presence.

Nebraska’s Towards Zero Deaths (TZD) initiative does not have a specific end date, unlike the Vision Zero initiative, which allows for more flexibility and discretion through implementation. The TZD implementation framework is developed by a strategic safety committee that coordinates with local highway safety advocates and MPOs, as well as Local Technical Assistance Programs (LTAP) and county officials. The NDOT did note they view Vision Zero more as a metro initiative and look forward to seeing an onboarding city’s success with the recently unveiled Omaha Vision Zero.

The TZD was implemented initially by the state patrol and the Nebraska Trucking Association. Projects are selected based on various criteria such as cost/benefit analysis, focus areas with systemic safety issues, and locations where preventative measures can be successfully implemented. Cost-benefit analysis was noted as a strong component in their project vetting, noting it was especially valuable in presenting policy and investment decisions to the legislature and other state leaders.

To successfully implement a TZD initiative, NDOT recommends including a coalition of engineering and safety experts at state and local levels. The success of the implementation has been measured by comparing crash data before and after implementation, and using performance targets and cost/benefit analysis to measure initiative effectiveness.

FHWA’s Safe System approach is incorporated into Nebraska’s TZD initiative, but they are attempting to build it in without naming it specifically to avoid pushback while using a top-down approach for implementation.

The NDOT Highway Safety Office is responsible for much of the media involvement with the zero fatalities initiative. Monthly crash reports are shared, and the communications department decides

when and how to relate information to the public through the media. NDOT believes that there is not a strong need for press releases, and it's more effective to avoid politics and focus on results.

They have engaged local highway commissioners within each Nebraska district who make high-level budget decisions for NDOT. Tribal outreach includes conducting workshops and roundtable discussions, and they plan to integrate tribal feedback into their statewide data.

Nebraska has four primary Native American Tribes that own land and transportation facilities. NDOT coordinates an annual Tribal Transportation Conference that includes discussion of transportation topics for the Nebraska tribal communities. The NDOT safety engineer presents each year at Tribal Transportation Conference about federal safety funding opportunities such as HSIP, TAP, TTSP, etc. His presentation would include any systemic safety funding programs developed from the HRRR team, such as the stop sign upgrade program and the shoulder widening program. As part of the new Vulnerable Road User Assessment public involvement, NDOT coordinated individual workshops/roundtables with each of the four primary Native American Tribes to get feedback for these communities that are disproportionately involved in fatal pedestrian crashes.

The NDOT believes the best way to successfully implement zero-fatality initiatives is to fund the best available projects that avoid politics by being primarily data-driven.

B.5.4 Wyoming

The Wyoming Department of Transportation (WYDOT) leads the state zero traffic fatalities initiative. The SHSP is the primary document and the Department of Health, State Highway Safety Office, and Highway Patrol along with WYDOT manage and update the SHSP periodically. They request general public input for SHSP updates. The SHSP goal of zero traffic fatalities is not specifically termed (e.g., VZ, TZD) within the SHSP.

The Highway Safety Behavioral Grants Program Manager who was interviewed has been with WYDOT for ten years and has managed this department for the past five years. WYDOT's primary reasons for selecting their zero-fatality initiative were to reduce fatalities and serious injuries throughout the state. A combination of law enforcement liaisons, seat belt coalition facilitators, and the Governor's Council on Impaired Driving facilitator focus on zero-fatality implementation.

Programs and projects are selected for the HSP via open application in February and close in March. Applications are reviewed by a committee who makes recommendations. There are usually not many applicants, so they are able to work with viable applications to make projects work effectively.

The success of the zero fatalities initiative is measured empirically by analyzing crash reports, impaired driving numbers, and seatbelt coalition reports which are all available online. It should be noted that speeding is the primary reason for traffic stops as Wyoming is a secondary seat belt state.

The local media plays a strong role in messaging the public as the NHTSA campaigns don't always apply to the state's local needs. WYDOT focuses more on local activities and events. Liaisons create messaging for press releases, and they target social media with different safety campaigns when needed. They also partner on social media campaigns with the University of Wyoming in Laramie and Laramie County Community College in Cheyenne.

WYDOT had some issues with tribal entities ordering safety supplies. They now provide supplies directly to the tribes to save time and money, but the tribal workforce is still involved with the implementation and installation of safety delineators, signs, etc.

When asked to consider best practices for zero fatality initiatives, WYDOT stressed not to turn away from new initiatives, but rather try to adapt to them and change accordingly. They would like to know from other states how to better target teen drivers to improve engagement and teen driving safety strategies, and “remaining relevant with teens”. They are also interested in other state social media strategies involving zero fatalities initiatives.

B.5.5 Montana

The Montana Department of Transportation (MDT) leads the state zero fatalities initiative. They began planning in 2006 and implemented a data-driven initiative in 2007. They analyzed crash data to determine the leading crash factors in periodic updates to their Comprehensive Highway Safety Plan. It was amended in 2010 and 2015 with an update occurring in 2020 and another planned for 2025. In the most recent update, the focus is on intersections, impaired driving, unrestrained vehicle occupants, and emergency response.

The HSP, HSIP, and CVSP plans are all housed within MDT, and they are linked together in common threads that reside in the broader CHSP. The three Montana MPOs sit on the CHSP advisory committee, as do representatives from HSIP, the state bike PED coordinator, Montana Highway Patrol, and MPO police officers. Montana has four emphasis area stakeholder groups that meet quarterly. The legislature meets in odd years and strategies are often reprioritized in preparation for these legislative sessions. Even years often shift to differing priorities.

The Montana zero fatalities initiative is quite broad with respect to education. They work with parent groups and school administrators, but their focus is on frontline educators along with prevention specialists. Many of them work in schools and with chemical dependency prevention programs as well as with their DUI Task Force. They also have an attorney who is a Traffic Safety Resource Prosecutor (TSRP) and does training for courts and judges. They work with media campaigns for safety countermeasures education with funding from the Highway Safety Improvement Program (HSIP). They did specific public outreach media campaigns when roundabouts and centerline rumble strips were first constructed.

Regarding HSIP infrastructure funding, it is used on state, local, and tribal safety projects. Communities can submit locations they would like addressed. They reach out to the Montana Association of County Road Supervisors every couple of years to gain a better understanding of what safety measures are needed. Most of the time, they hear about locations through the DOT district offices.

The three MPOs have long-range transportation plans that include safety aspects, but not distinct safety plans. Smaller communities are encouraged to ask for assistance if they are interested in developing a scaled-down version of the Comprehensive Highway Safety Plan. Eight communities have completed this process including specific emphasis areas.

When considering tribal transportation plans, they strongly recommend considering the *Four E's* framework (enforcement, education, emergency response, and engineering). The focus is from a

community perspective bringing in the broad stakeholder group, including schools and behavioral programs.

Since 2007, they have had a Safe On All Roads program (SOAR) for Native Americans with coordinators at each Montana Reservation, focusing on behavioral safety issues funded through NHTSA. They also do road safety audits that highlight needs and strategies that should be considered. The tribal SOAR program is also heavily supported by media with new positive messaging opposed to the “shock and awe” messaging of past campaigns. The SOAR coordinators focus these campaigns to the local communities and cultures.

MDT focuses on a few key emphasis areas, opposed to many that narrow the CHSP emphasis to four emphasis areas. They found there were too many overlapping priority areas and unnecessary meetings.

They feel that peer exchange of ideas is vital to the success of safety initiatives to better understand what is and isn’t working in different states. They also feel the FHWA Safe System Approach is not much different than what is already being done and will continue to promote the *Four Es* initiative locally.

C SAFETY INITIATIVE

C.1 Program Elements

- **Culture Shift:** Importantly, the transition to a Safe System approach requires shifting from primarily associating road fatalities to human error. While road users are expected to exercise caution, focusing solely on their faults diminishes the urgency to enhance the overall system's design and safety. It's vital to intensify efforts in enhancing public awareness. Launching an extensive, well-researched, and culturally inclusive zero fatality initiative and Safe System campaign can significantly enlighten the populace about the merits of safer road infrastructures. Monitoring the campaign's impact will be key to gauging shifts in traffic safety perceptions.
- **Communication Structure:** From the detailed interviews conducted with various state departments and agencies, the technical panel has gained valuable insights into the intricate dynamics of deploying a successful safety initiative using the safe system approach. A recurring theme throughout these discussions was the paramount importance of robust, clear, and continuous communication channels among all stakeholders. It is recommended that the implementation plan establish a digital platform, accessible to all parties, that facilitates real-time updates, centralizes crucial documentation, and fosters feedback. Furthermore, to mitigate the historically observed lack of communication, the scheduling of regular stakeholder meetings is vital. Through these, consistent dialogue is maintained, and a shared vision is reinforced.

Equally critical is acknowledging the diverse preferences and needs of stakeholders, urging the necessity of varied communication mediums—from emails to newsletters, and webinars to social media. The literature underscores the necessity of cultural change, enhanced public awareness, collaborative partnerships, skilled personnel, and data-driven strategies. A dedicated team, specializing in communication, can function as the cornerstone of these strategies, ensuring the timely and accurate relay of information, while also providing necessary training sessions or workshops.

- **Holistic Safety Integration:** With the zero-fatality initiative, safety is not just a program but a philosophy. Every aspect of what the implementation plan undertakes will have safety seamlessly woven into it. The challenges and issues faced by other states offer a roadmap of what pitfalls to avoid. For instance, understanding that politics can be a hindrance means strategies can be developed to preemptively address or mitigate these challenges.
- **Data-Driven Decision-Making:** The interviews also illuminated the significance of data-driven decision-making. Adopting a data-centric methodology not only elevates the initiative's credibility but also offers a strategic shield against potential political challenges. By underpinning project selections and implementations with concrete data, the implementation plan can deter detractors and provide a strong foundation against any political turbulence. To help ensure the initiative's longevity and effectiveness, it's crucial to have transparent reporting, swift response to feedback, and the inclusion of local community champions.

- **Funding Considerations:** Transforming the vast U.S. road network demands both strong leadership and substantial resources. With a significant portion of these roads under local jurisdictions the challenge becomes multifaceted. The implementation plan acknowledges the potential influence of federal surface transportation funds in catalyzing nationwide safety changes. The broader impacts of transportation on societal elements like housing, health, and employment highlight the need for diversified funding sources and collaborations.
- **Three Pillars of Safety:**
 - **Human Factors:** Addressing behaviors, education, and awareness that play a critical role in overall road safety. A deeper understanding and a tailored approach towards tribal communities can lead to more inclusive and effective safety programs.
 - **Physical Assets:** Ensuring South Dakota roads, bridges, and transportation facilities are designed, maintained, and optimized for utmost safety.
 - **Organizational Culture:** Embedding safety into the very fabric of the state's operations, ensuring every decision made prioritizes the wellbeing of South Dakota's citizens. The literature review and safety interviews highlighted that the lack of communication is a challenge that underscores the need for robust, clear, and continuous communication channels among all stakeholders.
- **Real-time Operations:** Leveraging advanced technologies and real-time data, SDDOT can respond to changing road conditions, incidents, and other emergent situations promptly and efficiently, further reducing risks and enhancing overall transportation safety.
- **Adaptability:** Zero fatality initiative strategy focuses not only on physical infrastructures but also considers human behavior and the overarching organizational ethos. All states highlighted the importance of data-driven strategies in the interview process. Harnessing this data helps ensure that the initiative targets the most pressing issues and measures progress effectively. As states like Minnesota work on their next versions (like TZD 2.0), it's evident that safety initiatives should be seen as evolving strategies. Regular reviews, feedback loops, and updates help ensure the initiative remains relevant and effective. Human behavior reacts and changes in unanticipated ways. For these reasons, the tools and strategies must adapt and occasionally course-correct to focus on the ultimate goals.

C.2 Examples of Ongoing SDDOT Safety Programs:

- **Pedestrian and Bike Safety: "Don't Thump Your Melon"**
 - Head injuries stand as the primary cause of fatalities in bicycle crashes, and they play a significant role in causing permanent disabilities. Correctly wearing a helmet can cut down the threat of severe head and brain injuries by up to 85%.
 - Since 1994, the "Don't Thump Your Melon" campaign has been at the forefront of advocating for bicycle helmet use and promoting bike safety across South Dakota. This initiative collaborates with various statewide stakeholders to amplify its impact.

- **Seat Belt & Occupant Protection: “Make It Click”**
 - The "Til it Clicks" campaign, resonating with the audible "click" of a fastened seat belt, urges South Dakotans to embrace consistent seat belt usage. By employing eye-catching and impactful displays throughout the state, the campaign seeks to break through the noise and emphasize the life-saving habit of buckling up every time someone is in a vehicle. Through this initiative, South Dakota aims to elevate its seat belt usage rates, ultimately improving safety for all its residents.
 - In the 2020 statewide survey, out of the 23,911 vehicle occupants observed, seat belt usage and non-usage was documented for 18,614 drivers and 5,297 front-seat passengers. Unweighted estimates showcased seat belt usage at 79.5% for drivers, 86.2% for passengers, with an overall usage of 80.97%. However, after accounting for the survey design and weights, the seat belt usage rate generalized for the state was 68.2%. This shows a decline when compared to the 2019 rate, which stood at a weighted 75.2%.
 - South Dakota's 2020 weighted seat belt usage of 68.2% is significantly lower than the national average reported by NHTSA at 90.7%. When compared to states with secondary seat belt laws, South Dakota's rate is closer but still lower, with those states averaging 86.2% as per NHTSA's 2019 data. This data suggests that seat belt usage in South Dakota has declined in comparison to earlier surveys, indicating a need for renewed focus on safety measures.
- **Impaired Driving: “15 Minutes a Night”**
 - This campaign encourages people to step up and be a designated driver for 15 minutes a night. Driving impaired impedes vital skills needed for safe driving, including judgment, decision-making, alertness, and muscle coordination. Whether it's due to alcohol consumption or drug use, impairment diminishes the ability to drive responsibly. Taking the wheel while impaired isn't just a personal risk—it jeopardizes the safety of everyone else on the road. Making this choice not only endangers the life of the driver, but also the lives of innocent bystanders and other drivers.
 - Every day, 28 Americans lose their lives in crashes involving alcohol-impaired drivers. In South Dakota alone, there were 51 fatalities in alcohol-related driving crashes in 2020. It's important to note that driving with a Blood Alcohol Concentration (BAC) of .08 or higher is illegal. From 2011 to 2020, 467 individuals died in South Dakota crashes where a driver was under the influence of alcohol. These statistics underscore the dire consequences of impaired driving and the urgent need for preventive measures.
- **Motorcycle Safety**
 - South Dakota has campaigns during riding season such as messaging targeted at road users to look out for motorcycles, and for riders to wear appropriate safety gear. In South Dakota, the allure of the open road has led to the state boasting the highest number of motorcycle riders per capita in the nation. With the

increased presence of riders, there's an amplified emphasis on ensuring safety for all who cherish the roadways.

- During the summer months, particularly July, August, and September, South Dakota sees a significant spike in motorcycle fatalities, accounting for about 70% of the state's yearly total. This surge can be attributed to events like the Sturgis Motorcycle Rally, which attracts numerous enthusiasts. As a consequence of South Dakota's motorcycling allure, 70% of those involved in these fatal crashes are not South Dakota residents, but come from other states. Over half of all motorcycle crashes in the state involve another vehicle. On a national scale, intoxication remains a grave concern, with nearly one-third of motorcycle riders killed in 2019 crashes being under the influence of alcohol.
- Distracted Driving: "Save it for L8R"
 - The "Save it for L8R" campaign, while specifically addressing the perils of texting while driving, serves as a larger clarion call against all forms of distracted driving. In an age of constant digital connectivity and multi-tasking, it underscores the critical message that when behind the wheel, driving must be the sole focus. Any momentary lapse in attention, be it through a text, call, or other distraction, can lead to irreversible consequences. By championing undivided attention on the road, this initiative aims to instill a sense of responsibility in every driver and promote a safer driving culture.
 - In 2019, a staggering 3,142 lives were lost in the U.S. due to distracted driving. Texting stands out as the most dangerous distraction while driving. To put it into perspective, when you send or read a text, you divert your eyes from the road for a full 5 seconds. Traveling at a speed of 55 mph, this equates to blindly driving the span of a football field. Such statistics underline the critical need for drivers to comprehend the gravity of the risks and prioritize focused driving.
- Teen Driver: "Lesson Learned SD"
 - South Dakota's Office of Highway Safety reported that the "Lesson Learned SD" program has had a notable impact on driving behaviors within just two years of its implementation. The program has contributed to a reduction in motor vehicle fatalities in South Dakota, emphasizing the importance of adopting safe driving as a vital life skill from the earliest days of driving.
 - Students aged 14 to 19 engaged in a campaign centered on safe driving practices. They watched videos addressing topics like distracted driving, driving under the influence, and seat belt usage, followed by safety-related questions. Upon completion, they were given a chance to win a \$10,000 prize.
- Teen Driver: "C.R.A.S.H. - Car Repair and Safety Help for Teens"
 - The C.R.A.S.H program, offered by the Safety Village of South Dakota, is designed to equip teens with essential safety skills and training, ensuring they are ready for the responsibilities of driving and vehicle ownership. This initiative prioritizes the

wellbeing of young drivers, preparing them for various road situations and promoting responsible vehicle ownership.

These programs indicate SDDOT's commitment to the zero-fatality initiative and set a strong foundation for continued strides in ensuring South Dakota's roads are safe for all.

C.3 The Safe System Approach for South Dakota Zero-Fatality Initiative

The "Safe System" approach, inspired by Sweden and adopted by FHWA, represents a revolutionary change in road safety thinking. Instead of solely blaming drivers for errors like speeding or inattention, this approach views the transportation system as a holistic entity. It acknowledges that humans can and will make mistakes, often unintentionally. In response, the onus is placed on the system—both the design of roads and the vehicles—to mitigate these mistakes and reduce the consequences. Roads are crafted to intuitively guide appropriate speeds and behaviors and are integrated with features to limit the severity of crashes when they occur. Vehicles, too, are designed to be more forgiving, with technologies that either prevent errors or reduce their impact. Additionally, the approach prioritizes post-crash care, ensuring rapid response to incidents. This method, reminiscent of the Swiss cheese model of crash causation, looks at layers of protection, understanding that while one layer might fail, subsequent layers can prevent a catastrophe (Oregon Department of Transportation, 2022). Continuous system evaluation and improvement remain central, ensuring that potential flaws are swiftly addressed.

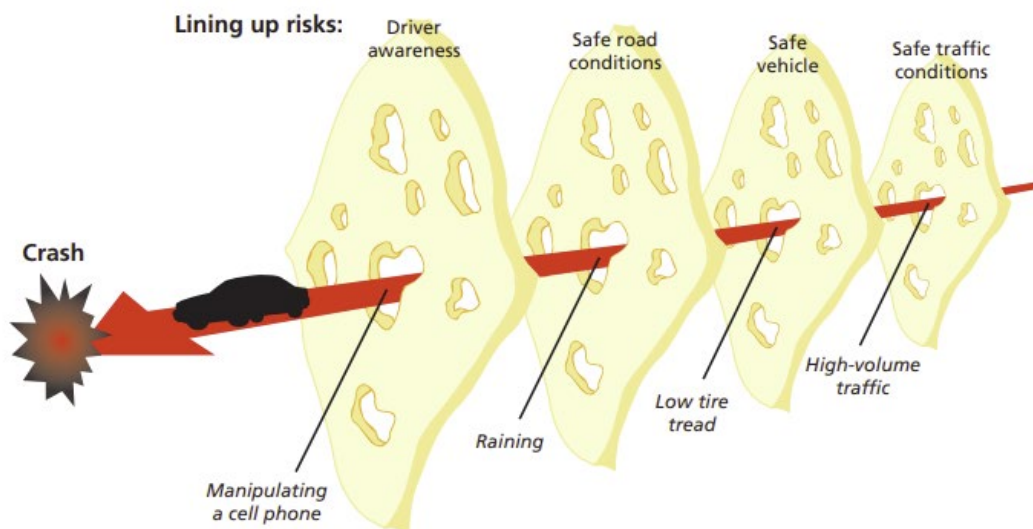


Figure 3: Swiss Cheese Model of Crash Causation

The five key objectives of the Safe System approach include:

- Safer people
- Safer vehicles
- Safer speeds
- Safer roads
- Post-crash care

C.3.1 Safer People

At the heart of the zero-fatality initiative is the understanding that humans make mistakes. Our strategy to reduce human mistakes will be to promote responsible road behavior through educational campaigns, awareness programs, and strategic enforcement. This encompasses not just drivers, but all road users including pedestrians, cyclists, and motorcyclists. Enhanced crosswalk designs, better lighting, road adjustments, and safety education are several examples that further support this initiative.

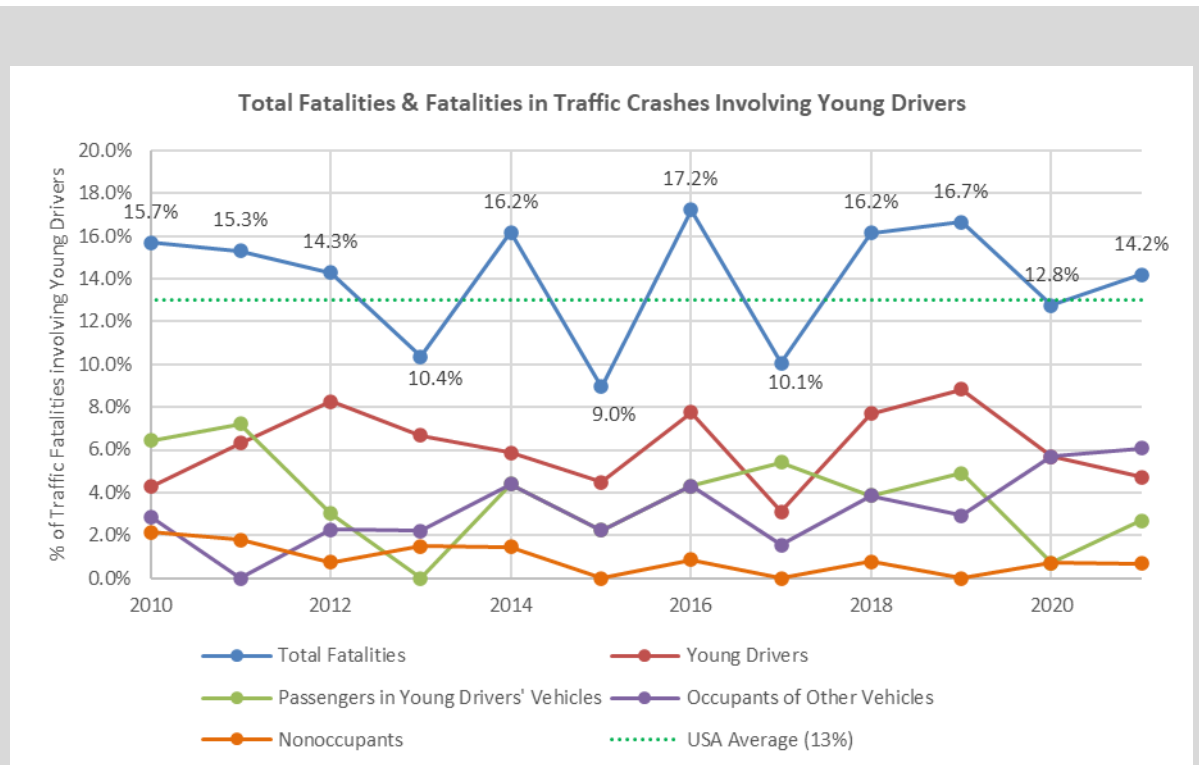


Figure 4: Total Fatalities & Fatalities in Traffic Crashes Involving Young Drivers

In South Dakota, young driver fatalities in traffic crashes averaged 14% from 2010 to 2021, surpassing the national average of 13%. While Figure 4 indicates that South Dakota's average occasionally dipped below the national rate in certain years, the state's overall percentage remains concerning.

C.3.2 Safer Vehicles

The vehicles on South Dakota roads must be equipped with the latest safety features. Collaborating with auto manufacturers, the initiative can promote the adoption of the most recent safety technologies and standards. Furthermore, regular vehicle safety inspections will be promoted to help ensure that all vehicles on South Dakota's roads meet essential safety criteria.

Vehicles are undeniably becoming safer for their occupants through advanced design and technology. However, there's a discernible trend towards larger vehicles, especially in the passenger segment. This size increase can inadvertently elevate risks for vulnerable road users. Larger vehicles not only obstruct the driver's field of vision, making it more challenging to spot pedestrians and cyclists, but the increased kinetic energy during a collision can result in more severe consequences. Recognizing this, it is imperative for emerging vehicle technology to prioritize the detection and response mechanisms to potential collisions, especially with vulnerable road users.

Vehicle safety technology plays a pivotal role in the Safe System approach to road safety. Advanced driver assistance systems (ADAS) like automatic emergency braking and lane-keeping assist enhance safety by addressing driver limitations. Passive driver impairment detection systems, under development for over a decade, offer ways to mitigate alcohol-related driving risks. Given these advancements, it's imperative for the implementation plan to proactively champion the adoption of ADAS as a key strategy for improving road safety in the state. Expanding the availability of ADAS technologies is vital for vehicle safety enhancement. Still, the focus shouldn't be limited to just these systems. The implementation plan should also prioritize incentivizing both ADAS and ADS technologies by investing in comprehensive research, pilot programs, and deployment strategies.

A prime example of a safe vehicle initiative is the Blue Lights Initiative, which was introduced to enhance the safety of the public and snowplow operators during winter weather conditions. Recognizing that people were becoming less responsive to flashing amber lights, the SDDOT turned to blue lights, which are more noticeable due to their shorter wavelength. After a successful 2020 pilot, where 25 trucks were fitted with these lights, the program was expanded, with 300 snowplows set to feature blue lights in the 2021-2022 period.

C.3.3 Safe Speeds

Speed is a major determinant in the severity of a crash outcome. The initiative will advocate for speed limits that are appropriate to the function and form of the road, the types of vehicles using them, and the volume and type of pedestrian activity. Advanced technologies like automatic speed enforcement and public awareness campaigns can be employed to help ensure compliance.

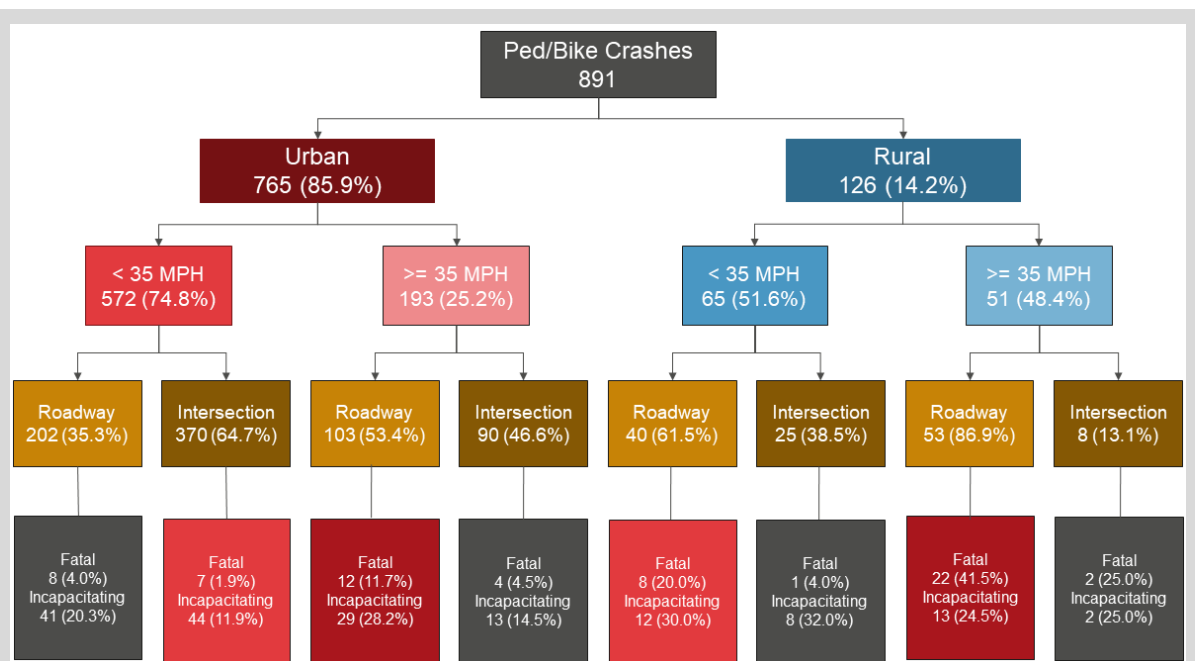


Figure 5: Pedestrian and Bike Crashes in South Dakota 2018-2022

In urban environments, most fatal pedestrian and bicycle crashes are observed at intersections with speed limits below 35 mph. In rural settings, however, these fatal incidents are primarily found on roadways where the speed limit is above 35 mph (Figure 5). The difference between these areas highlights the unique challenges and risks each environment presents, emphasizing the need for location-specific safety interventions.

The implementation plan should emphasize design elements, such as lane width and intersection design, which can naturally guide drivers towards safer speeds, while temporary conditions, like inclement weather, may require the use of variable speed limit signage and targeted education. Transportation design plays a crucial role in promoting safe speeds, and while conditions are a significant variable, solutions should extend beyond variable speed limit signs. The ever-changing nature of roadways necessitates providing drivers with real-time updates on elements like high winds, icy conditions, traffic congestion, and nearby emergency responders. Connected Vehicle (CV) technologies can offer this comprehensive information to drivers at any point on the road.

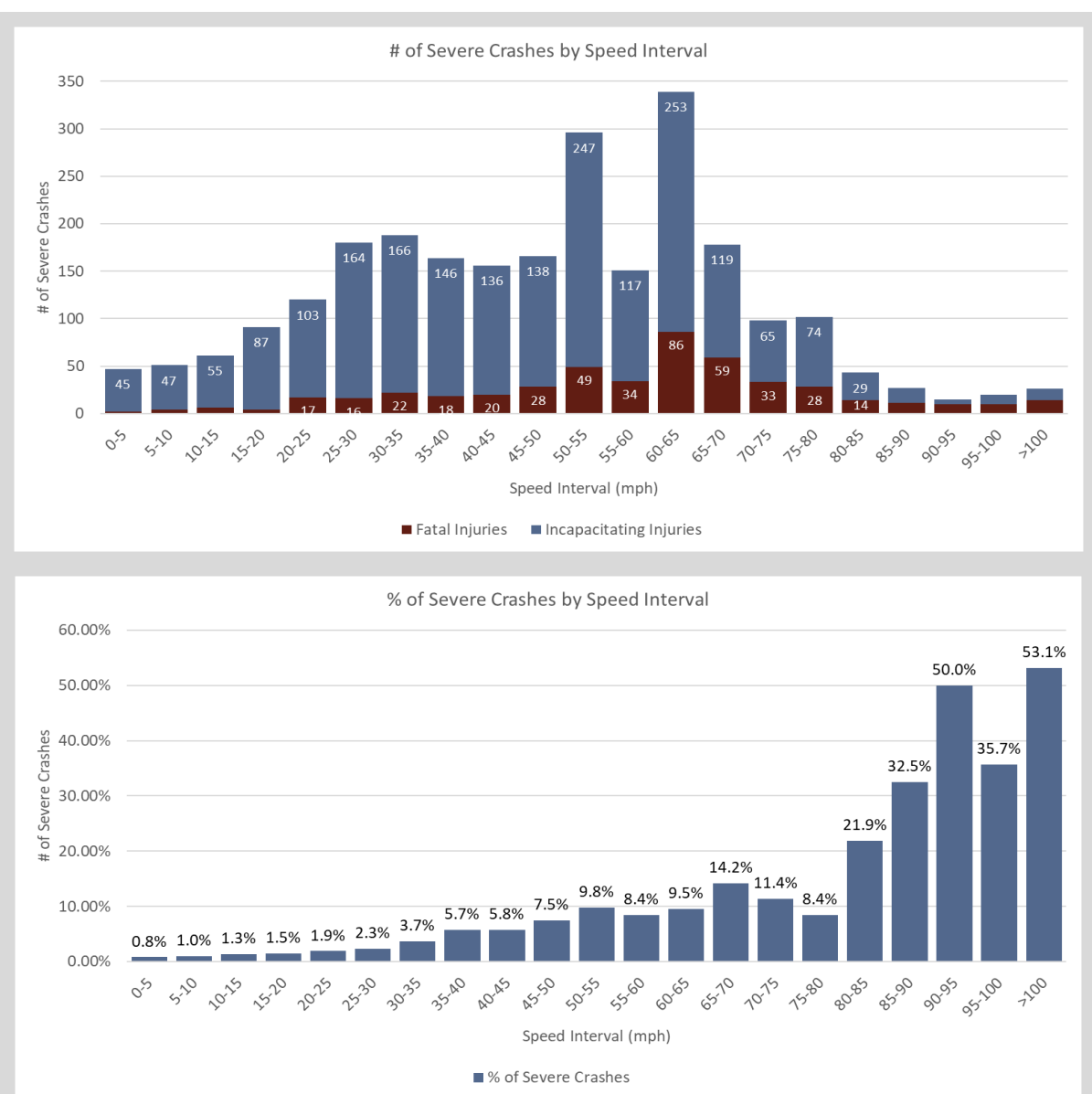


Figure 6: Distribution of Vehicle Speeds for Fatal Crashes in South Dakota

Lowering vehicle speeds is a cornerstone in the pursuit of safer roadways. As speeds increase, the severity of impacts in crashes also rise, heightening the probability of serious injuries or fatalities. It's not solely about enforcement of speed limits; the broader approach considers design, culture, and awareness. Figure 6 illustrates the relationship between speed intervals and the severity of crashes, specifically those that are fatal or incapacitating. As speeds escalate, the likelihood of severe crashes rises concurrently. The data indicates a higher proportion of severe crashes relative to the total number of incidents at increased speeds.

SDDOT has initiated a new Intelligent Transportation Systems (ITS) Program to harness advanced communication and information technologies. This includes the SD511 travel platform, 120 roadside cameras with weather sensors, implementation of variable speed limits on interstates, automated commercial vehicle screening, and 30 upgradeable dynamic message signs. Additionally, preparations are underway for vehicle automation, alternate fuel vehicles, and the development of reliable communication systems. The goal is to meet the evolving needs of travelers efficiently and securely.

C.3.4 Safer Roads

Infrastructure plays a pivotal role in ensuring safety. The initiative will focus on designing, building, and maintaining roads that are forgiving and self-explaining. Special attention will be paid to high-risk zones, ensuring that roadsides are free from hazardous obstacles, and implementing protective measures like barriers where needed.

C.3.5 Post-Crash Care

Despite all preventive measures, crashes will occur. The initiative recognizes the importance of swift and efficient post-crash response. Emphasis will be placed on strengthening the emergency medical system, ensuring quick evacuation and medical care, and offering rehabilitation services for crash victims.

The focus for Post-Crash Care emphasizes the importance of quick access to emergency medical assistance and ensuring a safe environment for first responders, all while aiming to prevent subsequent crashes. The timely arrival of emergency services significantly influences crash survival rates. With 20% of crashes being secondary, resulting from a prior incident, the implementation plan should prioritize faster on-scene response times and reducing exposure risks for first responders to subsequent crashes and traffic.

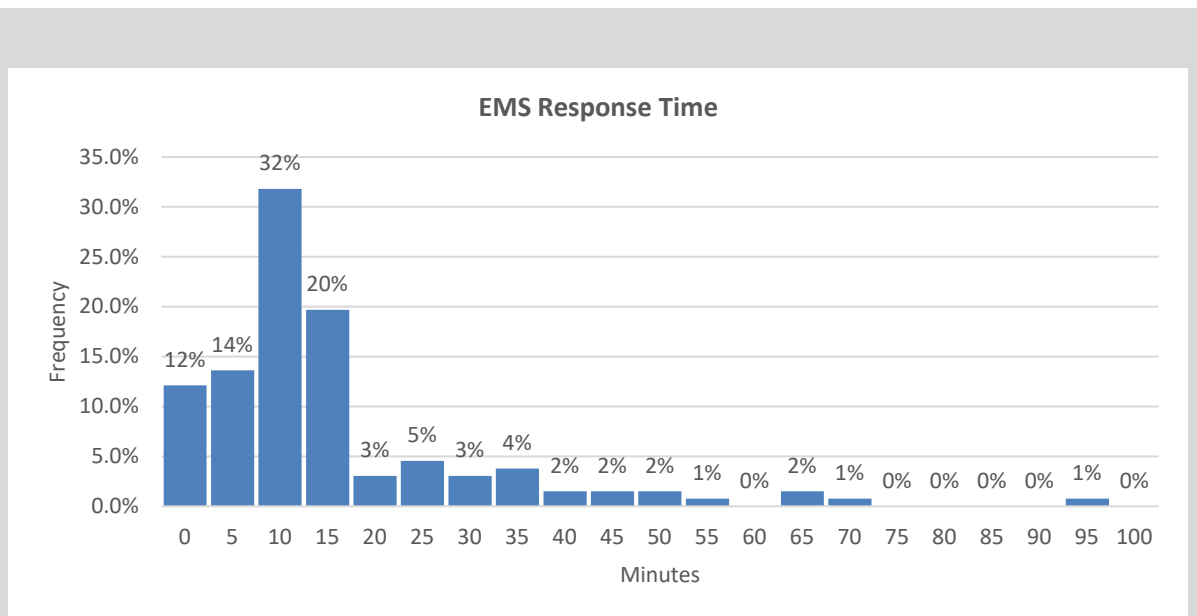


Figure 7: Frequency of EMS Response Time to Fatal Crashes in 2020

In South Dakota, the average emergency medical service response time stands at 13.4 minutes in 2020. Figure 7 illustrates the EMS response times that play a crucial role in understanding post-crash care dynamics, a fundamental aspect of the Safe System approach. Timely emergency response can make the difference between life and death, underscoring the importance of continually improving and optimizing these services. In the broader context of road safety, assessing and enhancing the efficiency of post-crash response times is pivotal to a comprehensive safety strategy.

Together, these five key elements form the backbone of the zero-fatality initiative. Through their diligent implementation, we envision a South Dakota where every journey is a safe one.

D LOCAL AND STATE AGENCY INTERVIEWS

D.1 SD State and Local Agency Interview Questions

1. What are the primary functions of your agency/group?
2. (For groups included in the SHSP)
 - a. Has the current role of your group in the SHSP been clearly defined and understood?
 - b. Have you implemented actions according to your group's role in the SHSP? If not, why?
 - c. If yes, is this a role your group wants to continue and/or expand?
 - d. What can be done to enhance this group's role in the SHSP?
3. Are you familiar with statewide TZD initiatives?
 - a. If not, the interviewer will provide some information on TZD.
 - b. If yes, given what you know about TZD initiatives, what role would you see for your organization if South Dakota pursued a TZD initiative?
 - c. Would you be interested in taking on a champion-type role with a specific safety emphasis (e.g., AARP with aging Drivers)?
4. Have you had any experience working with the SDDOT or Department of Public Safety on safety improvement efforts, either currently or in the past?
5. Have you been involved with multi-agency (or inter-departmental) efforts, either currently or in the past? What are they, and what is your role/how are you involved?
 - a. In these programs, what agency/group do you represent?
 - b. In these programs, are you satisfied with the level of involvement?
 - c. In these programs, what is going well for the coordination, and what can be done better?
6. Does your agency/department have your own groups or staff that can assist with a statewide TZD initiative in South Dakota? If yes, please describe. [infrastructure programs, outreach, information distribution channels]
7. Are there areas with a TZD for which your agency/group is particularly well-suited?
8. Would you anticipate having agency support for the implementation of a statewide TZD initiative?
 - a. If you anticipate challenges with agency support, where/what would they be, and what could be done to gain their support?
9. What do you think should be/can be done to encourage this stakeholder effort?
10. (if a group) How important is representation for this group and what is the best way to do it?

- a. Has this worked for other efforts?
 - b. Is there someone else we should include?
11. What question or area did we not cover that we should

D.2 South Dakota Department of Transportation

Four SDDOT interviews offer insights into departmental efforts towards the TZD initiative, showcasing strategies for road safety improvements and the significance of cross-departmental collaboration for its success.

D.2.1 SDDOT Communications Division

The SDDOT Communications team plays a crucial role in strategic external communications, focusing on road safety messaging through various platforms to enhance public awareness and education on safety resources. Their efforts are characterized by a dynamic approach to safety promotion, leveraging press releases and social media engagement. With a commitment to expanding their influence in the realm of public safety, the team actively collaborates with other agencies to lead and support safety messaging. Their involvement is seen as fundamental to the success of the TZD initiative in South Dakota, highlighting their dedication to utilizing available resources for public outreach and education, including school systems and community events. The feedback from the SDDOT Communications team underscores the significance of collaboration and the strategic dissemination of safety messages to advance the TZD initiative. Their readiness to embrace an active role in the TZD initiative, from initial engagement through to measurement of outcomes, reflects a comprehensive strategy to enhance public safety.

D.2.2 SDDOT Division of Operations

The summary on SDDOT Construction and Maintenance emphasizes a comprehensive and inclusive strategy towards roadway safety, addressing the critical need for safety awareness among maintenance and construction teams for the success of the TZD initiative. Highlighting the innovative idea of establishing "mini champions", it proposes a grassroots approach to embedding a safety-first culture across various operational levels. This strategy aims to fill the existing knowledge gaps and also seeks to enhance inter-agency collaboration, crucially involving emergency services and law enforcement for a cohesive TZD implementation. The discussion points towards a multifaceted approach, focusing on education, staffing solutions, and improved communication pathways to address and navigate the complexities of roadway safety. This proactive stance underscores the department's commitment to fostering a safer road environment through strategic planning, community engagement, and a culture of continuous safety education.

D.2.3 SDDOT Highway Safety, Transportation Alternatives Program (TAP), & Freight Divisions

The SDDOT Highway Safety TAP Freight interview summary outlines a focused effort on infrastructure and roadway safety improvements, highlighting the integration of safety in project scopes and policy development. The team acknowledges the need for more aggressive policy implementation if the TZD initiative is pursued, including the potential creation of a dedicated position for this initiative. Challenges in changing the DOT and local government mindsets towards safety and the necessity of an educational process to support this shift are noted. Multi-agency collaboration is recognized as crucial, with suggestions for enhanced communication through educational courses and

presentations. The department's comprehensive commitment to safety suggests a strong foundation for supporting a statewide TZD initiative, despite the anticipated challenges in altering existing practices and attitudes towards safety.

D.2.4 SDDOT Roadway Design

The SDDOT Roadway Design interview focuses on the department's efforts to integrate safety into their projects, illustrating this commitment through examples such as implementing intersection improvements and revising road design manuals to include newer safety standards. The dialogue touches on the willingness to explore additional safety features in future designs and emphasizes the importance of public education to help ensure community support for such initiatives. Challenges include overcoming departmental resistance and enhancing public and internal awareness about the benefits of safety-focused design practices. This approach demonstrates a nuanced understanding of the complexities involved in combining design with safety objectives, highlighting both the achievements and hurdles faced in striving towards the TZD goals.

D.3 South Dakota Department of Public Safety (DPS)

The DPS interview with key figures from the South Dakota Highway Patrol and the Highway Safety Office reveals a dual focus on roadway safety: Highway Patrol efforts to remove impaired drivers and educate the public, and Office of Highway Safety efforts to reduce injury and fatal crashes through data analysis, grants, and community initiatives. Both entities express a readiness to support and potentially lead a TZD initiative in South Dakota, emphasizing the importance of multi-agency collaboration and the potential challenges in agency support and coordination. Their experiences with safety improvements and inter-departmental efforts demonstrate a commitment to enhance road safety and the strategic importance of their roles in advancing the TZD goals.

D.4 Federal Highway Administration (FHWA)

The FHWA interview highlights their strong support for adopting a zero fatality initiative in South Dakota, emphasizing their role in providing federal aid, ensuring compliance with federal requirements, and offering technical assistance with the overarching goal of reducing serious injuries and fatal crashes. They advocate for involving local agencies like the SDDOT or DPS as the primary champions of the TZD initiative, stressing the importance of community engagement and including non-profit organizations in safety efforts. Furthermore, they highlight the flexibility allowed in implementing Vision Zero strategies without a strict template, suggesting that states can adapt their approach to fit local needs and conditions. This flexibility, combined with the FHWA's willingness to support and champion TZD initiatives at some level, underscores the potential for collaborative efforts to enhance road safety in South Dakota, drawing on examples like North Dakota's initiative for inspiration. North Dakota is an encouraging example due to its integrated approach to road safety, where the highway safety office is part of the NDDOT, and they are in charge of both highway safety as well as the SHSP. This unique dynamic allows for a more cohesive safety strategy exemplified by their Vision Zero initiative which employs coordinators in four regions and demonstrates an effective model of local engagement and interdepartmental cooperation that South Dakota could emulate to enhance its TZD efforts.

D.5 Local Transportation Assistance Program (LTAP)

The LTAP interview reveals its vital role in supporting local and tribal agencies with road maintenance and safety training, yet it faces challenges in adopting a safety-centric focus due to current structure, funding, and objectives. Despite recognizing the importance of safety, there is reluctance towards championing a new TZD initiative that is attributed to heavy workloads, lack of local interest in safety due to economic concerns, and difficulty in altering maintenance-focused priorities. LTAP's effectiveness in outreach and feedback collection positions it well for disseminating safety information, but the organization is cautious about expanding its role without addressing funding and local buy-in challenges.

D.6 South Dakota Police Chiefs' Association

The SD Police Chiefs' Association interview reveals their support for the TZD initiative, emphasizing education over enforcement for roadway safety. Despite limited personnel and funding, they are enthusiastic about increased collaboration and taking on a champion role for TZD. The Association views itself as a key player in implementing safety education locally and is adept at utilizing public media and community events to disseminate safety messages. Their commitment to public education and enforcement, along with their willingness to collaborate, positions them as a significant ally in advancing the TZD initiative.

D.7 South Dakota Department of Health

To comprehensively address the integration of transportation safety efforts with the TZD initiative, two interviews were conducted with the South Dakota Department of Health staff, focusing on injury prevention coordination and emergency medical services.

The SD Department of Health-Injury Prevention interview highlights significant challenges in engaging with transportation safety, notably due to a high turnover rate that leads to a lack of continuity and depth of knowledge regarding the SHSP. This turnover complicates efforts to maintain a consistent focus on motor vehicle safety initiatives. Additionally, the department faces funding constraints that limit its ability to actively participate in or lead TZD initiatives. Despite these obstacles, there is an openness to collaboration, suggesting that with increased support and clearer integration into safety plans, the department could play a more active role in public safety outreach related to TZD, leveraging its media resources to enhance public awareness and education on road safety.

The SD Department of Health Emergency Medical Services interview and related discussions confirmed a strong foundation and willingness within the department to support and champion the TZD initiative. The EMS Director group, with its extensive experience, data access, and established communication channels, is positioned to play a key role in enhancing post-crash care and leveraging technology for better emergency responses. SD EMS involvement in the SHSP and readiness to expand their role underscore the potential for their significant contributions to road safety in South Dakota. Their emphasis on data sharing, networking, and ability to mobilize resources highlights the department's capabilities to affect meaningful improvements in traffic fatality and serious injury outcomes.

D.8 South Dakota Department of Education

The SD Department of Education's interview delves deeper into the complexities of integrating transportation safety within its educational framework, highlighting a clear delineation between its

core educational mandates and the operational scope of transportation safety initiatives like the SHSP. Despite acknowledging the critical importance of safety, the department points to a blend of structural, prioritization, and resource constraints that limit its capacity to actively lead in the TZD initiative. Nevertheless, there is an expressed willingness to leverage its extensive network for disseminating safety information, suggesting a supportive, though indirect, role in enhancing road safety awareness through its educational channels and partnerships. This nuanced position highlights the department's commitment to student and community welfare, while also reflecting on the practical challenges of extending its involvement beyond its traditional educational remit.

D.9 South Dakota Safety Council (SDSC) & Minnesota Safety Council (MSC)

The SDSC is an organization focused on improving safety across various sectors within the state, including road safety, workplace safety, and community health. Through educational programs, training, and advocacy, the SDSC works to reduce accidents and injuries, promoting a safer environment for all South Dakotans. It collaborates with local and state agencies, businesses, and communities to implement safety initiatives and raise awareness on important safety topics. The relationship between the SDSC and MSC is characterized by a management agreement where the MSC provides executive and back-end services to the SDSC in a collaborative approach to safety and health initiatives across state lines. This partnership leverages the expertise and resources of both councils to enhance safety programs and outreach efforts.

The SDSC interview underscores their dedicated mission to roadway and traffic safety, emphasizing their success in engaging employers with ready-made safety information. They highlight the potential for leading a public safety coalition by coordinating with public health, safety, DOT, and enforcement agencies. The Safety Council's experience in Minnesota, utilizing data-driven campaigns and focusing on a proactive safety mindset, positions them as potential champions for the TZD initiative. Their approach includes redirecting the safety narrative towards preventing injuries and serious crashes, and they express a readiness to leverage their established networks and grant-funded programs to support TZD efforts in South Dakota.

D.10 Rosebud Sioux Tribe & Sisseton Wahpeton Oyate Department of Transportation

The Rosebud Sioux Tribe and Sisseton Wahpeton Oyate DOT interview reveals challenges in aligning tribal road safety initiatives with state strategies. Key issues include a variance in safety priorities between tribal and state levels, difficulties in data sharing due to tribal sovereignty, and unsafe conditions on township and county roads near tribal lands. Additional needs have been identified for police personnel and funding to improve safety, limiting previous collaboration. The discussion also emphasizes the importance of cultural sensitivity and the potential for enhanced collaboration by addressing obstacles related to resources, data sharing, and inter-agency communication.

D.11 South Dakota Unified Judicial System

The interview with the Judicial Court Administrator highlighted key perspectives on the integration and potential contributions of the judicial system to the TZD initiative. The administrator emphasized the judiciary's critical role in streamlining operations and overseeing a significant volume of criminal and civil cases, including traffic violations. Despite a lack of familiarity with TZD, there was openness to understanding how the judicial system could contribute, especially in areas such as data provision on criminal charges and traffic violations, penalty adjustments, and educational components for offenders. The possibility of creating specific courses for TZD, akin to DUI offense courses, was also

discussed, indicating a proactive approach to enhancing traffic safety through judicial measures. Additionally, the conversation touched on the importance of stakeholder engagement, including prosecutors, to align enforcement and penalty decisions with TZD goals, emphasizing a collaborative effort across various government branches and agencies to comprehensively address traffic safety.