Memorandum 5.4

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DATE:	April 29, 2021
TO:	Alameda County Technical Advisory Committee
FROM:	Kristen Villanueva, Principal Transportation Planner
SUBJECT:	ACTAC Information Exchange: Safe System Approach Training and Discussion

Recommendation

This item is to provide a training on the Safe System Approach and have an information exchange and discussion around supporting implementation of the Safe System Approach in Alameda County. This item is for information only.

Summary

Improving overall transportation safety was a core need and priority coming out of the 2020 Countywide Transportation Plan (CTP). To this end, staff has scheduled a mini-training and information exchange at the May meeting of ACTAC on the Safe System Approach. The Safe System Approach, currently being led by the Federal Highway Administration (FHWA), is a national road safety leadership initiative to develop a coordinated approach to reaching zero deaths in the transportation system within the next 30 years. The Safe System Approach is related to Vision Zero policies and practices and complements other relevant efforts by the FHWA.

Attachment A is a brochure from the FHWA on the principles and elements of a Safe System Approach, as well as the key ways in which the Safe System Approach represents a paradigm shift from traditional road safety practices. Attachment B is an excerpt from a report that describes these elements in slightly more detail. The full report is here: https://safety.fhwa.dot.gov/hsip/docs/fhwasa2018.pdf

In this item, Fehr & Peers and Alameda CTC staff will present the Safe System Approach and moderate an information exchange and discussion around supporting implementation of the Safe System Approach in Alameda County. Fehr & Peers is the consultant firm that collaborated with the FHWA to develop the materials on the Safe System Approach that will be the basis for the training. This will also be an opportunity for ACTAC members to share brief updates on safety and Vision Zero efforts across the county.

More information on the national effort can be found by visiting the FHWA website: https://safety.fhwa.dot.gov/zerodeaths/zero_deaths_vision.cfm

Fiscal Impact: There is no fiscal impact. This is an information item only

Attachments:

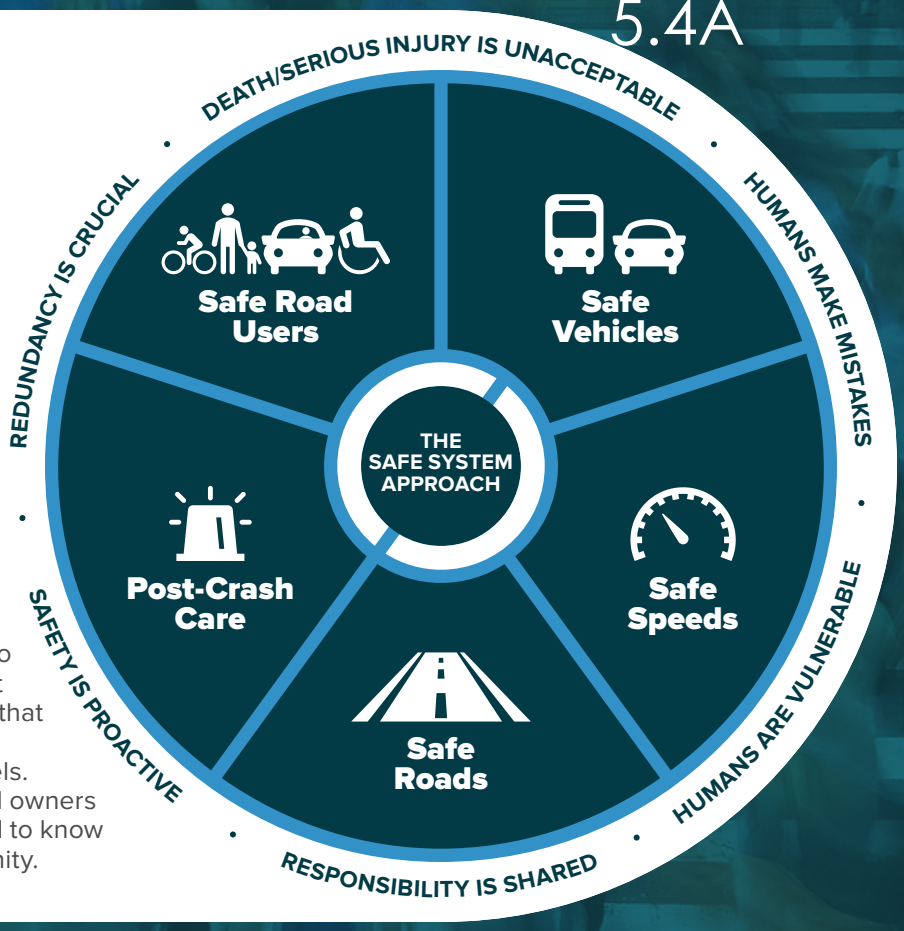
A. FHWA Safe System Brochure
B. FHWA Integrating the Safe System Approach with the Highway Safety Improvement Program Report Excerpt (Chapters 1 and 2)

THE SAFE SYSTEM

APPROACH

Zero is our goal. A Safe System is how we will get there.

Imagine a world where nobody has to die from vehicle crashes. The Safe System approach aims to eliminate fatal & serious injuries for all road users. It does so through a holistic view of the road system that first anticipates human mistakes and second keeps impact energy on the human body at tolerable levels. Safety is an ethical imperative of the designers and owners of the transportation system. Here's what you need to know to bring the Safe System approach to your community.



SAFE SYSTEM PRINCIPLES

Death/Serious Injury is Unacceptable

While no crashes are desirable, the Safe System approach prioritizes crashes that result in death and serious injuries, since no one should experience either when using the transportation system.

Humans Make Mistakes

People will inevitably make mistakes that can lead to crashes, but the transportation system can be designed and operated to accommodate human mistakes and injury tolerances and avoid death and serious injuries.

Humans Are Vulnerable

People have limits for tolerating crash forces before death and serious injury occurs; therefore, it is critical to design and operate a transportation system that is human-centric and accommodates human vulnerabilities.

Responsibility is Shared

All stakeholders (transportation system users and managers, vehicle manufacturers, etc.) must ensure that crashes don't lead to fatal or serious injuries.

Safety is Proactive

Proactive tools should be used to identify and mitigate latent risks in the transportation system, rather than waiting for crashes to occur and reacting afterwards.

Redundancy is Crucial

Reducing risks requires that all parts of the transportation system are strengthened, so that if one part fails, the other parts still protect people.

U.S.Department of Transportation
Federal Highway Administration
FHWA-SA-20-015

Safe Roads for a Safer Future
Investment in roadway safety saves lives

SAFE SYSTEM ELEMENTS

Making a commitment to zero deaths means addressing every aspect of crash risks through the five elements of a Safe System, shown below. These layers of protection and shared responsibility promote a holistic approach to safety across the entire transportation system. The key focus of the Safe System approach is to reduce death and serious injuries through design that accommodates human mistakes and injury tolerances.

Safe Road Users

The Safe System approach addresses the safety of all road users, including those who walk, bike, drive, ride transit, and travel by other modes.

Safe Vehicles

Vehicles are designed and regulated to minimize the occurrence and severity of collisions using safety measures that incorporate the latest technology.

Safe Speeds

Humans are unlikely to survive high-speed crashes. Reducing speeds can accommodate human injury tolerances in three ways: reducing impact forces, providing additional time for drivers to stop, and improving visibility.

Safe Roads

Designing to accommodate human mistakes and injury tolerances can greatly reduce the severity of crashes that do occur. Examples include physically separating people traveling at different speeds, providing dedicated times for different users to move through a space, and alerting users to hazards and other road users.

Post-Crash Care

When a person is injured in a collision, they rely on emergency first responders to quickly locate them, stabilize their injury, and transport them to medical facilities. Post-crash care also includes forensic analysis at the crash site, traffic incident management, and other activities.

THE SAFE SYSTEM APPROACH VS. TRADITIONAL ROAD SAFETY PRACTICES

Traditional		Safe System
Prevent crashes	→	Prevent deaths and serious injuries
Improve human behavior	→	Design for human mistakes/limitations
Control speeding	→	Reduce system kinetic energy
Individuals are responsible	→	Share responsibility
React based on crash history	→	Proactively identify and address risks

Whereas traditional road safety strives to modify human behavior and prevent all crashes, the Safe System approach also refocuses transportation system design and operation on anticipating human mistakes and lessening impact forces to reduce crash severity and save lives.

WHERE ARE YOU ON THE SAFE SYSTEM JOURNEY?

Implementing the Safe System approach is our shared responsibility, and we all have a role. It requires shifting how we think about transportation safety and how we prioritize our transportation investments. Consider applying a Safe System lens to upcoming projects and plans in your community: put safety at the forefront and design to accommodate human mistakes and injury tolerances. Visit **safety.fhwa.dot.gov/zerodeaths** to learn more.

5.4B

THE SAFE SYSTEM APPROACH

INTEGRATING THE

Safe System Approach

WITH THE

Highway Safety Improvement Program

AN INFORMATIONAL REPORT

U.S.Department of Transportation
Federal Highway Administration

Image source: Pixabay user B_Me

Safe Roads for a Safer Future
Investment in roadway safety saves lives

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All charts and tables in the document were created by FHWA, except where noted otherwise.

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		6. Performing Organization Code	
7. Author(s) Emily Finkel – Fehr & Peers Cullen McCormick – Fehr & Peers DC Meghan Mitman, AICP – Fehr & Peers Sarah Abel - ITE Jackie Clark – Leidos		**8. Performing Organization Report No.**	
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15. Supplementary Notes FHWA Project Leader, Karen Scurry, FHWA			

16. Abstract

The purpose of this report is to explore the relationship between the Safe System approach and the HSIP. This report focuses on the two major components of the HSIP: the States' Strategic Highway Safety Plan (SHSP) and the program of highway safety improvement projects (or States' HSIP), as well as foundational elements of the HSIP that influence both program areas. The report first defines the principles and core elements of the Safe System approach. The report then examines foundational elements of the HSIP, State SHSP, and State HSIP as compared to the Safe System principles and presents areas of alignment, as well as opportunities and noteworthy practices. The report concludes with a discussion of next steps for Federal and State safety stakeholders to advance implementation of the Safe System approach through these existing safety programs. The primary target audience for this report is Federal and State safety stakeholders involved in the State SHSP and HSIP. The report may also benefit other safety stakeholders that have a vested interest in these existing safety programs or administer similar efforts at the regional or local level (e.g., State safety program, local road safety plans).

17. Key Words Safety, Safe System approach, Highway Safety Improvement Program (HSIP), Strategic Highway Safety Plan (SHSP), countermeasures, speed, Vision Zero	**18. Distribution Statement** No restrictions. This document is available to the public.		
19. Security Classification (of this report) Unclassified	**20. Security Classification (of this page)** Unclassified	**21. No of Pages** 58	**22. Price**

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Introduction

Traffic safety is a public health crisis affecting all road users, and it demands a concerted response. Each year, more than a million lives are lost globally from traffic crashes.[1] Road traffic crashes are the eighth leading cause of death globally.[2] In 2018, an average of more than 100 people lost their lives on roads in the United States (U.S.) every day.[3] For the past 3 years, fatalities on U.S. roads are the highest they have been in 10 years.[4] Even more troubling, the number of pedestrians struck and killed by a motor vehicle has increased by more than 50 percent in the past decade.[5] Although pedestrian fatalities in 2017 slightly decreased,[6] 2018 (the last year on record at time of publication) was the deadliest, since 1990, for people killed by motor vehicles while walking.[7] This is unacceptable.

Crashes can irreversibly change the course of human lives, touching victims, their families and loved ones, and society as a whole. But we do not have to simply accept death or serious injury as a consequence of using our roadway system. Through collective action from all roadway system stakeholders—from system managers and vehicle manufacturers to law enforcement and everyday users—we can move to a Safe System approach that helps to anticipate human mistakes and keeps impact energy on the human body at tolerable levels, with the goal of eliminating fatalities and serious injuries for all road users.

Implementing the Safe System approach requires evaluating the current state of practice, evolving the approach for consistency, and institutionalizing the paradigm shift.

Imagine a future in the United States where no one dies in a traffic-related crash. Thinking about safety requires a paradigm shift in how we perceive the problem. Rather than accepting fatalities and serious injuries as a price for mobility, the philosophy of the Safe System approach is grounded in an ethical imperative that no one should be killed or injured when using the roadway system.

The Safe System approach is a worldwide movement that has been in place across the globe for more than 30 years. The Federal Highway Administration's (FHWA) top priority is safety. FHWA fully supports the vision of zero deaths and serious injuries on the Nation's roadway system and recognizes that a Safe System is how we get there.

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[1] World Resources Institute (WRI), Sustainable and Safe: A Vision and Guidance for Zero Road Deaths (2018), https://www.wri.org/publication/sustainable-and-safe-vision-and-guidance-zero-road-deaths.
[2] World Health Organization (WHO), "The top 10 causes of death" (May 2018), https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death.
[3] National Highway Traffic Safety Administration (NHTSA), Fatality Analysis Reporting System (FARS) database, https://www-fars.nhtsa.dot.gov/Main/index.aspx.
[4] NHTSA, FARS database, https://www-fars.nhtsa.dot.gov/Main/index.aspx.
[5] NHTSA, FARS database, https://www-fars.nhtsa.dot.gov/Main/index.aspx.
[6] NHTSA, FARS database, https://www-fars.nhtsa.dot.gov/Main/index.aspx.
[7] NHTSA, FARS database, https://www-fars.nhtsa.dot.gov/Main/index.aspx.

Implementing the Safe System approach requires evaluating the current state of practice, evolving the approach for consistency, and institutionalizing the paradigm shift. The Highway Safety Improvement Program (HSIP), which sets the funding and policy tone for national safety implementation efforts, is a key place to start.

The Safe System Approach

A Safe System approach acknowledges that the human body is vulnerable, in terms of the amount of kinetic energy transfer a body can withstand. This vulnerability is taken into account when designing and operating a transportation network to minimize serious consequences of crashes. According to the World Health Organization, the goal of a Safe System is to ensure that if crashes do occur, they "do not result in serious human injury."[8] As shown in figure 1, a Safe System approach addresses the five elements of a safe transportation system—safe road users, safe vehicles, safe speeds, safe roads, and post-crash care—in an integrated manner, through a wide range of interventions.

Figure 1. Illustration. The Safe System approach. (Source: FHWA)

The Safe System approach to road safety started internationally as part of the Vision Zero proclamation that, from an ethical standpoint, no one should be killed or seriously injured on the road system.[9,10] It is founded on the principle that people make mistakes, and that the road system should be adapted to

[8] WHO, *Decade of Action for Road Safety 2011–2020* (2011), 9, https://www.who.int/roadsafety/decade_of_action/plan/plan_en.pdf.
[9] R. Johansson, "Vision Zero - Implementing a Policy for Traffic Safety," *Safety Science* 47 (2009): 826–831.
[10] C. Tingvall and N. Haworth, "An Ethical Approach to Safety and Mobility" (paper presented at the *6th ITE International Conference Road Safety and Traffic Enforcement,* September 6–7, 1999, Melbourne, Australia).

anticipate and accommodate human mistakes and physiological and psychological limits.[11] Countries that have adopted the Safe System approach have had significant success reducing highway fatalities, with reductions in fatalities between 50 and 70 percent.[12]

In the United States, nearly 50 cities have adopted a Vision Zero policy.[13] They are supported by the Toward Zero Deaths (TZD) national strategy on highway safety to advocate for eliminating serious injuries and deaths on our Nation's roadways, conceptualized by participants in an FHWA workshop in 2009.[14] While TZD focuses on the importance of creating a culture of safety, and Vision Zero focuses on eliminating deaths and serious injuries, few local or national plans had explicitly stated the importance of a Safe System approach in achieving these goals. However, in 2018, the RAND® Corporation and the National Safety Council released *The Road to Zero*, a strategy document that has been held up by road safety experts as a national model since its publication.[15] *The Road to Zero* is built on a foundation of the Safe System approach, calling for the United States to "prioritize safety by adopting a Safe System approach and creating a positive safety culture."[16]

The Institute of Transportation Engineers (ITE) and the Road to Zero Coalition's *Safe Systems Framework*[17] articulate that to anticipate human mistakes, a Safe System seeks to:

- Separate users in a physical space (e.g., sidewalks, dedicated bicycle facilities)
- Separate users in time (e.g., pedestrian scramble, dedicated turn phases)
- Alert users to potential hazards
- Accommodate human injury tolerance through interventions that reduce speed or impact force

Creating a Safe System means shifting a major share of the responsibility from road users to those who design the road transport system. "Individual road users have the responsibility to abide by laws and regulations"[18] and do so by exhibiting due care and proper behavior on the transportation system. While road users are responsible for their own behavior, that behavior should not result in a fatality or serious injury in a culture of shared responsibility among road users and those who design, operate, and maintain

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[11] M.-Å. Belin, P. Tillgren, and E. Vedung, "Vision Zero - A Road Safety Policy Innovation," *International Journal of Injury Control and Safety Promotion* 19 (2012): 171–179.

[12] WRI, *Sustainable and Safe: A Vision and Guidance for Zero Road Deaths*, https://www.wri.org/publication/sustainable-and-safe-vision-and-guidance-zero-road-deaths.

[13] Vision Zero Network, Vision Zero Communities Map, retrieved from https://visionzeronetwork.org/resources/vision-zero-cities/.

[14] Toward Zero Deaths, retrieved from https://www.towardzerodeaths.org/.

[15] National Safety Council (NSC) and the RAND® Corporation, *The Road to Zero: A Vision for Achieving Zero Roadway Deaths by 2050* (2018), https://www.nsc.org/Portals/0/Documents/DistractedDrivingDocuments/Driver-Tech/Road%20to%20Zero/The-Report.pdf?ver=2018-04-17-111652-263.

[16] NSC and the RAND® Corporation, *The Road to Zero* (2018), paragraph 3, https://www.nsc.org/Portals/0/Documents/DistractedDrivingDocuments/Driver-Tech/Road%20to%20Zero/The-Report.pdf?ver=2018-04-17-111652-263.

[17] Institute of Transportation Engineers (ITE), *Safe Systems Framework* (November 2019), https://www.ite.org/pub/?id=C8B1C6F9-DCB5-C4F3-4332-4BBE1F58BA0D.

[18] WHO, *Decade of Action for Road Safety 2011–2020* (2011), 9, https://www.who.int/roadsafety/decade_of_action/plan/plan_en.pdf.

the transportation network, which includes road designers and managers; the automotive industry; police; elected officials; and government bodies.[19]

Purpose, Target Audience, and Structure of Report

The first step in initiating a paradigm shift to a Safe System is through education of Federal, State and local transportation safety leaders. As part of that education, we also need to understand how to advance Safe System implementation efforts through our existing programs and projects.

The purpose of this report is to explore the relationship between the Safe System approach and the HSIP. This report focuses on the two major components of the HSIP: the States' Strategic Highway Safety Plan (SHSP) and the program of highway safety improvement projects (or States' HSIP), as well as foundational elements of the HSIP that influence both program areas.

The primary target audience for this report is Federal and State safety stakeholders involved in the State SHSP and HSIP. The report may also benefit other safety stakeholders that have a vested interest in these existing safety programs or administer similar efforts at the regional or local level (e.g., State safety program, local road safety plans).

The report first defines the principles and core elements of the Safe System approach. The report then examines foundational elements of the HSIP, State SHSP, and State HSIP as compared to the Safe System principles and presents areas of alignment, as well as opportunities and noteworthy practices. The report concludes with a discussion of next steps for Federal and State safety stakeholders to advance implementation of the Safe System approach through these existing safety programs.

[19] WHO, *Decade of Action for Road Safety 2011–2020* (2011), https://www.who.int/roadsafety/decade_of_action/plan/plan_en.pdf.

Safe System Principles and Core Elements

The Core Principles of a Safe System

The fundamental objective of the Safe System approach aims to eliminate fatalities and serious injuries for all road users by accommodating human mistakes and keeping impacts on the human body at tolerable levels. What distinguishes the Safe System approach from the traditional safety approach is that no death or level of injury is acceptable in a transportation network. The core principles of a Safe System are shown in figure 2.

Figure 2. Illustration. The Safe System core principles. (Source: FHWA)

Death/Serious Injury Is Unacceptable

While no crashes are desirable, the Safe System approach prioritizes crashes that result in death and serious injury. The Safe System approach is grounded in the imperative that no one should be killed or injured when using the road system, and decisions for designing and operating the system should prioritize safety.

Humans Make Mistakes

A Safe System assumes that road users are alert and compliant, but will inevitably make mistakes that can lead to crashes. The transportation system can be designed and operated to accommodate human mistakes and injury tolerances and avoid death and serious injuries. An example of designing a roadway to accommodate human mistakes is adding a median barrier to prevent errant drivers from entering oncoming traffic.

Humans Are Vulnerable

The human body has limits for tolerating crash forces before death and serious injury occur; therefore, it is important to design and operate a transportation system that is human-centric and accommodates human vulnerabilities. This concept is illustrated in figure 3.

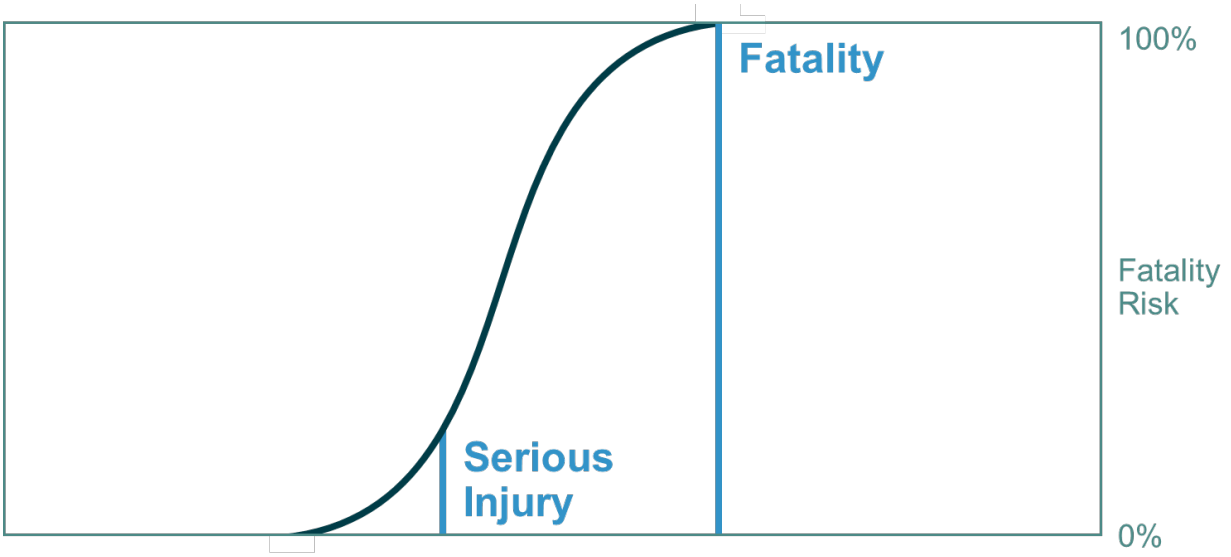

Figure 3. Graph. Relationship between kinetic energy and crash severity. (Source: FHWA)

As figure 3 shows, the human body has limited tolerance for crash impacts before death or serious injury occur. Managing kinetic energy transfer within survivable limits is important for understanding how to design and operate the road system consistent with the Safe System philosophy. The Safe System approach focuses not just on managing speed but managing the transfer of kinetic energy.

Responsibility Is Shared

In a Safe System, all stakeholders work together in a manner that recognizes we are responsible for doing our part, so that crashes do not lead to fatalities or serious injuries. Stakeholders include, but are not limited to, road users, system managers (includes planners, designers, builders, operators, maintainers), law enforcement, emergency responders, and vehicle manufacturers. For example, system designers propose facilities with proven safety countermeasures such as roundabouts or median barriers, system maintainers keep roadway systems in a state of good repair, vehicle manufacturers apply the latest safety features in vehicles, law enforcement equitably enforce traffic safety laws, and users of all travel modes safely move through the roadway system.

Safety Is Proactive

Roadway system managers should use proactive tools to identify and mitigate latent risks in the roadway system, rather than waiting for crashes to occur and reacting afterwards. This process, known as the systemic approach to safety, uses crash history, roadway design characteristics, and other data to identify patterns in geometric design that lead to certain crash types. System designers then identify appropriate countermeasures to mitigate the crash types. These countermeasures are systemically applied at all locations meeting the particular geometric design, irrespective of crash history. Rather than managing risk at certain locations, a systemic approach takes a broader view and evaluates risk across an entire roadway system. A system-based approach acknowledges that crashes alone are not always sufficient to determine what countermeasures to implement. In particular, on low-volume local and rural roadways where crash densities are lower, and in many urban areas where there are conflicts between vulnerable road users (pedestrians, bicyclists, and motorcyclists) and vehicles.

Redundancy Is Crucial

Reducing crash potential requires all parts of the system to be strengthened so that if one part fails, other parts still protect roadway users. An example of redundancy is rumble strips, which protect people when their own ability to be safe road users is compromised by distraction or drowsiness. Redundancy is critical across all five elements of a Safe System, outlined in the next section.

The Five Elements of a Safe System

As defined by FHWA and in alignment with international non-governmental organizations, figure 4 illustrates the five elements of a Safe System.

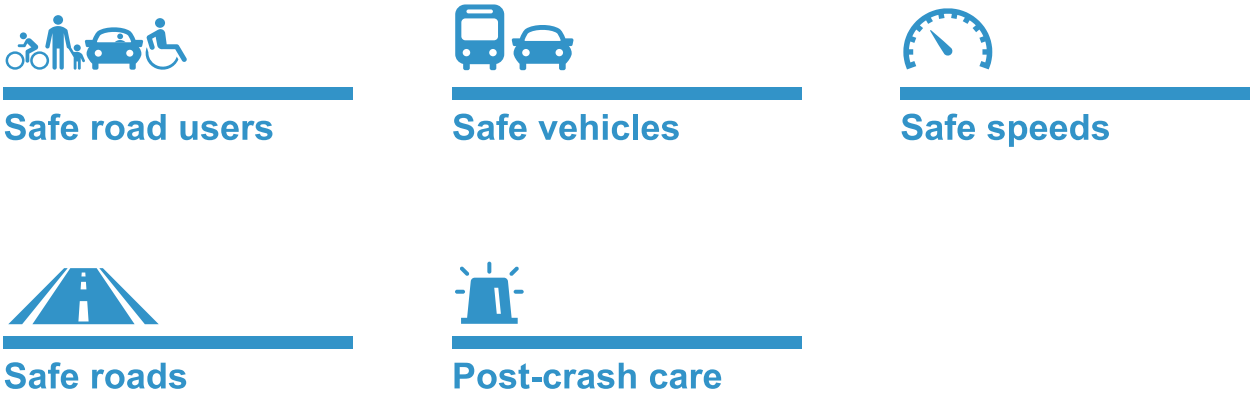

Figure 4. Illustration. The five elements of a Safe System. (Source: FHWA)

These five elements apply to all roads, including freeways, local roads, and rural roads. None of the elements are sufficient on their own, and they should not be addressed in silos. When they are all taken into consideration and implemented as a whole, in a coordinated approach, the entire transportation network becomes safer.

Safe Road Users

As part of the shared responsibility for safety, road users are expected to comply with rules of the road, including paying attention, adapting to changing conditions, not driving under the influence, and driving without distraction. Roadway design, education, enforcement, and vehicle feedback components (e.g., speedometer, automated driving systems) are all important in enabling and encouraging road users to behave safely.

Safe Vehicles

Safe vehicles include active safety measures, which help prevent crashes from occurring (e.g., autonomous emergency braking), and passive safety measures, which protect occupants when a crash occurs (e.g., seatbelts and airbags). Yet, while vehicles have become safer for occupants, pedestrian deaths have increased in the United States.[20] Safe vehicles should also account for the safety of other road users through elements such as vehicle size, design, and materials. Although safety is often touted as the primary benefit of an automated or autonomous vehicle fleet, a safer system is not inherent to smart infrastructure and technological innovation. Elements such as bicyclist and pedestrian detection on connected vehicles (CV) and autonomous vehicles (AV) will be necessary so that vehicles are safe for all road users in the future.

Safe Speeds

According to the Organisation for Economic Co-operation and Development (OECD), "Speed is at the heart of a forgiving road transport system. It transcends all aspects of safety: without speed there can be no movement, but with speed comes kinetic energy, and with kinetic energy and human mistakes come crashes, injuries, and even deaths."[21] In 2017, the National Transportation Safety Board (NTSB) released *Reducing Speeding-Related Crashes Involving Passenger Vehicles*,[22] a report that stated, "Substantial reductions in highway crashes cannot be achieved without a renewed emphasis on the impact of speeding."[23]

Maintaining safe speeds can help avoid crashes, as well as mitigate injury severity by reducing the speed at which impacts occur. Speed-limit-setting methodologies that provide alternatives to the traditional 85th percentile approach, such as USLIMITS2,[24] can help determine appropriate speeds based on roadway context and modal priority, rather than the historic behavior of road users. Roadway design focused on

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[20] Governors Highway Safety Association, *Pedestrian Traffic Fatalities by State: 2018 Preliminary Data* (2019), https://www.ghsa.org/sites/default/files/2019-02/FINAL_Pedestrians19.pdf.

[21] International Transport Forum (ITF), *Zero Road Deaths and Serious Injuries: Leading a Paradigm Shift to a Safe System* (2016), 107, http://www.towardszerofoundation.org/wp-content/uploads/2016/10/Zero_road_deaths-SafeSystems.pdf.

[22] National Transportation Safety Board (NTSB), *Reducing Speed-Related Crashes Involving Passenger Vehicles* (July 2017), https://www.ntsb.gov/safety/safety-studies/Documents/SS1701.pdf.

[23] NTSB, "Study Identifies Opportunities to Reduce Speeding-Related Deaths and Serious Injuries" (July 2017), paragraph 5, https://www.ntsb.gov/news/press-releases/Pages/pr20170714.aspx.

[24] Federal Highway Administration (FHWA), "USLIMITS2," page last modified April 28, 2020, https://safety.fhwa.dot.gov/uslimits/.

speed management, such as target speed-based design, is key to achieve target operating speeds. Many of these design strategies are highlighted in FHWA's *Speed Management: A Manual for Local Rural Road Owners*[25] and *Speed Management Toolkit*.[26] Enforcing existing speed limits, including automated enforcement, and educating road users also play a role in contributing to driver compliance with speed limits. Speed harmonization strategies can also be used to achieve safe speeds in congested areas.

Safe Roads

In a Safe System, driver behavior is taken into consideration as a part of engineering design. Design features and safety countermeasures—many of which are the primary focus of the HSIP—can contribute to safe roads by separating users in space and time. This separation can also be designed temporally, as with traffic signals, to mitigate conflicts between road users and reduce the risk of a crash. Safe roads also include clear zones where objects are relocated away from the road, or roadside appurtenances designed to mitigate severity when roadway departures do occur. In an urban setting, vertical and horizontal separation can create additional space between heavier and faster vehicles and slower and smaller road users who are walking or cycling. Roundabouts, when designed well, are a countermeasure that can significantly reduce speed at intersections. Design designations, such as functional class and modal priority, can also support safe roads. Understanding functional class and modal priority can help to pinpoint the set of safety countermeasures that may be most effective on a given type of facility.

Post-Crash Care

In a Safe System, post-crash care incorporates elements related to emergency services and medical care, crash reporting and investigation, traffic incident management, and the justice system. Health outcomes for victims injured in serious crashes can be heavily dependent on the ability of emergency services to quickly respond to the scene of a crash, administer on-site care, transport victims to the hospital, and provide care at the hospital and after discharge (if necessary). The post-crash response in a Safe System extends beyond emergency services. Quick-response and detailed investigation by police and road managers/operators can help ensure crash factors are documented and reported correctly, the justice system can take appropriate action, and the risk of future crashes can be mitigated through an appropriate design and program or policy changes. Crash reporting practices, such as complete data collection and documentation of road user behavior and infrastructure, and sharing data across agencies or organizations (e.g., among police departments, transportation officials, and hospitals) can help lead to a greater understanding of the holistic safety landscape, and thus lead to improved investments in safety.

Design designations, such as functional class and modal priority, can support safe roads.

[25] FHWA, *Speed Management: A Manual for Local Rural Road Owners*, FHWA-SA-12-027 (November 2012), https://safety.fhwa.dot.gov/local_rural/training/fhwasa010413spmgmt/.

[26] FHWA, *Speed Management Toolkit*, FHWA-SA-15-017, https://safety.fhwa.dot.gov/speedmgt/ref_mats/docs/speedmanagementtoolkit_final.pdf.

Summary

This chapter summarized the Safe System approach, and the six core principles and five elements that are foundational for a Safe System and shown in figure 5.

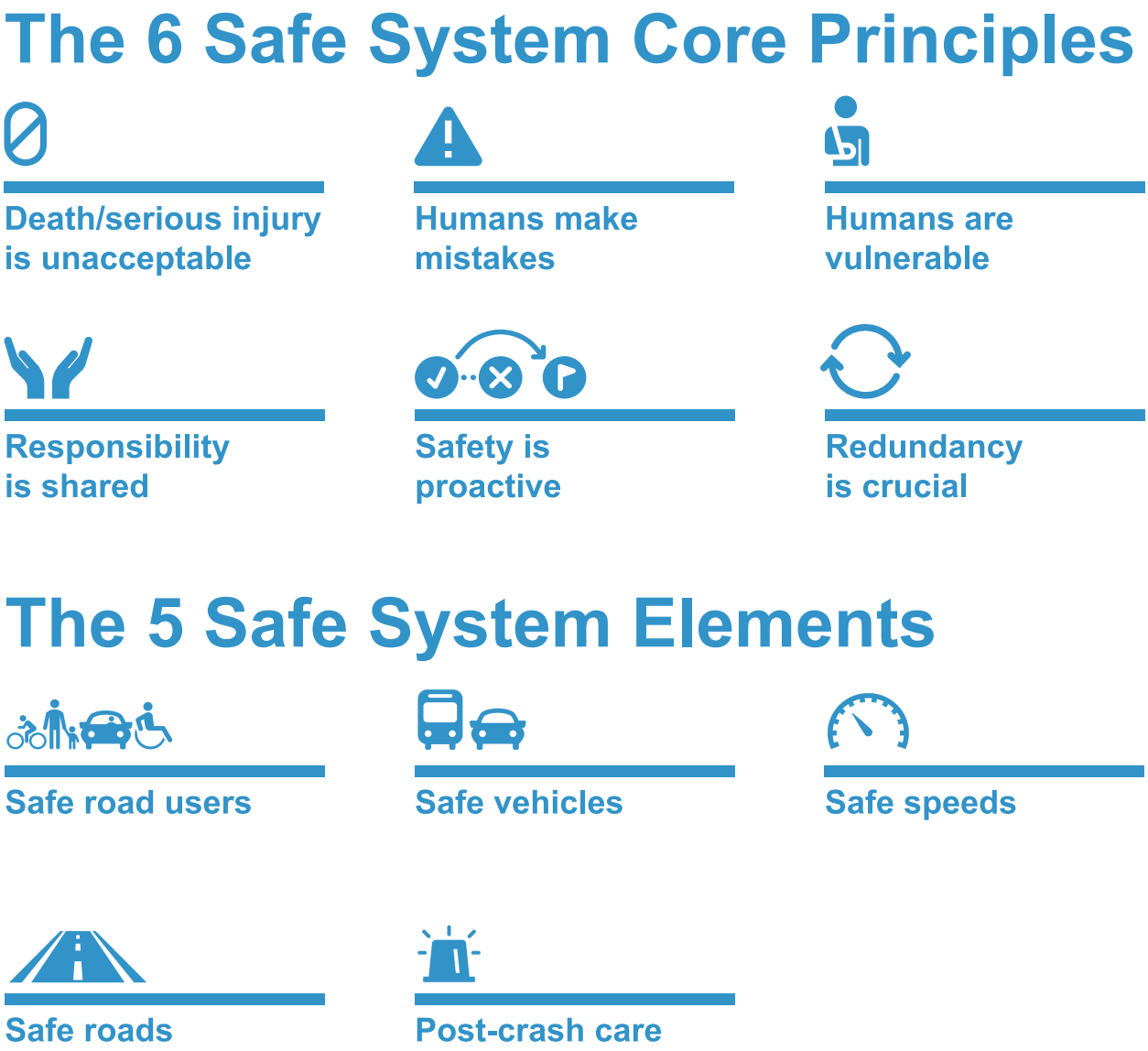

Figure 5. Illustration. Summary of Safe System core principles and elements. (Source: FHWA)

The following chapters present the foundational elements of the HSIP, and major program features of the States' SHSP and the States' HSIP, and describe how each step is aligned with Safe System principles, as well as opportunities and noteworthy practices to better integrate the Safe System approach in these existing safety programs.