ITEM 9 – Information
September 21, 2022

U.S. DOT Safe System Approach for Roadway Safety

Background:

As part of the TPB's focus on safety, the board will be briefed on the U.S. DOT Safe System approach as the guiding paradigm to address roadway safety. The Safe System approach has been embraced by the transportation community as an effective way to address and mitigate the risks inherent in our enormous and complex transportation system. It works by building and reinforcing multiple layers of protection to both prevent crashes from happening in the first place and minimize the harm caused to those involved when crashes do occur. It is a holistic and comprehensive approach that provides a guiding framework to make places safer for people. This is a shift from a conventional safety approach because it focuses on both human mistakes and human vulnerability, and designs a system with many redundancies in place to protect everyone. The U.S. DOT's National Roadway Safety Strategy and the Department's ongoing safety programs are working towards a future with zero roadway fatalities and serious injuries.

U.S. Department of Transportation
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An Introduction to the Safe System Approach

Transportation Planning Board Meeting
September 21, 2022, Item 9
12:00pm to 2:00pm ET

THE SAFE SYSTEM APPROACH

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

U.S.Department of Transportation
Federal Highway Administration

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

Why are people killed and seriously injured on our roads?

IMPAIRED DRIVING

SPEEDING AND AGGRESSIVE DRIVING

DISTRACTED DRIVING

OCCUPANT PROTECTION

PEDESTRIANS AND BICYCLISTS

MOTORCYCLISTS AND MOTOR SCOOTER RIDERS

COMMERCIAL MOTOR VEHICLE OPERATORS

TEEN DRIVERS

AGING ROAD USERS

People are killed and seriously injured on our roads when collision forces transferred onto the human body exceed tolerable thresholds.

" In road injury epidemiology, kinetic energy is the pathogen "

Robertson LS. *Injury epidemiology*. Oxford: Oxford University Press, 1992

A NEW DIRECTION

The Safe System approach aims to eliminate fatal and serious injuries for all road users by:

Accommodating human mistakes

Keeping impacts on the human body at tolerable levels

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WHAT IS THE SAFE SYSTEM APPROACH?

Image: FHWA

SUCCESSFUL SAFE SYSTEM ADOPTERS

Sweden

Vision Zero

60-70%

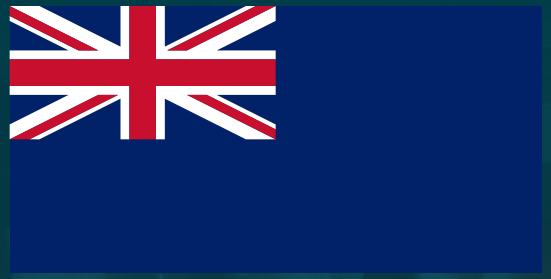
Reduction in fatalities
1994-2015

Netherlands

Sustainable Safety

50-60%

Reduction in fatalities
1994-2015



Australia

Safe System

50-60%

Reduction in fatalities
1994-2015

New Zealand

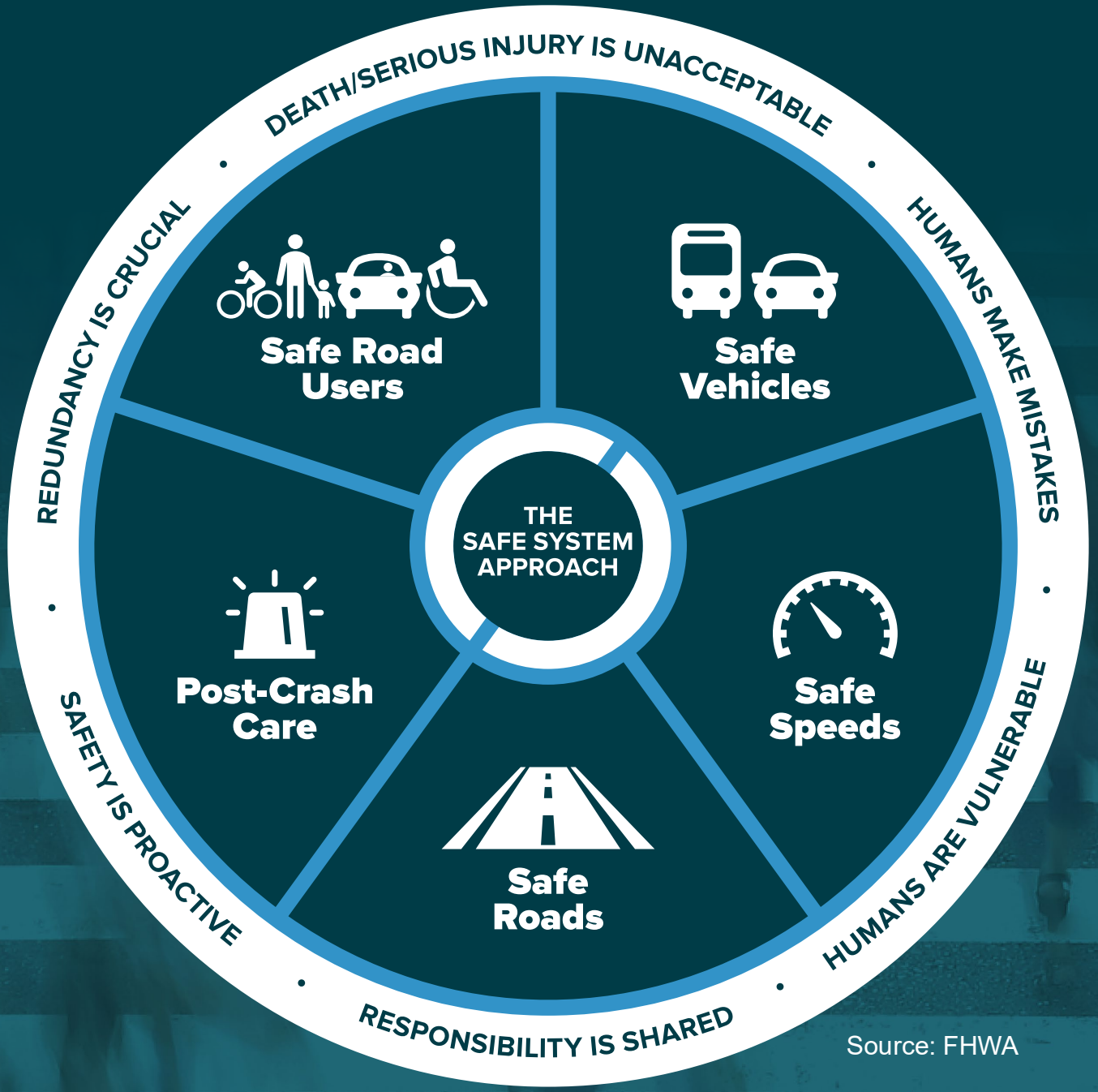
Safer Journeys

50-60%

Reduction in fatalities
1994-2015

Source: World Resources Institute

THE SAFE SYSTEM APPROACH



Source: FHWA

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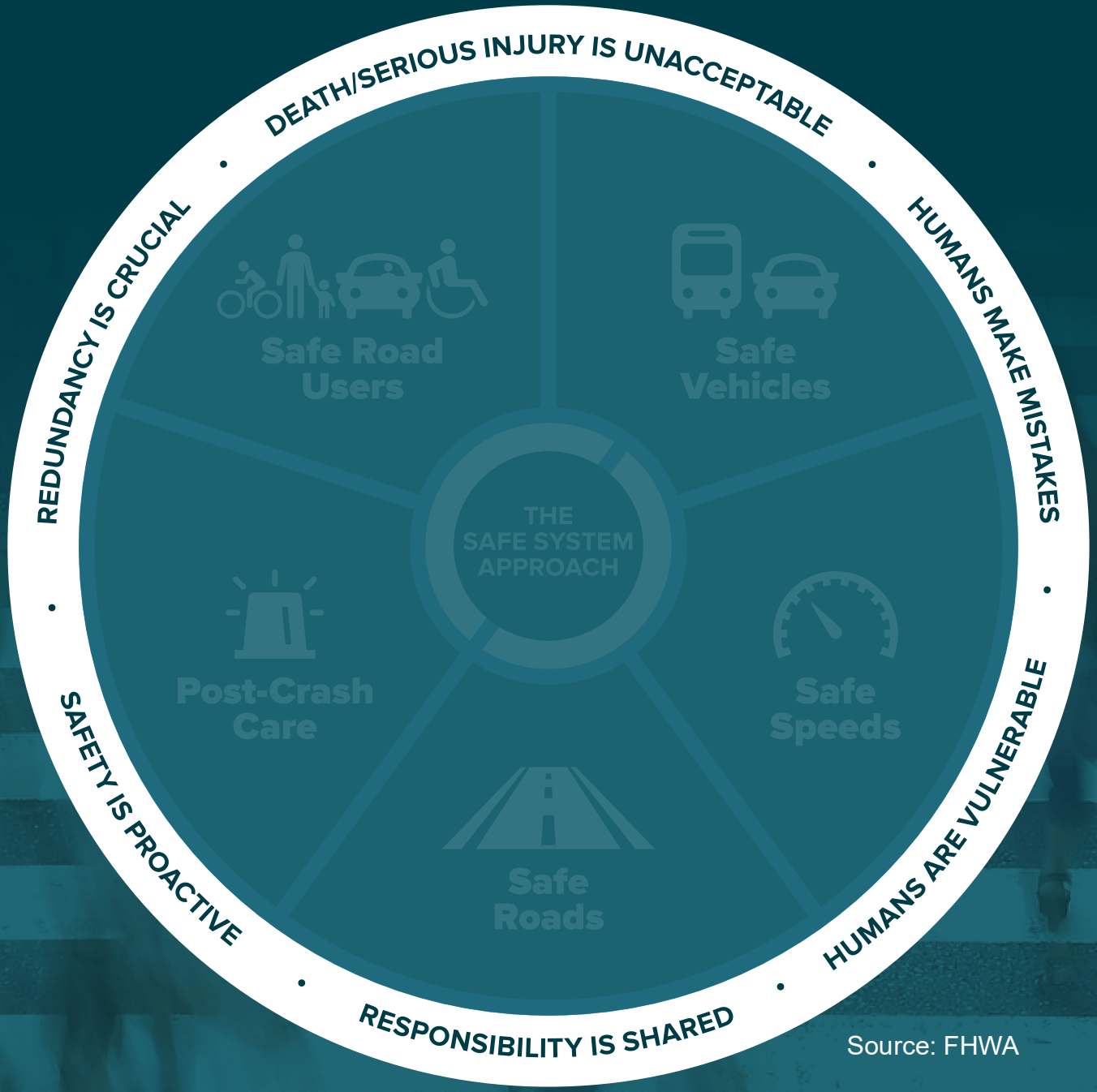
THE 6 SAFE SYSTEM PRINCIPLES



Source: FHWA

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THE 5 SAFE SYSTEM ELEMENTS

Source: FHWA

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THE 6 SAFE SYSTEM PRINCIPLES

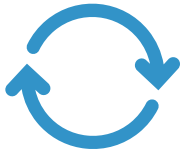
Death/serious injury is unacceptable

Humans make mistakes

Humans are vulnerable

Responsibility is shared

Safety is proactive



Redundancy is crucial

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THE 5 SAFE SYSTEM ELEMENTS

Safe road users

Safe vehicles

Safe speeds

Safe roads

Post-crash care

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PARADIGM SHIFT → NEW PARADIGM AHEAD

Humans make mistakes

People as road users will inevitably make mistakes that can lead to crashes

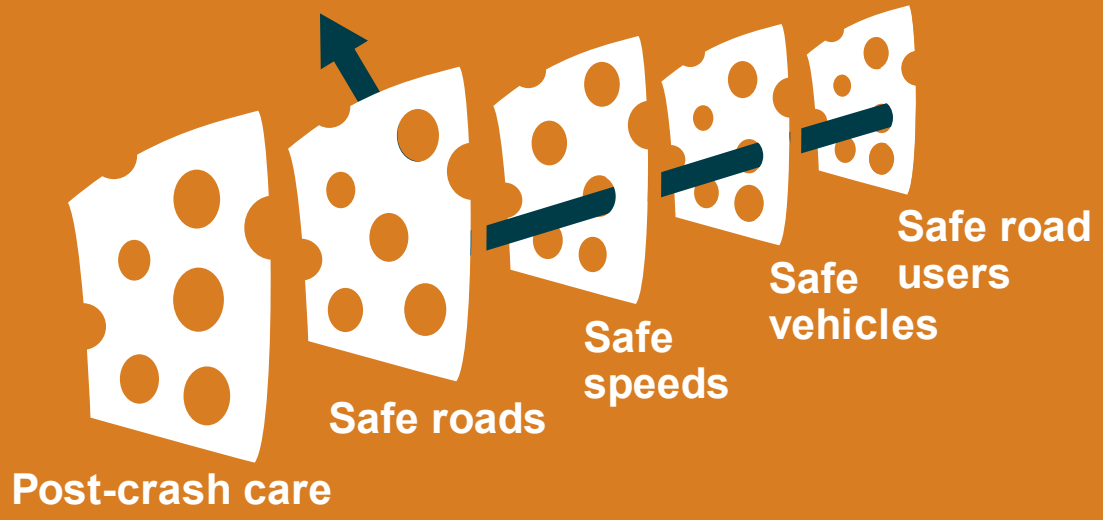
In a Safe System approach, the system owners and operators should strive to make it easy for humans to *not* make mistakes by designing roads and vehicles to be in tune with human competences.

Source: FHWA

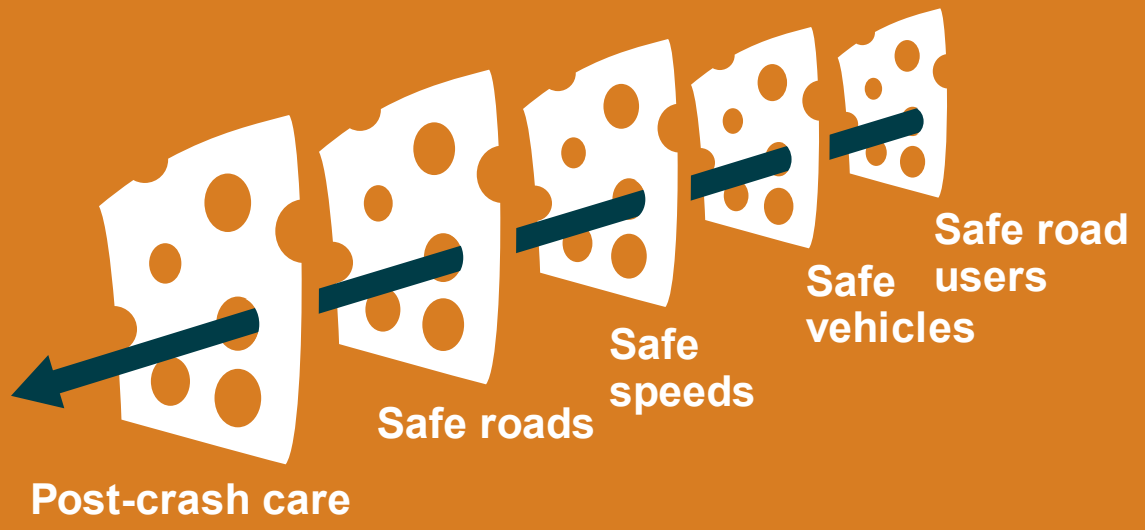
SAFE SYSTEM ELEMENTS CREATE REDUNDANCY

Redundancy is crucial

The “Swiss Cheese Model” of redundancy creates layers of protection



Death and serious injuries only happen when all layers fail



Adapted from James Reason’s model for analyzing accident causation
https://royalsocietypublishing.org/doi/10.1098/rstb.1990.0090

Image Source: FHWA

WHERE ARE YOU ON THE SAFE SYSTEM JOURNEY?

Traditional approach		Safe System approach
Prevent crashes	→	Prevent death 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

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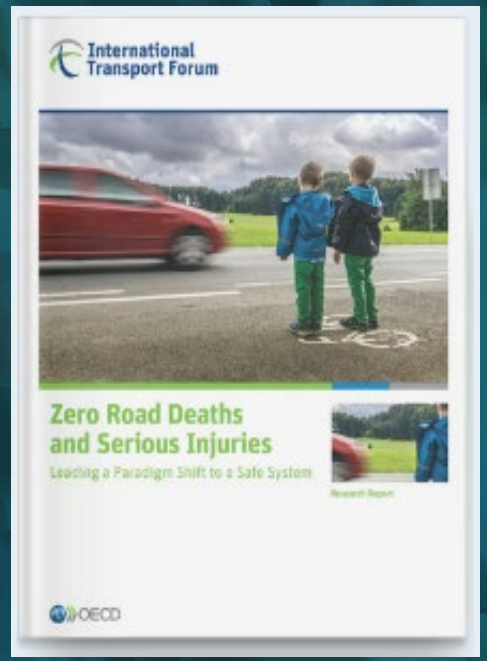
Safe System Approach – What's Next?

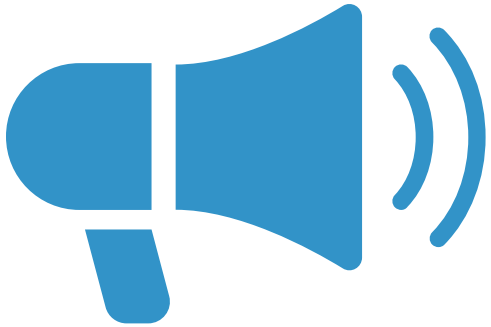
"There is no single pathway for the adoption, establishment and implementation of a Safe System. Moving to a Safe System is a learning-by-doing process best described as a journey which presents opportunities, hazards and challenges along the way. The experiences of the pioneering countries show that each follows its own journey, shaped by the cultural, temporal, and local context, but guided by the underlying principles."



Source: Zero Road Deaths and Serious Injuries: Leading a Paradigm Shift to a Safe System; OECD (2016)

http://www.oecd.org/publications/zero-road-deaths-and-serious-injuries-9789282108055-en.htm

FHWA RESOURCES



Safe System Materials

Find more resources at: safety.fhwa.dot.gov/zerodeaths

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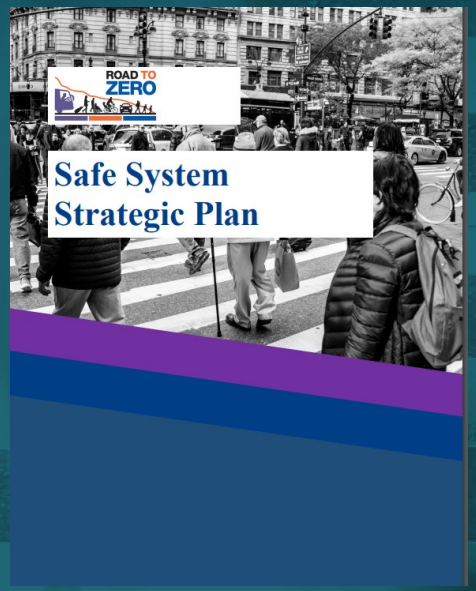
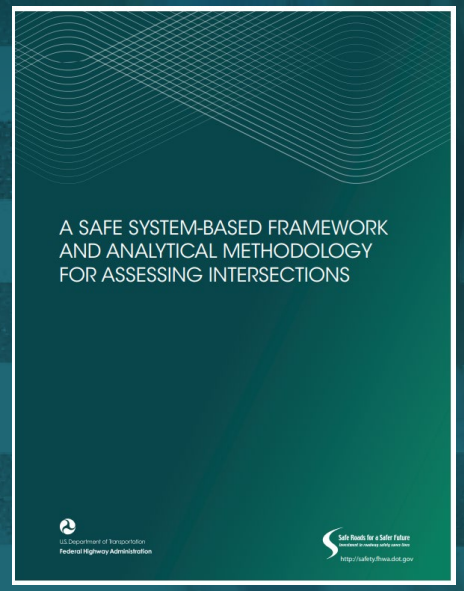
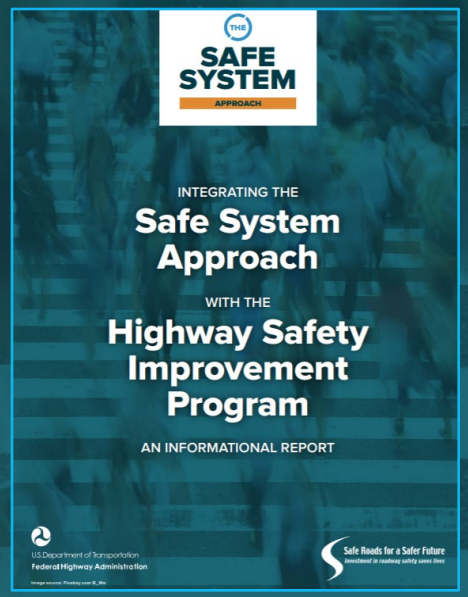
For More Information

FHWA Resources: https://safety.fhwa.dot.gov/zerodeaths/zero_deaths_vision.cfm

ITE Resources: https://www.ite.org/technical-resources/topics/safe-systems/







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Thank you!

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