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

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• Unless noted otherwise, FHWA is the source for all images in this presentation.
Imagine our country as a place where *nobody* has to die from vehicle crashes.

Source: Fehr & Peers
Presentation Overview

1. Introduction
2. Safe System Principles
3. Safe System Elements
4. Conclusion & Resources
Introduction

Assessment of our current situation and introduction to the Safe System approach
WE HAVE A NATIONAL ROADWAY SAFETY PROBLEM

Fatalities of pedestrians and bicyclists have been increasing even greater

Source: Fatality Analysis Reporting System
Source: US DOT
“Traffic crashes are a leading cause of death for teenagers in America, and disproportionately impact people who are Black, American Indian, and live in rural communities. We face a crisis on our roadways; it is both unacceptable and solvable.”

How does the United States reach zero deaths?

Source: Fehr & Peers
It involves a paradigm shift to improve safety culture, increase collaboration across all safety stakeholders, and refocus transportation system design and operation on anticipating human mistakes and lessening impact forces to reduce crash severity and save lives.

SUCCESSFUL SAFE SYSTEM ADOPTERS
Changes from 2000 to 2019.

- Norway: ↓68.5%
- France: ↓57.6%
- Sweden: ↓47.3%
- Netherlands: ↓43.3%
- Australia: ↓33.5%
- United States of America: ↓5.6%

Source: FHWA with data from World Health Organization Global Health Observatory Repository
THE SAFE SYSTEM APPROACH

DEATH/SERIOUS INJURY IS UNACCEPTABLE

HUMANS MAKE MISTAKES

REDUNDANCY IS CRUCIAL

SAFETY IS PROACTIVE

RESPONSIBILITY IS SHARED

SAFE ROADS

SAFE USERS

SAFE VEHICLES

SAFE SPEEDS

POST-CRASH CARE

Source: FHWA
THE 6 SAFE SYSTEM PRINCIPLES

1. Death/serious injury is unacceptable
2. Humans make mistakes
3. Humans are vulnerable
4. Safety is proactive
5. Redundancy is crucial
6. Responsibility is shared

Source: FHWA
THE 5 SAFE SYSTEM ELEMENTS

- Safe Road Users
- Safe Vehicles
- Safe Roads
- Safe Speeds
- Post-Crash Care

Source: FHWA
Safe System Principles

Overview of the 6 principles of the Safe System approach

1. Introduction
2. Safe System Principles
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4. Conclusion & Resources
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
DEATH/SERIOUS INJURY IS UNACCEPTABLE

Source: Vision Zero Network
HUMANS MAKE MISTAKES

Source: Fehr & Peers
HUMANS ARE VULNERABLE

Risk of Fatality and Serious Injury

Crash Kinetic Energy

Source: FHWA
Responsibility is shared among:

- System managers
  - Planners, designers, builders, operators, maintenance workers
- Vehicle manufacturers
- Law enforcement personnel
- Traffic Incident Management personnel
- System users
SAFETY IS PROACTIVE

- Identify risks
- Mitigate risks
REDUNDANCY IS CRUCIAL

- Safe road users
- Safe vehicles
- Safe speeds
- Safe roads
- Post-crash care
Safe System Elements

Overview of the 5 elements of the Safe System approach

1. Introduction
2. Safe System Principles
3. Safe System Elements
4. Conclusion & Resources
THE 5 SAFE SYSTEM ELEMENTS

Safe road users
Safe vehicles
Safe speeds
Safe roads
Post-crash care
<table>
<thead>
<tr>
<th>Mode</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk</td>
<td><img src="image-url" alt="Walk Image" /></td>
</tr>
<tr>
<td>Bike</td>
<td><img src="image-url" alt="Bike Image" /></td>
</tr>
<tr>
<td>Drive</td>
<td><img src="image-url" alt="Drive Image" /></td>
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<tr>
<td>Transit</td>
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<tr>
<td>Other</td>
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</table>

Source for all images: Fehr & Peers
<table>
<thead>
<tr>
<th><strong>SAFE VEHICLES</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active safety</strong></td>
</tr>
<tr>
<td>Measures to reduce the chance of a crash occurring</td>
</tr>
<tr>
<td>• Lane departure warning</td>
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<tr>
<td>• Autonomous emergency braking</td>
</tr>
<tr>
<td><strong>Passive safety</strong></td>
</tr>
<tr>
<td>Protective systems for when crashes do occur</td>
</tr>
<tr>
<td>• Seatbelts and airbags</td>
</tr>
<tr>
<td>• Crash-absorbing vehicle crumple zones</td>
</tr>
</tbody>
</table>
SAFE SPEEDS

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 error come crashes, injuries, and even deaths.”

Organization for Economic Co-operation and Development
SAFE SPEEDS: FATALITY RISKS

Source: FHWA. Adapted from graphic created by Australian Roads and Traffic Authority of New South Wales.
Safe roads are designed and operated to:

1. Prevent crashes among all users
2. Keep impacts on the human body at tolerable levels
Think of “Safe Roads” as a continuum – not an absolute

• The aim is to design and operate roads to continuously approach toward creating a Safe System by implementing features appropriate for the intended and actual road use and speed environment
  • Reduce the likelihood of error
  • Reduce the consequences of error

Source: FHWA
POST-CRASH CARE: TRAFFIC INCIDENT MANAGEMENT

First responders
Crash investigation
Medical care
Media
Engineering
Justice

Source: Ron Moore
Post-crash care extends to actions after TIM returns a crash scene to normal conditions.
Conclusion & Resources

Tools to bring the Safe System approach to your community

1 Introduction
2 Safe System Principles
3 Safe System Elements
4 Conclusion & Resources
The “Swiss Cheese Model” of redundancy creates layers of protection.

Death and serious injuries only happen when all layers fail.

Post-crash care

Safe roads

Safe speeds

Safe vehicles

Safe road users

Source: FHWA
“Double-Down” on what works

Transportation agencies are strongly encouraged to consider widespread implementation of PSCs to accelerate the achievement of local, State, and National safety goals.
<table>
<thead>
<tr>
<th>Traditional approach</th>
<th>Safe System approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevent crashes</td>
<td>Prevent death and serious injuries</td>
</tr>
<tr>
<td>Improve human behavior</td>
<td>Design for human mistakes/limitations</td>
</tr>
<tr>
<td>Control speeding</td>
<td>Reduce system kinetic energy</td>
</tr>
<tr>
<td>Individuals are responsible</td>
<td>Share responsibility</td>
</tr>
<tr>
<td>React based on crash history</td>
<td>Proactively identify and address risks</td>
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</tbody>
</table>
Implementing the Safe System approach is our shared responsibility, and we all have a role.

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