



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

Imagine our country as a place where *nobody* has to die from vehicle crashes.



Source: Fehr & Peers

OUR CURRENT REALITY

Traffic fatalities are a public health crisis affecting all road users.

1.25M

Lives lost globally each year from traffic crashes

Source: World Resources Institute

36,835

Lives lost on US roads in 2018

Source: NHTSA

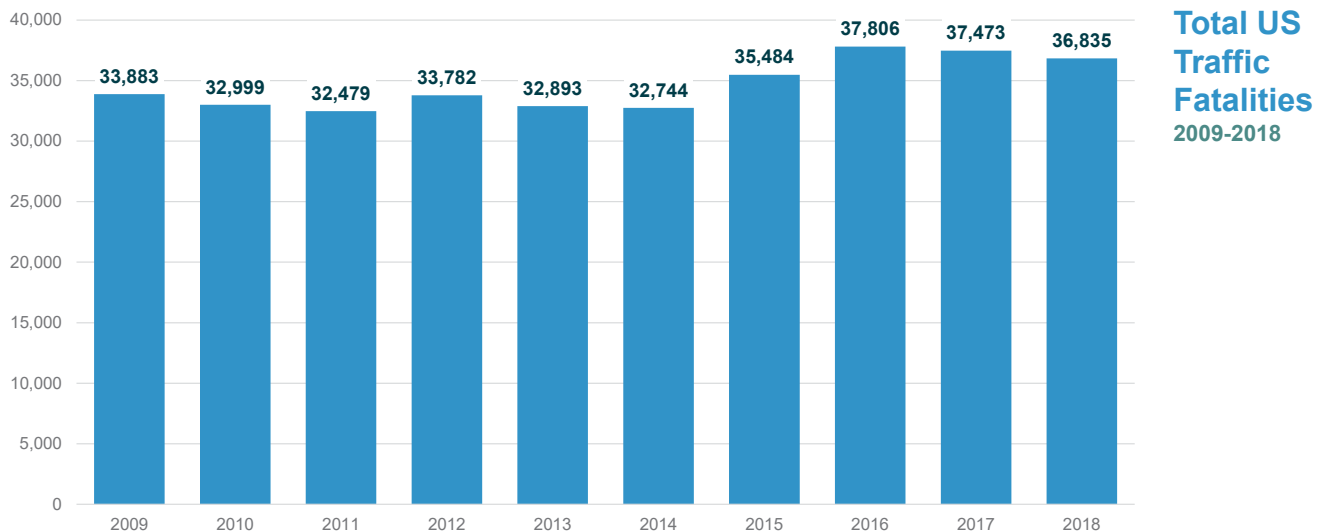
6,283

Pedestrians killed in US traffic crashes in 2018

Source: NHTSA

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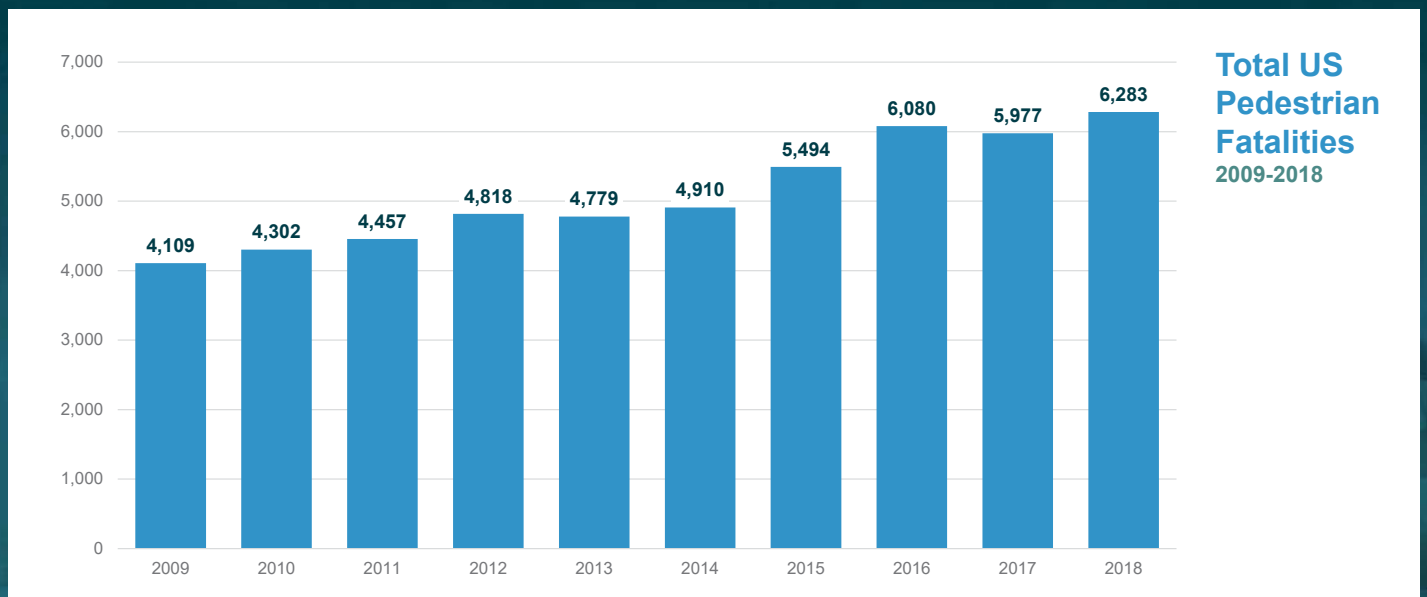
THOUSANDS OF LIVES ARE LOST EACH YEAR



Source: NHTSA

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PEDESTRIAN DEATHS ARE INCREASING



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Source: NHTSA

How does the United States
reach zero deaths?



Source: Fehr & Peers

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A NEW DIRECTION

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



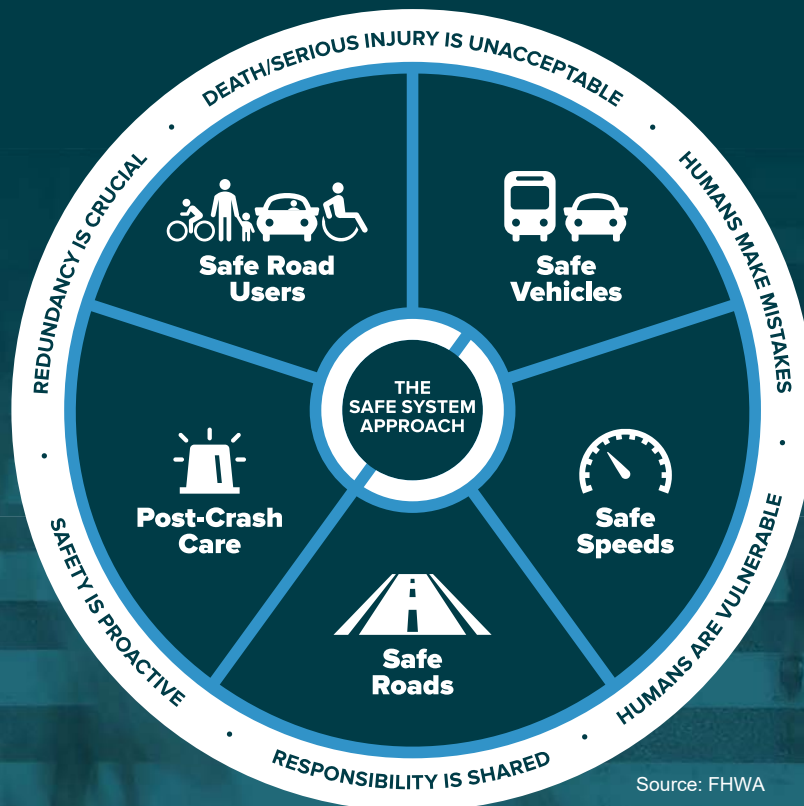
Accommodating human mistakes



Keeping impacts on the human body at tolerable levels

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THE SAFE SYSTEM APPROACH



Source: FHWA

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THE 6 SAFE SYSTEM PRINCIPLES



Source: FHWA

THE 5 SAFE SYSTEM ELEMENTS



Source: FHWA

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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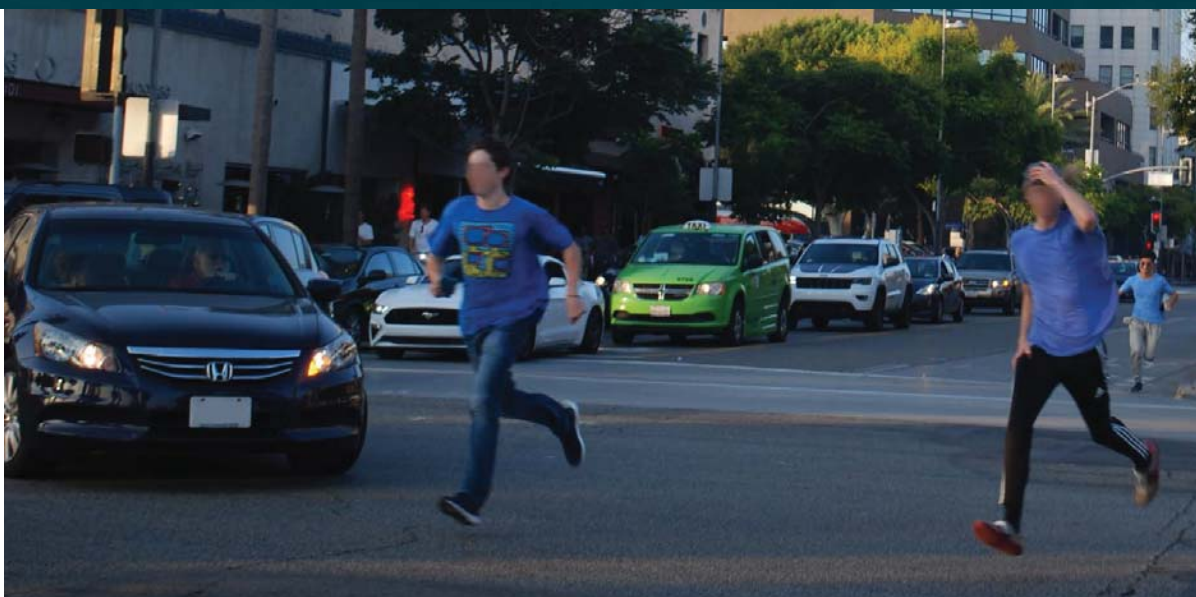
DEATH/SERIOUS INJURY IS UNACCEPTABLE



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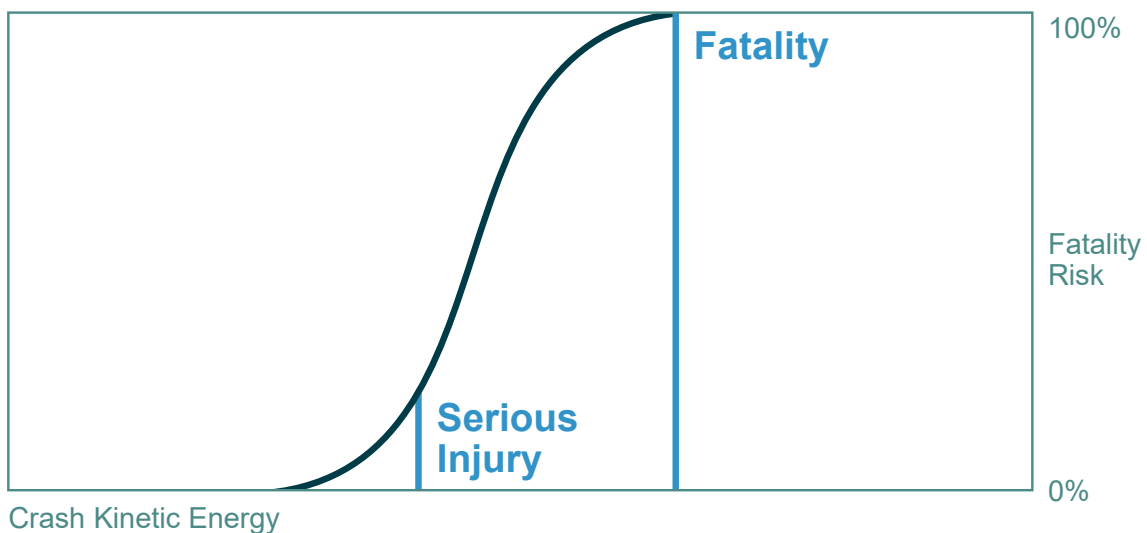
Source: Vision Zero Network

HUMANS MAKE MISTAKES



Source: Fehr & Peers

HUMANS ARE VULNERABLE



Source: FHWA

RESPONSIBILITY IS SHARED



System managers

Planners, designers, builders, operators, maintenance workers



Vehicle manufacturers



Law enforcement personnel

Post-crash personnel



System users



SAFETY IS PROACTIVE

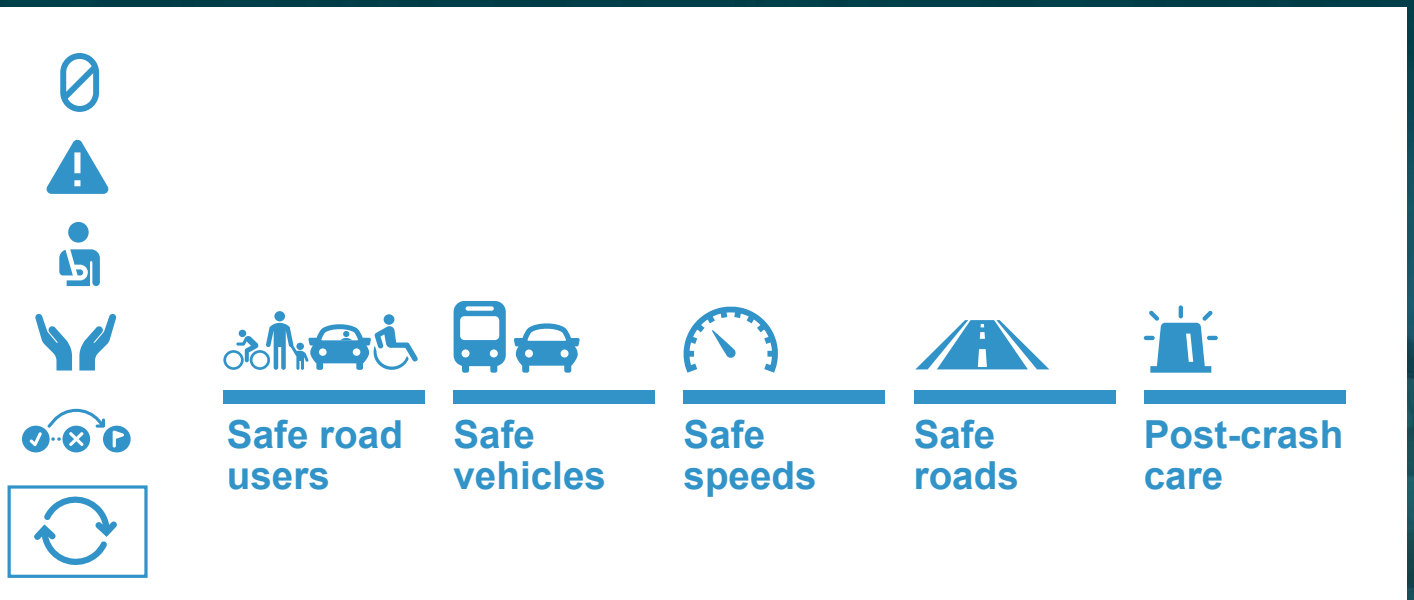


Identify risks



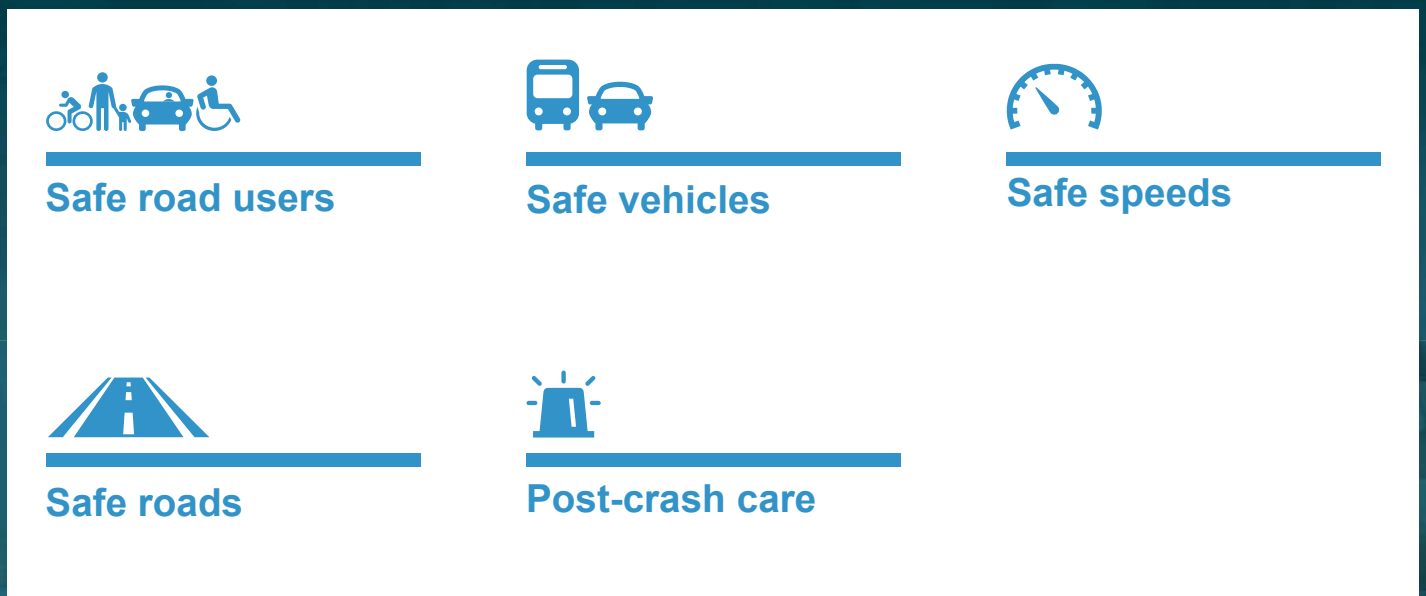
Mitigate risks

REDUNDANCY IS CRUCIAL



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THE 5 SAFE SYSTEM ELEMENTS



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SAFE ROAD USERS



Walk



Bike



Drive



Transit



Other

SAFE ROAD USERS – CONTINUED



Not distracted
or impaired



Follow rules



Act within the
limits of the
road design

SAFE VEHICLES



Active safety

Measures to reduce the chance of a crash occurring

- Lane departure warning
- Autonomous emergency braking

Passive safety

Protective systems for when crashes do occur

- Seatbelts and airbags
- Crash-absorbing vehicle crumple zones

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SAFE VEHICLES - CONTINUED



Other road user safety

Measures that protect other road users

- Bicyclist and pedestrian detection
- Vehicle size and design

New technology

Leveraging connected and automated vehicle (CAV) technology to improve safety

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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.”

Organisation for Economic Co-operation and Development

SAFE SPEEDS: REDUCING PEDESTRIAN FATALITIES

Hit by a vehicle traveling at

23

MPH

10% risk of death



Hit by a vehicle traveling at

42

MPH

50% risk of death



Hit by a vehicle traveling at

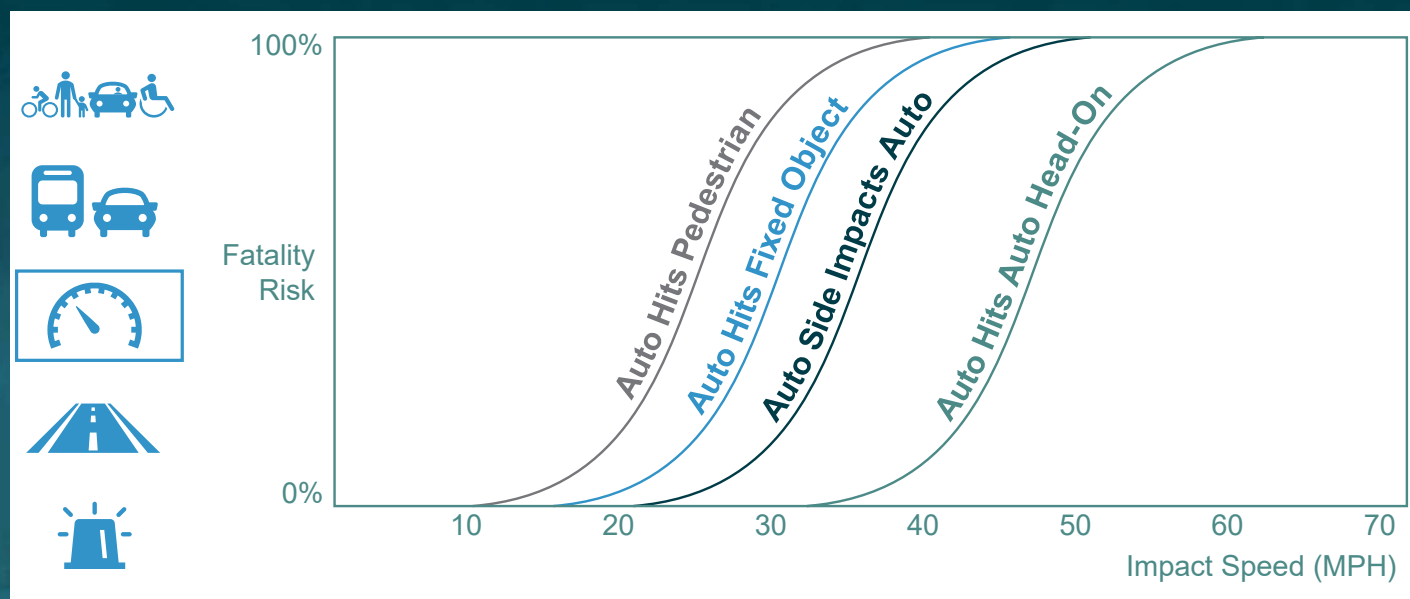
58

MPH

90% risk of death



SAFE SPEEDS: FATALITY RISKS



SAFE SPEED: TREATMENTS THAT MINIMIZE INJURIES

Speed through typical intersection



Speed through Safe System intersection



SAFE ROADS



Safe roads are designed and operated to:

1. Prevent crashes
2. Keep impacts on the human body at tolerable levels

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SAFE ROADS: AVOIDING CRASHES



Avoiding crashes involves:



Separating users in space



Separating users in time



Increasing attentiveness and awareness

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Source for all images: Fehr & Peers

SAFE ROADS: CRASH KINETIC ENERGY



Managing crash kinetic energy involves:



Managing speed



Manipulating mass



Manipulating crash angles



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Source: Fehr & Peers

Source: Fehr & Peers

Source: City of Carmel, IN

SAFE ROADS: ALL ASPECTS OF THE ROADWAY SYSTEM



Safe roads include all aspects of the roadway system:



Design



Construction



Maintenance



Operation



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POST-CRASH CARE



Vital post-crash actions include:



First responders



Medical care



Crash investigation



Traffic incident management

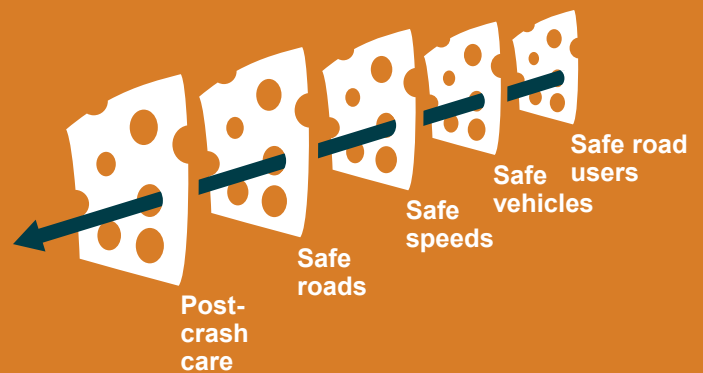
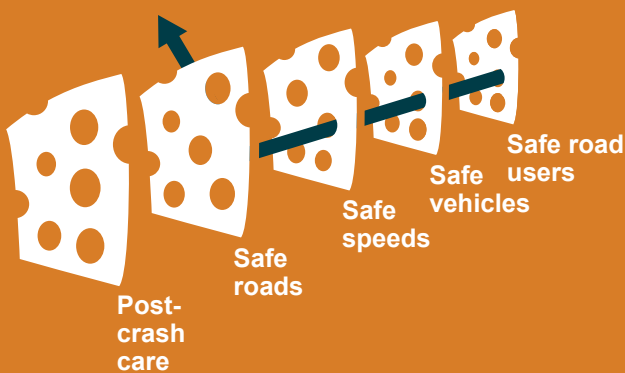


Justice

THE 5 SAFE SYSTEM ELEMENTS CREATE REDUNDANCY

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

Death and serious injuries only happen when all layers fail



ROUNDBOUTS: CARMEL, IN

Safe System Elements Covered



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Source: City of Carmel, IN

QUEENS BLVD: NEW YORK, NY

Safe System Elements Covered



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Source: NYCDOT

WHERE ARE YOU ON THE SAFE SYSTEM JOURNEY?

Traditional approach

Prevent crashes →

Improve human behavior →

Control speeding →

Individuals are responsible →

React based on crash history →

Safe System approach

Prevent death and serious injuries

Design for human mistakes/limitations

Reduce system kinetic energy

Share responsibility

Proactively identify and address risks

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Implementing the Safe System approach is our shared responsibility, *and we all have a role.*



Source: Fehr & Peers



Source: Arlington County, VA



Source: Fehr & Peers



Source: Fehr & Peers

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A Safe System is how we get there.

Questions?