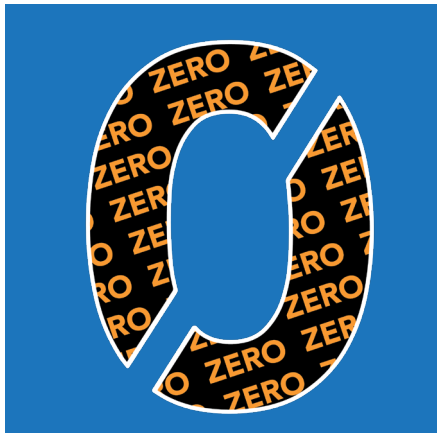
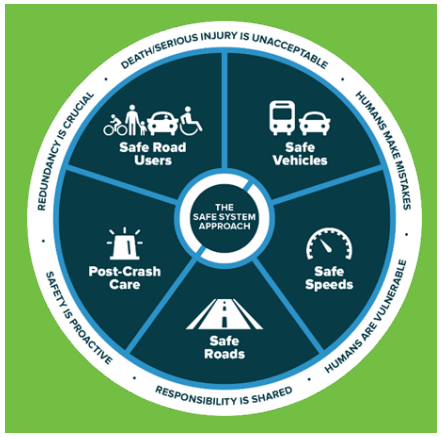
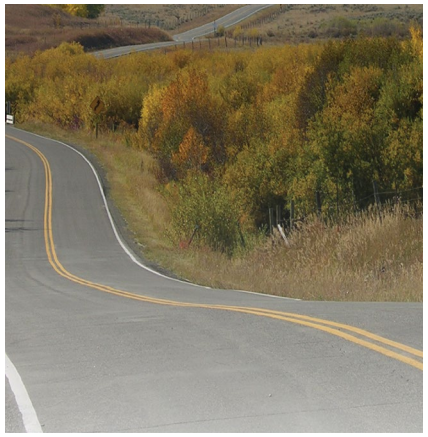
National Center for Rural Road Safety







A Safe System Approach: In the Real World

A Rural Perspective

Presented by: Jaime Sullivan, Director, National Center for Rural Road Safety

Key Takeaways for Today

- Identify the importance of safety culture in applying the Safe System Approach
- View the 5 Safe System elements from a rural perspective
- List examples and resources being used in rural areas

Graphic Source: FHWA

Importance of Safety Culture in Applying the Safe System Approach

Graphic Source: ARA

Linking Organizational Safety Culture to SSA

Organizational Safety Culture

the **shared beliefs** (including values, assumptions, etc.) of an organization which affect **behaviors** related to safety.

Safe System Principles

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

Graphic Source: FHWA

SSA: A Holistic Approach to include in all Processes

Rural Perspective

- Systemic Safety Analysis
- Road Safety Audits
- Local Road Safety Plans
- Safety Coalitions

https://www.youtube.com/watch?v=1Gtz0qjPx0M

https://safety.fhwa.dot.gov/LRSPDIY/

Graphic Source: FHWA

Safe Road User Element

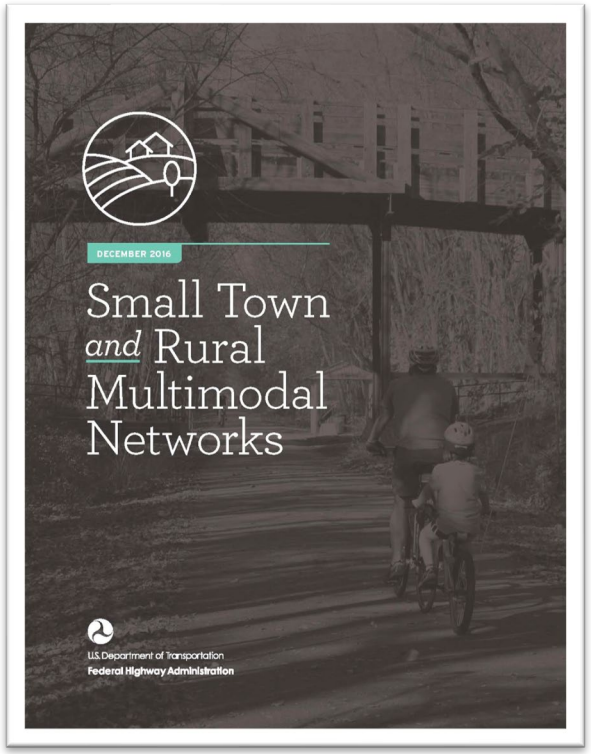
A Rural Perspective

- Variety of road users
  - Bicyclists and pedestrians
  - Horse and buggies
  - Agricultural equipment
  - Motorcycles
  - Tourists unfamiliar with the area
  - Aging population
- Different perceptions/safety mindset

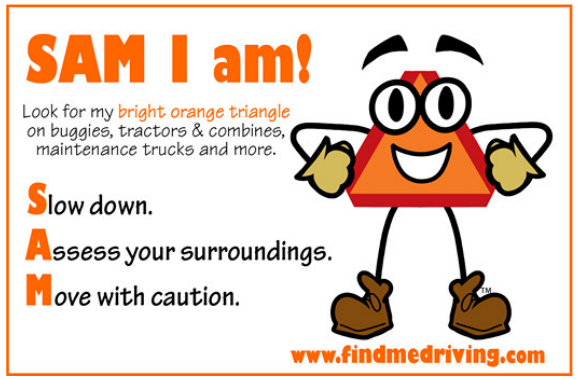
Photo Source: Jaime Sullivan, WTI

Safe Road User Element

Rural Resources & Examples

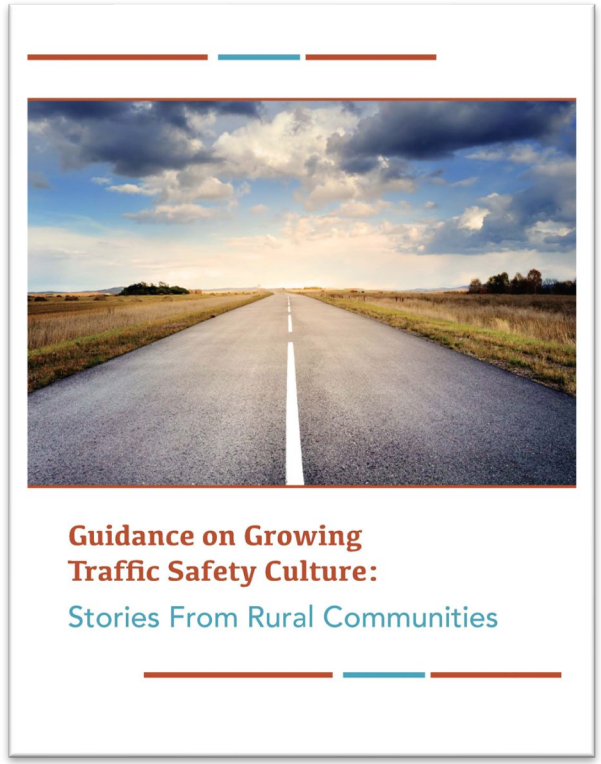


https://ruralsafetycenter.org/wp-content/uploads/2017/01/fhwahep17024_lg.pdf



https://findmedriving.com/

https://wtsc.wa.gov/programs-priorities/tribes/



https://ruralsafetycenter.org/resources/list/guidance-on-growing-traffic-safety-culture/

Safe Vehicle Element

A Rural Perspective & Examples

- Personal vehicles
  - Drivers 70 and older tend to drive older, smaller vehicles not equipped with important safety features (IIHS)
- Leveraging connected and automated vehicle (CAV) technology to improve safety
  - WY connected vehicle pilot
  - CO autonomous traffic mobile attenuator truck
  - MO real-time digital warning system on motorist assist vehicles

Active Safety	Passive Safety
Reduces the chance of a crash occurring	Protective systems for when crashes occur
• Lane departure warnings • Lane keeping assist • Forward collision warnings • Autonomous emergency braking • Pedestrian detection • Backup camera • Antilock brakes • Electronic stability control	• Seatbelts • Airbags • Crumple zones • Collapsible steering column

Graphic Source: FHWA

Statistics source: https://www.iihs.org/news/detail/retirement-vehicles-raise-the-risk-of-crash-fatalities-for-older-drivers

Safe Speed Element

A Rural Perspective

- Not about universally reducing speeds
- Designing to meet user expectancies
  - Self-explaining roads
  - Self-enforcing roads
- Matching speed appropriate to the road conditions that exist
  - Vulnerable road users
  - Curves
  - Tourist areas
  - Weather

Some roads are engineered to accommodate higher speeds …

… and others not.

Source: FHWA

Safe Speed Element

Rural Resources & Examples

Speed Feedback Signs

Roundabouts

Variable Speed Limits

Photo Sources: Neil Hetherington, WTI (left), Jaime Sullivan, WTI (Center), and FHWA (right)

Safe Road Element

A Rural Perspective

Photo Sources: Neil Hetherington and Jaime Sullivan, WTI

“Safe Roads” is 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

- Examples include:
  - Minimizing instances of conflict (for all users)
  - Forgiving roadway and roadsides relative to the speed environment

Source: FHWA

Safe Road Element

Rural Resources & Examples

https://safety.fhwa.dot.gov/FoRRRwD/RwDPocketGuide.pdf

Driving FoRRRwD to a Safe System (https://youtu.be/rpXxLSbmtU0)

Keep vehicles in their lane

Improve curve delineation

Friction treatments in curves and other spot locations

Edge line, shoulder & center line rumble strips

Reduce the potential for crashes

SafetyEdge^{SM}

Maintained clear zones

Traversable roadside slopes

Minimize crash severity

Breakaway Features

- Signs & Luminaire Supports
- Utility Poles

Barriers to Shield Obstacles

- Trees and Shrubbery
- Other Fixed Objects
- Slopes

Graphic Sources: FHWA

Post-Crash Care Element

A Rural Perspective & Resources

- Golden hour
  - Identification and notification of crash
  - Large geographic regions
  - Regionalizing hospitals

Vital post-crash actions include:

- First responders
- Medical care
- Crash investigation
- Traffic incident management
- Justice

Crash Countermeasures (CC)

Tools that focus on reducing crash frequency and severity.

CC1 Animal Warning Systems

CC2 Automated Visibility Warning Systems

CC3 Bicycle Safety Systems

CC4 Connected Vehicles

CC5 Wrong Way Driver Detection & Warning System

CC6 Highway-Rail Crossing Safety Systems

CC7 Intersection Collision Warning Systems (ICWS)

CC8 Pedestrian Safety Systems

CC9 Road Geometry Warning System

CC10 Smart Trucks

CC11 Speed Warning Systems

CC12 Work Zone Safety Systems

Traffic Management (TM)

Tools that facilitate the identification of congestion and the management of traffic.

TM1 Access Control Gates

TM2 Variable Speed Limit (VSL)

TM3 Geographic Information Systems (GIS)

TM4 Interconnected Signal Systems

TM5 Vehicle Detection

TM6 Monitoring Travel Times and Speeds

TM7 Parking Management Systems

TM8 Planned Special Event Management Systems

TM9 Rural Traffic Management Center (TMC)/Traffic Operations Center (TOC)

TM10 Adaptive Signal Control Technologies (ASCT)

Operations & Maintenance (OM)

Tools that facilitate operations, enhance maintenance, or extend the longevity of the transportation assets.

OM1 Weigh-in-Motion (WIM) Systems

OM2 Site Management During Avalanches

OM3 Global Positioning System (GPS) Data

OM4 Fixed Automated Spray Technology (FAST)

Emergency Services (ES)

Tools that support, facilitate and expedite emergency response efforts.

ES1 Next Generation 911

ES2 Smartphone Applications for First Responders

ES3 Crash Reporting

ES4 Automatic Crash Notification Systems

ES5 Emergency Vehicle Traffic Signal Preemption

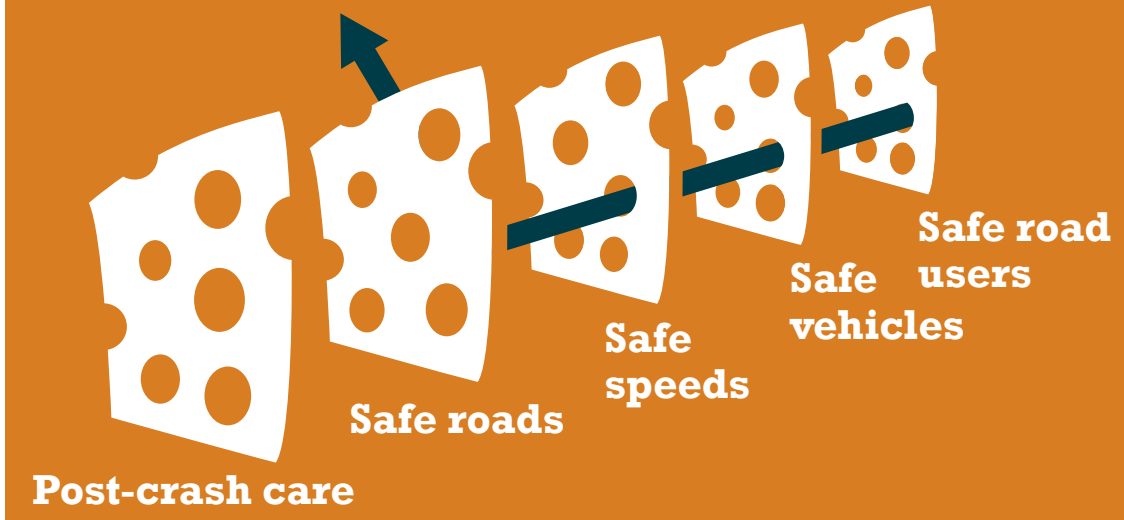
ES6 Unmanned Aerial Systems (UAS)

https://ruralsafetycenter.org/resources/rural-its-toolkit/

Graphic Source: FHWA (post-crash)

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

Resources to Explore on Your Safe System Journey

National Center for Rural Road Safety
www.ruralsafetycenter.org

Road to Zero
https://www.nsc.org/road-safety/get-involved/road-to-zero

Toward Zero Deaths & Traffic Safety Culture
https://www.towardzerodeaths.org/traffic-safety-culture/

Vision Zero Network
https://visionzeronetwork.org/

Center for Health and Safety Culture
https://chsculture.org/

FHWA's Safe System Materials
https://safety.fhwa.dot.gov/zerodeaths/zero_deaths_vision.cfm

ITE's Safe System Material
https://www.ite.org/technical-resources/topics/safe-systems/

Road to Zero's Double Down on What Works Page
https://www.nsc.org/road/resources/road-to-zero/doubling-down-on-what-works

FHWA Proven Safety Countermeasures
https://safety.fhwa.dot.gov/provencountermeasures/

NHTSA's Countermeasure that Work
https://rosap.ntl.bts.gov/view/dot/57466

FoRRRwd
https://safety.fhwa.dot.gov/FoRRRwd/

LRSP DIY Site
https://safety.fhwa.dot.gov/LRSPDIY/

Rural Opportunities to Use Transportation for Economic Success (ROUTES)
https://www.transportation.gov/rural

Contact Information

If you have any questions related to this presentation, please contact:

Jaime Sullivan at Jaime.sullivan2@montana.edu

Or contact the National Center for Rural Road Safety Help Desk at:

(406) 994-7368 or info@ruralsafetycenter.org

http://ruralsafetycenter.org/

National Conference on Highway Safety Priorities

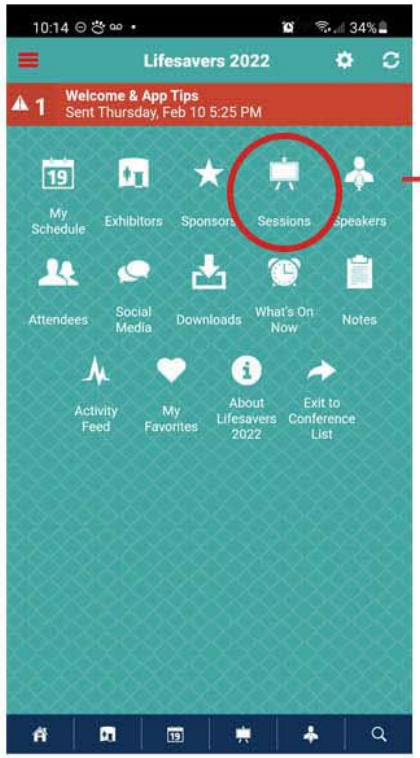
LIFESAVERS

CHICAGO

MARCH 13-15, 2022

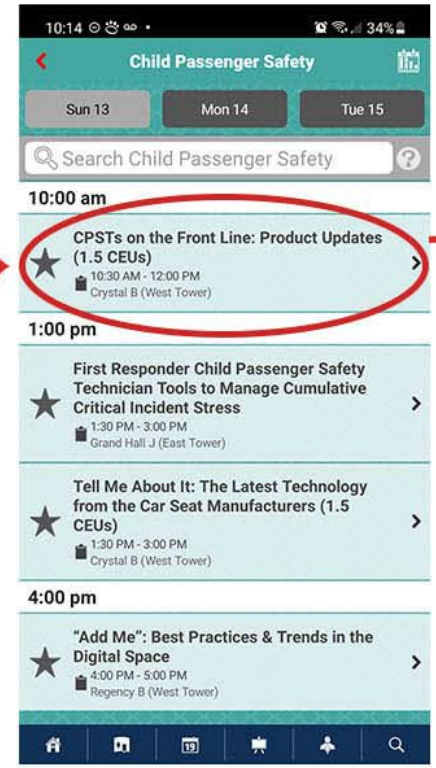
Please evaluate this presentation using the

Lifesavers Conference Mobile App

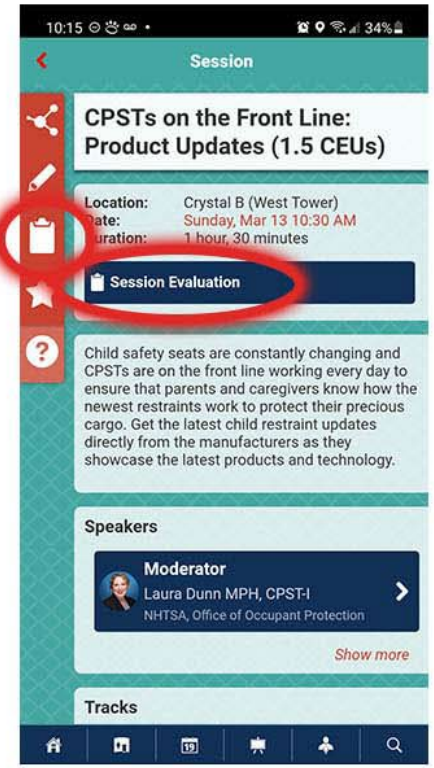


SELECT SESSIONS ICON

SELECT APPLICABLE TRACK



SELECT APPLICABLE WORKSHOP



CLICK SESSION EVALUATION BUTTON (OR) CLIPBOARD ICON