



PROVEN SAFETY COUNTERMEASURES
LTAP/WVAMPO CONFERENCE
PARTNERING FOR A BETTER FUTURE
APRIL 18, 2018



PROVEN SAFETY COUNTERMEASURES



Roadside Design Improvement at Curves



Reduced Left-Turn Conflict Intersections



Systemic Application of Multiple Low Cost Countermeasures at Stop-Controlled Intersections



Leading Pedestrian Interval



Local Road Safety Plan



USLIMITS2



Enhanced Delineation and Friction for Horizontal Curves



Longitudinal Rumble Strips and Stripes on Two-Lane Roads



Median Barrier



Safety EdgesSM



Backplates with Retroreflective Borders



Corridor Access Management



Dedicated Left- and Right-Turn Lanes at Intersections



Roundabouts



Yellow Change Intervals



Medians and Pedestrian Crossing Islands in Urban and Suburban Areas



Pedestrian Hybrid Beacon



Road Diet



Walkways



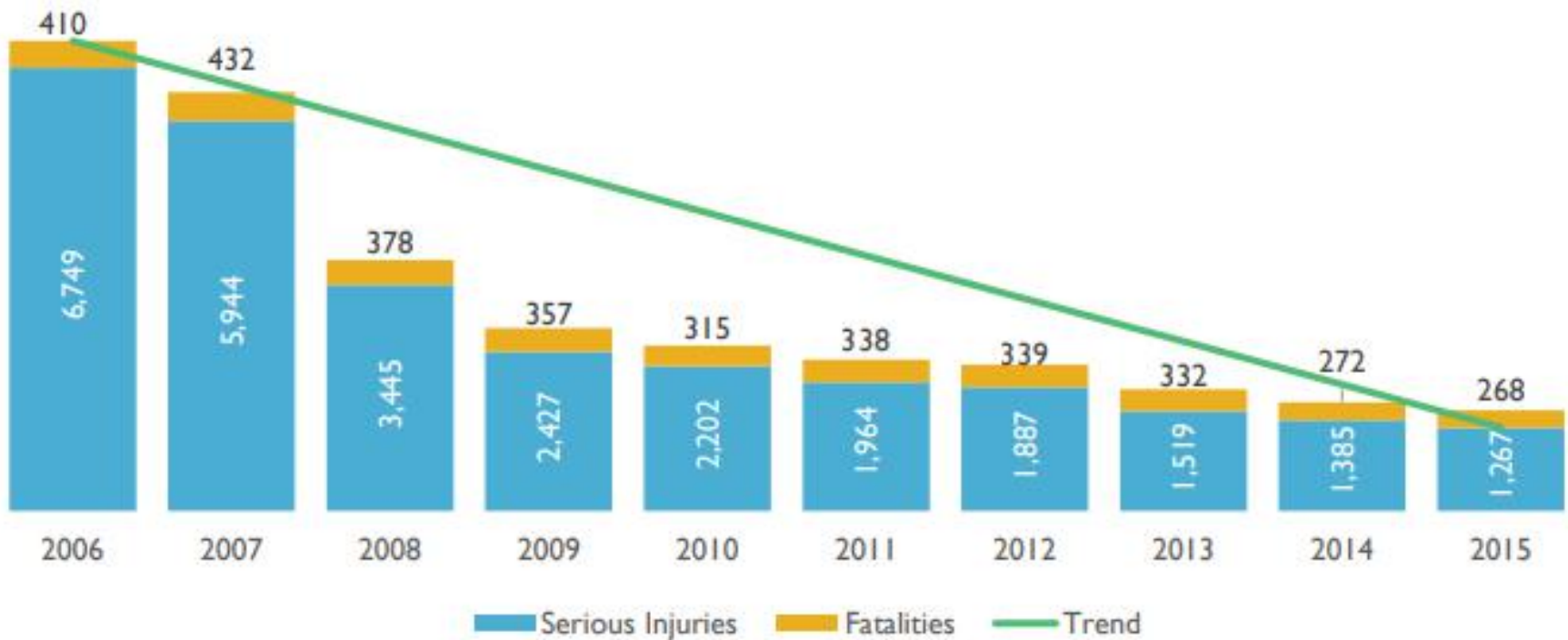
Road Safety Audit

SAFETY PERFORMANCE MEASURES

- Performance management connects the Highway Safety Improvement Program (HSIP) and Highway Safety Plan (HSP) to the Strategic Highway Safety Plan (SHSP).

Performance Measure	State Target		MPO Target <i>For Each Performance Measure, Support State Target or Establish MPO-Specific Target</i>
	Target Reported in HSIP Annual Report for FHWA	Target Reported in Highway Safety Plan for NHTSA	
Number of Fatalities	281.6	= 281.6	281.6
Rate of Fatalities per 100 Million VMT	1.37	= 1.37	1.37
Number of Serious Injuries	1341.0	= 1341.0	1341.0
Rate of Serious Injuries per 100 Million VMT	6.327	Not required	6.327
Number of Non-motorized Fatalities and Non-motorized Serious Injuries	94.1	Not required	94.1

SHSP FATALITIES AND SERIOUS INJURIES (2006 - 2015)



2016 Fatalities - 269

2017 Fatalities - 303

ROADSIDE DESIGN IMPROVEMENTS AT CURVES



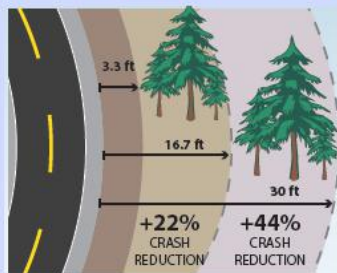
Provide Safe Recovery

Clear zone

Slope flattening

Adding or widening shoulders

Increasing the Clear Zone prevents crashes



27%

of all fatal crashes occur at curves

80%

of all fatal crashes at curves are roadway departure crashes

Source: Fatality Analysis Reporting System (FARS)

Reduce Severity

Cable barrier

Guardrail

Concrete barrier

ROADWAY DEPARTURE FOCUS STATE

FHWA HQ adjusted its formula to account for many smaller states whose data warranted focus state status but was high enough statistically to compete with larger states

West Virginia Implementation

- Focus area measures incorporated into the updated 2017 SHSP
- IDIQ Contracts – Cable barrier and Guardrail

ENHANCED DELINEATION AND FRICTION FOR HORIZONTAL CURVES



Enhanced Delineation and Friction for Horizontal Curves

SAFETY BENEFITS:

Chevron Signs
25%
Reduction in nighttime crashes

16%
Reduction in non-intersection
fatal and injury crashes

Source: CMF Clearinghouse, CMF IDs 2438 and 2439

High Friction Surface Treatment
52%
Reduction in wet road crashes

24%
Reduction in curve crashes

Enhance Delineation

- Pavement markings
- Post-mounted delineation
- Larger signs and signs with enhanced retroreflectivity
- Dynamic advance curve warning signs and sequential curve signs

Increased Pavement Friction

- Sharp curves
- Inadequate cross-slope design
- Wet conditions
- Polished roadway surfaces
- Driving speeds in excess of the curve advisory speed

WEST VIRGINIA STATE WIDE IMPLEMENTATION



Median Barrier

8%
of All Fatalities on Divided Highways
Are Due to Head-On Crashes¹

SAFETY BENEFITS:

**Median Barriers Installed on Rural Four-Lane
Freeways**
97%

Reduction in cross-median crashes²

¹ Fatality Analysis Reporting System (FARS).

² NCHRP Report 704, *Median Cross-Section Design for Rural Divided Highways*.



Longitudinal Rumble Strips and Stripes

SAFETY BENEFITS:

Center Line Rumble Strips
44-64%

Head-on, opposite-direction, and sideswipe fatal and injury crashes

Shoulder Rumble Strips
13-51%

Single vehicle, run-off-road fatal and injury crashes

Source: NCHRP Report 641, *Guidance for the Design and Application of Shoulder and Centerline Rumble Strips*.



SafetyEdge_{SM}



Example of SafetyEdge_{SM} after backfill material settles or erodes.

Source: FHWA.

SAFETY BENEFIT:

11%

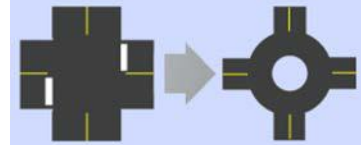
Reduction in fatal and injury crashes

Source: *Safety Effects of the SafetyEdge_{SM}*, FHWA-SA-17-044.



Roundabouts

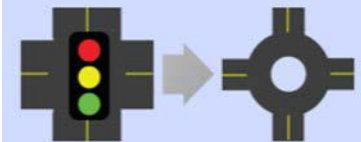
Two-Way Stop-Controlled Intersection to a Roundabout



82%

Reduction in severe crashes

Signalized Intersection to a Roundabout



78%

Reduction in severe crashes

Source: *Highway Safety Manual*

LOCAL LEVEL IMPLEMENTATION/RESOURCES



USLIMITS2¹ is a free, web-based tool designed to help practitioners assess and establish safe, reasonable, and consistent speed limits for specific segments of roadway. It is applicable to all types of facilities, from rural and local roads and residential streets to urban freeways.



A local road safety plan (LRSP) provides a framework for identifying, analyzing, and prioritizing roadway safety improvements on local roads. The LRSP development process and content are tailored to local issues and needs. The process results in a prioritized list of issues, risks, actions, and improvements that can be used to reduce fatalities and serious injuries on the local road network.

LOCAL LEVEL IMPLEMENTATION



A **median** is the area between opposing lanes of traffic, excluding turn lanes. Medians in urban and suburban areas can be defined by pavement markings, raised medians, or islands to separate motorized and non-motorized road users.

A **pedestrian crossing island** (or refuge area) is a raised island, located between opposing traffic lanes at intersection or midblock locations, which separate crossing pedestrians from motor vehicles.

Medians and Pedestrian Crossing Islands in Urban and Suburban Areas



Median and pedestrian crossing islands near a roundabout.

Source: www.pedbikemages.org / Dan Burden

SAFETY BENEFITS:

Raised Median
46%

Reduction in pedestrian crashes

Pedestrian Crossing Island
56%

Reduction in pedestrian crashes

Source: Desktop Reference for Crash Reduction Factors, FHWA-SA-08-011, September 2008, Table 11.

Potential Locations

Mid-block areas

Approaches to multi-lane intersections

Areas near transit stops or other pedestrian-focused sites

STATE/LOCAL LEVEL IMPLEMENTATION



Walkways

SAFETY BENEFITS:

Sidewalks 65-89%

Reduction in crashes involving pedestrians walking along roadways

Paved Shoulders 71%

Reduction in crashes involving pedestrians walking along roadways



Example of a shared use path.

Source: pedbikeimages.org/Burden

Source: *Desktop Reference for Crash Reduction Factors*, FHWA-SA-05-011, Table 11.



Road Safety Audits

A road safety audit is a proactive formal safety performance examination of an existing or future road or intersection by an independent and multi-disciplinary team.

SAFETY BENEFIT:

10-60%

Reduction in total crashes

Source: *Road Safety Audits: An Evaluation of RSA Programs and Projects*, FHWA-SA-12-037; and *FHWA Road Safety Audit Guidelines*, FHWA-SA-06-08.



Road Diets (Roadway Reconfiguration)

A "Road Diet," or roadway reconfiguration, can improve safety, calm traffic, provide better mobility and access for all road users, and enhance overall quality of life.

SAFETY BENEFIT:

4-Lane → 3-Lane

Road Diet Conversions

19-47%

Reduction in total crashes

Source: *Evaluation of Lane Reduction "Road Diet" Measures on Crashes*, FHWA-HRT-10-053.



Leading Pedestrian Intervals

SAFETY BENEFIT

60%

Reduction in pedestrian-vehicle crashes at intersections



LPIs are beneficial at intersections with high left-turning volumes.

Source: pedbikeimages.org/Burden

CONTACT INFO/ONLINE RESOURCES

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<https://safety.fhwa.dot.gov/provencountermeasures>

<https://safety.fhwa.dot.gov/uslimits/>

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

THANK YOU

