

# **FHWA Proven Safety Countermeasures**

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# Introduction and Background

- FHWA issued Nine Proven Countermeasures Guidance in 2008
- Many of those countermeasures have been widely applied
- In 2012 the guidance was updated

*"While States as a whole still practice a high level of compliance with all of the countermeasures listed in the 2008 guidance, this more widely applied the national baseline 2012 2012 Countermeasures Guidance"*

# 2012 FHWA Proven Countermeasures

1. Delineation and Friction for Horizontal Curves
2. Rumble Strips and Stripes on 2-Lane Roads
3. Safety Edge
- ~~4. Roundabouts~~
5. Corridor Access Management
6. Signal Backplates with Retroreflective Borders
7. “Road Diet” (Roadway Reconfiguration)
- ~~8. Pedestrian Hybrid Beacon~~
9. Medians and Pedestrian Crossing Islands in Urban and Suburban Areas

## Focus Areas

**Roadway  
Departure**

**Intersection  
Corridor**

**Pedestrian  
Safety**

# Data-Driven Safety Process

“...countermeasure selection should continue to be based on appropriate analytical techniques...”

- 2012 Countermeasure Guidance

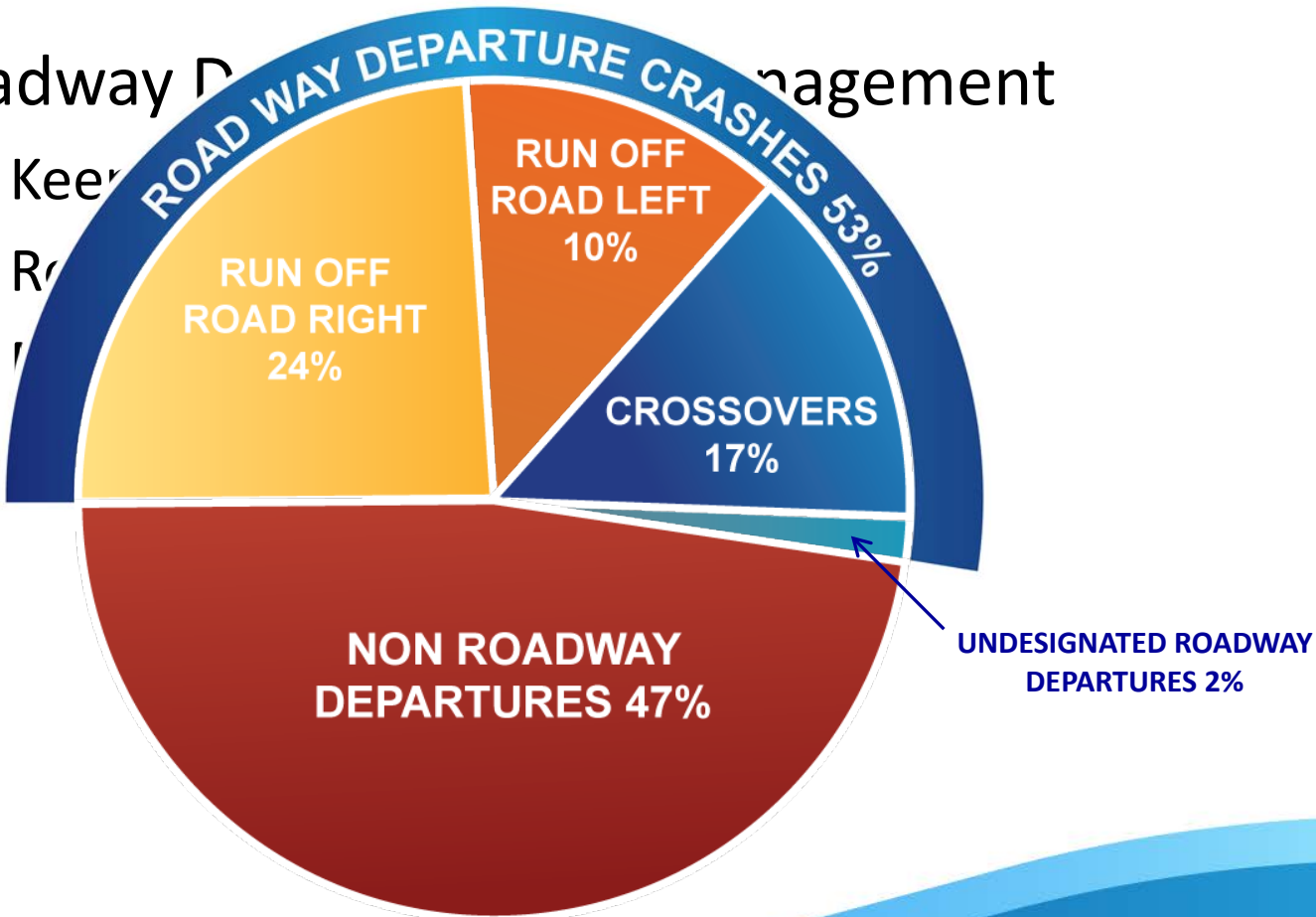
Encourage States and local agencies to use Analytical Site-Specific Approaches (such as the Highway Safety Manual) and Systemic Planning Approaches to Make Safety Investment Decisions

- Conduct Appropriate Analysis of Quality Safety Data
- Use Evidence-Based Framework for Decision-Making
- Use the CMF Clearinghouse to Choose Appropriate Countermeasures
- Consider the Proven Countermeasures as Viable Options

# Roadway Departure Focus Area

Roadway Departure Management

- 1. Keep
- 2. Re
- 3. M



# Enhanced Delineation and Friction for Horizontal Curves

- Low-cost treatment
- Includes signs and markings that help drivers safely negotiate curves or...
- Additional pavement friction to address geometric deficiencies and low friction
- Safety benefits
  - Up to 43% reduction of all fatal crashes



# Longitudinal Rumble Strips and Stripes on 2-Lane Roads

- Alerts drivers with sound and vibration when vehicles cross the edge or center line.
- Reduction of Severe Crashes:
  - Rural Edge, Run Off Road: 36%
  - Rural Center, Head-ons: 44%
  - Urban Center, Head-ons: 64%



# Safety Edge<sub>SM</sub>

- Consolidating the pavement edge into 30° shape during paving to provide stability for vehicles recovering from a roadway departure due to pavement drop off
- Implement as a standard practice for paving and resurfacing projects
- 6% reduction of total crashes
- B/C range: 4 to 63





# Intersection-Corridor Focus Area:

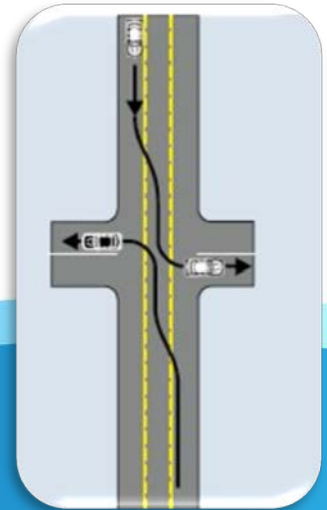
- Corridor Access Management
- Backplates with Retroreflective Borders
- “Road Diet” (Roadway Reconfiguration)
- Roundabouts

*“There are approximately 300,000 signalized intersections in the United States. About 1/3 of all intersection fatalities occur at these locations; resulting in roughly 2,300 people killed in a single year. “*

*– Roundabouts Fact Sheet*

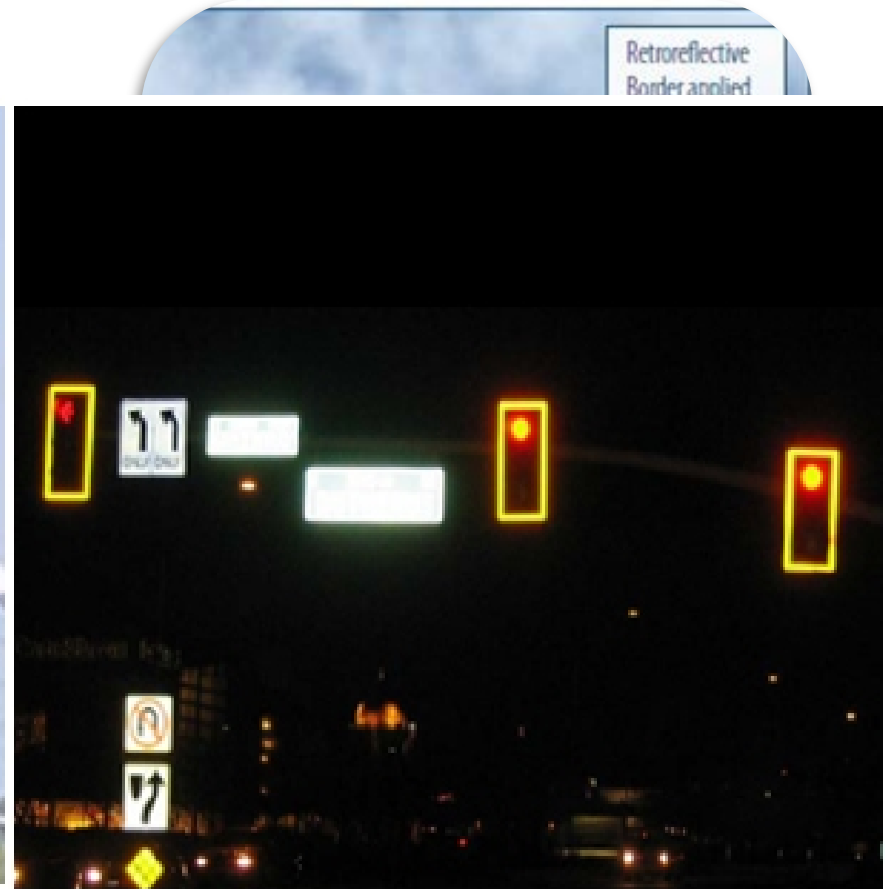
# Corridor Access Management

- Involves the design, implementation and control of entry and exit points along a roadway
- Reducing access points along urban/suburban corridor can reduce injury and fatal crashes by about 25%<sup>1</sup>
- May be considered as a component of general corridor improvements or as its own project



# Backplates with Retroreflective Borders

- Retroreflective strip added



as a systemic retrofit safety improvement

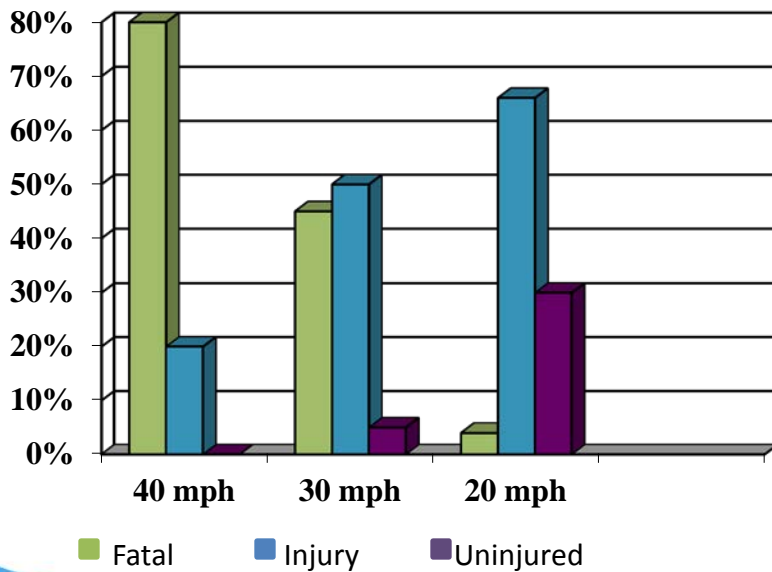
# “Road Diet” (Roadway Reconfiguration)

- Conversion of four-lane undivided roadway into three lanes with two through-lanes and a center two way left turn.
- Best on Roadways with ADT of 20,000 or less.  
Safety results: 29% reduction in all roadway crashes



# Pedestrian Safety Focus Area

- Medians and Pedestrian Crossing Islands in Urban and Suburban Areas



## Pedestrian Safety Facts:

- Pedestrians represent over 12% of Highway Fatalities.
- Midblock locations account for over 70% of pedestrian fatalities.
- Over 80% of pedestrian fatalities hit by vehicles traveling at 40 mph or faster will die, while less than 10% die when hit at 20 mph or less.

# Medians and Pedestrian Crossing Islands in Urban and Suburban Areas

- *Median* is between opposing lanes of traffic, excluding turn lanes (can be paint or concrete).
- Islands can be placed at intersections or midblock locations to separate crossing pedestrians from motor vehicles.
- Use in curbed sections of multi-lane roadways in urban areas with vehicular-pedestrian conflicts and med/high travel speeds.



Safety results:  
46% reduction in pedestrian crashes  
39% reduction in total crashes

# Fact Sheets and Further Information

FHWA website:

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

## Office of Safety Proven Safety Countermeasures

These nine countermeasures address crashes that occur in the focus areas of intersections, pedestrians, and roadway departure.



### Proven Safety Countermeasures Backplates with Retroreflective Borders

### Proven Safety Countermeasures Longitudinal Rumble Strips and Stripes on 2-Lane Roads

#### Longitudinal Rumble Strips and Stripes On 2-Lane Roads

"A Roadway Departure Countermeasure"

Longitudinal rumble strips are milled or raised elements on the pavement intended to alert inattentive drivers through vibration



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-road  
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er line  
r a single or double line of rumbles. They reduce cross center road left crashes.  
strips where the pavement marking is placed over the rumble of the pavement marking.

hanced retroreflectivity. For more challenging curves, dual i can be used. Pavement markings are also an effective pavement friction is critical for changing vehicle direction and surges or high friction surface treatments should be considered for urves with higher operating speeds.

nges in the roadway greatly improve the safety for the curve, a contributing factor to the high incidence of crashes on curves is a more uniform application across the U.S. Other recent research for improving safety with low cost options. In addition to these challenging curves, such as dynamic advanced curve signs or dynamic

valable. While they typically have a higher unit cost than traditional curve location for a relatively low-cost. Additionally, where cross-ation exist, this can be a low-cost alternative to address a problem in

### Proven Safety Countermeasures Medians and Pedestrian Crossing Islands in Urban and Suburban Areas

Medians and Pedestrian Crossing Islands in Urban and Suburban Areas

### Proven Safety Countermeasures Roundabouts

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achets to multi-lane  
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s from each other.  
onstrated a 46%  
duction in

n and suburban  
an 12,000 ADT]  
8 feet wide for

to most other intersection forms  
use of effectiveness of

and local road agencies have adopted  
is encouraged this treatment as a human  
blind drivers. The magnitude of  
the CMF Clearinghouse is a 15% reduction

systemically improve safety performance  
ickplate can be a very low-cost safety  
ing traffic signals that lack even standard  
s accommodated on existing mast arm  
specially evaluated. The most effective mars  
settlement for signalized intersections across  
ernization projects, as well as being a  
rash histories. Implementation of this  
annual on Uniform Traffic Control Devices.

duction of head-on / fatal and injury crashes.  
duction of head-on / fatal and injury crashes.  
uction of run-off-road fatal and injury crashes.

ulti-lane facilities, the focus here is on two-lane facilities where  
show even higher crash reductions than on other roadways.

Improving safety is a top priority for the U.S. Department of Transportation, and FHWA remains committed to road Nation's highways. We are highly confident that certain processes, infrastructure design techniques, and highway encouraged.

Memo  
2012 "Guidance Memorandum on Promoting the Implementation of Proven Safety Countermeasures" (HTML)

In 2008, FHWA issued a "Guidance Memorandum on the Consideration and Implementation of Proven Safety Co believe certain processes, design techniques, or safety countermeasures should be used. Many of the counterme and FHWA is updating its previous guidance. While agencies should still consider the application of all of the cou "Guidance Memorandum on Promoting the Implementation of Proven Safety Countermeasures" supersedes that l latest safety research. Safety practitioners are encouraged to consider this new set basis.

Click on one of the nine countermeasures below for more information and a download

Roundabouts

Corridor  
Access  
Management

#### Proven Safety Countermeasures Corridor Access Management

Corridor Access Management  
"An Intersection Countermeasure"

Access management is a set of techniques that state and local governments use to control access to highways, major arterials, and other roadways. The benefits of access management include improved movement of traffic, reduced crashes, and fewer vehicle conflicts. Access management principles are applicable to roadways of all types, ranging from fully access controlled facilities, such as freeways to those with little or no access control such as local streets. Successful access management, managed by changes in access density, leads to substantially enhanced safety, presence capacity, and provide for pedestrian and bicycle needs.

Background  
Every at-grade intersection, from a busy signalized intersection to a simple ungraded driveway, has the potential for conflicts between motorized vehicles, pedestrians and bicyclists. In general, the number and types of conflict points (i.e., the number of locations where the travel paths of two different users may cross) influence the safety performance of the intersection or driveway. Analysis of access-related crashes has revealed that driveways and minor uncontrolled intersections can be especially dangerous locations for pedestrians and bicyclists.

Access management refers to the design, implementation and control of entry and exit points along a roadway. This includes intersections with other roads and driveways that share adjacent properties. These entry and exit points can be managed by careful planning regarding their location, complexity, extent (i.e. types of turning movements allowed), and appropriateness, use of medians or other schemes that facilitate or prohibit access to the roadway. Developing and implementing effective access management strategies that improve safety requires considering the location of driveway in the context of current and future access needs, current and future intersection operations, and mobility for pedestrians and bicyclists. The magnitude of effectiveness of access management per the Highway Safety Manual is:

- 6-23% reduction in all crashes along two-lane rural highways
- 10-15% reduction in severe (injury/fatal) crashes along urban/suburban arterials

Safe Roads for a Safer Future

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# Questions and Answers