

VOLUME 20

NCHRP

NATIONAL
COOPERATIVE
HIGHWAY
RESEARCH
PROGRAM

REPORT 500

Guidance for Implementation of the
AASHTO Strategic Highway Safety Plan

Volume 20: A Guide for
Reducing Head-On
Crashes on Freeways



TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

Reducing Head-on Crashes on Freeways

Larry Hagen, P.E., PTOE



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How big an issue are
head-on crashes?



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- Map Layers
- Bar Chart
- Pie Chart
- 2D Chart

Layers

Events

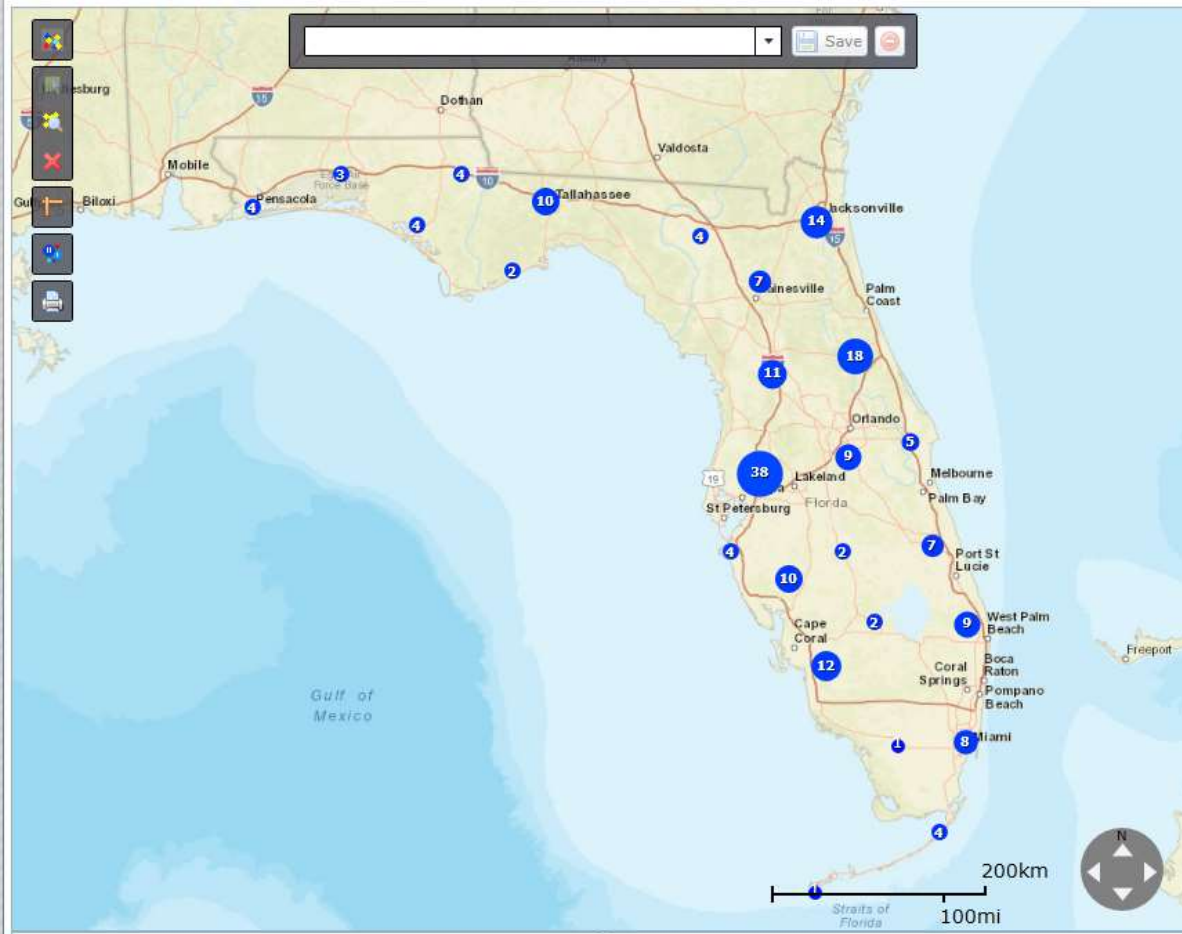
- Crash

Reference

- Hospital
- School
- Fire Department
- Police Station

Base Map

- Cartographic
- Aerial
- Hybrid
- Grayscale



Showing: All (193) / Mapped (193) / Selected (0) Retrieved 193 (193 Mapped)

Crashes

Time and Place Filters

- Date/Time**
 - Date Range: 4/1/2016 - 4/1/2017
 - Day of Week: All
 - Time of Day: All
- Geographic Area**
 - Geographic Extent: State of Florida

Crash Filters

- Street Network**
 - Network Extent: None
- Database**
 - DHSMV Report No.
 - DHSMV Report Number(s):
 - Crashes: Crashes on Public Roads
 - Form Type: All
 - DHSMV Codeable Crashes: All
 - Reporting Agency: All
- Participants**
 - Driver Gender: All
 - Driver Age: All
 - Pedestrian Age: All
- Hide Unused Filters

Search Clear

Query Filters

- Map Layers
- Bar Chart
- Pie Chart
- 2D Chart

Layers

Events

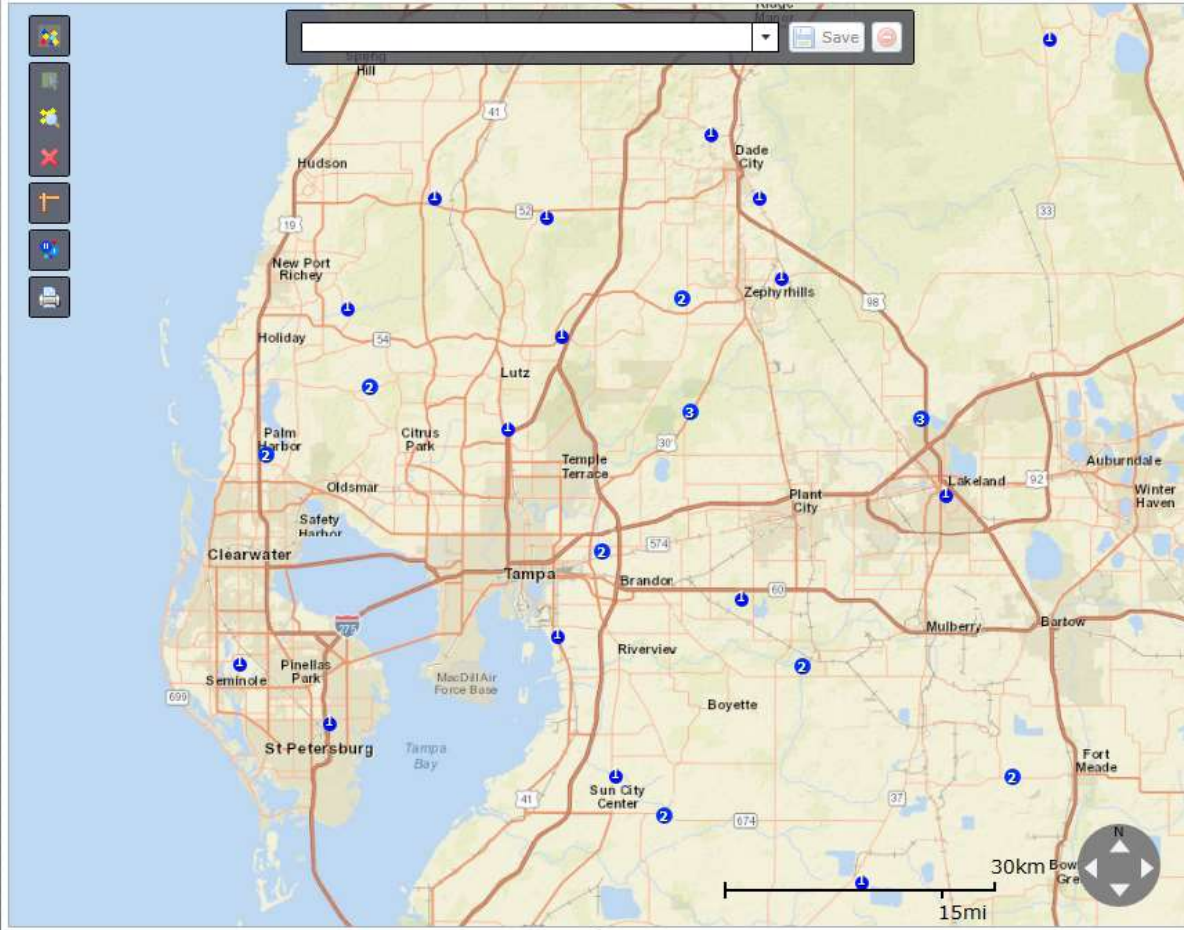
- Crash

Reference

- Hospital
- School
- Fire Department
- Police Station

Base Map

- Cartographic
- Aerial
- Hybrid
- Grayscale



Showing: All (193) / Mapped (193) / Selected (0) Retrieved 193 (193 Mapped)

Crashes

Query Filters

- Day of Week: All
- Time of Day: All
- Geographic Area: Geographic Extent: State of Florida
- Crash Filters
 - Street Network: Network Extent: None
 - Database: DHSMV Report No., DHSMV Report Number(s):
 - Crashes: Crashes on Public Roads
 - Form Type: All
 - DHSMV Codeable Crashes: All
 - Reporting Agency: All
- Participants
 - Driver Gender: All
 - Driver Age: All
 - Pedestrian Age: All
 - Cyclist Age: All
 - Non-Auto Mode of Travel: All

Hide Unused Filters

Search Clear

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Available for download in the download pod.



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AASHTO Strategic Highway Safety Plan

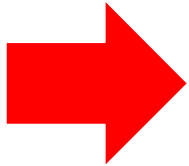
Identified 22 goals to pursue in order to reduce highway crash fatalities

- Goal 15 – Keep vehicles on the roadway
- Goal 16 – Minimize the consequences of leaving the road
- Goal 18 – Reduce head-on and across-median crashes



Addressed in four emphasis areas:

- Run-off-road (ROR) crashes
- Head-on collisions
- Head-on collisions on freeways
- Crashes with trees in hazardous locations



Addressed in four emphasis areas:

- 6 • Run-off-road (ROR) crashes
- 4 • Head-on collisions
- 20 • Head-on collisions on freeways
- 3 • Crashes with trees in hazardous locations



VOLUME 20

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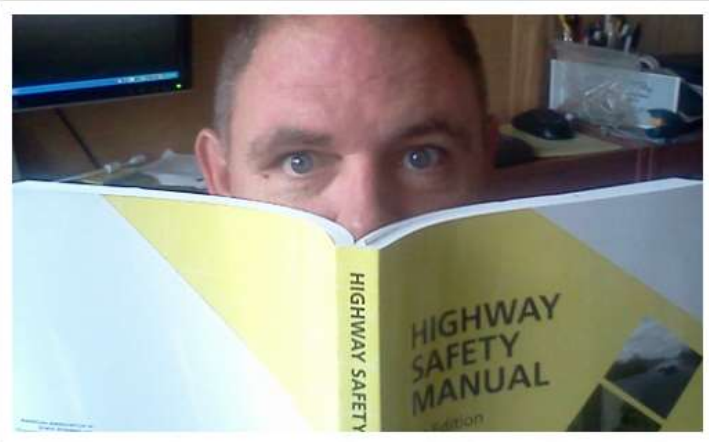
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Glad you stopped by!

My goal for this site is to provide excellent traffic safety training so that you too can call yourself a traffic safety guru. I have developed online training sessions that you can enjoy, and hopefully benefit from, right from the comfort of your computer. My intent is to deliver these webinars as short, one-hour sessions that will be perfect for a "Lunch & Learn" type of thing that you can share in your office, or just use to sharpen your own technical skills. The recorded sessions are available for download, so that you can take the training on your own schedule.

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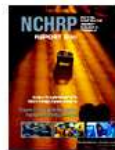
CART (0)



Useful links:

- Distracted Driving Resource Guide
- District 7 Local Agency Traffic Safety Academy
- FDOT Safety Page
- FHWA Safety Page
- Florida Section ITE
- History of policing in America
- Insurance Institute for Highway Safety
- NCHRP 500**
- Ped/Bike Information Center

Transportation Research Board > Blurbs > NCHRP Report 500: Guidance for Implementation of the AASHTO Strategic Highway Safety Plan



NCHRP Report 500: Guidance for Implementation of the AASHTO Strategic Highway Safety Plan

In 1998, the American Association of State Highway and Transportation Officials (AASHTO) approved its [Strategic Highway Safety Plan](#), which was developed by the AASHTO Standing Committee for Highway Traffic Safety with the assistance of the Federal Highway Administration, the National Highway Traffic Safety Administration, and the Transportation Research Board Committee on Transportation Safety Management. The plan includes strategies in 22 key emphasis areas that affect highway safety. The plan's goal is to reduce the annual number of highway deaths by 5,000 to 7,000. Each of the 22 emphasis areas includes strategies and an outline of what is needed to implement each strategy.

The National Cooperative Highway Research Program (NCHRP) has developed a series of guides to assist state and local agencies in reducing injuries and fatalities in targeted areas. The guides correspond to the emphasis areas outlined in the AASHTO Strategic Highway Safety Plan. Each guide includes a brief introduction, a general description of the problem, the strategies/countermeasures to address the problem, and a model implementation process.



[A Guide for Reducing Speeding-Related Crashes](#)

April 8, 2009

TRB's National Cooperative Highway Research Program (NCHRP) Report 500, Vol. 23: Guidance for Implementation of the AASHTO Strategic Highway Safety Plan: A Guide for Reducing Speeding-Related Crashes provides suggested guidance on strategies that can be employed to reduce crashes involving speed...



[A Guide for Addressing Collisions Involving Motorcycles](#)

January 24, 2009

TRB's National Cooperative Highway Research Program (NCHRP) Report 500, Vol. 22: Guidance for Implementation of the AASHTO Strategic Highway Safety Plan: A Guide for Addressing Collisions Involving Motorcycles provides guidance on strategies that can be employed to reduce crashes involving motor...



[Safety Data and Analysis in Developing Emphasis Area Plans](#)

September 4, 2008

TRB's National Cooperative Highway Research Program (NCHRP) Report 500, Vol. 21: Guidance for Implementation of the AASHTO Strategic Highway Safety Plan: Safety Data and Analysis in Developing Emphasis Area Plans provides guidance on data sources and analysis techniques that may be employed to a...



[A Guide for Reducing Head-On Crashes on Freeways](#)

June 29, 2006

TRB's National Cooperative Highway Research Program (NCHRP) Report 500, Vol. 20: Guidance for Implementation of the AASHTO Strategic Highway Safety Plan: A Guide for Reducing Head-On Crashes on Freeways, provides strategies that can be employed to reduce head-on crashes on freeways. In 1998, the...



[A Guide for Reducing Collisions Involving Young Drivers](#)

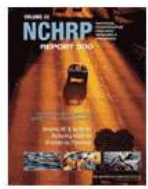
- All
- by Series
- by Subject
- Errata

- Cooperative Research Programs Series
- Highway (NCHRP)
- Transit (TCRP)
- Airport (ACRP)
- Hazardous Materials (HMCRP)
- Freight (NCFRP)
- Rail (NCRRP)

- Other TRB Series
- Policy Studies
- Strategic Highway Research (SHRP 2)
- Exploratory Analysis (IDEA)
- Commercial Truck and Bus Safety (CTBSSP)
- Conferences and Workshops Proceedings
- TRR Journal
- Transportation Research Circulars

- Periodicals and Other Documents
- TR News Magazine
- Critical Issues in Transportation
- Practice-Ready Papers
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- Millennium Papers
- Miscellaneous

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TRB's National Cooperative Highway Research Program (NCHRP) Report 500, Vol. 20, Guidance for Implementation of the AASHTO Strategic Highway Safety Plan: A Guide for Reducing Head-On Crashes on Freeways, provides strategies that can be employed to reduce head-on crashes on freeways.

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Over the next few years the National Cooperative Highway Research Program (NCHRP) will be developing a [series of guides](#), several of which are already available, to assist state and local agencies in reducing injuries and fatalities in targeted areas. The guides correspond to the emphasis areas outlined in the AASHTO Strategic Highway Safety Plan. Each guide includes a brief introduction, a general description of the problem, the strategies/countermeasures to address the problem, and a model implementation process.

Project: [Project Information](#)
DOI: [10.17226/23088](#)
Project Number: 17-18(03)

E-Newsletter Type: [Recently Released TRB Publications](#)
TRB Publication Type: [NCHRP Report](#)

This Summary Last Modified On: 4/15/2016

How do head-on crashes occur on freeways?

1. A head-on crash can occur when a vehicle crosses the median and crashes with a vehicle traveling in the opposite direction
2. A head-on crash can also occur when a vehicle inadvertently travels the wrong way in the opposing traffic lanes



Median Crossover Crashes

According to the report...

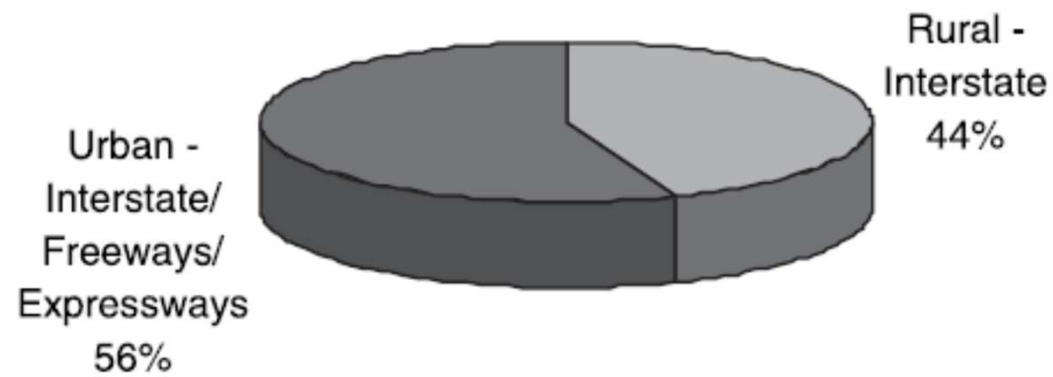
“The Florida Department of Transportation found in an unpublished preliminary study that is still underway that 62 percent of all cross-median crashes occurred within 1/2-mile and 82 percent occurred within 1 mile of interchange ramp termini.”



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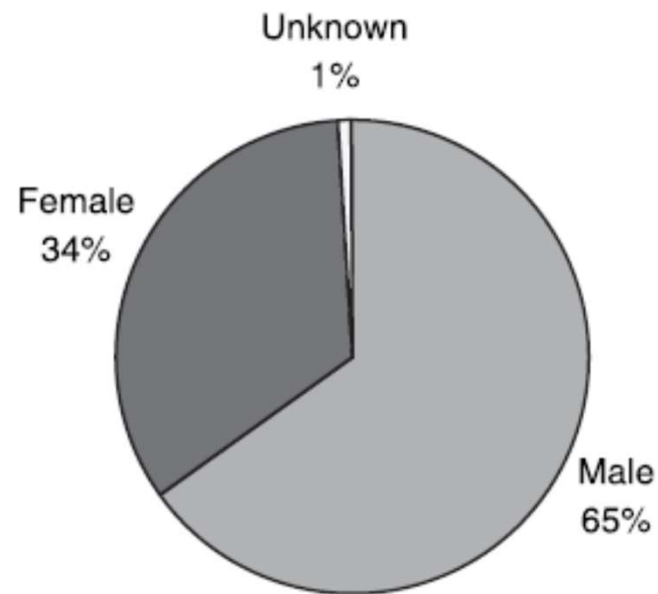
Urban vs Rural Head-On Fatal Crashes

Head-on Crashes on Interstates, Urban vs. Rural
Source: 2003 FARS data.



Fatal Crossover Crashes by Gender

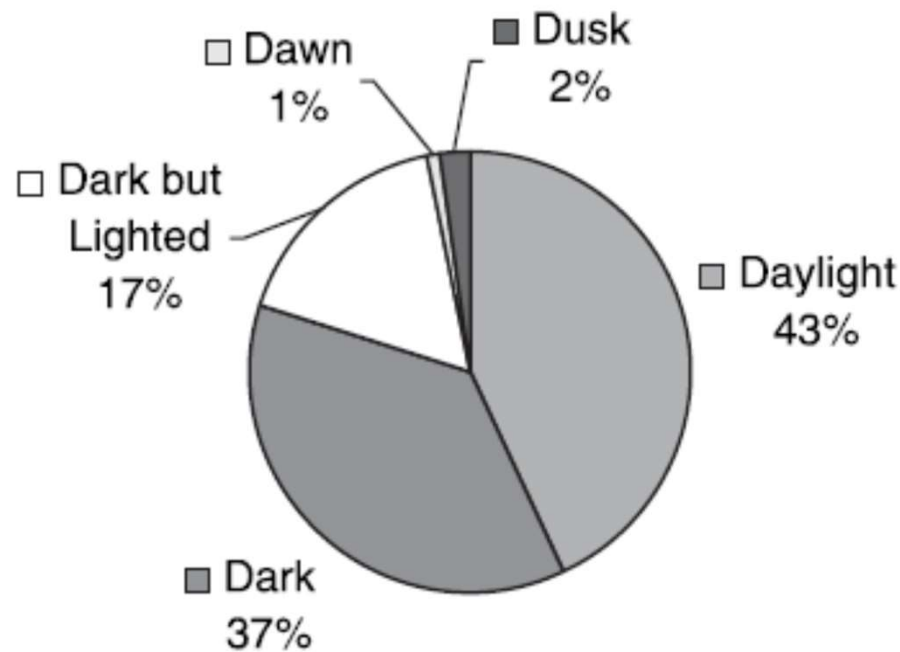
Fatal Crossover Crashes on Interstates by Gender
Source: 2003 FARS data.



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Fatal Crossover Crashes by Light Condition

Fatal Crossover Crashes on Interstates by Light Condition
Source: 2003 FARS data.



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So what do we do about
these crossover crashes?



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Install guardrail in
median of highway



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I-75
Florida
Street View - Jul 2015



Google



Search Results

There were 243 CMFs returned for your search on "**median barrier**". [\[modify your search\]](#).

Having trouble deciding between similar CMFs? Use our [comparison tool](#) or [Check out our FAQs](#).

Overwhelmed by too many results? See our [Search Tips](#).

Star Quality Rating

- 1 (4)
- 2 (44)
- 3 (104)
- 4 (65)
- 5 (26)

Country

- U.S. & Canada (241)
- International (2)

Crash Type

Crash Severity

Roadway Type

Results Control: [Collapse All](#) | [Expand All](#)

Click on the links below to expand individual categories.

▶ Category: Access management (13)

▶ Category: Alignment (5)

▼ Category: Roadside (200)

▼ Subcategory: Median barriers (122)

▶ Countermeasure: Install any type of median barrier

▼ Countermeasure: Install beam guardrails on median of divided highway

[Compare](#)

CMF

CRF(%)

Quality

Crash Type

Crash Severity

Area Type

Reference

Comments

- 3 (104)
 - 4 (65)
 - 5 (26)
 - ▶ Country
 - U.S. & Canada (241)
 - International (2)
 - ▶ Crash Type
 - ▶ Crash Severity
 - ▶ Roadway Type
 - ▶ Area Type
 - ▶ Intersection Type
 - ▶ Intersection Geometry
 - ▶ Traffic Control
 - ▶ In HSM
-

- ▶ Category: Alignment (5)
- ▼ Category: Roadside (200)
 - ▼ Subcategory: Median barriers (122)
 - ▶ Countermeasure: Install any type of median barrier
 - ▼ Countermeasure: Install beam guardrails on median of divided highway

<input type="checkbox"/>	CMF	CRF(%)	Quality	Crash Type	Crash Severity	Area Type	Reference	Comments
<input type="checkbox"/>	0.22	78	★★★★☆	Cross median	All	Not specified	Hauer, E., 2000	
<input type="checkbox"/>	0.13	87	★★★★☆	All	Fatal	Not specified	Hauer, E., 2000	
<input type="checkbox"/>	1.4	-40	★★★★☆	All	Property Damage Only (PDO)	Not specified	Hauer, E., 2000	
<input type="checkbox"/>	1.18	-18	★★★☆☆	All	Serious injury, Minor injury	Not specified	Hauer, E., 2000	

**NOTE: You can compare CMFs across countermeasures, subcategories, and categories.*

- ▶ Countermeasure: Install cable median barrier
- ▶ Countermeasure: Install cable median barrier (high tension)
- ▶ Countermeasure: Install cable median barrier (low or high tension on curve)

▼ Countermeasure: Install beam guardrails on median of divided highway

<input type="checkbox"/> Compare	CMF	CRF(%)	Quality	Crash Type	Crash Severity	Area Type	Reference	Comments
<input type="checkbox"/>	0.22	78	★★★★★	Cross median	All	Not specified	Hauer, E., 2000	
<input type="checkbox"/>	0.13	87	★★★★☆	All	Fatal	Not specified	Hauer, E., 2000	
<input type="checkbox"/>	1.4	-40	★★★★☆	All	Property Damage Only (PDO)	Not specified	Hauer, E., 2000	
<input type="checkbox"/>	1.18	-18	★★★☆☆	All	Serious injury, Minor injury	Not specified	Hauer, E., 2000	

Compare

Reset Compare

**NOTE: You can compare CMFs across countermeasures, subcategories, and categories.*



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Install shoulder rumble strips



TrafficSafetyGuru.com

▼ Countermeasure: Install shoulder rumble strips

Compare	CMF	CRF(%)	Quality	Crash Type	Crash Severity	Area Type	Reference	Comments
<input type="checkbox"/>	0.763	23.74	★★★★☆	Cross median,Fixed object,Run off road,Other	All	Rural	Graham et al., 2014	This CMF applies to all ... [read more]
<input type="checkbox"/>	0.771	22.95	★★★★☆	Other	All	Rural	Graham et al., 2014	This CMF applies to hit-barrier ... [read more]
<input type="checkbox"/>	0.642	35.84	★★★★☆	Fixed object	All	Rural	Graham et al., 2014	This CMF applies to fixed-object ... [read more]
<input type="checkbox"/>	0.765	23.49	★★★★☆	Fixed object	Fatal,Serious injury,Minor injury	Rural	Graham et al., 2014	This CMF applies to fixed-object ... [read more]
<input type="checkbox"/>	0.476	52.39	★★★☆☆	Other	All	Rural	Graham et al., 2014	This CMF applies to other ... [read more]

[Compare](#)

[Reset Compare](#)

*NOTE: You can compare CMFs across countermeasures, subcategories, and categories.



Install concrete guardrail in median



TrafficSafetyGuru.com

▼ Countermeasure: Install concrete guardrail in median

<input type="checkbox"/> Compare	CMF	CRF(%)	Quality	Crash Type	Crash Severity	Area Type	Reference	Comments
<input type="checkbox"/>	2.2	-120	★★★★★	Single vehicle	All	Rural	Tarko, A.P. et al., 2008	
<input type="checkbox"/>	0.8	20	★★★★★	Sideswipe	All	Rural	Tarko, A.P. et al., 2008	
<input type="checkbox"/>	0	100	★★★★★	Cross median, Frontal and opposing direction sideswipe, Head on	All	Rural	Tarko, A.P. et al., 2008	
<input type="checkbox"/>	1.15	-15	★★★★	All	Serious injury, Minor injury	Not specified	Elvik, R. and Vaa, T., 2004	

Compare

Reset Compare

*NOTE: You can compare CMFs across countermeasures, subcategories, and categories.



Install median barrier



▼ Countermeasure: Install median barrier

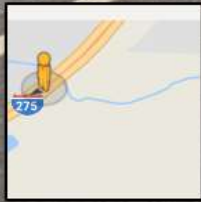
Compare	CMF	CRF(%)	Quality	Crash Type	Crash Severity	Area Type	Reference	Comments
<input type="checkbox"/>	3.25	-225	★★★★★	Cross median,Fixed object,Run off road,Other	All	Rural	Graham et al., 2014	This CMF applies to all ... [read more]
<input type="checkbox"/>	1.55	-55	★★★★★	Cross median,Fixed object,Run off road,Other	Fatal,Serious injury,Minor injury	Rural	Graham et al., 2014	This CMF applies to all ... [read more]
<input type="checkbox"/>	3.77	-277	★★★★★	Cross median,Fixed object,Run off road,Other	All	Rural	Graham et al., 2014	This CMF applies to all ... [read more]
<input type="checkbox"/>	1.6	-60	★★★★★	Cross median,Fixed object,Run off road,Other	Fatal,Serious injury,Minor injury	Rural	Graham et al., 2014	This CMF applies to all ... [read more]



<input type="checkbox"/>	0.03	97	★★★★★	Cross median	All	Rural	Graham et al., 2014	This CMF applies to cross-median ... [read more]
<input type="checkbox"/>	0.04	96	★★★★★	Cross median	Fatal,Serious injury,Minor injury	Rural	Graham et al., 2014	This CMF applies to cross-median ... [read more]
<input type="checkbox"/>	0.04	96	★★★★★	Cross median	All	Rural	Graham et al., 2014	This CMF applies to all ... [read more]
<input type="checkbox"/>	0.08	92	★★★★★	Cross median	Fatal,Serious injury,Minor injury	Rural	Graham et al., 2014	This CMF applies to all ... [read more]
<input type="checkbox"/>	0.31	69	★★★★★	Cross median,Other	All	Rural	Graham et al., 2014	This CMF applies to cross-median ... [read more]
<input type="checkbox"/>	0.33	67	★★★★★	Cross median,Other	Fatal,Serious injury,Minor injury	Rural	Graham et al., 2014	This CMF applies to ... [read more]



I-275
Lutz, Florida
Street View - Aug 2016



Google



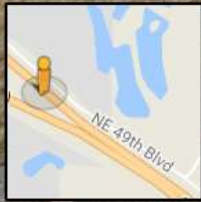
Install median bifurcation



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Florida's Turnpike
Wildwood, Florida

Street View - Dec 2016



Google



▼ Countermeasure: Change horizontal alignment

Compare	CMF	CRF(%)	Quality	Crash Type	Crash Severity	Area Type	Reference	Comments
<input type="checkbox"/>	1.284	-28.38	★★★★☆	Other	All	Rural	Graham et al., 2014	This CMF applies to the ... [read more]
<input type="checkbox"/>	1.444	-44.4	★★★★☆	Fixed object	All	Rural	Graham et al., 2014	This CMF applies to the ... [read more]
<input type="checkbox"/>	1.205	-20.48	★★★★☆	Fixed object	All	Rural	Graham et al., 2014	This CMF applies to the ... [read more]
<input type="checkbox"/>	1.319	-31.93	★★★★☆	Fixed object	All	Rural	Graham et al., 2014	This CMF applies to the ... [read more]
<input type="checkbox"/>	1.518	-51.83	★★★★☆	Fixed object	Fatal, Serious injury, Minor injury	Rural	Graham et al., 2014	This CMF applies to the ... [read more]

[Compare*](#)

[Reset Compare](#)

*NOTE: You can compare CMFs across countermeasures, subcategories, and categories.



▼ Countermeasure: Increase median shoulder width

<input type="checkbox"/> Compare	CMF	CRF(%)	Quality	Crash Type	Crash Severity	Area Type	Reference	Comments
<input type="checkbox"/>	1.035	-3.47	★★★★☆	Cross median,Fixed object,Run off road,Other	All	Rural	Graham et al., 2014	This CMF applies to a ... [read more]
<input type="checkbox"/>	1.522	-52.17	★★★★☆	Cross median,Fixed object,Run off road,Other	All	Rural	Graham et al., 2014	This CMF applies to a ... [read more]
<input type="checkbox"/>	0.819	18.14	★★★★☆	Other	All	Rural	Graham et al., 2014	This CMF applies to a ... [read more]
<input type="checkbox"/>	0.69	31.03	★★★★☆	Other	All	Rural	Graham et al., 2014	This CMF applies to a ... [read more]
<input type="checkbox"/>	1.415	-41.51	★★★★☆	Fixed object	All	Rural	Graham et al., 2014	This CMF applies to a ... [read more]
<input type="checkbox"/>	1.316	-31.63	★★★★☆	Fixed object	All	Rural	Graham et al., 2014	This CMF applies to a ... [read more]
<input checked="" type="checkbox"/>	1.036	-3.6	★★★★☆	Other	All	Rural	Graham et al., 2014	This CMF applies to a ... [read more]
<input type="checkbox"/>	1.151	-15.05	★★★★☆	Other	Fatal,Serious injury,Minor injury	Rural	Graham et al., 2014	This CMF applies to a ... [read more]



Wrong Way Entry



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Transportation Safety Council Edmund R. Ricker Award (Organization)

Florida's Wrong-Way Driving Mitigation Initiative

Florida Department of Transportation



The main purpose of the Florida Wrong-Way Driving Mitigation Initiative is to approach wrong-way driving (WWD) in a methodical and scientific

way to comprehensively address the WWD concern. Florida Department of Transportation (FDOT) has been continually exploring ways for developing and deploying countermeasures while proactively identifying areas to help mitigate WWD. The initiative is data-driven, cross-jurisdictional, multi-disciplinary, replicable, and decision-centric. The WWD evolving practice from FDOT has garnered interest from several states, with Caltrans paying a two-day visit to FDOT to see the field deployments and interact.





Wig-Wag Flashing Beacons



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Internally Illuminated Raised Pavement Markers



Revised Signing & Pavement Marking Standards



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Red RRFBs on WRONG WAY Signs



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LEDs Around WRONG WAY Signs



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Blank-Out WRONG WAY Signs



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Objectives for Addressing Head-On Crashes on Freeways

- 18.2A – Keep vehicles from departing the traveled way
- 18.2B – Minimize the likelihood of head-on crashes with an oncoming vehicle
- 18.2C – Reduce the severity of median barrier crashes that occur
- 18.2D – Enhance enforcement and awareness of traffic regulations
- 18.2E – Improve coordination of agency safety initiatives



Keep vehicles from departing the traveled way

- Install left shoulder rumble strips
- Provide enhanced pavement markings and median delineation
- Provide improved pavement surfaces



Minimize the likelihood of head-on crashes with an oncoming vehicle

- Provide wider medians
- Improve median design for vehicle recovery
- Install median barriers for narrow-width medians
- Implement channelization, signing & striping improvements at interchanges susceptible to wrong-way movements



Reduce the severity of median barrier crashes that occur

- Improve the design and application of barrier and attenuation systems



Enhance enforcement and awareness of traffic regulations

- Designate “Highway Safety Corridors”
- Conduct public information & education campaigns



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Improve coordination of agency safety initiatives

- Enhance agency crash data systems



Relative cost and time for implementation

Relative Cost to Implement and Operate	Strategy
<i>Time Frame: Short (less than a year)</i>	
Low	18.2.A1—Install Left Shoulder Rumble Strips 18.2.A2—Provide Enhanced Pavement Markings and Median Delineation 18.2.D1—Designate “Highway Safety Corridors”
Moderate	18.2.D2—Conduct Public Information and Education Campaigns
Moderate to High	
High	



Relative cost and time for implementation

Relative Cost to Implement and Operate	Strategy
<i>Time Frame: Medium (1–2 years)</i>	
Low	
Moderate	18.2.A3—Provide Improved Pavement Surfaces 18.2.B4—Implement Channelization, Signing and Striping Improvements at Interchanges Susceptible to Wrong-Way Movements 18.2.E1—Enhance Agency Crash Data Systems
Moderate to High	18.2.B2—Improve Median Design for Vehicle Recovery 18.2.C1—Improve Design and Application of Barrier and Attenuation Systems
High	



Relative cost and time for implementation

Relative Cost to Implement and Operate	Strategy
<i>Time Frame: Long (more than 2 years)</i>	
Low	
Moderate	18.2.B3—Install Median Barriers for Narrow-Width Medians
Moderate to High	
High	18.2.B1—Provide Wider Medians



Objectives and Strategies - Description

Objectives	Strategies
18.1 A Keep vehicles from departing the traveled way	18.2 A1 Install left shoulder rumble strips (T) 18.2 A2 Provide enhanced pavement markings and median delineation (T) 18.2 A3 Provide improved pavement surfaces (T)
18.1B Minimize the likelihood of head-on crashes with an oncoming vehicle	18.2 B1 Provide wider medians (P) 18.2 B2 Improve median design for vehicle recovery (T) —Pavement edge drop-offs —Install paved median shoulder (new) —Design for safer slopes 18.2 B3 Install median barriers for narrow-width medians (P) 18.2 B4 Implement channelization, signing and striping improvements at interchanges susceptible to wrong-way movements (T,E)
18.1 C Reduce the severity of median barrier crashes that occur	18.2 C1 Improve design and application of barrier and attenuation systems (T)
18.1 D Enhance enforcement and awareness of traffic regulations	D1 Designate “Highway Safety Corridors” (T) D2 Conduct public information & education campaigns (T)
18.1 E Improve coordination of agency safety initiatives	E1 Enhance agency crash data systems (T)

P = proven; T = tried; E = experimental. Several strategies have sub-strategies with different ratings.

Attributes of Each Strategy

Strategy Attributes for Left Shoulder Rumble Strips (T)

Attribute	Description
Technical Attributes	
Target	Drivers who unintentionally cross into the left shoulder from the travel lane. For the application here, the target population is drivers leaving the left or median side of a divided freeway or expressway.
Expected Effectiveness	On freeways, right shoulder rumble strips have proven to be a very effective way to warn drivers that they are leaving or are about to leave the road. According to FHWA, several studies have estimated that right shoulder rumble strips can reduce the rate of ROR crashes by 20 to 50 percent, but it is not known how well this number can be translated to a reduction in cross-median head-on crashes; it potentially would be lower and would also depend on the median width. <i>NCHRP Report 500, Volume 6: A Guide for Addressing Run-Off-Road Collisions</i> gives a detailed description and the statistics regarding effectiveness for specific programs applied to two-lane rural highways.



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Attributes of Each Strategy

Strategy Attributes for Left Shoulder Rumble Strips (T)

Attribute	Description
Keys to Success	To be effective, left (median) shoulder rumble strips should be installed over a continuous length of facility. See discussion below—the design should enable drainage, not create maintenance problems, and should be incorporated with other reconstruction or resurfacing of the roadway and shoulder.
Potential Difficulties	<p>Some potential pitfalls include complications with snow removal, shoulder maintenance requirements, and noise. With respect to adverse weather, ice and snow can collect in rumble strips. When the trapped water freezes, icy conditions may occur. However, if properly designed to accommodate for drainage requirements for shoulders, as well as speed, turbulence, and vibrations from passing vehicles, such factors tend to knock the ice from the rumble strips.</p> <p>There have been reports of noise complaints where shoulder rumble strips have been installed. New installations should acknowledge this concern and make provisions where necessary. Implementing a program of left rumble strips system-wide should consider local sensitivities to maintain support for such a program.</p>



Attributes of Each Strategy

Strategy Attributes for Left Shoulder Rumble Strips (T)

Attribute	Description
Appropriate Measures and Data	In implementation evaluations, <i>process measures</i> would include the number of road miles or number of hazardous locations where left rumble strips are installed. Process measures may include the aspect of exposure, and the number of vehicle-miles of travel exposed to left shoulder rumble strips.
Associated Needs	There have been a few reports of people who mistook the sounds produced by the rumble strips as car trouble. A public information or education campaign, as well as standard installation, should eliminate such misinterpretations. However, current moves to their standardized use on freeways may provide the most effective public training.



Attributes of Each Strategy

Strategy Attributes for Left Shoulder Rumble Strips (T)

Attribute	Description
<i>Organizational and Institutional Attributes</i>	
Organizational, Institutional and Policy Issues	Many states have established specific design and placement policies for the placement of right shoulder rumble strips. From the experience of these agencies it does not appear that significant extra coordination with other agencies is needed for the installation of left shoulder rumble strips.
Issues Affecting Implementation Time	This low cost strategy does not involve reconstruction and would not involve an environmental process or right-of-way acquisition. Left shoulder rumble strips in many instances can be implemented quickly, certainly within 1 year once a site is selected if the existing shoulder is in good condition and the shoulder width is adequate.
Costs Involved	Costs will vary depending on whether the strategy is implemented as a stand-alone project or incorporated as part of a reconstruction or resurfacing project already programmed.



Attributes of Each Strategy

Strategy Attributes for Left Shoulder Rumble Strips (T)

Attribute	Description
Training and Other Personnel Needs	There appear to be no special personnel needs for implementing this strategy. States can either use agency personnel or contractors. The need for training will depend on whether the agency has been using retrofitted rumble strips on freeways or other roadways. If not, either agency or contractor personnel will need to be trained in proper installation techniques.
Legislative Needs	None identified.



Designate “Highway Safety Corridors”

- More frequent and enhanced enforcement efforts
- Low-cost engineering improvements
- Educational efforts to enhance safety in the corridor



Other NCHRP 500 Guides that may help:

Strategies That Are Detailed in Other Emphasis Area Guides—Programs to improve safety related to head-on crashes for freeways should also consider applicable strategies covered in the following guides (<http://www.safety.transportation.org>):

- Head-On Collisions
- Horizontal Curves
- Aggressive Driving
- Speed Guide (under development)
- Run-Off-Road Collisions
- Rural Emergency Management Systems
- Unbelted Occupants
- Unlicensed Drivers
- Distracted Fatigued Drivers
- Alcohol Impaired Drivers
- Safety Data Needs (under development)



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Is that a pretty good resemblance?



Questions?



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