



Florida Roadway Departure and Intersection Coalition Overview

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Poll Slide #1

What influenced you to attend this session?

1. Recommended by a co-worker
2. My Boss
3. Interest in the topic
4. Related to my job

Poll Slide #2

Employer/representation

1. Federal Government
2. State Government
3. Local Government
4. Consultant
5. General Public

Florida Roadway Departure and Intersection Coalition Overview

- Overlap with other sessions
 - Access Management and Complete Streets
 - Lighting Design Updates
 - The New Guardrail Drawings
 - US 98 Lighting Project
 - Traffic Barriers
 - Roundabout Lessons Learned and Critical Features
 - Road Diets
 - I-10 Roadway Departure Study
 - ...and more

Florida Roadway Departure and Intersection Coalition Overview

- Setting The Stage
 - What the numbers tell us
 - Strategic Highway Safety Plan, Emphasis Areas, and Update
 - FHWA Focus State
 - Coalition Development
 - Timeline
- Lane Departure and Intersection Efforts
 - Plan Overview and Proven Countermeasures
- Next Steps

Florida Roadway Departure and Intersection Coalition Overview

The numbers are relative...
2012 Fatalities

Connecticut	236	Miami-Dade County - 235
Utah	217	
Nebraska	212	
Montana	205	
Idaho	184	Broward County - 184
North Dakota	170	Hillsborough County - 178
Maine	164	
South Dakota	133	Palm Beach County - 137
Hawaii	126	
Wyoming	123	
Delaware	114	Duval County - 119



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The numbers are still relative...

2014 Fatalities

Connecticut	248	Miami-Dade County - 280
Utah	256	
Nebraska	225	
Montana	192	
Idaho	186	Broward County - 173
North Dakota	135	Hillsborough County - 158
Maine	131	
South Dakota	136	Palm Beach County - 130
Hawaii	95	
Wyoming	150	
Delaware	121	Duval County - 120

FL - All Crashes Statewide

2010-14 Annual Averages

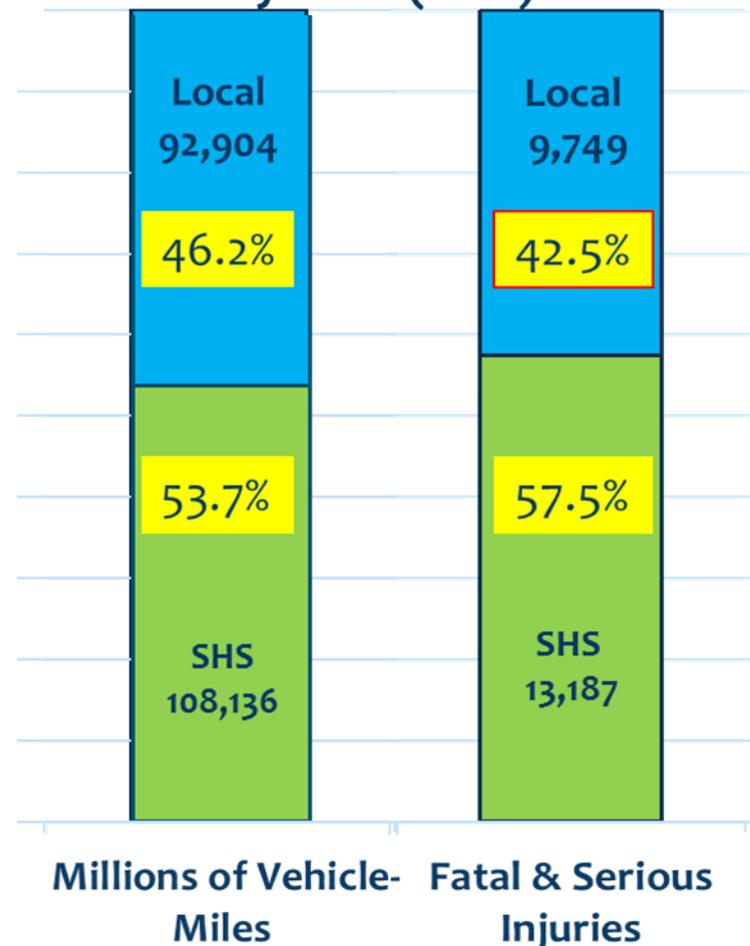
Annual 5-Year Averages for **ALL CRASHES:** **Local versus State** Highway System (SHS)

Year Span -->	06-10	07-11	08-12	09-13	10-14	11-15
SHS Serious Injuries	13,718	12,870	12,193	11,755	11,608	n/a
SHS Fatalities	1,779	1,655	1,563	1,490	1,578	n/a
SHS Combined	15,497	14,525	13,756	13,245	13,186	n/a
Local Serious Injuries	10,162	9,245	8,723	8,496	8,741	n/a
Local Fatalities	1,135	1,068	997	960	1,007	n/a
Local Combined	11,297	10,313	9,720	9,456	9,748	n/a

Fatal and Serious Injuries per MVMT

SHS	Local
0.122	0.105

Proportion of **Local** **versus State** Highway System (SHS)



Data Source: Fatalities and Serious Injuries are from the FDOT State Safety Office Crash Analysis Reporting (CAR) database. Numbers centerline miles are certified for 2014 by the FDOT's Transportation Statistics Office

Florida Roadway Departure and Intersection Coalition Overview

Setting the stage.... Florida Strategic Highway Safety Plan (SHSP)

- Existing 2012 Plan
 - EA and Coalitions
 - Aggressive Driving (c)
 - Intersection Crashes
 - Vulnerable Road Users (c)
 - Motorcycle
 - Bicycle
 - Pedestrian
 - Lane Departure Crashes
 - Impaired Driving (c)
 - At Risk Drivers (c)
 - Teen
 - Aging Road user
 - Distracted Driving
 - Traffic Data (c)
- Continuing Priority Areas
 - Occupant Protection
 - Commercial vehicles
 - Work Zone

Florida Roadway Departure and Intersection Coalition Overview

Florida Strategic Highway Safety Plan (SHSP)

- 2016 Update

- Florida Transportation Plan (FTP) and Long Range Transportation Plan (LRTP)
 - New EA's
 - Occupant Protection
 - Commercial vehicles
 - Work Zone
 - Wrong Way Driving
- Engineering Coalition (Lane Departure and Intersection)
- July-August Signing

Poll Slide #3

What percentage of crashes in Florida are considered a “Lane Departure” crash?

1. Less than 20%
2. Between 20% and 40%
3. Between 40% and 60%
4. More than 60%

Poll Slide #3

What percentage of crashes in Florida are considered a “Lane Departure” crash? (Answer 2 - 28.9% based on 5 year average)

1. Less than 20%
2. **Between 20% and 40%**
3. Between 40% and 60%
4. More than 60%

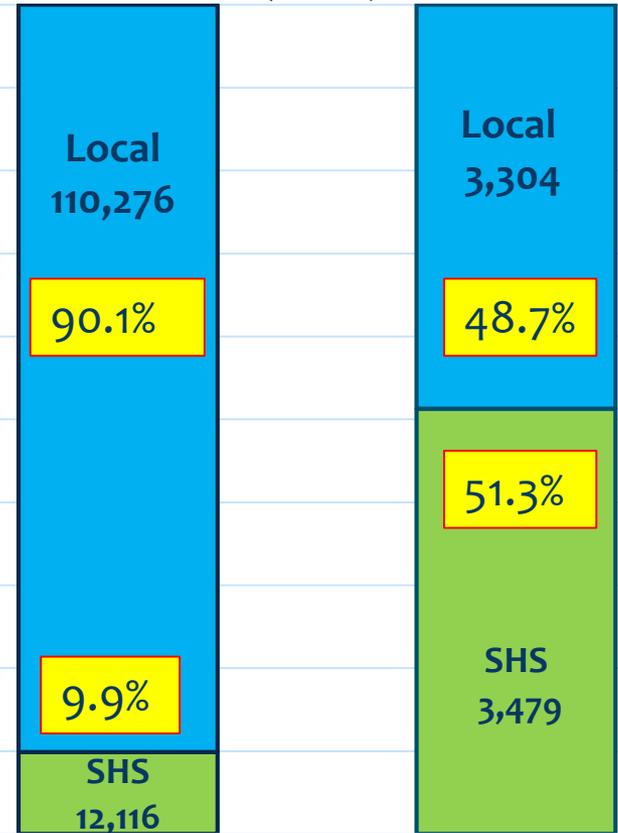
FL - Lane Departure Crashes Statewide

2010-14 Annual Averages



Proportion of **Local versus State** Highway System (SHS)

Annual 5-Year Averages for LANE DEPARTURES: Local versus State Highway System (SHS)						
Year Span -->	06-10	07-11	08-12	09-13	10-14	11-15
SHS Serious Injuries	4,249	3,855	3,424	3,051	2,757	n/a
SHS Fatalities	390	439	553	638	616	n/a
SHS Combined	4,639	4,294	3,977	3,689	3,373	n/a
Local Serious Injuries	3,226	2,967	2,829	2,776	2,802	n/a
Local Fatalities	333	365	420	459	443	n/a
Local Combined	3,559	3,332	3,249	3,235	3,245	n/a



Centerline Miles

Fatal & Serious Injuries

Fatal and Serious Injuries per Centerline Mile	
SHS	Local
0.278	0.029

Data Source: Fatalities and Serious Injuries are from the FDOT State Safety Office Crash Analysis Reporting (CAR) database. Numbers centerline miles are certified for 2014 by the FDOT's Transportation Statistics Office



Poll Slide #4

What percentage of crashes in Florida are considered an “Intersection” crash?

1. Less than 20%
2. Between 20% and 40%
3. Between 40% and 60%
4. More than 60%

Poll Slide #4

What percentage of crashes in Florida are considered an “Intersection” crash? (**Answer 3 – 42.3% based on 5 year average**)

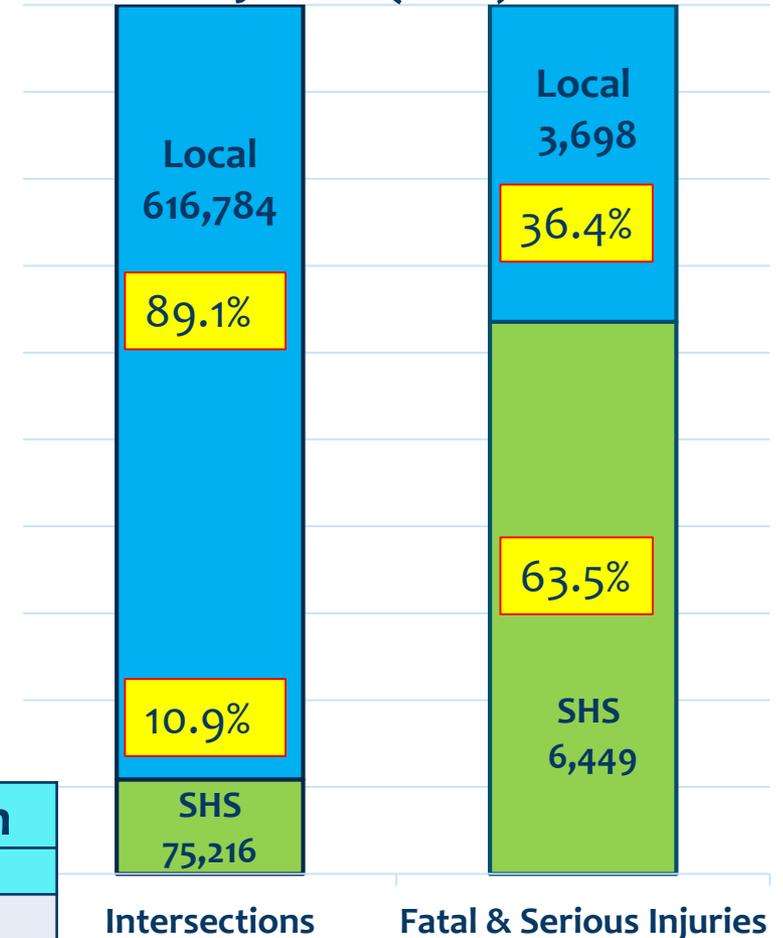
1. Less than 20%
2. Between 20% and 40%
3. **Between 40% and 60%**
4. More than 60%

FL - Intersection Crashes Statewide

2010-14 Annual Averages



Proportion of **Local versus State** Highway System (SHS)



Annual 5-Year Averages for INTERSECTIONS: Local versus State Highway System (SHS)

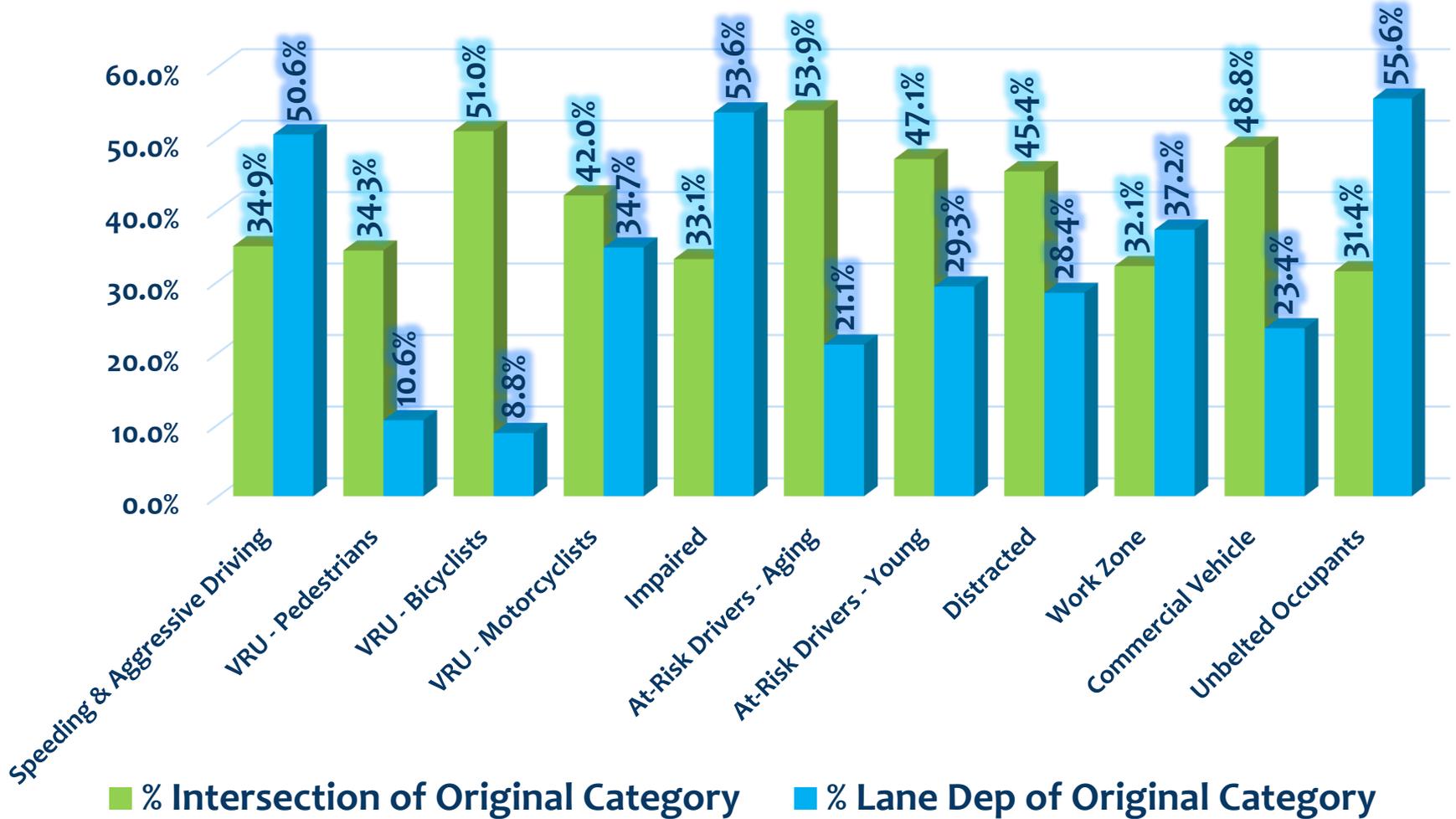
Year Span -->	06-10	07-11	08-12	09-13	10-14	11-15
SHS Serious Injuries	6,316	5,920	5,729	5,701	5,591	n/a
SHS Fatalities	534	488	462	462	493	n/a
SHS Combined	6,850	6,408	6,191	6,163	6,084	n/a
Local Serious Injuries	4,572	4,072	3,717	3,487	3,324	n/a
Local Fatalities	351	322	284	283	286	n/a
Local Combined	4,923	4,394	4,001	3,770	3,610	n/a

Fatal and Serious Injuries per Intersection

SHS	Local
0.081	0.006

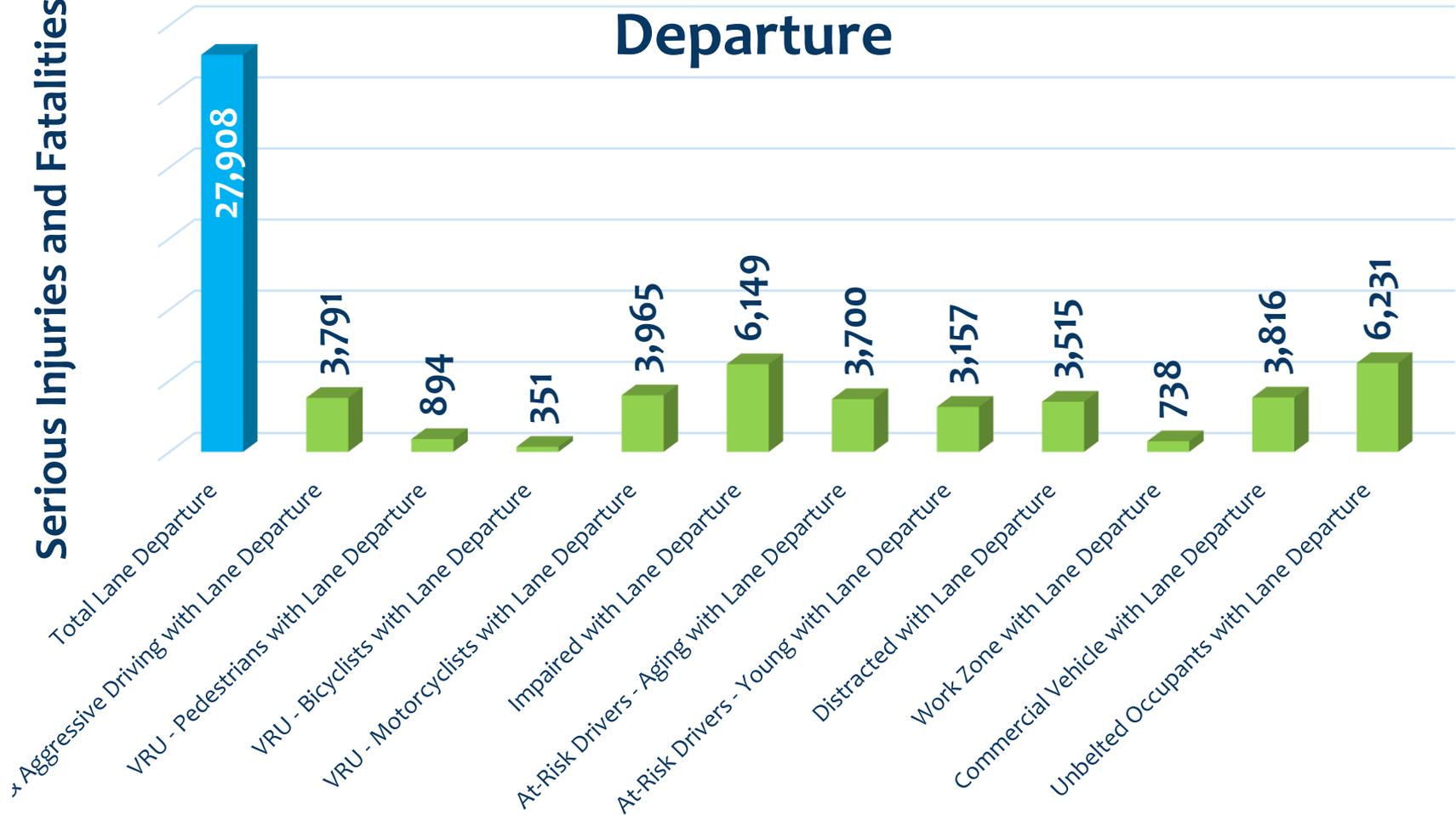
Data Source: Fatalities and Serious Injuries are from the FDOT State Safety Office Crash Analysis Reporting (CAR) database. Numbers of intersections are estimated based on FDOT's Roadway Characteristics Inventory and on the NavTeq™ data for 2011

2011-2014 Florida Fatalities and Serious Injuries in Traffic Crashes

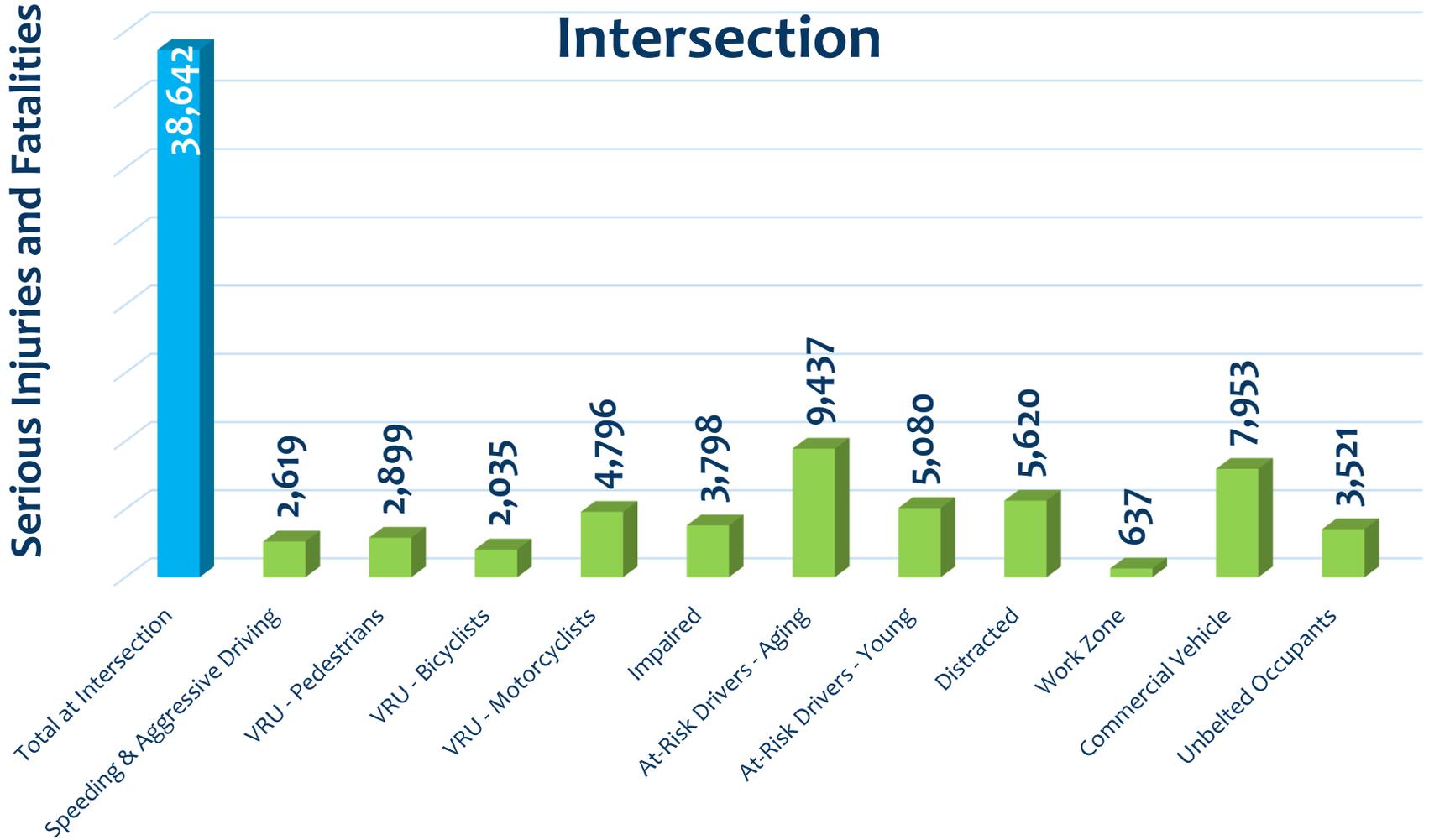


Serious Injuries and Fatalities

2011-2014 Category Overlaps with Lane Departure



2011-2014 Category Overlaps with Intersection



Florida Roadway Departure and Intersection Coalition Overview

- FHWA Focus State

- Lane Departure
- Intersection
- Bicycle - Pedestrian

Eligible Focus States



Florida Roadway Departure and Intersection Coalition Overview

- Vision/Mission

- Vision and Mission (5/2/16)

The vision of the Florida Lane Departure and Intersection Coalition is to serve the people of Florida by **delivering a transportation system that is free of fatalities and serious injuries.**

The mission of the Florida Lane Departure and Intersection Coalition is to **analyze data, develop strategies and implement improvements to eliminate severe and fatal crashes.**

Florida Roadway Departure and Intersection Coalition Overview

- Development
 - Follow best practices from existing coalitions
 - Representation from Central Office and District Staff (early stages)
 - Sharing Information
 - Sharepoint site in development

Florida Roadway Departure and Intersection Coalition Overview

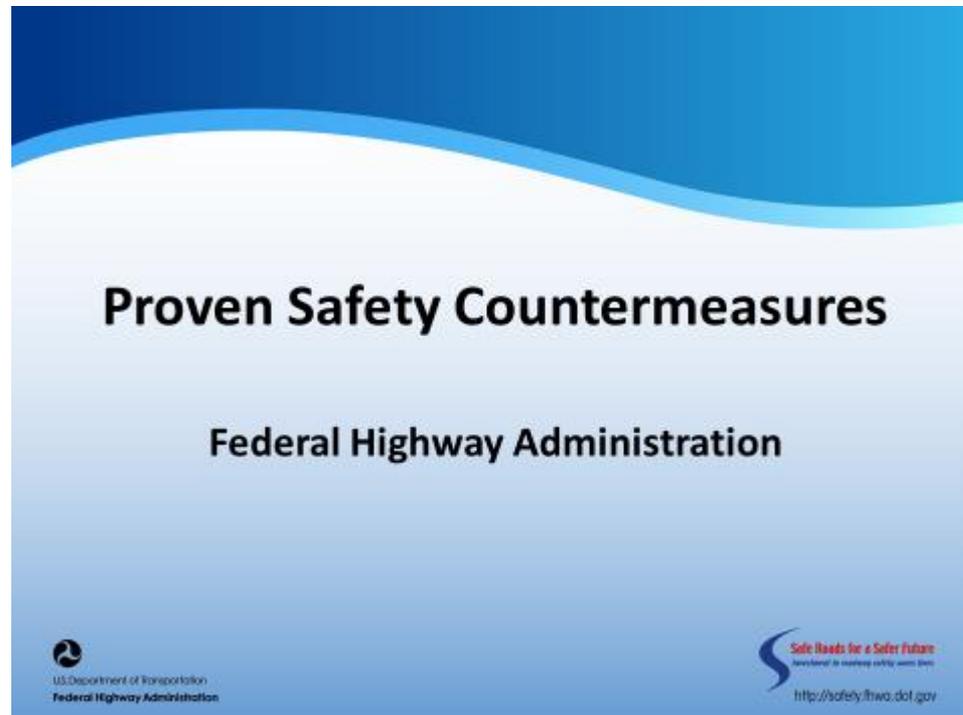
- Timeline
 - Nov 2015 - FHWA Provides Lane Departure Workshop and Draft Plan
 - Feb 2016 - Initial Coalition Meeting
 - May 2016 – Established FDOT Org Chart
- Future/Ongoing Items
 - 2016 – Local Participation
 - 2017 – Training and Statewide Meeting

Florida Roadway Departure and Intersection Coalition Overview

- Florida Roadway Departure Plan Overview
 - Systemic Deployment of Low-Cost Countermeasures
 - Enhanced sign and Markings improvements for curves with crash histories
 - Center line rumble strips/stripes
 - Edge line rumble strips/stripes
 - Alignment delineation and active lighting
 - Improved friction surfaces
 - Guardrail improvements
 - Select tree removal
 - Traffic calming treatments

Florida Roadway Departure and Intersection Coalition Overview

Proven Safety Countermeasures



Florida Roadway Departure and Intersection Coalition Overview

Introduction and Background

"While States should still be considering the application of all of the countermeasures listed in the 2008 guidance, this memo supersedes the previous guidance. " – 2012 Countermeasure Guidance

- FHWA Issued Nine Proven Countermeasures Guidance in 2008.
- Many of those countermeasures have been widely applied.
- FHWA is updating our previous guidance.
- We are taking into consideration the latest safety research.

"...we encourage safety practitioners to consider a new set of countermeasures ...that are research-proven, but not widely applied on a national basis. " – 2012 Countermeasure Guidance

Florida Roadway Departure and Intersection Coalition Overview

Florida Longitudinal Rumble Strips and Stripes on 2-Lane Roads Info

- Florida Crash Modification Factor
 - REF. http://www.dot.state.fl.us/research-center/Completed_Proj/Summary_SF/FDOT-BDK78-977-14-rpt.pdf
- Plans Prep Manual
- Roadway Design Bulletins
- Design Index



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Florida Roadway Departure and Intersection Coalition Overview

Table 8-3: CMFs for *Adding Shoulder Rumble Strips*

Setting (Road Type)	Crash Type (Severity)	CMF	Std. Error
Rural/Urban (Two-lane undivided roadways)	All types (All severities)	0.71	0.10
	All types (Injury)	0.81	0.13
	SVROR (All severities)	0.50	0.16
	SVROR (Injury)	0.67	0.25
Rural (Two-lane undivided roadways)	All types (All severities)	0.70	0.11
	All types (Injury)	0.78	0.12
	SVROR (All severities)	0.56	0.18
	SVROR (Injury)	0.68	0.25

Note: The CMFs in bold are statistically significant at a 90% confidence level.
The CMF for this treatment is not included in the HSM.



Florida Roadway Departure and Intersection Coalition Overview

Florida Longitudinal Rumble Strips and Stripes on 2-Lane Roads Info

- Plans Prep Manual
 - *PPM*, Volume 1, Chapter 7.
- Roadway Design Bulletin 15-03, Rumble Striping, 1/22/15
- Design Index
 - ***Design Standards*** Index 519 is only applicable for projects with dense graded friction course. For projects with open graded friction course use ***Developmental Design Standards*** Index D519.



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Florida Roadway Departure and Intersection Coalition Overview

Enhanced Delineation and Friction for Horizontal Curves

- Low-cost treatments
- Includes signs and markings that help drivers safely negotiate curves or...
- Additional pavement friction to address geometric deficiencies



Safety Impacts:

- Vary based on application
- Up to 43% reduction of all fatal crashes

Florida Roadway Departure and Intersection Coalition Overview

Florida Enhanced Delineation and Friction for Horizontal Curves

- HFST used in Florida since 2006 On 23 projects.
- Initial Pre and Post crash analysis has shown a 55% Reduction in total crash per year and a 84.2% reduction for wet weather crashes per year for curves, Curve Ramps, and Loop Ramps
- Existing Florida HFST Developmental Spec
 - <http://www.dot.state.fl.us/programmanagement/OtherFDOTLinks/Developmental/Files/Dev333.pdf>
- HFST Research and Guidelines being completed by Texas A&M Transportation Research Institute.



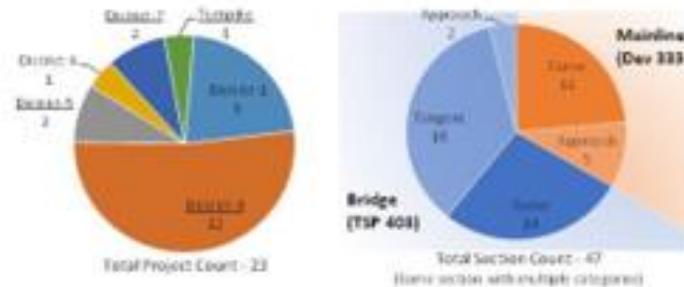
Florida Roadway Departure and Intersection Coalition Overview

Florida Friction for Horizontal Curves

- HFST used in Florida since 2006 on 23 projects.



Figure 2 - Map of all Florida HFST sections.



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Florida Roadway Departure and Intersection Coalition Overview

Safety Edge_{SM}

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



Florida Roadway Departure and Intersection Coalition Overview

The Safety Edge In Florida

- FDOT – Developmental Spec (Dev330SE)
 - 1/12 and forward
- Florida Greenbook (2013)
 - Provide a Safety Edge treatment adjacent to the travel lane on roadways without curb or paved shoulders and with posted speed 45 mph or greater.
- Note: Topic # 625-000-015 May - 2013 Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways



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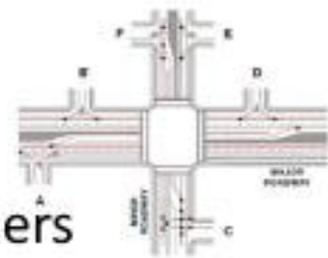
Florida Roadway Departure and Intersection Coalition Overview

- Florida Intersection Plan Overview
 - Systemic Deployment of Low-Cost Countermeasures
 - Intersection Sign and Marking Improvements
 - Turning restrictions at multi-lane stop controlled intersections
 - Signal Improvements
 - Detection Control Systems
 - Pedestrian Improvements
 - Lighting
 - Pavement Friction Improvements

Florida Roadway Departure and Intersection Coalition Overview

Addressing the **Intersection** Focus Area:

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



“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



Florida Roadway Departure and Intersection Coalition Overview

Roundabouts

- Modern designs are safer and more efficient than old circles and rotaries
- Can reduce crashes resulting in injury or fatality by nearly 80%¹
- Should be considered as part of corridor or intersection improvement projects
- Highly adaptable, proven in both low-speed urban and high-speed rural environments



¹ AASHTO Highway Safety Manual, Chapter 14

Florida Roadway Departure and Intersection Coalition Overview

2. Florida Roundabout Info

- 13 State Highway System
- 150-200 approx Local Road System
- Florida Intersection Design Guide
 - <http://www.dot.state.fl.us/rddesign/FIDG-Manual/FIDG.shtm>
 - FDOT Roundabout Screening Process
- Training with FHWA
- Research - http://www.dot.state.fl.us/research-center/Completed_Proj/Summary_PL/FDOT-BDK77-977-22-rpt.pdf



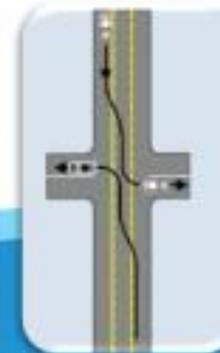
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Corridor Access Management

- 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%¹
- May be considered as a component of general corridor improvements or as its own project



Florida Roadway Departure and Intersection Coalition Overview

Florida Corridor Access Management

MEDIAN OPENINGS AND ACCESS MANAGEMENT; Topic 625-010-021-h

- **ACCESS MANAGEMENT DECISIONS IN DEPARTMENT IMPROVEMENT PROJECTS**
 - **3.1 Existing Features** - Existing medians, median openings, driveways, traffic signals, and adjacent highway features play a role in the decision on locating median openings during a Department roadway improvement project. Generally, existing features are allowed to remain in place. **However, a corridor analysis will be performed during the engineering and design phase of a Department project to determine if existing connection, median opening and signal spacing are in conformance or can be brought into conformance with Department standards.**



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Florida Roadway Departure and Intersection Coalition Overview

Florida Corridor Access Management Info

- Florida CMF TWLTL to Raised Median

- Ref. http://www.dot.state.fl.us/research-center/Completed_Proj/Summary_SF/FDOT-BDK78-977-14-rpt.pdf

Table 5-23: Recommended CMFs for *Converting a TWLTL to a Raised Median in Florida*

Severity/ Crash type	Before-After with CG		Before-After with EB (Full SPF)	
	CMF	SE	CMF	SE
Total Crashes	0.53	0.02	0.73	0.04
F+I	0.67	0.04	0.89	0.06
Head-on	0.27	0.07	0.49	0.15

Note: The values in bold are recommended CMFs for Florida.



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3. Florida Corridor Access Management Info

- Before-and-after crash summary statistics showed that four-lane urban arterials had a mere 4.7 percent reduction in total crash rate after conversion, while six-lane facilities experienced a 37.2 percent reduction. From these statistics, it could be inferred that conversions resulted in a greater overall safety benefit for six lane facilities compared to four-lane facilities.
- Ref. Before-and-After Safety Study of Roadways Where New Medians Have Been Added, FIU, 2012, http://www.dot.state.fl.us/research-center/Completed_Proj/Summary_PL/FDOT-BDK80-977-18-rpt.pdf

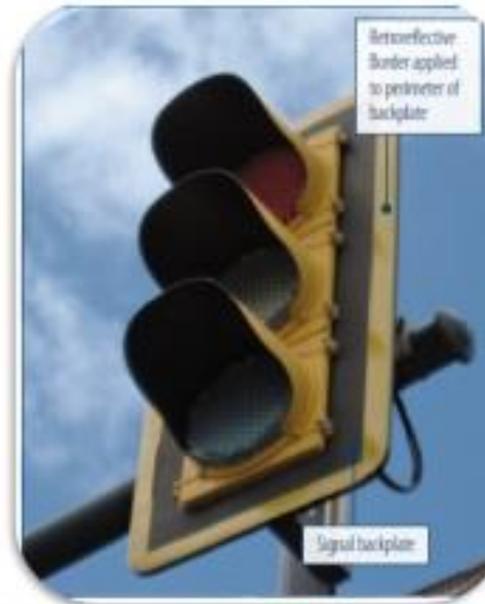


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Florida Roadway Departure and Intersection Coalition Overview

Backplates with Retroreflective Borders

- Retroreflective strip added around the border of a signal backplate
- Documented 15% reduction in crashes of all types and severities at urban signalized intersections¹
- Consider as standard treatment for new and modernized signal projects, or as a systemic retrofit safety improvement



Florida Roadway Departure and Intersection Coalition Overview

4. Florida Backplates with Retroreflective Borders Info

- PPM Chapter 7, Section 7.4.16, Backplates
 - Louvered backplates shall be installed on all signal sections for all approaches. Retroreflective backplate borders are required for all backplates where the posted speed for the approach is 45 mph or greater. Retroreflective borders are encouraged on all backplates where the posted speed for the approach is less than 45 mph.

Ref.

<http://www.dot.state.fl.us/rddesign/PPMManual/2015/Volume1/Chap07.pdf>



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Florida Roadway Departure and Intersection Coalition Overview

“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



Florida Roadway Departure and Intersection Coalition Overview

Florida Lane Elimination (“Road Diet”)

Florida CMF - http://www.dot.state.fl.us/research-center/Completed_Proj/Summary_SF/FDOT-BDK78-977-14-rpt.pdf

Table 8-10: CMFs for *Converting 4 to 3 Lanes*

Setting (Road Type)	Traffic Volume (AADT)	Crash Type (Severity)	CMF	Std. Error
Urban (Undivided arterials)	2,000~28,500	All types (All severities)	0.56	0.15
		All types (Injury)	0.63	0.17

Note: The CMFs in bold are statistically significant at a 95% confidence level.



Florida Roadway Departure and Intersection Coalition Overview

Florida Lane Elimination (“Road Diet”)

FDOT Lane Elimination Guidance

The links below are to documents intended to assist FDOT District staff in developing processes for reviewing State highway lane elimination re-quests.

- <http://www.dot.state.fl.us/rddesign/CSI/Files/Lane-Elimination-Guide-Part1.pdf>
- <http://www.dot.state.fl.us/rddesign/CSI/Files/Lane-Elimination-Guide-Part2.pdf>



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Florida Roadway Departure and Intersection Coalition Overview

- FL Coalition Development
 - Next steps
 - Representation from local government
 - Coordinate consultant support
 - Capture data needs to support plans
 - Training
 - Data and Low Cost Safety Improvements
 - Enhance Coalition Sharepoint Site

Florida Roadway Departure and Intersection Coalition Overview

- Setting The Stage
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QUESTIONS?