ROADWAY DEPARTURE (RUN-OFF-THE -ROAD) CRASHES

Roadway Safety Foundation

October 2009

2008 FARS DATA

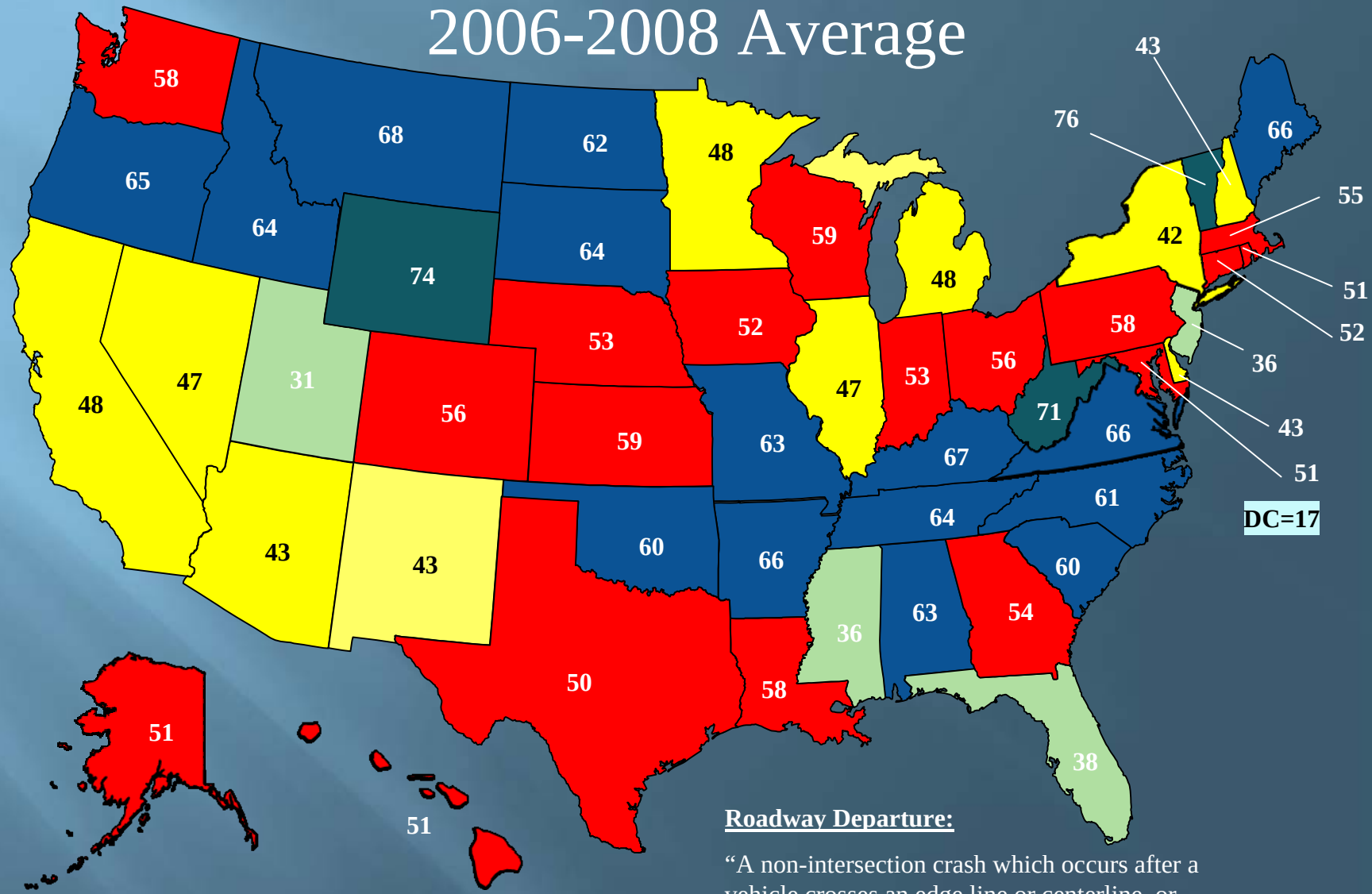
- All fatal crashes: 34,017
- All fatalities: 37,261

- Fatal Roadway Departure Crashes: 19,794 (58%)
- Roadway Departure Fatalities: 22,080 (59%)

A roadway departure crash is a non-intersection crash which occurs after a vehicle crosses an edge line or a centerline or otherwise leaves the traveled way.

Percent Roadway Departure Crashes

2006-2008 Average



FHWA ROADWAY DEPARTURE TEAM

US Department of Transportation
Federal Highway Administration

Roadway Departure:

"A non-intersection crash which occurs after a vehicle crosses an edge line or centerline, or otherwise leaves the traveled way."

Maryland 2008 Crash Data

- All fatal crashes: 539
- All fatalities: 592

- Fatal Roadway Departure Crashes: 196 (36%)*
- Roadway Departure Fatalities: 208 (35%)

*Differs from the 51% of fatal crashes reported by FARS – Md data does not include opposite direction crashes from crossing the centerline

Maryland Roadway Departure Crashes and Fatalities 1999 - 2008

Percentage Run Off Road Crashes										
Year	99	00	01	02	03	04	05	06	07	08
All Crashes	19.3	19.4	19.5	20.1	20.5	20.8	20.6	21.2	22.4	21.9
Fatal Crashes	35.7	36.1	37.4	37.0	32.4	41.1	34.0	37.8	40.3	36.3

Roadway Departure Crashes Maryland 1999 - 2008

- WHO

Driver Age		
Age	All Crashes	Rdwy Dep Crashes
<21 yrs	14%	23%
21-30 yrs	23	29
30-64 yrs	56	43
>64 yrs	7	5

Driver Gender		
Gender	All Crashes	Rdwy Dep Crashes
Male	60%	67%
Female	40	33

Roadway Departure Crashes Maryland 1999 - 2008

- WHO

Driver Condition		
Noted Condition	All Crashes	Rdwy Dep Crashes
No Unusual Cond	94%	81%
Alcohol/Drugs	5	15
Fatig/Ill/Asleep	1	4

Roadway Departure Crashes Maryland 1999 - 2008

- WHEN

Day of Week		
	All Crashes	Rdwy Dep Crashes
Weekday	73%	66%
Weekend	27	34

Illumination		
	All Crashes	Rdwy Dep Crashes
Daylight	64%	50%
Dawn/Dusk	5	5
Darkness	31	45

Roadway Departure Crashes Maryland 1999 - 2008

- WHEN

Pavement Condition		
	All Crashes	Rdwy Dep Crashes
Dry	74%	63%
Wet	22	28
Ice, Snow, etc.	4	9

Roadway Departure Crashes Maryland 1999 - 2008

- WHERE

Highway Ownership (Public Rds Only)		
	All Crashes	Rdwy Dep Crashes
State	49%	52%
Municipal	24	12
County	27	36

Speed Limit		
	All Crashes	Rdwy Dep Crashes
<40 mph	58%	49%
40 – 50 mph	27	29
> 50 mph	15	22

Roadway Departure Crashes Maryland 1999 - 2008

- WHAT

Crash Type	
Fixed Object Crashes	87%
Other Collisions & Non Collision	13%

Fixed Object Struck	
Guardrail/Barrier	20%
Curb/Wall	16
Tree/ Shrubbery	14
Light/Sign Pole	11
Other Pole	12
Other Object	27

Roadway Departure Crashes Maryland 1999 - 2008

- SEVERITY

Crash Severity		
	All Crashes	Rdwy Dep Crashes
Property Damage	63%	66%
Injury	36	33*
Fatal	.567	1.02
* Injuries, when they occur, tend to be more severe		

Roadway Departure Countermeasures

- Behavioral
- Rumble Strips/Rumble Stripes
- Traffic Control Devices
- Physical Improvements

Roadway Departure Countermeasures

Behavioral

- Legislative: Restrictions on wireless communication device use, Increase penalties for speeding, etc.
- Information & Education: Campaigns re impaired, aggressive & inattentive driving; Excessive speeds, etc
- Enforcement: Programs aimed at excessive speeds and impaired and aggressive driving

Roadway Departure Countermeasures

Rumble Strips and Rumble Stripes in MD

- Implement rumble strips as a blanket rather than spot improvement
- Initially on rural freeways (expressways)
- Expanded to expressways & 2-lane rural roads
- Benefit – Cost ratio: 182 to 1
- Recently installed rumble stripes
- Bicyclist issues
- Crash reductions 10% - 20% on rural highways – nearly 40% on freeways (National)

Roadway Departures at Curves

In US, over 40% of roadway departures and more than 1/4 of all fatal crashes occur at curves

Curves not all equal – Curve radius and tangent vehicle speed most important

CH2M Hill Research indicates

Radius	Crash Risk - TTI	Crash Risk - Minn
>2,000′	Same as tangent	Same as tangent
1,000′	2 times higher	5 times higher
500′	8 times higher	11 times higher

Minnesota: 90% of fatal crashes where radius <1,500′

Roadway Departure Countermeasures at Curves

- Curve Warning Signs (Curve and turn signs, reverse curve/turn signs, etc, dynamic signs)
- Travel Path Delineation (Post delineators, chevrons, wide edge lines, raised pavement markers, large arrow panel)
- Advisory speed signing
- Physical improvements (Shoulders, improved friction, superelevation, clear roadsides, reduce curvature, safety edge, etc)

Universe of Horizontal Curve Safety Treatments*

Treatment	Cost/Curve	Effectiveness	Crash Reduction
Static Signs	$500	Base Condition	-
Chevrons	$2,000	Tried	20% - 50%[1]
Edge Line Rumble Strips	$2,000	Proven	15% - 30%[1,2]
Shoulder paving	$25,000 – $50,000	Tried	15% - 40%[1]
Dynamic Curve/ Speed Warning Sign	$20,000 $60,000 w/R	Tried	30% – 50%[1]
Reconstruct (flatten) curve	$250,000 – $500-000	Proven	40% - 60%[1,2]

Source:

*Horizontal Curves – A New Method for Identifying At-Risk Locations for Safety Investment, Howard Preston, CH2M HILL, Inc, Iowa State University, August 2009

1.Desktop reference for Crash Reduction Factors, Report No. FHWA-SA-04-015, Sept 2007

2.Cost-Benefit Analysis of In-Vehicle Technologies and Infrastructure Changes to Avoid Crashes, University of Minnesota & CH2M HILL, Inc,. Draft Report July 2009