

# FHWA Roadway Departure Technology Transfer Roadside Safety Systems Installer Training

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# Housekeeping

- *No Smoking*
- *Cell phones/Pagers/other noise makers, **OFF**, Please*
- *Restrooms/Public Phones*
- *Breaks, as needed, or about every hour or so, as time allows: **TEN MINUTES.***
- *Lunch at noon, one hour (adjustable)*

# Scope

This course addresses:

- The need for guardrail systems.
- Their performance capabilities.
- The pre-installation field reviews, temporary traffic control, installation, inspection.
- The maintenance, repair and/or removal of these systems

# Objectives of Course

Course participants will receive information in:

- Determining when a traffic barrier is the best treatment to use at a specific site.
- Ensuring that the barrier selected will adequately shield the identified hazard.
- Assessing the topography of the worksite to ensure an optimal installation.

# Objectives of Course

- Laying out a worksite
- Installing and maintaining various guardrail and terminal systems
- Documenting any deviations from the original plans and specifications

# Course Topics

- Session One – Introduction
- Session Two – Testing Requirements and Performance Characteristics of Common Barrier Systems, Terminals, and Crash Cushions
- Session Three – Guardrail Design and Site-specific Installation Considerations
- Session Four – Pre-Installation Considerations

# Course Topics (cont'd)

- Session Five – Temporary Traffic Control Through the Work Area
- Session Six – Guardrail/Terminal Installation and Common Errors
- Session Seven – Inspection of Completed Work and Liability Issues
- Session Eight – Maintenance of Systems

# Session 1 Objectives

- Describe the Roadside Safety Concerns in Delaware
- Define Clear Zone
- Explain Warrants

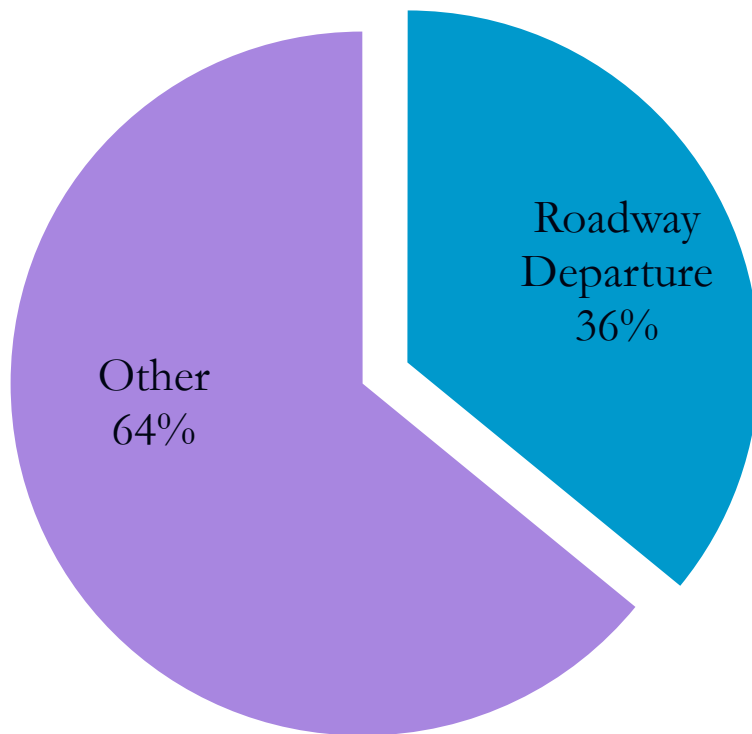


# Session 1 Outline

- Roadway Departure Problem
- Clear Zone
- Barrier Warrants
- Need for Training

# Crash Data

2009 National Fatalities  
33,808 Total



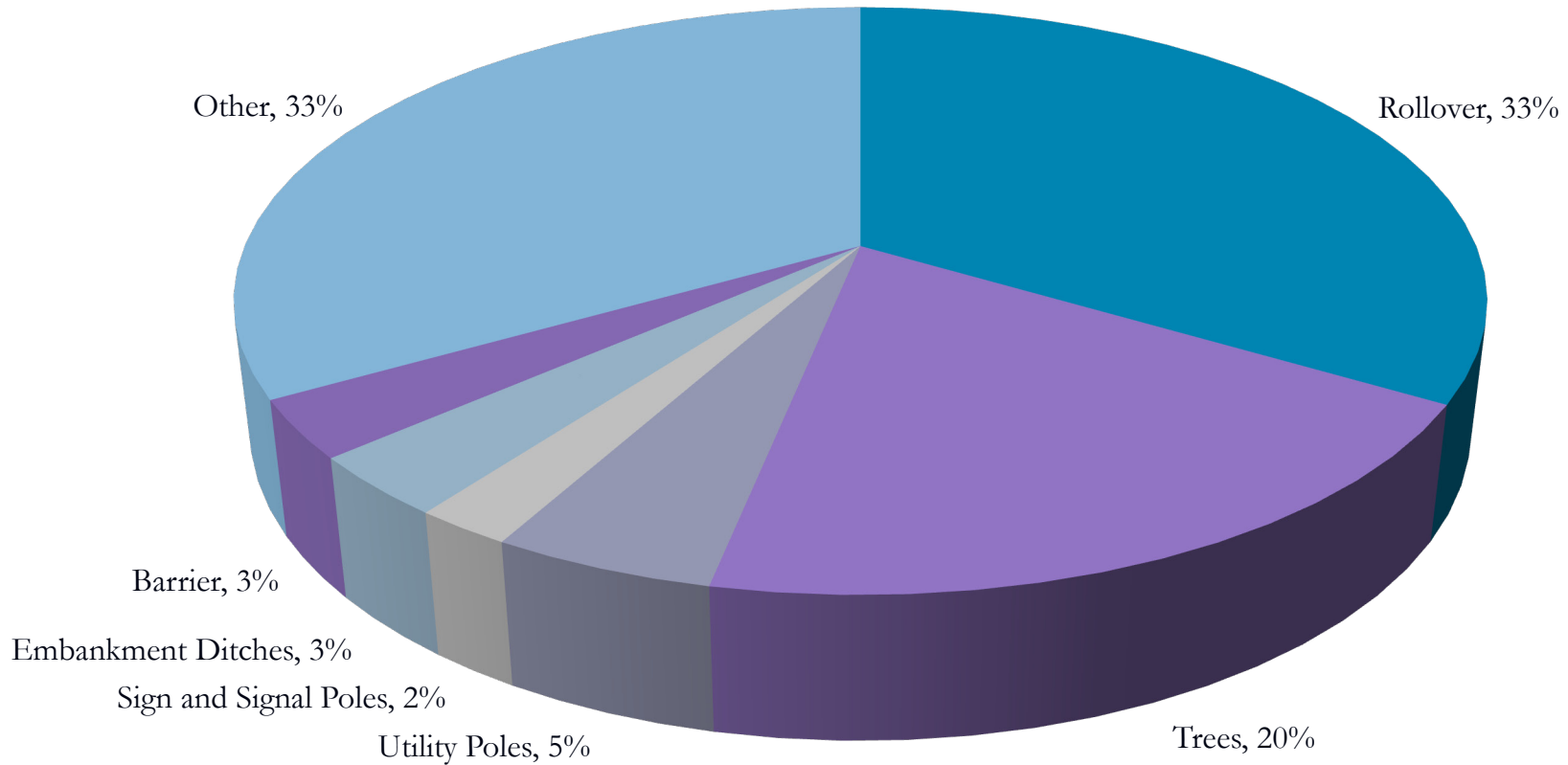
Delaware Roadway  
Departure: 52%

Number of Fatalities:  
Approx. 116 (60)

Ref: FARS Data – 2009

# Crash Data

## National Roadside Fatalities (Single Vehicle Crashes 2009)



Ref: FARS Data – 2009

# Crash Data

## Delaware Single Vehicle Fatalities by Most Harmful Event

Rollover	19
Trees	21
Utility Poles	9
Embankment and Ditches	1
Barrier	3
Other	7



Ref: FARS Data – 2009

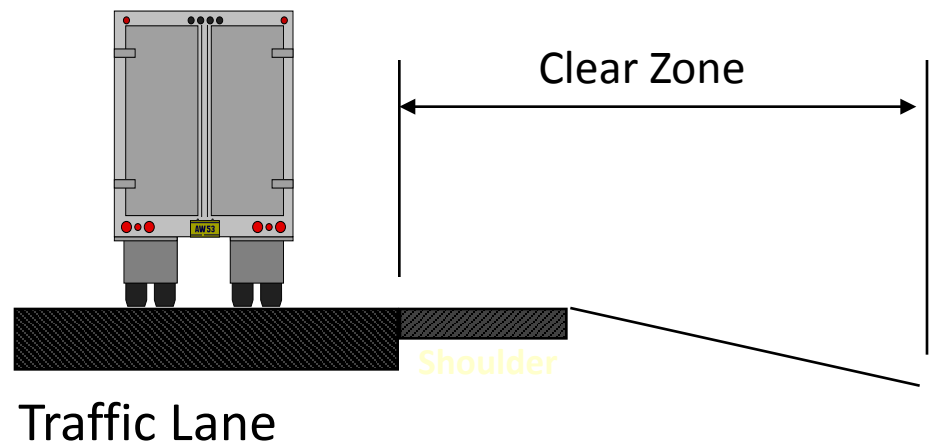
# Delaware Strategic Highway Safety Plan

- Emphasis Area #1: Reducing the frequency and severity of Roadway Departure Crashes
- Strategies include:
  - Design safer slopes and ditches to prevent rollovers.
  - Improve the design of roadside hardware.
  - Develop guidelines for barrier repair/maintenance.



# Clear Zone: A Definition

A traversable area that starts at the edge of the through travelled way, including shoulders, bike lanes, and certain auxiliary lanes



# Design Clear Zone Determination Table

Design Speed (mph)	Design ADT	Foreslopes			Backslopes		
		1V:6H or flatter	1V:5H to 1V:4V	1V:3H	1V:3H	1V:5H to 1V:4H	1V:6H or flatter
≤40	UNDER 750 <sup>c</sup>	7-10	7-10	b	7-10	7-10	7-10
	750-1500	10-12	12-14	b	12-14	12-14	12-14
	1500-6000	12-14	14-16	b	14-16	14-16	14-16
	OVER 6000	14-16	16-18	b	16-18	16-18	16-18
45-50	UNDER 750 <sup>c</sup>	10-12	12-14	b	8-10	8-10	10-12
	750-1500	14-16	16-20	b	10-12	12-14	14-16
	1500-6000	16-18	20-26	b	12-14	14-16	16-18
	OVER 6000	20-22	24-28	b	14-16	18-20	20-22
55	UNDER 750 <sup>c</sup>	12-14	14-18	b	8-10	10-12	10-12
	750-1500	16-18	20-24	b	10-12	14-16	16-18
	1500-6000	20-22	24-30	b	14-16	16-18	20-22
	OVER 6000	22-24	26-32 <sup>a</sup>	b	16-18	20-22	22-24
60	UNDER 750 <sup>c</sup>	16-18	20-24	b	10-12	12-14	14-16
	750-1500	20-24	26-32 <sup>a</sup>	b	12-14	16-18	20-22
	1500-6000	26-30	32-40 <sup>a</sup>	b	14-18	18-22	24-26
	OVER 6000	30-32 <sup>a</sup>	36-44 <sup>a</sup>	b	20-22	24-26	26-28
65-70 <sup>d</sup>	UNDER 750 <sup>c</sup>	18-20	20-26	b	10-12	14-16	14-16
	750-1500	24-26	28-36 <sup>a</sup>	b	12-16	18-20	20-22
	1500-6000	28-32 <sup>a</sup>	34-42 <sup>a</sup>	b	16-20	22-24	26-28
	OVER 6000	30-34 <sup>a</sup>	38-46 <sup>a</sup>	b	22-24	26-30	28-30

Ref: AASHTO ROADSIDE DESIGN GUIDE, 4<sup>th</sup> EDITION – TABLE 3.1, Pg. 3-3



# Barrier Warrants





# Order of Preference

- REMOVE hazard.
- REDESIGN the obstacle so it can be traversed.
- RELOCATE hazard (i.e. move away from traffic).
- REDUCE impact severity (i.e. use breakaway design).
- SHIELD the obstacle w/traffic barrier or crash cushion.
- DELINEATE hazard so motorist can avoid.

# Potential Hazards

- Bridge Piers / Abutments / Railing Ends
- Drainage Structures / Ditches
- Rigid Sign and Luminaire Supports
- Permanent Bodies of Water
- Steep Embankments
- Opposing traffic on divided roadways

# Need for Training

Potential consequences of poorly designed, installed, maintained, or repaired barrier systems include:

- Crash severities may be increased.
- Installer/agency may be liable for damages and injuries due to negligence.

# Need for Training

Examples of improper installation of systems:



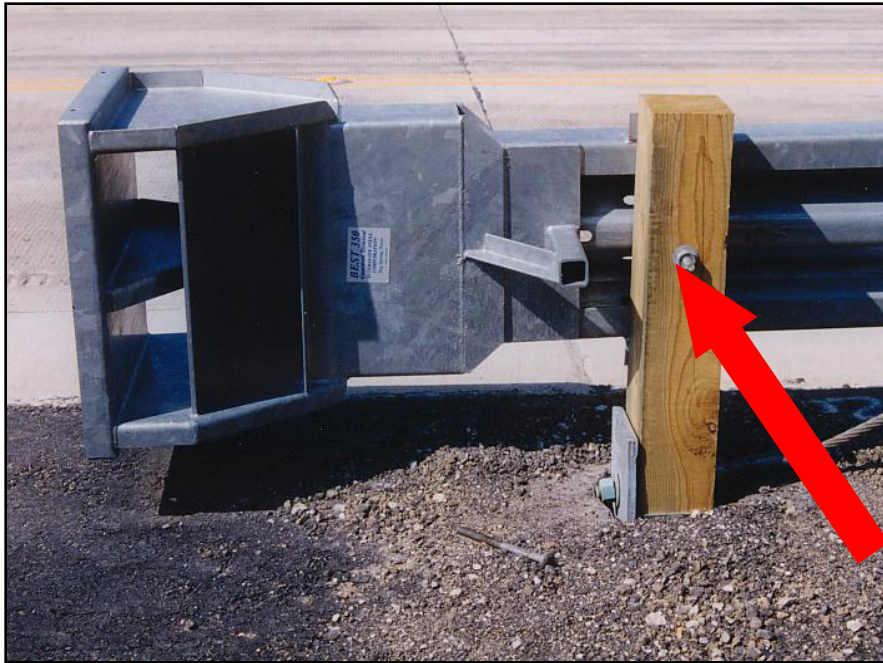
# Need for Training

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# Need for Training

Examples of improper installation of systems:



# Session 1 Outcomes

- Understand the single vehicle, run off the road crash situation nationwide and how it pertains to Delaware.
- Know the benefits of providing an appropriate clear zone adjacent to a road or street.
- Know when a traffic barrier may be the most effective solution to a roadside hazard.