Session 1: Roadside Safety Problem, Clear Zone and Warrants for Barrier
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Disclaimer

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Ground Rules

- Be on time
- Participate
- Restrict sidebar conversations
- Turn off cellphones

Objectives of Course

This 2-day session will help you to:

- Verify that a traffic barrier is the best treatment to use at a specific site.
- Understand the principles of good barrier system design
- Identify installations that may not adequately shield all the significant hazards or secondary hazards.
- Recognize common installations errors for barriers and terminals and know how to avoid them.
- Understand when damaged barrier and/or terminal is no longer functional.

Course Topics

- Session One – Roadside Safety Problem, Clear Zone and Warrants for Barrier
- Session Two – Testing Requirements and Performance Characteristics of Common Barrier Systems
- Session Three – Testing Requirements and Performance Characteristics of Common Terminals and Crash Cushion
Course Topics (cont’d)

- Session Four – Guardrail Design, Length of Need and Site-specific Installation Considerations
- Session Five – Installation/Common Errors of Systems
- Session Six – Maintenance of Systems

Session 1: Roadside Safety Problem, Clear Zone and Warrants for Barrier

Session 1 Learning Outcomes

At the end of this session, you will be able to:
- Describe the primary Roadside Safety Concerns in Montana.
- Identify the need for training.
- Define clear zone and barrier warrants.
Roadway Departure Fatalities

(Single Vehicle Fatal Crashes 2016)

National (Montana)
19,285 (142)

- Rollover/Overturn, 8,935, 46% (131, 84%)
- Barrier Ends, 164, 1% (3, 2%)
- Barrier, 924, 5% (2, 1%)
- Embankment/Ditch/Culvert/Curb, 1,524, 8% (14, 9%)
- Utility Poles, 1,143, 6% (1, 1%)
- Trees, 4,956, 26% (3, 2%)
- Other, 1,639, 8% (2, 1%)

Ref: FARS Data – Most Harmful 2016

Real World Crashes

Video Clip
Real World Crashes

Need for Training

Potential consequences of poorly Designed/Installed barrier systems include:

- Systems may not function as designed.
- Crash severities may be increased.
Need for Training

Must have a strong connection between systems

Examples of improper installation of systems:

Fatal Flaw
Need for Training

Examples of improper installation of systems:

Clear Zone: A Definition

The unobstructed, traversable area provided beyond the edge of the through traveled way for the recovery of errant vehicles. The clear zone includes shoulders, bike lanes, and auxiliary lanes, except those auxiliary lanes that function like through lanes.

Clear Zone Principle

Get MAXIMUM, COST-EFFECTIVE width

Clear Zone

THE “MAGIC” 30 FEET
### MDT Design Clear Zone Distance - Fill

<table>
<thead>
<tr>
<th>Design Speed</th>
<th>Design AADT</th>
<th>Fill Slopes/Foreslopes</th>
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<td></td>
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<td>6:1 or Flatter</td>
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<tr>
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<td>&lt; 750</td>
<td>8</td>
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<tr>
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<td>12</td>
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<td>14</td>
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<tr>
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<td>1500-6000</td>
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<td>26</td>
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<tr>
<td>&gt; 6000</td>
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### Order of Preference

1. **Remove hazard**
2. **Redesign hazard (make traversable)**
3. **Relocate hazard (move away from traffic)**
4. **Reduce Impact Severity (use breakaway design)**
5. **SHIELD hazard**
6. **Delineate hazard so motorist can avoid**

Barriers Must Be Less of a Hazard

Potential Hazards

- Bridge Piers / Abutments / Railing Ends
- Drainage Structures / Ditches
- Sign and Luminaire Supports
- Permanent Bodies of Water
- Steep Embankments
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Review Learning Outcomes

- Describe the primary Roadside Safety Concerns in Montana.
- Identify the need for training.
- Define clear zone and barrier warrants.