Clear Zones (1 of 2)

**DESCRIPTION AND DEFINITION**

Provide a traversable and unobstructed roadside area (clear zone) beyond the edge of the roadway by removing, relocating, redesigning, or shielding adjacent objects.

![The Roadside diagram]

Strategies for minimizing the consequences of leaving the road include:
- Considering or providing clear recovery areas wherever possible
- Removing hazardous trees (collisions with trees result in more deaths than any other fixed object)
- Providing setback to utility poles
- Improving ditch slopes
- Upgrading roadside safety hardware (construction, reconstruction, and maintenance)

**SAFETY CHARACTERISTICS**

A comparison study found that two rural roads in northern Minnesota (TH 6 and TH 38) have similar characteristics (volumes and functions) and traverse the Chippewa National Forest. TH 6 was reconstructed, but TH 38 was not.

TH 38 has the following crash characteristics when compared with TH 6:
- More than twice as many crashes
- More than twice as many injuries
- A crash rate more than twice the average for two-lane rural roads (and 30 percent greater than the critical rate)
- Ten times as many trees hit
- More than twice as many nighttime crashes

<table>
<thead>
<tr>
<th></th>
<th>TH 6</th>
<th>TH 38</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length (Miles)</td>
<td>11.2</td>
<td>11.2</td>
</tr>
<tr>
<td>Total Crashes (5 Years)</td>
<td>23</td>
<td>51</td>
</tr>
<tr>
<td>PDO Crashes</td>
<td>11</td>
<td>25</td>
</tr>
<tr>
<td>Injury Crashes</td>
<td>12</td>
<td>26</td>
</tr>
<tr>
<td>Fatal Crashes</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Volume (VPD)</td>
<td>1,100</td>
<td>1,100</td>
</tr>
<tr>
<td>MVM</td>
<td>22.48</td>
<td>22.48</td>
</tr>
<tr>
<td>Crash Rates (Crashes/MVM)</td>
<td>1.0</td>
<td>2.3</td>
</tr>
<tr>
<td>Critical Crash Rates</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td>SVRD Crashes</td>
<td>37 (73%)</td>
<td>30</td>
</tr>
<tr>
<td>Hit Trees</td>
<td>10 (43%)</td>
<td>30</td>
</tr>
<tr>
<td>Passing Crashes</td>
<td>8 (35%)</td>
<td>3 (6%)</td>
</tr>
<tr>
<td>Angle Crashes</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Deer Hits</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Night</td>
<td>10 (43%)</td>
<td>21 (41%)</td>
</tr>
</tbody>
</table>

Source: MnDOT District 1, Traffic Engineering Roadside Safety Strategies (6 of 6)
Clear Zones (2 of 2)

PROVEN, TRIED, INEFFECTIVE, OR EXPERIMENTAL
- All studies in the FHWA Crash Reduction Clearinghouse documented crash reductions associated with providing clear zones and traversable slopes.
- Documented crash reductions are in the range of 20 to 40 percent.
- Providing clear zones and traversable slopes is considered a PROVEN and effective safety strategy.

TYPICAL CHARACTERISTICS OF CANDIDATE LOCATIONS
The concept of providing for clear recovery area is primarily intended for high-speed rural roadways; however, the concept can be applied to suburban or urban roadways if road departure crashes are a concern.

ROADWAY OPERATIONS
Clear zones contribute to drivers perception of the road conditions, suggesting a rural environment, and may result in higher operating speeds.

TYPICAL COSTS
Implementation Costs = $100,000 to $500,000 per mile

A Vision for Improved Roadside Safety
“A highway system where drivers rarely leave the road, but when they do, the vehicle and the roadside work together to protect vehicle occupants from serious harm.”—Roadside Design Manual

DESIGN FEATURES
The recommended clear zone distance is a function of speed, slope, volume, and horizontal curvature. Generally, higher speeds, steeper fill slopes, higher volumes, and locations along the outsides of horizontal curves require larger clear zones. More information can be found in AASHTO’s Roadside Design Guide.

BEST PRACTICE
Lower cost safety strategies should be considered first. Before changes in the clear zone are implemented, clear zones should be reviewed for reconstruction projects, and improvements should be incorporated into the design when possible.

SOURCEs
Mn/DOT District 1, Traffic Engineering TH 6/TH 38 Before and After Study.
**POLICY PURPOSE/INTRODUCTION**

The purpose of this policy is to establish uniformity and consistency in the application, installation, and maintenance of clear zones on the <Insert Agency>’s roadway system.

There are four general methods of providing a clear zone. In order of preference, the methods to attain roadside safety are:

1. Remove the obstacle.
2. Redesign the obstacle so it can be safely traversed.
3. Relocate the obstacle to where it is less likely to be struck.
4. Reduce impact severity by using an appropriate breakaway device.

**DEFINITIONS**

The clear zone is a roadside border area that is available for the safe use by errant vehicles as determined in accordance with Chapter 3 of the AASHTO Roadside Design Guide. It is measured from the edge of the roadway pavement.

**POLICY**

It is the policy of <Insert Agency> to review clear zones as part of new construction and reconstruction projects on <Insert Agency> roadways. Clear zones will not be addressed on maintenance (overlay) projects.

**POLICY CRITERIA**

Clear zone width is a function of speed, volume, cross slopes, and alignment. Higher speeds result in vehicles travelling farther off the roadway before control is recovered. Horizontal curvature also increases the likelihood of a vehicle leaving the roadway. Steeper slopes adjacent to the roadway increase the distance an errant vehicle travels after leaving the roadway. It is important for clear zone distances not to be used as boundaries for introducing roadside hazards such as bridge piers or trees, which should be as far from the roadway as practical.

The clear zone width is to be determined based on design guidance in MnDOT’s Road Design Manual or AASHTO’s Roadside Design Guide. Roadside slopes apply an important part in the clear zone width determination. Fill slopes of 1V:4H/1V:3H are preferred in areas of high fill (a 1V:4H slope extending from the shoulder line out for a distance necessary to obtain the clear zone then break the slope to 1V:3H or flatter). If feasible, the flattening of slopes is preferable to installation of guardrail.

<Insert Agency> will provide clear zones where the anticipated posted speed of the roadway is 45 mph or more. When the anticipated posted speed is less than 45 mph, clear zones are still beneficial, but they are to be considered based on engineering judgment. Non-traversable slopes or fixed objects will be removed, relocated, or shielded by a barrier if they are within the indicated minimum clear zone width and if it is cost-effective to do so.

**FINANCIAL CONSIDERATIONS**

The clear zone is not to be obtained at all costs. It is acknowledged that it will not be possible to achieve the suggested clear zones on all projects because of a variety of potential environmental and land use constraints. Variations from the clear zone guides will be documented.