

Low-Cost Safety Measures







Both urban and rural areas are challenged with high crash rates. However, they face unique challenges when trying to resolve roadway issues. Often, rural areas struggle with funding, availability of engineering staff, and available resources. These limitations adversely affect rural roads.

The Federal Highway Administration (FHWA) recommends a few actions to mitigate this problem. Deemed Low-Cost Safety Enhancements¹ and Proven Safety Countermeasures,² these established methods lead to a 15-50% reduction in crashes. Low-cost and high-crash-reduction measures provide a significant benefit-to-cost ratio. Utilizing low-cost safety measures to reduce roadway departures helps to resolve a rampant problem without overrunning the budget.

The two main collision types on rural roads are collisions with other motor vehicles and collisions with fixed objects. Keeping a vehicle in its lane significantly reduces the risk of collision. There are many methods to ensure that a vehicle does not depart from the roadway. Striping, rumble strips, center line, edgeline, and signage are a few ways to minimize lane departure. Vegetation control can also play an important factor in preventing collisions and roadway departures.

Curve Signing

Inadequate or improper signage is the leading reason for payouts related to collision or departure claims. Curve signing is used to advise motorists of changes in the roadway alignment. Advance warning signs, guidance through curves, and advisory speed plaques make up curve signing. For more information on curve signing and how to set appropriate advisory speeds for curves, see the TapIT! Sheets on Horizontal Alignment Signing and Setting Curve Advisory Speeds.

# of curves	Less than or equal to 30 mph	Greater than 30 mph
1	 W 1-1	 W 1-2
2	 W 1-3	 W 1-4
3 or more	 W 1-5	 W 1-5

Roadway Width	Edgelines	Centerlines
<16 ft	Permitted	Prohibited
≥ 16 ft < 20 ft	Either EL or CL NOT both	
≥ 20ft	Required ADT > 1000	Required

Pavement Markings

Pavement markings are also effective in providing guidance for vehicles to negotiate a roadway. Even on narrow roadways, edgelines have proven to be effective in reducing both single vehicle and head-on crashes by providing demarcation of the road edge for drivers at night. Edgeline only striping is recommended for roadways with crash potential or experience for roadways under 16 feet and may be used on roadways between 16-20 ft in width. For low-volume roads under 400

vpd, edgeline striping may be more beneficial than centerline striping due to the low exposure for multi-vehicle crashes.

Clear Zones

Maintain an unobstructed, relatively flat area beyond the edge of the traveled way that allows drivers to stop safely or regain control of a vehicle that leaves the traveled way. Factors include roadway design speed, traffic volume, and embankment slope. As a general rule, get as much clear zone as you can, and keep what you get.

Recoverable Slope	Non-Recoverable Slope	Critical Slope
A slope on which a motorist may retain or regain control of the vehicle	A slope that is considered traversable but on which the bottom errant vehicle will continue to the bottom	A slope on which the vehicle is likely to overturn
Slopes 4:1 and flatter	Slopes between 3:1 and 4:1	Slopes steeper than 3:1

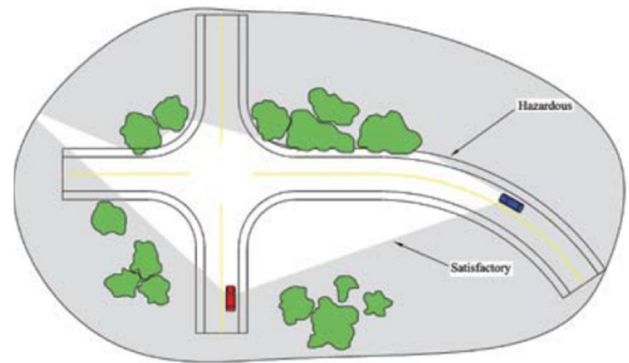
Fixed objects in the clear zone include trees, utility poles, headwalls, signs, guardrails, etc. These fixed objects often result in fatal crashes.

To address clear zone impediments, the following priority of mitigation measures should be followed:

Remove obstacle → Relocate obstacle → Make traversable →
Reduce impact severity → Shield obstacle → Delineate obstacle

Vegetation Management

Clearing vegetation around signs and intersections is one of the most cost-effective safety measures you can take. It will also help with snow and ice removal by allowing more sunlight to reach the roads. Consider sight triangles as guidance as to how much vegetation should be cleared.



Roadway Maintenance

Consider drainage, pavement edge dropoff/shouldering, and superelevation as additional low-cost safety measures. Drive your roads during poor weather conditions to look for potential hazards. Use the Safety Edge or other dropoff countermeasures to ensure recoverability.

1. Low-Cost Safety Enhancements for Stop-Controlled and Signalized Intersections, Federal Highway Administration. 2020. https://safety.fhwa.dot.gov/provencountermeasures/syst_stop_control.cfm
2. Proven Safety Countermeasures, Federal Highway Administration. <https://highways.dot.gov/safety/proven-safety-countermeasures>