

Enhancing rural roadside safety

Tom McDonald, Safety Circuit Rider

EDITOR'S NOTE: *Nationally 38 percent of fatal crashes result from single vehicles leaving the roadway and overturning or hitting fixed objects. In 1999, almost 30 percent of vehicle fatalities in Iowa occurred off the roadway. As part of its Vital Few safety initiative, the FHWA wants to reduce or mitigate the effects of single-vehicle, run-off-the-road crashes.*

This article introduces concepts and resources for increasing safety of rural roadsides. A second article in the July–August issue of Technology News will discuss proactive, rural roadside safety programs.

A little history

For decades, transportation agencies generally operated under the assumption that run-off-the-road crashes were caused by driver error and therefore agencies had little responsibility for what happened to motorists once they left the roadway.

In the 1960s, however, responding to a high number of crash fatalities, highway engineers began to consider how fatalities and severe injuries might be reduced if roadsides better accommodated vehicles leaving the roadway.

As a result, engineers developed the concepts of “forgiving roadsides” and “clear zones.”

Forgiving, clear environments

A forgiving environment anticipates drivers' mistakes, allows time and space for making driving corrections, and minimizes potential hazards for errant vehicles. Potential hazards include bridges, poles, trees, guard rails, mailboxes and, most frequently, ditches or embankments.

In short, just about anything in the right of way that can be struck by an errant vehicle is considered a potential hazard.

A clear zone is a transversable area that is adjacent to the driving surface and has no fixed objects. Clear zone widths vary from over 30 feet to 10 feet or less, based on several factors like traffic volumes and speeds, roadway geometrics and classification, and foreslope characteristics.

Familiar resources

As emphasis on safer roadsides has increased, guidelines for designers and engineers have been developed.

1. The 2002 edition of AASHTO's *Roadside Design Guide* provides guidance in all aspects of roadside design and protective devices. It also addresses unique situations posed by work zones and urban areas.

2. The millennium edition of the MUTCD increasingly emphasizes less potentially hazardous roadsides:

- In addition to specifying minimum offset distance for signs, the MUTCD (Section 2A.19) requires that sign supports in the clear zone be breakaway, yielding, or shielded with a barrier or crash cushion.
- Similar language can be found in Part 6 for temporary traffic control sign supports in work zones.
- Even Part 5 for low volume roads requires sign supports in the clear zone to be crashworthy.

Resources for local roads

Many roadside safety improvements are simply not cost effective for lower traffic volume roads. Two resources can help:

1. The 2001 edition of AASHTO's *Guidelines for Geometric Design of Very Low Volume Local Roads* acknowledges that most users of lower volume roads (ADT < 400) and certain collector roads are familiar with the roadway and terrain and will adjust their driving practices accordingly.

The guidelines in this document allow great flexibility to designers and engineers in applying minimum standards for roadside safety improvements.

2. The Iowa DOT's Office of Local Systems has developed Instructional Memoranda with Design Aids and has summarized AASHTO guidelines for designing improvements on rural county roads.

This document offers recommendations for features such as shoulder width, slopes, and clear zone dimensions while considering allowable variances for volume, terrain, and road classification.

Iowa initiatives

The aforementioned references provide needed advice for significant improvements such as new construction and 3R work (resurfacing, restoration, and rehabilitation). But roadside safety can also be addressed through specific focused activities, like these in Iowa:

1. In 1989 an initiative was undertaken by Iowa county engineers to flatten driveway slopes on farm to market roads, as part of a 3R project or as an individual improvement. Since that time, approximately 15,000 entrances have been improved or removed in many Iowa counties.

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LTAP Advisory Board

The people listed below help guide and direct the policies and activities of Iowa's Local Technical Assistance Program (LTAP). Contact any of the advisory board members to comment, make suggestions or ask questions about any aspect of LTAP.

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For that continuing effort, the Iowa County Engineers Association, ICEA, was presented with an Achievement in Transportation Safety Award by the Iowa Traffic Control and Safety Association in 2001.

2. To address potentially hazardous objects in the right of way, Story County has established a policy and adopted an ordinance to ensure that roadsides are as safe as possible. This initiative, described in the July–August 2002 edition of *Technology News*, included a public communications campaign, a detailed inventory of county roadsides, and a plan for removal or mitigation of identified obstructions.

Similar removal/mitigation plans might be prioritized as follows:

- remove potentially hazardous objects
- relocate obstructions outside the clear zone
- redesign objects to permit vehicles to pass over them safely
- replace objects with breakaway or crashworthy designs
- shield obstructions with guardrails or other protective devices

- if feasible, delineate potentially hazardous objects
- if no other option is possible, do nothing and monitor

For more information

AASHTO's *Guidelines for Geometric Design of Very Low Volume Local Roads* (P1616), *Roadside Design Guide* (2002), and the MUTCD: Contact Jim Hogan, Iowa LTAP library coordinator, 515-294-9481, hoganj@iastate.edu.

Iowa DOT's Office of Local Systems Instructional Memoranda with Design Aids and summaries of AASHTO guidelines for designing improvements on rural county roads: See www.dot.state.ia.us/local_systems/publications/county_im/county_im_toc.htm.

Story County initiative: Contact Bob Sperry, county engineer, 515-382-7355, engineer@storycounty.com, www.storycounty.com/engineer/default1.html.

Also see Chapter 17 of Iowa's *Toolbox of Highway Safety Strategies*, "Keeping Vehicles on the Roadway and Minimizing the Consequences of Leaving the Road." Contact Mary Stahlhut, Iowa DOT Office of Traffic and Safety, 515-239-1169, mary.stahlhut@dot.state.ia.us. •

Portable utility box

Editor's note: The "portable utility box" is one of several winning innovations from the "Better Mousetrap" competition at the Iowa Maintenance Training Expo in 2002. In each issue of Technology News we're highlighting one of the winners. For information about other winning "mousetraps," see CTRE's website: www.ctre.iastate.edu/ (see "Popular Links").

WHEN FEW vehicles are available for hauling heavy, multi-purpose items, a portable utility box is a handy alternative.

The utility box is maneuvered with chains attached to it and the truck box. Using the box is simply a matter of raising and lowering the truck box. Raise the truck box to lower the utility box to the ground for loading. When ready to haul, lower the truck box and the utility box is lifted up into position, resting against a wooden bumper guard.

The Iowa DOT maintenance crew in Tipton developed the box, which measures 74 inches wide by 52 inches deep by 27-1/2 inches high. The tailgate measures 69 inches by 25-1/2 inches.

The crew manufactured the box with square tubing, channel iron, flat iron, and chain. The materials cost \$400 and labor cost \$600.

For more information about the portable utility box, contact Denny Petersen or Loren Reynolds, Tipton maintenance shop, 563-946-2391. •

