Preliminary Results from Evaluation of Dynamic Speed Feedback Signs on High-Speed Curves

Shauna Hallmark  
Center for Transportation Research and Education  
Iowa State University  
2711 S. Loop Drive, Suite 4700  
Ames, IA 50010  
shallmar@iastate.edu

Omar Smadi  
Center for Transportation Research and Education  
Iowa State University  
2711 S. Loop Drive, Suite 4700  
Ames, IA 50010  
smadi@iastate.edu

Neal Hawkins  
Center for Transportation Research and Education  
Iowa State University  
2711 S. Loop Drive, Suite 4700  
Ames, IA 50010  
hawkins@iastate.edu

ABSTRACT

Crash rates on horizontal curves are often higher than those on tangent sections. Frequency and severity are related to factors including radius, degree of curve, length of curve, type of curve transition, lane and shoulder widths, preceding tangent length, and required speed reduction (Luediger et al. 1988; Miaou and Lum 1993; Mohamedshah et al. 1993; Vogt and Bared 1998; Shankar et al. 1998). “A Guide for Reducing Collisions on Horizontal Curves (2004)” reports that the crash rate for horizontal curves is around three times that of tangent sections. It also indicates that about 76% of curve-related fatal crashes involve single-vehicle run-off-road crashes, and 11% are head-on with an oncoming vehicle. In Iowa (2001–2005), 12% of all fatal crashes and 15% of all major injury crashes occur on curves; 14% of all urban fatal crashes and 11% of all urban major injury crashes occur on curves; 11% of all rural fatal crashes and 19% of all rural major injury crashes occur on curves.

Curve-related crashes result from a number of causes, including driver workload, driver expectancy, and speeding. Approximately 56% of run-off-road fatal crashes on curves are speed related. Studies have suggested that geometric improvements can reduce crashes. Zegeer et al. (1992) suggested that curve flattening could reduce crashes by as much as 80%, while widening lanes and paving shoulders on horizontal curves could reduce crashes by 21% and 33%, respectively. Costs for geometric improvements, however, are prohibitive, especially for counties with a large number of rural two-lane roads to maintain. Geometric improvements also require programming and can take some time to implement.

Reducing speed on curves can be done in the short term and at significantly lower costs than making geometric improvements. Dynamic curve warning systems (DCWS) are one method that has been tried in limited applications to reduce vehicle speeds and, subsequently, crashes. A DCWS consists of a speed measuring device, which may include loop detectors or radar, and a variable message sign, which provides warnings to speeding drivers to slow down.
This presentation will discuss results of a project funded by the Federal Highway Administration (FHWA), the Iowa Highway Research Board, and the Iowa Department of Transportation. This project is conducting a national field evaluation of low-cost dynamic speed signs on rural roadways. The objective was to provide traffic safety and county engineers and other professionals with additional tools to more effectively manage speeds and decrease crashes on rural horizontal curves. The project installed two different types of signs on 22 curves in Washington, Oregon, Iowa, Florida, Pennsylvania, Arizona, and Texas. One sign displays the drivers speed when they exceed the 50th percentile speed, as shown in Figure 1a. The other displays the appropriate curve warning sign when a driver exceeds the 50th percentile speed, as shown in Figure 1b.

![Figure 1. Dynamic speed feedback signs](image)

Speed studies were conducted before the signs were installed and will be collected 1 month, 12 months, and 24 months after installation. A before and after crash analysis will be conducted as well.

The first signs were installed in July 2008. This presentation will provide initial speed results.

**Key words: curves—dynamic speed feedback signs—run-off-road crashes**
REFERENCES


