



Priority, Market-Ready Technologies and Innovations

Safe Speeds in Work Zones

Problem: Speeding in work zones causes injuries and fatalities

In 2001, there were 106,000 work zone crashes, accounting for 1.7 percent of all roadway crashes. These crashes resulted in 1,079 work zone fatalities, or an average of 3 deaths every day. In that same year, 47,000 people were injured in work zone crashes—an average of one injury every 11 minutes. When drivers speed through work zones, crash risks increase.

Why do drivers disregard speed limit signs in work zones?

Studies show that motorists do reduce driving speeds in work zones—even in work zones with no speed limit reductions—but not to the levels posted. As a source of traffic delays, work zones can cause driver frustration. In addition, sometimes the signs posted in work zones do not accurately reflect the current driving conditions, and drivers learn to disregard them.



Drivers disregard static signs that don't reflect current driving speeds

Many factors contribute to the lack of credibility for speed limit signing; the most critical factor is that, because of changes in volume, lighting, work activity, weather, and other conditions, the appropriate safe speed changes throughout the day. This is particularly true in highway work zones.

For example, a reduced speed limit when there is no roadwork activity encourages drivers to disregard the speed restriction when workers are present. If the speed signs are not current, they are not credible and will be ignored.

Putting It in Perspective

In 2001, on average:

- Three people a day died as a result of work zone crashes.
- One work zone crash occurred every 5 minutes.
- Every day, 130 people were injured in work zones.

Solution: Work zone speed display technologies help manage safe speeds

What are work zone speed displays?

Work zone speed displays are intelligent transportation system technologies that give drivers current and accurate information about safe driving speeds. There are several types of work zone speed displays.

Variable Speed Limit (VSL)

The VSL systems provide real-time information on appropriate speeds for current conditions and warn drivers of coming road conditions. These systems consist of multiple roadside monitoring and display trailers, each independently powered and controlled. Each speed trailer uses detectors to measure traffic speed and roadway conditions. A microcontroller processes this information along with other inputs, such as nature and duration of roadwork activity, to determine the appropriate speed limit, which is displayed on a trailer-mounted variable speed limit sign. The posted speeds can vary throughout the work zone.



VSL trailer displays safe speed based on road work and traffic conditions

Speed Feedback

A second type of work zone speed display is the Speed Feedback display, which informs approaching drivers of their current speed and encourages them to slow down if they are traveling above the speed limit. This is a portable display that can be moved to areas where speed is a problem. A maximum display speed is usually set to discourage drivers from competing to post higher speeds on the display.

How do these displays help reduce driving speeds?

Credible speed limits combined with timely advance warnings are essential for improving mobility and safety through work zones. VSL systems overcome many of the problems of static speed limit signs. Because these systems provide real-time information on appropriate speeds for current roadwork conditions, drivers will trust and use VSL information. The Speed Feedback display is effective because it gives drivers immediate feedback on their individual driving speeds. This feedback alerts drivers to specific driving behaviors.



Speed Feedback display encourages speeding drivers to comply to posted limit

Successful Applications: Speed displays reduce vehicle speeds in several States

State highway agencies in Iowa, Kansas, Nebraska, and Wisconsin deployed speed feedback signs in rural high-speed work zones as part of the Midwest Smart Work Zone Deployment Initiative. The feedback signs reduced speeds by about 8 kilometers (5 miles) per hour; each 1.6 kilometer (1 mile) per hour reduction in speed may reduce injury crashes by 5 percent. Similar speed reductions have been observed by the Texas Department of Transportation (DOT) in rural, short-term work zones, and by the New Mexico State Highway and Transportation Department in urban work zones.

The Michigan DOT deployed a VSL system in one direction within an 29-kilometer (18-mile) work zone on U.S. Interstate 96 during the 2002 construction season. Travel time was reduced through the work zone because higher speeds were posted when appropriate. With the VSL in operation, driving speeds were slower through the work zone median crossover than when a static "50 miles per hour" limit was displayed, suggesting that variable speed limits were more credible. Ten crashes occurred in the direction with static speed limits, compared to only two crashes in the VSL direction.

Benefits

Work zone speed displays:

- Are portable and can be moved to new areas where speed management is needed.
- Provide current and credible information to drivers.
- Require minimal maintenance.

Additional Resources

FHWA requires that VSL systems and Speed Feedback displays conform to the national standards described in the Manual on *Uniform Traffic Control Devices* (MUTCD). For more information, visit the FHWA MUTCD Web site at <http://mutcd.fhwa.dot.gov>.

For more information, contact:

Davey Warren, FHWA Office of Safety
Phone: 202-366-4668
E-mail: davey.warren@fhwa.dot.gov