Effectiveness of Speed Advisory Sign Systems in Reducing Speeds Upstream of a Traffic Slowdown

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ABSTRACT

A primary safety concern associated with work zones on rural interstate highways is the increased crash potential when congestion occurs on the approach to a work zone. Depending on the traffic volume and capacity of the work zone, the queue of slow-moving or stopped vehicles caused by the congestion may extend rapidly upstream creating a high speed differential between the end of the queue and approaching traffic. The unexpectedly sudden encounter with congestion often makes it very difficult for some drivers to safely reduce their speeds and avoid colliding with other vehicles as they approach the end of the queue. One solution to this problem is to use some Intelligent Transportation System technology that can warn driver of possible hazard downstream. The D-25 Speed Advisory Sign System from MPH Industries is one of the technologies. It was evaluated as part of the Midwest States Smart Work Zone Deployment Initiative, a pooled-fund study sponsored by Iowa, Kansas, Missouri, Nebraska, and the Federal Highway Administration.

The system deployed for the purpose of this evaluation consists of a series of three MPH D-25 speed trailers that operates independently placed at approximately 1/4- to 1/2-mile intervals depending on the weather, terrain, and prevailing roadway and traffic conditions. Each trailer is equipped with: (1) an LED display with 25-inch speed digits, (2) directional radar directed toward downstream traffic, (3) two flashing strobes to warn drivers of downstream problems, (4) SPEED OF TRAFFIC AHEAD sign mounted over the speed display, and (5) USE EXTREME CAUTION WHEN FLASHING sign mounted beneath the speed display. The on-board radar monitored speeds downstream of the trailer. When a traffic slowdown was detected, the strobe lights began flashing. When there was no slowdown, the strobe lights were off and either the speed of traffic downstream or the work zone speed limit was displayed, whichever was lower. The messages were intended to warn drivers of stopped or slow-moving traffic ahead and thereby enable them to reduce their speeds and the potential of rear-end crashes.

The system was evaluated based on speed data measured by the MPH D-25 speed trailers. Traffic was also videotaped during peak hours to study driver behavior, conflicts, and braking activity. The initial results of the on-going evaluation indicated that the speed messages were effective in reducing speeds.

Key words: speed advisory sign systems—traffic congestion—traffic speed reduction—work zone safety

Note: Data collection and analysis were still in progress at the time of publication; final results will be presented at the symposium.

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