Transverse Speed Bars for Rural Traffic Calming

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Background

Small rural communities often lack the expertise and resources necessary to address speeding and the persistent challenge of slowing high-speed through traffic. The entrances to communities are especially problematic given that drivers must transition from a high-speed, often-rural roadway setting to a low-speed community setting.

The rural roadway provides high-speed mobility outside the community, yet the same road within town provides local access and accommodates pedestrians of all ages, on-street parking, bicycles, and other features unique to the character of a small community. Drivers who have been traveling for some distance on the high-speed road, and are traveling through the community, may not receive the appropriate clues that the character of the roadway is changing and may not adjust their speeds appropriately.

Addressing speeding issues is an even greater challenge given that smaller communities typically lack engineering staff and resources, which can lead to decisions that may not conform to accepted design guidance. For instance, many rural communities set speed transition zones too low a significant distance outside the community, before there is any practical need for drivers to slow down.

Communities may also have unrealistic expectations about what speed reductions are practical and, in some cases, may even implement strategies to reduce speeds that are not appropriate for the situation. For instance, some small communities with speeding issues simply use stop signs to slow traffic, which can diminish both enforcement and compliance.

A number of traffic-calming devices were evaluated to determine their effectiveness in reducing speeds along the main road through a small rural community. Five different treatments

Transverse bar treatment at Hazleton east entrance

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were selected and installed in six rural Iowa communities. This tech brief highlights use of transverse speed bars.

Description

Transverse or optical speed bars have been used in several applications. Katz (2007) reported on use of the peripheral transverse markings at sites in New York (freeway exit), Mississippi (two-lane road), and Texas (two-lane road on curve). Overall, Katz found a 4 mph reduction in average speeds and a 5 mph reduction in 85th percentile speeds. The differences were statistically significant.

Speed reduction markings were used at the entrance to Union, Iowa along State Highway 215 and County Road D-65 as part of a previous Center for Transportation Research and Education (CTRE) study on rural traffic-calming applications. The treatments resulted in a reduction in mean speeds up to 1.9 mph and reductions in 85th percentile speeds up to 2 mph. The percentage of vehicles traveling 5 or more mph over the posted speed limit was reduced by up to 5 percent and the percentage of vehicles traveling 10 or more mph over the posted speed limit was reduced by up to 8.5 percent (Hallmark et al., 2007).

The transverse speed bar (also called optical speed bar) treatment was based on the concept of speed-reduction markings that are covered in Section 3B.22 of the Manual on Uniform Traffic Control Devices (MUTCD 2009 edition).

The transverse markings by themselves were only moderately effective in an earlier phase of this study. So, the treatments were modified to provide more visual effect. The middle bar provides additional visual contrast for the driver and the bar spacing also encourages drivers to place their vehicle between the bars, which is expected to cause drivers to slow as they concentrate on the driving task.


Application of transverse bar treatments

Transverse treatment at Quasqueton south entrance

Treatment Design

The treatment consists of a series of three horizontal bars. The bars were spaced at intervals so that drivers are able to position their vehicle within the wheel paths. The treatment was spaced for approximately 100 feet before the first posted speed limit where drivers are encouraged to slow down. Approximate transverse bar spacing was 10 to 12 feet apart.

Although spacing and size of bars was consistent for this application, in other applications, spacing and treatment width have been placed so that the bars are closer together as the driver traverses the treatment and the bars become thinner. This is thought to create the perception that the driver is traveling faster than they actually are, helping to encourage them to slow down.

The treatment was a thermoplastic product, which is placed through heating. Glass beads are added while the treatment is placed to increase visibility and skid resistance. The treatment was installed in Hazleton, Iowa along County Road C-57, which is the main east/west road through the community. The treatment was installed at the east community entrance and was placed to end at the first 25 mph posted speed limit.

This treatment was also installed in Quasqueton, Iowa along the main road through the community, County Road W-40. One treatment was installed at the north community entrance where the speed limit changes to 35 mph and another was installed at the south community entrance where the speed limit changes to 25 mph.

Results

Pneumatic road tubes were used to collect speed and volume data before and after installation of the rural traffic-calming treatments. Pneumatic road tubes are fairly accurate (99 percent accuracy for individual vehicle speeds), can collect individual vehicle data (speed, volume, headway, and classification), and are fairly low-cost. Data were collected using JAMAR FLEX HS counters. Road tubes were typically laid just downstream of the treatment or at the treatment.

Data were typically collected for 48 hours on a Monday through Friday under mostly dry weather conditions. In a few cases, due to issues with the traffic counters, data were available for only a 24 hour period. Use of full 24 hour periods avoids biasing the speed sample to speed choices based on time of day. The collection periods occurred Monday through Friday while avoiding holidays to avoid any unusual traffic patterns.

Typical speed statistics, such as change in average speed, were calculated for each location where data were collected as described below.

Speeds decreased at two of the three sites with decreases of 1 mph in mean and 85th percentile speeds. The fraction of vehicles traveling 5 or more mph over the posted speed limit decreased by about 8 percent and the fraction of vehicles traveling 10 or more mph over decreased by 12 percent for both sites. A large decrease resulted in the fraction of vehicles traveling 15 or more mph over (25 percent and 17 percent) and 20 or more mph over (40 percent and 25 percent).

At the third site, mean and 85th percentile speeds increased slightly. The fraction of vehicles traveling over the posted speed limit increased with an 8 percent increase for vehicles traveling 5 mph over, a 24 percent increase for vehicles traveling 10 mph over, a 36 percent increase for vehicles traveling 15 mph over, and a 100 percent increase for vehicles traveling 20 or more mph over the posted speed limit.

Results for transverse bar treatment at 1 month after installation

	Hazleton	Quasqueton North	Quasqueton South
Mean Speed	-1.6	1.4	-1.2
85th Percentile Speed	-1	2	-1
Fraction of Vehicles Traveling Over Posted Speed Limit			
≥ 5 mph	-8.3%	8.8%	-8.8%
≥ 10 mph	-11.9%	24.3%	-12.3%
≥ 15 mph	-25.0%	36.4%	-16.7%
≥ 20 mph	-40.0%	100.0%	-25.0%

References

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