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Center Island with Raised Curbing for Rural Traffic Calming

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Center Island with Raised Curbing for Rural Traffic Calming

Abstract

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.

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 were selected and installed in six rural Iowa communities. This tech brief highlights use of temporary curbing to create center islands.

Keywords

Radar vehicle detectors, Road markings, Speed signs, Traffic calming, colored pavement markings, dragon's teeth, radar activated signs, roadway treatments, rural traffic calming, rural transitions, speed feedback signs, temporary center islands, traffic management, transition zones, transverse speed bars

Disciplines

Civil Engineering

Center Islands with Raised Curbing 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 were selected and installed in six rural Iowa communities. This tech brief highlights use of temporary curbing to create center islands.



Mountable curbing at south entrance to St. Charles

Description

Use of vertical devices creates the sensation of less space creating some discomfort to drivers, which encourages them to slow. In the previous traffic-calming study conducted by the Center for Transportation Research and Education (CTRE), 36 inch tall yellow tubular channelizers were spaced approximately 2 feet apart creating a center island, which narrowed the width of each travel lane to approximately 11 feet (Hallmark et al. 2007). The treatment was placed in Slater, Iowa and was very effective with reductions of up to 3 mph in both mean and 85th percentile speeds.

Although the treatment was effective, it required a number of channelizers, which had to be replaced when farm vehicles and snowplow equipment struck them. In addition, use of the



Installation of raised curbing using bolts



Close-up of mountable curbing

wider center area of a rural two-lane roadway is not appropriate in many cases given it may cause drivers to leave the roadway to avoid the treatment.

As a result, an alternative design using temporary curbing was tested. Both temporary curbing and channelizers have been used to prohibit movements such as lane changes or going around crossbars at rural railroad crossings.

Given the temporary curbing treatment is commercially available, the Manual on Uniform Traffic Control Devices (MUTCD) does not require approval for experimentation with it.

The temporary curbing that was purchased is approximately 2 inches high by 40 inches long by 8 inches wide. The curbing has a rounded design that can be mounted by errant vehicles.

Treatment Design

The treatment was placed at community entrances and extended into the community by several hundred feet depending on location. The first several sections of 40 inch curb sections were placed approximately 1 foot apart and subsequent sections were placed about 5 feet apart.

In general, the treatment was placed after the normal speed limit was posted along each roadway within the community. For instance, if a road was 55 mph outside of town, then had a transition to 35 mph, and transitioned to a 25 mph speed limit through the community, the treatment was placed after the 25 mph limit.

While rural traffic calming has been used within the transition zone to slow drivers as they enter the community in many cases, in this case, the treatment was placed within the community because there was some concern that drivers entering the transition zone at high rates of speed may strike the channelizers in the center of the roadway. Although the hazard signs used are strikable and the curb sections are mountable, it was decided to be judicious in where they were placed.

Hazard markers were placed at the beginning and end of the treatment so that drivers were aware that a vertical object was located within the traveled roadway.

The treatment was affixed to the pavement using bolts. As a result, the treatment could be removed and replaced as needed. This was important given the treatment needed to be removed for the winter months so city and county snowplow operators did not need to worry about maneuvering around the treatments during winter storm events.

The treatment was installed at three locations in the community of St. Charles, Iowa (population 653). Speed problems were present at all four community entrances. County Road R-35 is oriented north/south and has a volume of 410 vehicles per day (vpd) at the north community entrance and 940 vpd at the south entrance. State Highway 251/West Main Street is oriented east/west and has a volume of 1,200 vpd at the west community entrance and 2,240 at the east entrance. The roadway serves as a major collector route for drivers commuting to metro Des Moines, Iowa.

Temporary islands were created using mountable curbing at the north, west, and south entrances. (A different treatment was placed at the east entrance to St. Charles). Mountable curbing was not appropriate for the east entrance given a horizontal curve, which may lead to some sight-distance issues for drivers being able to see the curbing in time.

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.

Decreases in mean speed and 85th percentile speed between 1 and 3 mph resulted for two of the locations. Decreases in the fraction of vehicles traveling 5 or more mph over the speed limit of up to 37 percent were noted and decreases of up to 50 and 71 percent in the fraction traveling 10 and 15 or more mph over, respectively. At the third location, little change in speed resulted for any of the speed metrics.



Mountable curbing installed at west St. Charles community entrance

Results for raised curb treatment after installation

	St. Charles North		St. Charles South		St. Charles West	
	1 Month	12 Months	1 Month	12 Months	1 Month	12 Months
Mean Speed	-2.2	-2.6	-1.9	-2.2	0.4	-0.3
85th Percentile Speed	-3	-3	-1	-3	0	-1
Fraction of Vehicles Traveling Over Posted Speed Limit						
≥ 5 mph	-28.6%	-36.7%	-23.4%	-29.8%	5.9%*	-8.8%
≥ 10 mph	-45.8%	-50.0%	-28.6%	-33.3%	11.1%*	0.0%
≥ 15 mph	-71.4%	-57.1%	-28.6%	-42.9%	0.0%*	-50.0%

* Not statistically significant at 95% level of significance

References

Hallmark, Shauna L., Eric Peterson, Eric Fitzsimmons, Neal Hawkins, Jon Resler, and Tom Welch. 2007. *Evaluation of Gateway and Low-Cost Traffic-Calming Treatments for Major Routes in Small Rural Communities*. November 2007. www.intrans.iastate.edu/research/detail.cfm?projectID=-226410767

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