RESEARCH ADMINISTRATION
Bureau of Field Services
Michigan Department of Transportation

Research Spotlight

Gateway treatment makes crosswalks safer for pedestrians

Pedestrian safety is an important issue for MDOT, but getting drivers to yield to pedestrians consistently at crosswalks is a significant challenge. The gateway treatment, which consists of yield signs installed both at the edge of the roadway and between travel lanes, is an inexpensive strategy to increase driver yielding rates. Two research projects evaluated and confirmed the strategy's effectiveness and durability.

Project Information

REPORT NAMES: Evaluation of R1-6 Gateway Treatment Alternatives for Pedestrian Crossings; Evaluation of R1-6 Gateway Treatment Alternatives for Pedestrian Crossings: Follow Up Report

START DATES:
October 2013, February 2016

REPORT DATES:
February 2016, December 2016

RESEARCH REPORT NUMBERS:
RC-1638, RC-1643

TOTAL COST:
$265,695 (total for both projects)

COST SHARING: 20% MDOT, 80% FHWA through the SPR, Part II, Program

MDOT Project Manager

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Problem

Nationwide, there were more than 4,700 pedestrian fatalities in 2013, with 148 such fatalities in Michigan. Enhancing pedestrian safety is one of the main goals of Michigan's Toward Zero Deaths statewide safety campaign, and improving the rates at which drivers yield to pedestrians at crosswalks is an important part of that campaign. However, the established strategies for achieving this goal (which are provided in the Michigan Manual on Uniform Traffic Control Devices) have limited effectiveness, particularly at sites with more than one travel lane in each direction. The rectangular rapid flash beacon and pedestrian hybrid beacon are more effective, but with installation costs of $20,000 and $100,000, respectively, they are too expensive for widespread implementation.

MDOT's user guide will aid implementation of the gateway treatment at appropriate locations by showing recommended configurations and providing usage guidelines.

The gateway treatment is a promising and less-expensive option, costing only $1,200 to $1,800 for a six-sign configuration. MDOT conducted two research

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> *"We wanted a low-cost, effective treatment to improve pedestrian safety. It's exciting to show that the gateway treatment can be of value at lots of downtown locations."*
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> **Carissa McQuiston, P.E.**
> Project Manager

projects to evaluate the effectiveness of the treatment in its various configurations, both initially and over the course of a spring-through-fall test period. In addition, since the gateway treatment includes in-street signs, MDOT investigated the likelihood of the signs' survival and the effectiveness of a partial treatment if one sign is struck down by a vehicle.

Research

The initial project evaluated the effectiveness of the gateway treatment. The research team installed the signs in several configurations at a variety of sites, including non-signalized intersections, traffic circles, trail crossings, midblock crosswalks and Interstate highway ramp entrances. To evaluate the influence of the message imprinted on the signs, researchers also tested a gateway configuration using all blank signs.

In a follow-up project, researchers evaluated whether the impact of the gateway treatment on driver behavior would persist over time, and they collected speed information as part of this study to see whether speed reductions were noticed with the installation of the gateways. During the initial study, researchers observed sites for two or three months. In the follow-up phase, they monitored sites for six months, from May through October, since the signs generally had to be removed in November so that they wouldn't interfere with snowplows.

Results

The gateway configuration significantly improved driver yielding rates at several sites. Under baseline conditions (that is, without the gateway treatment), many locations had yield rates of less than 10 percent. After installation of the signs, yield rates increased to more than 90 percent in some circumstances. The gateway treatment also had a traffic-calming effect, leading to speed reductions of between 4 and 10 mph, even when pedestrians were not present. The signs were less effective at roundabouts and Interstate highway ramps, however.

Blank signs in the gateway configuration had a smaller impact on driver behavior, suggesting that the message content of the signs was a factor in their effectiveness.

In the second study, the improvement in yield rates and the traffic-calming impacts persisted throughout the study period. These benefits were seen even when a sign was missing from the gateway. As for sign durability, among signs affixed to a curb-type mount with a flexible rubber attachment, 100 percent survived for the full study period, but among flush-mounted signs with a pivoting base, only 58 percent survived.

Value

The gateway treatment is an inexpensive and effective strategy for improving pedestrian safety in crosswalks. Appropriate locations include intersections and midblock crosswalks on roads with speed limits of 30 mph or less, or speed limits of 35 mph with average annual daily traffic levels below 12,000.

MDOT has published a user guide to aid implementation of the gateway treatment. This guide describes the signs needed, installation time and costs, and anticipated driver-yielding compliance for eight types of sites based on the number of lanes and the presence of a refuge island. The guide also includes such recommendations as the use of curb extensions at certain locations and the use of flexible delineators where signs are particularly vulnerable to being struck by cars. A crash modification factor assigning an estimated safety impact is likely to be developed for the gateway treatment.

Research Administration

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This final report is available online at

https://mdotjboss.state.mi.us/SpecProv/getDocumentById.htm?docGuid=9d0d0591-90af-4628-bc0c-66df35f30c01 and https://mdotjboss.state.mi.us/SpecProv/getDocumentById.htm?docGuid=32bd0eea-faf5-4b75-8cdd-8da7b2e829f9.

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