



# Safety Evaluation of Yield-to-Pedestrian Channelizing Devices

FINAL REPORT

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Montana State University

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# **Safety Evaluation of Yield-to-Pedestrian Channelizing Devices**

## Executive Summary

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## EXECUTIVE SUMMARY

Highway safety is an ongoing challenge throughout the United States, including in Pennsylvania, where more than 1,600 people died in motor vehicle crashes in 2005. Of that number, approximately 10 percent were pedestrians. Highway improvements to address pedestrian safety are difficult because of the cost associated with many potential solutions, along with the geographically dispersed nature of vehicle-pedestrian crashes.

The Pennsylvania Department of Transportation (PennDOT) has adopted a new approach to improving pedestrian safety in recent years through the installation of Yield-to-Pedestrian Channelizing Devices (YTPCD). These devices combine text with commonly accepted symbology to read, “STATE LAW YIELD TO PEDESTRIANS WITHIN CROSSWALK”. YTPCD are placed prior to painted marked crosswalks in the center of the road. It is hoped that these signs, by being in the driver’s immediate field of view, will improve motorist awareness of pedestrians who may be crossing, and prompt them to slow down when pedestrians are present. With PennDOT having made a significant investment in these low-cost devices, it is important to know how effective they are in Pennsylvania, and where they would be most effective.



PennDOT contracted with the Western Transportation Institute to test the effectiveness of YTPCD by examining motorist and pedestrian behavior. This research project examined both direct effects and spillover effects, i.e. how the devices would affect motorists’ behavior at the location where they were deployed as well as at other marked crosswalks in the same community where devices were not deployed. The devices were tested in four types of communities (urban, suburban, small city, and college town), as well as at two types of locations (unsignalized intersections and mid-block crossings). To ensure that permutations of all these factors were considered, testing for direct effects was conducted at three sites and measurement of spillover effects at two sites within each community type, with each testing including both types of crossing locations.

The research team focused on four communities within District 6-0: Manayunk (NW Philadelphia), Haverford Township, Pottstown and West Chester. Data were collected in two periods: “before” data (i.e. no locations had YTPCD) were collected May 4-12, 2006; and “after” data (i.e. direct testing locations had YTPCD) were collected June 12-15, 2006. Motorist and pedestrian behavioral data were collected on weekdays during daylight time, often including part of the peak traffic period. Behavioral data were collected under the supervision of the research team. The data were compiled in a spreadsheet, with various quality control checks to ensure the quality of the data.

To analyze the behavioral data, the research team focused on testing three hypotheses related to YTPCD installation: 1) motorists are more likely to yield to pedestrians; 2) pedestrians are less likely to yield to motorists (i.e. pedestrians are more secure); and 3) pedestrians are more likely to use crosswalks. The research team compared before and after data at the locations where YTPCD were employed looking at overall effects across groups of sites, and then looking at

individual sites to see if YTPCD effectiveness was impacted by community type (urban, suburban, small city, college town); location type (intersection or mid-block); or intersection traffic control (all-way stop control, or partial stop control). Similar analyses were conducted for other sites in the same communities to examine the presence of spillover effects. A 90 percent confidence level was used in all these analyses.

In terms of direct effects, i.e. examining behavior at crosswalks before and after YTPCD were deployed at those locations, the analysis showed generally positive and statistically significant effects of the YTPCD. A few findings in support of the previous statement are provided below:

- The likelihood of the first motorist arriving at a crosswalk yielding to a waiting pedestrian increased 30-34 percent at intersections and 17-24 percent at mid-block crosswalks.
- The percentage of pedestrians who yielded to motorists decreased by 11-16 percent at intersections and 8-13 percent at mid-block crossings, suggesting increased pedestrian security when the devices were in place.
- There was a small (1-4 percent) but statistically significant increase in the percentage of pedestrians who used crosswalks, which should also correlate with pedestrian safety.

The YTPCD were generally found more effective at intersections than at mid-block locations, and effects did not seem to exhibit any bias with respect to community type.

In general, the spillover effects seemed to be positive primarily at intersections and on corridors or streets where the YTPCD were installed at nearby crosswalks. The effects of YTPCD at spillover intersections were comparable to those observed at intersections where YTPCD were deployed, while the effects at mid-block crossings were unclear.

The research concluded that the YTPCD have a significant and positive effect on surrogate measures for pedestrian safety, including the motorists' willingness to yield, pedestrian security, and pedestrian use of crosswalks. To the extent these surrogate measures correlate with vehicle-pedestrian crash rates, YTPCD should reduce the number of vehicle-pedestrian crashes and improve pedestrian safety. The research found that the devices were most effective at intersections but also provided benefits at mid-block crossings. The research recommended that future YTPCD deployments consider the effects of narrow lane widths and the need for regular monitoring and replacement of devices as needed.

The recommendation for continued use of YTPCD is tempered by a couple of caveats. The long-term effectiveness of YTPCD may be different than what was observed in this research. It is unclear whether the devices might produce a false sense of security among pedestrians. A long-term analysis of pedestrian crash data at locations with and without YTPCD would be a better way to measure the ultimate effectiveness of these signs than relying solely on surrogate measures evaluated in this study. Nonetheless, based on the findings of this research, communities should consider deployment of YTPCD at locations where local design conditions and pedestrian safety concerns warrant them.