

JOINT TRANSPORTATION RESEARCH PROGRAM

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Selection of Pedestrian Crossing Treatments at Controlled and Uncontrolled Locations

Introduction

Designers and traffic engineers have to make decisions on selecting a pedestrian treatment whenever designing a new pedestrian facility or retrofitting an existing one. The goal is either to provide or improve pedestrian safety at pedestrian crossing facilities, including controlled locations of signalized intersections and approaches with stop and yield signs, and uncontrolled locations of intersections and midblock sites. Currently, the only source of pedestrian treatment selection for Indiana Department of Transportation (INDOT) is Figure 51-7 O in the INDOT (2013) Design Manual. The information in the current figure is general, limited, and does not take into consideration key elements such as the number of lanes and the existence of a raised median. Therefore, there is a need to find a more detailed and comprehensive approach to providing guidelines when deciding on a pedestrian crossing treatment. The approach has to be practical and can be easily utilized by traffic and design engineers, planners, and other constituents.

Findings

Guidelines for the selection of pedestrian crossing treatments at controlled and uncontrolled locations have been recommended in this final report based on a review of the most updated federal and state reports, guidelines, design manuals, polices, and other relevant documents and resources on pedestrian crossing treatment selection. The following is a summary of the findings:

- The National MUTCD and State MUTCD along with the corresponding state supplement(s) are the main sources of standards and guidelines on pedestrian treatment selection for all state DOTs.
- Some state DOTs have established standalone guidelines on pedestrian treatment selection; some have the guidelines as part of their traffic or design manual; and the rest either have limited information or information could not be found.

- Most of the State DOTs developed their guidelines based mainly on several FHWA, AASHTO, and ITE published studies and reports. However, the study by Zegeer, Stewart, Huang, and Lagerwey (2002) was adopted by several states either “as is,” or with modifications, or referenced as a source on pedestrian crosswalk selection.
- Several cities in the US have developed their own guidelines on pedestrian crossing treatment selection.
- State DOTs use mainly standards and guidelines from the National MUTCD, Part 3, and a study by FHWA (2000) for roundabout crosswalk markings.
- There are no clear warrants for grade separation treatment. However, several states used the general guidelines in the AASHTO (2004) design guide or have established criteria for grade separation of path crossings for roadways. Arizona DOT, however, has established comprehensive criteria that must be satisfied to consider construction of a pedestrian grade-separated structure (ADOT, 2012).
- There is no unique or common procedure for selecting pedestrian crossing treatments at controlled and uncontrolled locations in the US.
- There is a need for a national and comprehensive study to develop practical guidelines on pedestrian crossing treatments, especially on multilane roadways, complex intersections, and when the speed is 45 mph or more.
- A survey was conducted online on pedestrian crossing treatments and high-speed divided highways and a total of 21 subjects completed the survey fully. The results of the survey indicate that the treatments most frequently used by the different states represented in the survey are advanced signs, crosswalk signs and pavement markings, countdown displays at signalized intersection, high-visibility signs and markings, curb extensions, and median refuge islands. The least frequently used treatments include in-roadway warning lights, pedestrian railings, overhead flashing beacons (passive), split midblock signals, and pedestrian crossing flags.
- The top choices among all subjects for future treatments were countdown displays at signalized intersection,

crosswalk signs and pavement markings, high-visibility signs and markings, and median refuge islands. The least frequently selected treatments for future projects were in-roadway warning lights and pedestrian crossing flags.

- The top five most effective pedestrian treatments ranked by subjects are countdown displays at signalized intersections, crosswalk signs and pavement markings, median refuge islands, high-visibility signs and markings, and curb extensions. The bottom five pedestrian treatments are overhead flashing beacons (continuous), overhead flashing beacons (passive), split midblock signals, in-roadway warning lights, and pedestrian crossing flags.
- In the case of high-speed divided highways, the majority of subjects (82%) reported that they will consider providing adequate pedestrian timings to cross the entire highway length. In addition, 73% of the subjects do not believe the delays caused by providing the pedestrian timing is a major concern.
- The main recommendations on providing pedestrian timings to cross the entire high-speed divided highway length were to provide enough time to cross the entire width of the intersection without a median whenever there is a demand. The feedback on the concern of creating considerable vehicular traffic delay when treating high-speed divided highways with adequate pedestrian timings indicates that safety trumps reasonable delay where pedestrian demand is not high.
- On the issue of having a refuge island built with curbs, which are not typically used on high-speed roadways with speeds equal to or greater than 50 mph, the results of the survey showed a split vote on the recommendation of a refuge island in the median: 6 out of 10 (60%) said yes and 4 (40%) said no. The results suggested that a maximum speed limit, where a refuge island is not feasible, should be site specific and in the range of 40–45 mph. In addition, it is recommended either to let pedestrians cross the entire length at one time or, if possible, to provide grade separation for pedestrian crossings.

Implementation

The recommended Guidelines for Marking Crosswalks and Treatments Selection of Pedestrian Crossings in this study provide information on the installation of marked crosswalks at controlled and uncontrolled locations. INDOT engineers

can use the proposed guidelines as a source for selecting appropriate treatment for existing and new pedestrian crosswalks. A workshop will be arranged in the near future and after the approval of the final report to disseminate the findings of the project to INDOT engineers, planners, and other constituents.

References

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