NCUTCD Proposal for Changes to the Manual on Uniform Traffic Control Devices

TECHNICAL COMMITTEE: Regulatory & Warning Signs

ITEM NUMBER: 16B-RW-02

TOPIC: In-Street Pedestrian Signs Gateway Installation

ORIGIN OF REQUEST: RW Task Force: Tom Heydel (chair), Joanne Conrad, Randy McCourt, Ross Oyen. Michigan FHWA Request to Experiment Study- Ron Van Houten and Mark Bott

AFFECTED SECTIONS OF MUTCD: Sections 2B.12

DEVELOPMENT HISTORY: task force: 4-23-16, revised 4-24-16, revised 4-26-16, revised following sponsor comments 12-17-16, revised 12-27-16, updated 1-2-17

- Approved by Technical Committee: 06/08/2016
- Approved by RWSTC Technical committee following sponsor comments: 01/04/2017
- Approved by NCUTCD Council: 01/06/2017

This is a proposal for recommended changes to the MUTCD that has been approved by the NCUTCD Council. This proposal does not represent a revision of the MUTCD and does not constitute official MUTCD standards, guidance, or options. It will be submitted to FHWA for consideration for inclusion in a future MUTCD revision. The MUTCD can be revised only through the federal rulemaking process.

SUMMARY:

Section 2B.12, In-Street and Overhead Pedestrian Crossing Signs (R1-6, R1-6a, R1-9 and R1-9a) are permitted in the roadway at the crosswalk location on the centerline, on a lane line, or on a median island. Placement of the sign in the gutter pan commonly was done with a portable application of the R1-5 with a heavy rubber base, allowing space for drainage between the base and the curb.

Michigan DOT requested experimental approval in 2014 in accordance with Section 1A.10 of the MUTCD to evaluate the installation technique of installing the R1-6 sign in the bottom of the curb which sometimes is referred to as the gutter pan (in some parts of the country) and also another trial of installing the sign on the curb top using the same 4 foot maximum height above the permanent surface to top of sign as shown in Section 2B.12 (paragraph 13). FHWA
approved the request to experiment on May 22, 2014 by letter from Mark R. Kehrli, Director, Office of Transportation Operations, FHWA. Dr. Ron Van Houten, Western Michigan University carried out study in 2015. Application of the R1-6 or R1-6a in this manner provides a gateway impression to the driver and has resulted in reduced speeds approaching the crossing. The curb top installation is also very useful in northern climates where snow removal does not allow for installing the in-street pedestrian sign during the winter months. By allowing both the top of curb and median installation allows for leaving the in-street pedestrian sign in the “gateway” configuration over the winter months. A 6 month status report was presented to RWSTC in January 2016 for consideration to revise the MUTCD language to allow for the gutter pan installation or top of curb mounted application for the R1-6 or R1-6a signs.

DISCUSSION

Evaluation of the R1-6 Signs as a Gateway Treatment to Improve Yielding to Pedestrians is recapped by the Ron Van Houten report. Below is an excerpt from their 6 month status report in December 2015.

Introduction:
One of the goals of the MDOT research project is to determine a robust method of installing the Gateway R1-6 crosswalk installation that can survive over time with minimum maintenance effort. One way to improve the survival of the signs used to develop the edge of the Gateway is to place these signs in the gutter pan. However, this can lead to drainage issues, can impede sweeping the roadway and can be an obstacle for bicyclist. Placement on the top of the curb would overcome these potential problems.

Figure 1 shows a gateway location in the City of San Antonio, TX. As can be seen the Gateway was not complete because there was a drain in the gutter pan area. A curb top placement at this location would have the best solution.

Figure 1. An incomplete gateway that resulted from a combination of narrow lane width and drainage issues.

We have evaluated the R1-6 sign at one of the original research locations, Rose St. at Academy in Kalamazoo. The results obtained at this site are presented in Table 1. Placement of a gateway
with edge side R1-6 signs placed on the curb top is associated with 72% of drivers yielding to pedestrians vs. 79% yielding with gateway configuration with edge signs in the gutter pan. The baseline yielding prior to addition of signs was only 7% at this site. This small difference in yielding between curb top and gutter pan placement is offset by sign survival and maintenance issues. This result was repeated replicated at this site and is significant at the .01 confidence level. This site was not selected for permanent installation because of planned construction at this to the roadway. Three new locations were selected in the City of Ann Arbor. Data have been collected in Ann Arbor and are shown in Table 1. These data show that on average edge signs improve yielding behavior to 70-90%+ and that curb top placement is only 10% less effective than gutter pan placement but far superior to the baseline condition. A Gateway that does not include an edge sign (sign in middle only) produces yielding at the 50% to 60% levels. Figure 2 shows a photo with curb top placement at Huron. In all cases we used the city post on the lane line.

Figures 3, 4 and 5 shows the average percent of drivers yielding during each measurement session (20 crossings) at each crosswalk. These data show that yielding behavior was relatively consistent at each site and that results did not vary when gutter pan placement was first treatment or curb top placement condition was introduced first. The stability of the effect over multiple replications provides evidence that the differences in driver yielding behavior were a result of the two different edge sign treatment conditions.

<table>
<thead>
<tr>
<th>Location</th>
<th>Baseline</th>
<th>Gutter Pan Placement</th>
<th>Curb Top Placement</th>
<th>Gateway without Edge Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huron Midblock</td>
<td>62</td>
<td>97</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td>Midblock 7th Street</td>
<td>15</td>
<td>70</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>Nixon at Bluett</td>
<td>40</td>
<td>93</td>
<td>86</td>
<td>68</td>
</tr>
<tr>
<td>Rose at Academy</td>
<td>6</td>
<td>82</td>
<td>72</td>
<td>52</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td><strong>31</strong></td>
<td><strong>86</strong></td>
<td><strong>76</strong></td>
<td><strong>60</strong></td>
</tr>
</tbody>
</table>

Table 1. The percent of drivers yielding right-of-way to pedestrians during the baseline, gutter pan placement and curb to placement conditions. Gateway without Edge signs just had signs on the yellow line or at the refuge island.
Figure 3. Percent of drivers yielding right-of-way during each condition of the experiment (note: GW = Gateway)

Figure 4. Percent of drives yielding right-of-way during each condition of the experiment
Figure 5. The percent of drivers yielding right-of-way during condition of the experiment.

Permanent signs were installed in September and were removed for winter operations in November. Data over the first two months show that yielding remains high at each of the Ann Arbor locations. The signs will be reinstalled in the spring of 2016. Preliminary evidence shows that curb top mounted signs have not been struck while some placed in the gutter pan area have been struck.

RECOMMENDED MUTCD CHANGES

The following present the proposed changes to the current MUTCD within the context of the current MUTCD language. Proposed additions to the MUTCD are shown in blue underline and proposed deletions from the MUTCD are shown in red strikethrough. Changes previously approved by NCUTCD Council (but not yet adopted by FHWA) are shown in green double underline for additions and green double strikethrough for deletions. In some cases, background comments may be provided with the MUTCD text. These comments are indicated by [highlighted light blue in brackets].

PART 2. SIGNS

CHAPTER 2B. REGULATORY SIGNS, BARRICADES, AND GATES

Section 2B.12 In-Street and Overhead Pedestrian Crossing Signs (R1-6, R1-6a, R1-9, and R1-9a)

Option:

01 The In-Street Pedestrian Crossing (R1-6 or R1-6a) sign (see Figure 2B-2) or the Overhead Pedestrian Crossing (R1-9 or R1-9a) sign (see Figure 2B-2) may be used to remind road users of laws regarding right-of-way at an unsignalized pedestrian crosswalk. The legend STATE LAW may be displayed at the top of the R1-6, R1-6a, R1-9, and R1-9a signs, if applicable. On the R1-6 and R1-6a signs, the legends STOP or YIELD may be used instead of the appropriate STOP sign or YIELD sign symbol.
Highway agencies may develop and apply criteria for determining the applicability of In-Street Pedestrian Crossing signs.

**Standard:**

02 If used, the In-Street Pedestrian Crossing sign shall be placed **at one or more of the following locations at or near the crosswalk:**

a. In the roadway on the center line
b. In the roadway on a lane line
c. On a median island
d. In either (but not both) the bottom of curb which is level with the roadway or on top of the curb

in the roadway at the crosswalk location on the center line, on a lane line, or on a median island. The In-Street Pedestrian Crossing sign shall not be post-mounted on the left-hand or right-hand side of the roadway.

04 If used, the Overhead Pedestrian Crossing sign shall be placed over the roadway at the crosswalk location.

05 An In-Street or Overhead Pedestrian Crossing sign shall not be placed in advance of the crosswalk to educate road users about the State law prior to reaching the crosswalk, nor shall it be installed as an educational display that is not near any crosswalk.

**Guidance:**

06 If an island (see Chapter 3I) is available, the In-Street Pedestrian Crossing sign, if used, should be placed on the island.

Option:

07 If a Pedestrian Crossing (W11-2) warning sign is used in combination with an In-Street or an Overhead Pedestrian Crossing sign, the W11-2 sign with a diagonal downward pointing arrow (W16-7P) plaque may be post-mounted on the right-hand side of the roadway at the crosswalk location.

07a In-Street Pedestrian Crossing signs may be mounted back to back for median or centerline of an undivided roadway applications.

**Standard:**

08 The In-Street Pedestrian Crossing sign and the Overhead Pedestrian Crossing sign shall not be used at signalized locations.

09 The STOP FOR legend shall only be used in States where the State law specifically requires that a driver must stop for a pedestrian in a crosswalk.

10 The In-Street Pedestrian Crossing sign shall have a black legend (except for the red STOP or YIELD sign symbols) and border on a white background, surrounded by an outer yellow or fluorescent yellow-green background area (see Figure 2B-2). The Overhead Pedestrian Crossing sign shall have a black legend and border on a yellow or fluorescent yellow-green background at the top of the sign and a black legend and border on a white background at the bottom of the sign (see Figure 2B-2).
11. Unless the In-Street Pedestrian Crossing sign is placed on a physical island, the sign support shall be designed to bend over and then bounce back to its normal vertical position when struck by a vehicle.

Support:
12. The Provisions of Section 2A.18 concerning mounting height are not applicable for the In-Street Pedestrian Crossing sign. See Section 2A.21 for sign mounting methods.

Standard:
13. The top of an In-Street Pedestrian Crossing sign shall be a maximum of 4 feet above the pavement surface. The top of an In-Street Pedestrian Crossing sign placed in an island or on top of a curb shall be a maximum of 4 feet above the island or top of curb.

Option:
14. The In-Street Pedestrian Crossing sign may be used seasonally to prevent damage in winter because of plowing operations, and may be removed at night if the pedestrian activity at night is minimal.

15. In-Street Pedestrian Crossing signs, Overhead Pedestrian Crossing signs, and Yield Here To (Stop Here For) Pedestrians signs may be used together at the same crosswalk.