

This recommendation
was approved by the
National Committee
Council on 01/19/07.

TECHNICAL COMMITTEE RECOMMENDATION

TECHNICAL COMMITTEE: Signals Technical Committee

DATE OF ACTION: June 29, 2006

TOPIC: **Proposed new Chapter 4M Traffic Control Beacons For Pedestrians**

ORIGIN OF REQUEST: Signals Technical Committee

DISCUSSION: A recommendation for a new section for pedestrian beacons was approved by the Signals Technical Committee (STC) at the January 2006 meeting. The recommendation was distributed to sponsors for comments prior to the June meeting. Several changes to the proposed new section were approved by the STC at the June 2006 meeting. Due to the nature of the changes, the STC is distributing this item to the sponsoring agencies again prior to making a recommendation to the National Committee Council.

Following is a summary of the changes to this proposed new section approved by the STC at the June 2006 meeting:

- Modified the definition proposed for Section 4A.02 to parallel the existing definition of emergency beacon.
- Modified the guidance to indicate this device should be considered if the pedestrian or school warrant for traffic control signals is satisfied but a decision is made to not install a traffic control signal.
- Deleted the limitation on installation only at midblock locations. Installation now permitted at midblock or intersection locations.
- Added Guidance, including figures, to show recommended pedestrian and vehicle volumes for various street widths for installation consideration. These guidance figures were developed based on the TCRP/NCHRP D-08/3-71 research. The curves were developed using the pedestrian delay equation included in the *Highway Capacity Manual* and were calculated using 16 pedestrian-hours of delay in the peak hour for the highest approach (or 21.3 pedestrian-hour of delay for both approaches). Guidelines on selecting pedestrian treatments were developed as part of the TCRP/NCHRP research and are documented in TCRP Report

112/NCHRP report 562. The curves included in Figures 4M-1 and 4M-2 reflect the guideline recommendations on when a “red” device should be considered.

- Made minor wording clarifications concerning installation consideration and compliance with other sections of the MUTCD.
- Added a standard that traffic approaching the location on any minor streets or driveways be controlled by STOP signs.
- Modified a Standard to note that the steady don't walk indication shall be displayed when the vehicle indications are dark.

Following is the background information on this proposed new section as distributed prior to the June 2006 meeting:

Pedestrian safety at unsignalized crosswalks is a concern. While various treatments exist at unsignalized crossings, there is a growing concern that they are not effective. Despite most states having a law that requires motorists to yield to pedestrians in a marked crosswalk, a 2002 FHWA study found that, on multi-lane streets with moderate to high traffic volumes, marked crosswalks had higher crash rates than unmarked crosswalks. The FHWA study further recommended that additional pedestrian enhancements be provided at such locations to improve crossing safety, as opposed to not marking crosswalks at all.

NCHRP Project 3-71 Innovative Pedestrian Treatments at Unsignalized Crossings, administered jointly with Transit Cooperative Research Program (TCRP) Project D-8, Improving Pedestrian Safety at Unsignalized Roadway Crossings, reviewed pedestrian crossing issues and developed recommendations for engineering treatments to improve safety for pedestrians crossing high-volume and high-speed roadways at unsignalized locations, in particular those served by public transportation.

The TCRP/NCHRP study found that the crossing treatment does have an impact on motorist yielding. Those treatments that show a red signal indication to the motorist have a statistically significant different compliance rate from devices that do not show a red indication. These red signal or beacon devices had compliance rates greater than 95 percent. On a 35 mph roadway, the best yielding rate observed for a treatment that was not showing a red indication to the motorist was approximately 58 percent. Kay Fitzpatrick with the Texas Transportation Institute presented a recommendation for a new pedestrian beacon to the

Signal Technical Committee at the January 2006 meeting.

The pedestrian beacon would look and operate similar to the emergency beacon previously recommended by the Signals Technical Committee and subsequently approved by the National Committee as a recommendation to FHWA.

Pedestrian beacons would be pedestrian activated and the pedestrian movements would be controlled by pedestrian signal heads. Vehicular traffic on the street being crossed would be controlled by a signal head with three signal sections - a CIRCULAR YELLOW signal lens centered below two horizontally aligned CIRCULAR RED signal lenses. The pedestrian signals heads would display a steady upraised hand (symbolizing DON'T WALK) signal indication and the vehicular signal heads would be dark between activations pedestrian activations.

The proposed pedestrian beacon would provide an alternative treatment for locations where traffic signal installation based on a pedestrian warrant is not justified but treatments including typical markings, signs, and/or a warning beacon are considered insufficient. The use of pedestrian beacons could result in a reduction in the number of traffic control signals installed to assist pedestrians crossing activities.

The Signals Technical Committee recommends that the National Committee submit the following proposed MUTCD changes to sponsors for comments.

COMMITTEE ACTIONS :

See following pages for proposed text. All of the text is new so no underline or strikethrough is shown.

VOTE:

Several motions were made and discussed during the consideration of this item at the June meeting. Five motions were approved that resulted in the changes summarized above. Each of the approved motions received more than the required 2/3 support by a quorum of the technical committee membership. Following are the vote counts for the approved motions:

For	-	29	26	23	27	25
Opposed	-	1	3	5	1	2
Abstentions	-	0	1	3	2	3

REFERENCE TO AFFECTED PAGE NUMBERS IN MUTCD:

Not in 2003 Edition of MUTCD, Rev. 1. New pages proposed to be added following Page 4L-2.

NOTE: In response to sponsor comments, several minor modifications were made at the January 2007 meeting. These modifications are incorporated in the following text.

[Add a new definition of pedestrian beacon to Section 4A.02 as follows:](#)

Section 4A.02 Definitions Relating to Highway Traffic Signals

Pedestrian Beacon— a special type of beacon used to warn and control traffic at an unsignalized location to assist pedestrians in crossing a street or highway at a marked crosswalk.

[Add a Chapter for traffic control beacons for pedestrians as follows:](#)

CHAPTER 4M. TRAFFIC CONTROL BEACONS FOR PEDESTRIANS

Section 4M.01 Application of Pedestrian Beacons

Support:

A pedestrian beacon is a special type of beacon used to warn and control traffic at an unsignalized location to assist pedestrians in crossing a street or highway at a marked crosswalk.

Option:

A pedestrian beacon may be considered for installation at a location that does not meet other traffic signal warrants to facilitate pedestrian crossings.

Standard:

If used, pedestrian beacons shall be used in conjunction with signs and pavement markings to warn and control traffic at locations where pedestrians enter or cross a street or highway. A pedestrian beacon shall only be installed at a marked crosswalk.

Guidance:

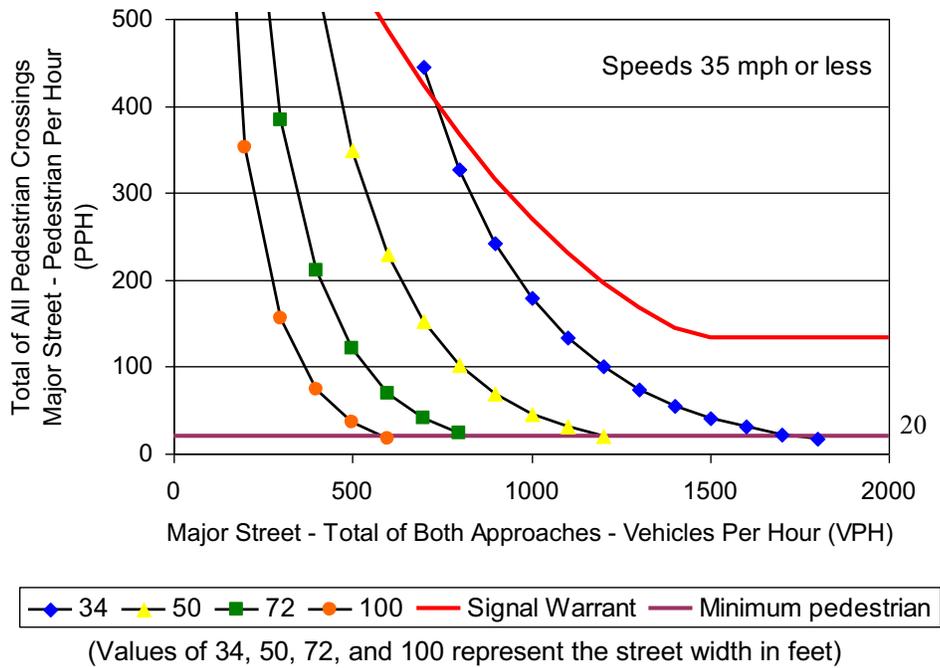
If a location meets the traffic control signal warrants under Sections 4C.05 and/or 4C.06 and a decision is made not to install a traffic control signal, a pedestrian beacon should be considered. If one of the signal warrants of Chapter 4C is met and a traffic control signal is justified by an engineering study, and if a decision is made to install a traffic control signal, it should be installed based upon the provisions of Chapter 4D.

If a traffic control signal is not justified under the signal warrants of Chapter 4C and if gaps in traffic are not adequate to permit pedestrians to cross, or if the speed for vehicles approaching on the major street is too high to permit pedestrians to cross, or if pedestrian delay is excessive, the need for a pedestrian beacon should be considered on the basis of an engineering study that considers

major-street volumes, speeds, widths, and gaps in conjunction with pedestrian volumes, walking speeds, and delay.

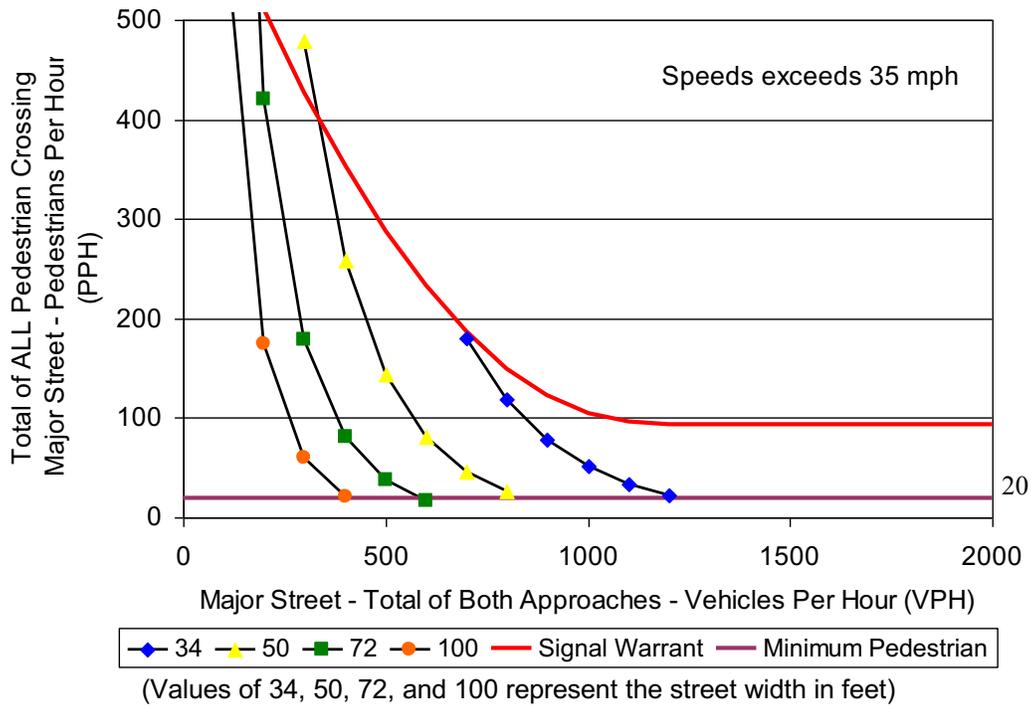
For a major street where the posted or statutory speed limit or the 85th-percentile speed is 60 km/h or less or is 35 mph or less, the need for a pedestrian beacon should be considered if the engineering study finds that the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding total of all pedestrians crossing the major street for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4M-1 for the length of the crosswalk (measured in feet).

Figure 4M-1. Guidelines for the Installation of Pedestrian Beacons on Low Speed Roadways



For a major street where the posted or statutory speed limit or the 85th-percentile speed exceeds 60 km/h or exceeds 35 mph, the need for a pedestrian beacon should be considered if the engineering study finds that the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding total of all pedestrians crossing the major street for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4M-2 for the length of the crosswalk (measured in feet).

Figure 4M-2. Guidelines for the Installation of Pedestrian Beacons On High Speed Roadways



[Note: Metric versions of Figures 4M-1 and 4M-2 also need to be developed.]

Section 4M.02 Design of Pedestrian Beacons

Standard:

Except as otherwise specified in this Section, a pedestrian beacon shall meet the provisions of Chapters 4D and 4E.

A pedestrian beacon shall consist of three signal sections, with a CIRCULAR YELLOW signal lens centered below two horizontally aligned CIRCULAR RED signal lenses (see Figure 4M-3).

When an engineering study finds that installation of a pedestrian beacon is justified, then:

- A. At least two pedestrian beacons shall be installed for each approach of the major street, and
- B. A stop line shall be installed for each approach of the major street, and

C. A pedestrian signal head conforming to the provisions set forth in Chapter 4E shall be installed at each end of the marked crosswalk, and

D. The pedestrian beacon shall be pedestrian actuated.

Guidance:

When an engineering study finds that installation of a pedestrian beacon is justified, then:

- A. Parking and other sight obstructions should be prohibited for at least 30 m (100 ft) in advance of and at least 6.1 m (20 ft) beyond the marked crosswalk,
- B. The installation should include suitable standard signs and pavement markings, and
- C. If installed within a signal system, the pedestrian beacon should be coordinated.

Option:

Pedestrian beacons may be located over the roadway or adjacent to each side of the roadway at a suitable location.

Guidance:

On approaches having posted speed limits or 85th-percentile speeds in excess of 60 km/h (35 mph) and on approaches having traffic or operating conditions that would tend to obscure visibility of roadside beacon locations, at least one of the pedestrian beacons should be installed over the roadway.

On multilane approaches having posted speed limits or 85th-percentile speeds of 60 km/h (35 mph) or less, either a pedestrian beacon should be installed on each side of the approach (if a median of sufficient width exists) or at least one of the pedestrian beacons should be installed over the roadway.

A pedestrian beacon should comply with the signal face provisions described in Sections 4D.15 and 4D.17.

Standard:

A CROSSWALK STOP ON RED (symbolic red ball) (R10-23) sign shall be mounted adjacent to a signal face on each major street approach (see Section 2B.45). If an overhead signal face is provided, the sign shall be mounted adjacent to the overhead signal face.

Option:

A Pedestrian (W11-2) sign (see Section 2C.41) with an AHEAD (W16-9p) supplemental plaque may be placed in advance of a pedestrian beacon. A warning beacon may be installed to supplement the W11-2 sign and may be programmed to only flash during the yellow and red signal indications of the pedestrian beacon.

Standard:

If a warning beacon is installed to supplement the W11-2 sign, the design and location of the beacon shall conform to the provisions of Sections 4K.01 and 4K.03.

Vehicular traffic approaching the location on minor streets or driveways shall be controlled by STOP signs.

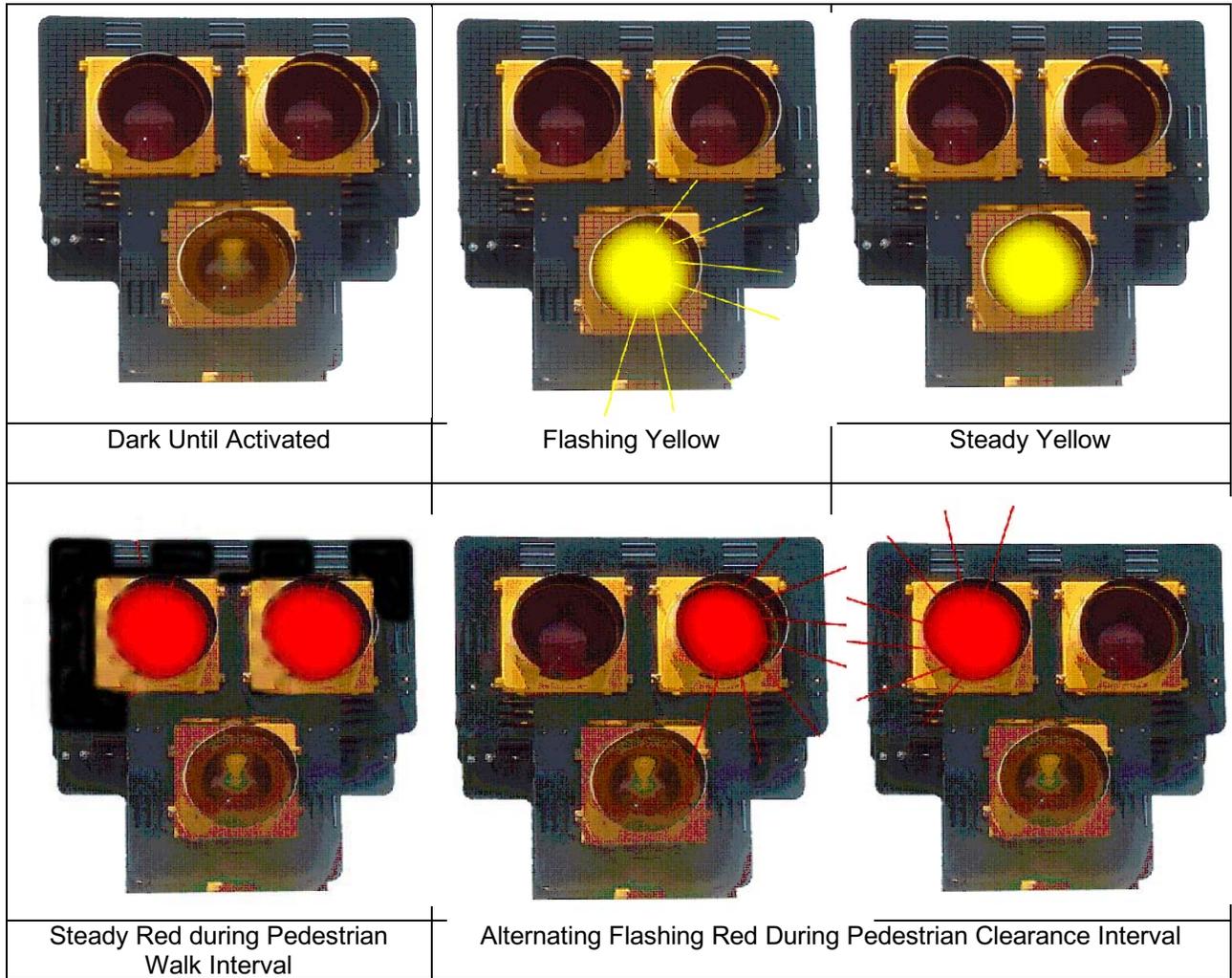
Section 4M.03 Operation of Pedestrian Beacons

Standard:

Pedestrian beacons shall be dark (not illuminated) during periods between actuations.

Upon actuation by a pedestrian, a pedestrian beacon shall display a flashing CIRCULAR YELLOW signal indication, followed by a steady CIRCULAR YELLOW signal indication, followed by both steady CIRCULAR RED signal indications during the pedestrian walk interval, followed by alternating flashing CIRCULAR RED signal indications during the pedestrian clearance interval (see Figure 4M-3). Upon termination of the pedestrian clearance interval, the pedestrian beacon shall revert to a non-illuminated condition.

Figure 4M-3. Example of Sequence for a Pedestrian Beacon



The pedestrian signal heads shall continue to display a steady **UPRAISED HAND** (symbolizing **DONT WALK**) signal indication when the pedestrian beacon is either dark or displaying a flashing or steady **CIRCULAR YELLOW** signal indication. The pedestrian signal heads shall display a **WALKING PERSON** (symbolizing **WALK**) signal indication when the pedestrian beacon is displaying a steady **CIRCULAR RED** signal indication. The pedestrian signal heads shall display a flashing **UPRAISED HAND** (symbolizing **DONT WALK**) signal indication when the pedestrian beacon is displaying alternating flashing **CIRCULAR RED** signal indications. Upon termination of the pedestrian clearance interval, the pedestrian signal heads shall revert to a steady **UPRAISED HAND** (symbolizing **DONT WALK**) signal indication.

Guidance:

The duration of the flashing yellow interval should be determined by engineering judgment.

The steady yellow interval should have a duration of approximately 3 to 6 seconds (see Section 4D.10). The longer intervals should be reserved for use on approaches with higher speeds.

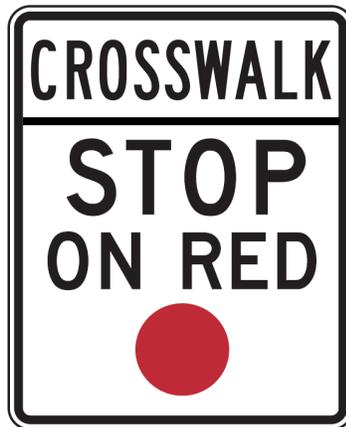
[Recommend a new sign and associated text be added in Part 2](#)

The new pedestrian beacon section recommended by the Signals Technical Committee includes a requirement that a CROSSWALK STOP ON RED sign be installed. This is a new sign. The Signal Technical Committee recommends that the following new sign and associated text be added in Part 2. The Regulatory and Warning Signs Technical Committee reviewed a version of this sign at the June 2006 meeting and indicated its support. The sign was modified slightly at the January 2007 meeting.

- The new sign is proposed to be numbered R10-23.
- The following paragraph is proposed to be added as a Standard just prior to the last paragraph of Section 2B.45:

The CROSSWALK STOP ON RED (symbolic red ball) (R10-23) sign (see Figure 2B-19) shall be used in conjunction with pedestrian beacons (see Chapter 4M).

- The following sign image is proposed to be added to Figure 2B-19:



Background information on the design of the sign recommended for use with the pedestrian beacon is included in the following pages.

[This paragraph in Section 4D.01 will need to be changed:

Midblock crosswalks should not be signalized if they are located within 30 m (100 ft) from side streets or driveways that are controlled by STOP signs or YIELD signs.]