Texas Department of Transportation

MEMO

September 11, 2018

To: District Engineers

From: Michael A. Chacon, P.E.
Director, Traffic Safety Division

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Subject: Rectangular Rapid Flash Beacons (RRFBs) and Pedestrian Hybrid Beacons (PHBs)

This memo supersedes the January 2, 2018, issued guidance prohibiting the use of Rectangular Rapid Flash Beacons (RRFBs) due to FHWA terminating the Interim Approval (IA-11) that allowed the device to be used. FHWA has since issued a new Interim Approval for RRFBs (IA-21) allowing use of the device. IA-21 contains revised provisions and modifications to the flash pattern. Attached is the criteria for the use of RRFBs. Approval from TRF is necessary prior to the installation of RRFBs on state highways.

Interim approvals allow interim use of a new or revised traffic control device based on experimentation, studies, or research with the intention to place the new or revised device into a future rulemaking process for MUTCD revisions. While FHWA approval is required to use an Interim Approval device, FHWA has granted blanket statewide approval to use RRFBs in Texas. A municipality that wishes to use RRFBs on roads under their jurisdiction off the state highway system may do so without contacting FHWA. TRF must be notified so a list of locations can be maintained as part of the provisions for IA-21.

Existing RRFBs that were installed under the terms and conditions of the terminated Interim Approval (IA-11) may remain in operations until they reach the end of their useful service life. Existing RRFBs should be reprogrammed to the new flash pattern specified in IA-21 as part of a systematic upgrading process, such as when maintenance is performed or when signs are replaced.

Additionally, the attached criteria for Pedestrian Hybrid Beacons (PHBs), another pedestrian crossing safety measure, remains unchanged and may be used on state highways with approval from TRF. FHWA has offered additional guidance to assist practitioners in selecting compliant pedestrian crossing treatments in an Information Brief: Treatments for Uncontrolled Marked Crosswalks.

If you have any further questions please contact Doug Skowronek at (512) 416-3120 or me at (512) 416-3200.

Attachments

cc:	ADM	District Traffic Engineers
	CST	District Maintenance Engineers
	DES	Stephen Ratke, FHWA
	MNT	Ed Burgos-Gomez, FHWA
	PTN	Amelia Hayes, FHWA

Rectangular Rapid Flashing Beacons

The Federal Highway Administration (FHWA) granted TxDOT interim approval for the use of Rectangular Rapid Flashing Beacons (RRFB) at marked crosswalks where the crossing is not controlled by a traffic control device such as a traffic signal or stop signs.

RRFB are user-actuated amber LEDs that supplement warning signs. A RRFB consist of two rapidly and alternately flashed rectangular yellow indications having LED-array based pulsing light sources.

This device provides an additional tool for improving the safety of crosswalks when traffic signals do not meet warrants. RRFB should 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.

All of the following conditions must be met before RRFB can be considered on our highways:

- an established crosswalk with adequate visibility, markings and signs
- a posted speed limit of 40 mph or less (does not include school speed zones)
- 20 pedestrians or more crossing in one hour
- location deemed as a high risk area (e.g. schools, shopping centers, etc.)
- crosswalk is more than 300 ft. from an existing, traffic controlled pedestrian crossing

Districts must submit and receive Traffic Safety Division approval for installation of a RRFB for each location.

If the above criteria are met, and you have received approval from the Traffic Safety Division to install a RRFB at a location, the following conditions must be met to be in compliance with the FHWA Interim Approval that TxDOT has been granted:

1. General Conditions:
    a. Each RRFB shall consist of two rapidly flashed rectangular-shaped yellow indications with an LED-array-based light source, and shall be designed, located, and operated in accordance with the detailed requirements specified below.
    b. The use of RRFBs is optional. However, if an agency opts to use an RRFB under this Interim Approval, the following design and operational requirements shall apply, and shall take precedence over any conflicting provisions of the TMUTCD for the approach on which RRFBs are used:

2. Allowable Uses:
    a. An RRFB shall only be installed to function as a Warning Beacon (see 2011 TMUTCD Section 4L.03).
    b. An RRFB shall only be used to supplement a W11-2 (Pedestrian) warning sign with a diagonal downward arrow (W16-7p) plaque or S1-1 (School) crossing warning sign with a diagonal downward arrow (SW16-7p) plaque, located at or immediately adjacent to a marked crosswalk.
    c. An RRFB shall not be used for crosswalks across approaches controlled by YIELD signs, STOP signs, or traffic control signals.

3. Sign/Beacon Assembly Locations:
    a. For any approach on which RRFB are used, two W11-2 or S1-1 crossing warning signs (each with RRFB and W16-7p or SW16-7p plaque) shall be installed at the crosswalk, one on the right-hand side of the roadway and one on the left-hand side of the roadway. On a divided highway, the left-hand side assembly should be installed on the median, if practical, rather than on the far left side of the highway.
    b. An RRFB shall not be installed independent of the crossing signs for the approach that the RRFB faces. The RRFB shall be installed on the same support as the associated W11-2 (Pedestrian) or S1-1 (School) crossing warning sign and plaque.

4. Beacon Dimensions and Placement in the Sign Assembly
    a. Each RRFB shall consist of two rectangular-shaped yellow indications, each with an LED-array-based light source. The size of each RRFB indication shall be at least 5 inches wide by at least 2 inches high.
    b. The two RRFB indications for each RRFB unit shall be aligned horizontally, with the longer dimension horizontal and with a minimum space between the two indications of at least 7 inches, measured from the nearest edge of one indication to the nearest edge of the other indication.
    c. The outside edges of the RRFB indications, including any housings, shall not project beyond the outside edges of the W11-2, S1-1, or W11-15 sign that it supplements.
    d. As a specific exception to Paragraph 5 of Section 4L.01 of the 2011 TMUTCD, the RRFB unit associated with a post-mounted sign and plaque may be located between and immediately adjacent to the bottom of the crossing warning sign and the top of the supplemental downward diagonal arrow plaque (or, in the case of a supplemental advance signs, the AHEAD or distance plaque) or within 12 inches above the crossing warning sign, rather than the recommended minimum of 12 inches above or below the sign assembly. (See the example photo that is shown below.)

5. Beacon Flashing Requirements
    a. When actuated, the two yellow indications in each RRFB unit shall flash in a rapidly flashing sequence.
    b. As a specific exception to the requirements for the flash rate of beacons provided in Paragraph 3 of Section 4L.01 of the 2011 TMUTCD, RRFBs shall use a much faster flash rate and shall provide 75 flashing sequences per minute. Except as provided in Condition 5f below, during each 800-millisecond flashing sequence, the left and right RRFB indications shall operate using the following sequence:

        The RRFB indication on the left-hand side shall be illuminated for approximately 50 milliseconds.

        Both RRFB indications shall be dark for approximately 50 milliseconds.

        The RRFB indication on the right-hand side shall be illuminated for approximately 50 milliseconds.

        Both RRFB indications shall be dark for approximately 50 milliseconds.

The RRFB indication on the left-hand side shall be illuminated for approximately 50 milliseconds.

Both RRFB indications shall be dark for approximately 50 milliseconds.

The RRFB indication on the right-hand side shall be illuminated for approximately 50 milliseconds.

Both RRFB indications shall be dark for approximately 50 milliseconds.

Both RRFB indications shall be illuminated for approximately 50 milliseconds.

Both RRFB indications shall be dark for approximately 50 milliseconds.

Both RRFB indications shall be illuminated for approximately 50 milliseconds.

Both RRFB indications shall be dark for approximately 250 milliseconds.

c. The flash rate of each individual RRFB indication, as applied over the full flashing sequence, shall not be between 5 and 30 flashes per second to avoid frequencies that might cause seizures.
d. The light intensity of the yellow indications during daytime conditions shall meet the minimum specifications for Class 1 yellow peak luminous intensity in the Society of Automotive Engineers (SAE) Standard J595 (Directional Flashing Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles) dated January 2005.
e. To minimize excessive glare during nighttime conditions, an automatic signal dimming device should be used to reduce the brilliance of the RRFB indications during nighttime conditions.
f. Existing RRFB units that use the flashing sequence that was specified in the Interim Approval 11 memorandum and a subsequent interpretation (the RRFB indication on the left-hand side emits two slow pulses of light after which the RRFB indication on the right-hand side emits four rapid pulses of light followed by one long pulse of light) should be reprogrammed to the flash pattern specified above in Condition 5b as part of a systematic upgrading process, such as when the units are serviced or when the existing signs are replaced.

6. Beacon Operation:
    a. The RRFB shall be normally dark, shall initiate operation only upon pedestrian actuation, and shall cease operation at a predetermined time after the pedestrian actuation or, with passive detection, after the pedestrian clears the crosswalk.
    b. All RRFBs associated with a given crosswalk (including those with an advance crossing sign, if used) shall, when activated, simultaneously commence operation of their alternating rapid flashing indications and shall cease operation simultaneously.
    c. If pedestrian pushbuttons (rather than passive detection) are used to actuate the RRFB indications, a PUSH BUTTON TO TURN ON WARNING LIGHTS should be mounted adjacent to or integral with each pedestrian pushbutton.
    d. The duration of a predetermined period of operation of the RRFB following each actuation should be based on the TMUTCD procedures for timing of pedestrian clearance times for pedestrian signals.

e. A small light directed at and visible to pedestrians in the crosswalk may be installed integral to the RRFB or push button to give confirmation that the RRFB is in operation.

7. Accessible Pedestrian Features
    a. If a speech pushbutton information message is used in conjunction with an RRFB, a locator tone shall be provided.
    b. If a speech pushbutton information message is used in conjunction with an RRFB, the audible information device shall not use vibrotactile indications or percussive indications.
    c. If a speech pushbutton information message is used in conjunction with an RRFB, the message should say, “Yellow lights are flashing.” The message should be spoken twice.

8. Other:
    a. Except as otherwise provided above, all other provisions of the TMUTCD applicable to Warning Beacons shall apply to RRFB.

For locations that have met the criteria, submit to the Traffic Safety Division for approval.

If you have any questions or require additional information regarding RRFB, please contact Doug Skowronek at (512) 416-3120.

Rectangular Rapid Flashing Beacon

Pedestrian Hybrid Beacons

The 2011 Texas Manual on Uniform Traffic Control Devices (TMUTCD) included the Pedestrian Hybrid Beacons (PHB) for use at marked crosswalks which are not managed by a traffic control device such as a traffic signal or stop signs.

A PHB is a pedestrian-activated warning device located on the roadside or on mast arms over midblock pedestrian crossings. The beacon head consists of two red lenses above a single yellow lens. The beacon head is "dark" until the pedestrian wanting to cross the roadway presses the button and activates the beacons.

This device provides an additional tool for improving the safety of crosswalks when traffic signals do not meet warrants. PHB's should 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.

All of the following conditions must be met before PHB can be considered on our roadways:

- an engineering study must be performed and meet the guidelines detailed in Chapter 4F of the TMUTCD
- an established crosswalk with adequate visibility, markings and signs
- a posted speed limit of 40 mph or less (does not include school speed zones)
- 20 pedestrians or more crossing in one hour
- location deemed as a high risk area (e.g. schools, shopping centers, etc.)
- crosswalk is more than 300 ft. from an existing, traffic controlled pedestrian crossing

Districts must receive Traffic Safety Division (TRF) approval for installation of a PHB for each location.

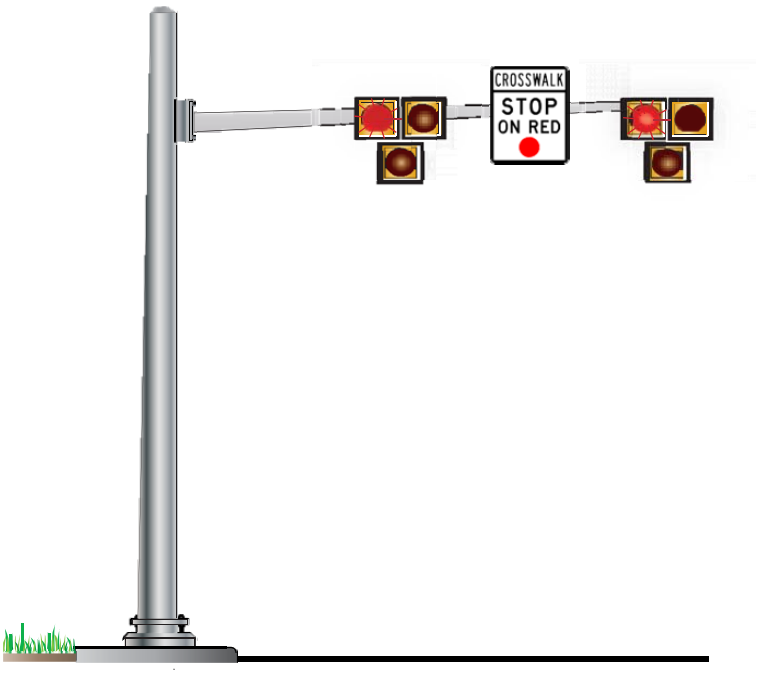
You can reference Appendix A of the NCHRP 562 Report for additional information on PHB at the following web address:

http://www.trb.org/Publications/Blurbs/157723.aspx

If the proposed location meets the criteria listed above for a PHB, please submit to the Traffic Safety Division for approval.

If you have any questions or require additional information regarding PHB, please contact Doug Skowronek at (512) 416-3120.

Pedestrian Hybrid Beacon



Sequence for a Pedestrian Hybrid Beacon

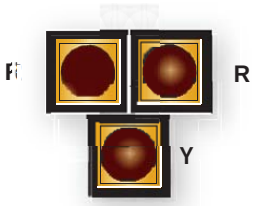
1. Dark Until Activated

2. Flashing Yellow Upon Activation

3. Steady Yellow

4. Steady Red During Pedestrian Walk Interval

5. Alternating Flashing Red During Pedestrian Clearance Interval



6. Dark Again Until Activated

Legend

SY Steady yellow
FY Flashing yellow
SR Steady red
FR Flashing red