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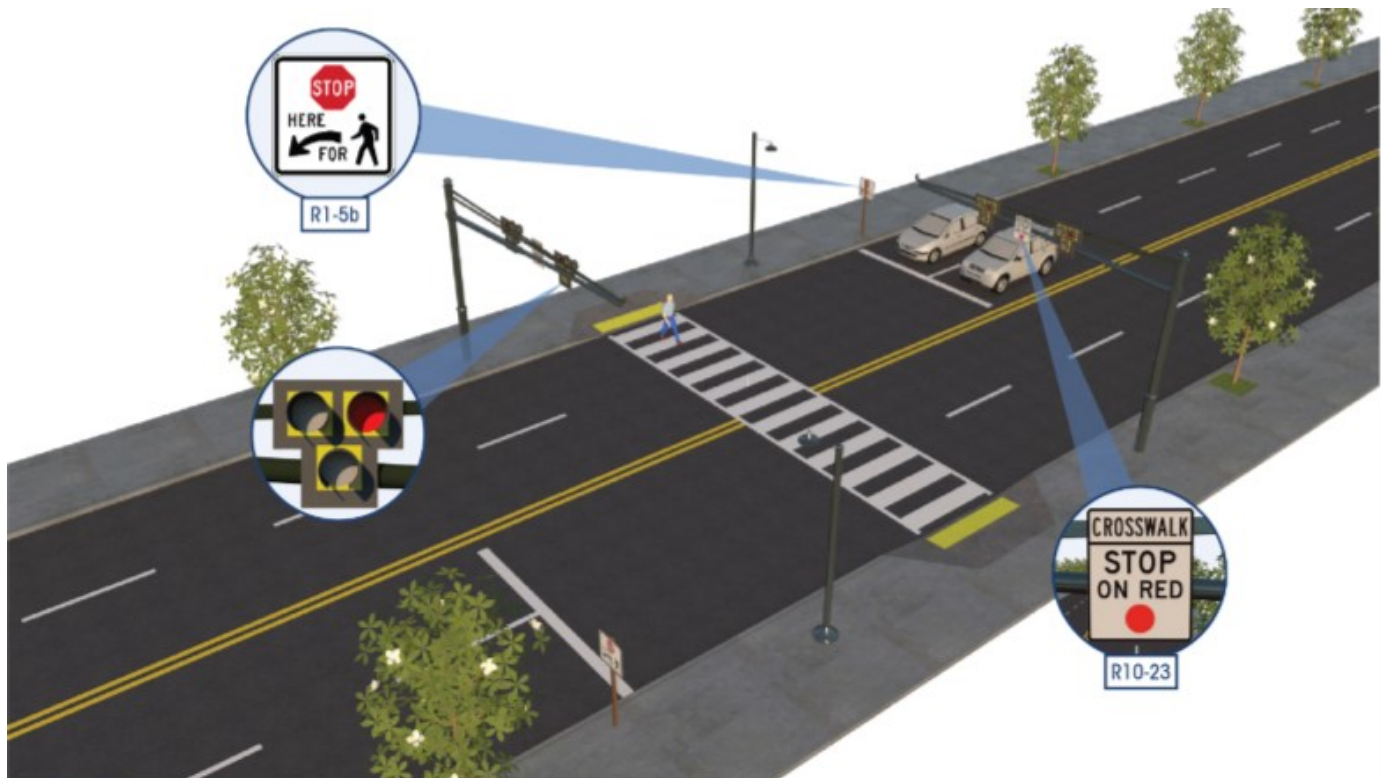
TRAFFIC SIGNAL BRIEF

Tech Brief Series

Tech Brief - 2019-3

Pedestrian Hybrid Beacon



This Traffic Signal Brief discusses the Pedestrian Hybrid Beacon (PHB), which is designated as a Proven Safety Countermeasure by the Federal Highway Administration (FHWA).



Source: FHWA



There is some confusion around the terms Rectangular Rapid Flashing Beacon (RRFB), Pedestrian Hybrid Beacon (PHB) and High-intensity Activated crossWalk (HAWK). We will first discuss what each of these terms mean.


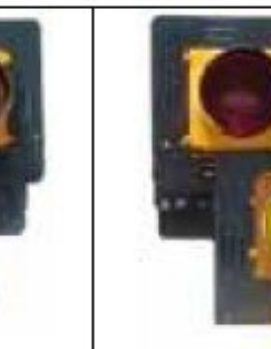




RRFB	PHB or HAWK
 <p data-bbox="139 863 423 892"><i>RRFB - Source: FHWA</i></p>	 <p data-bbox="846 821 1114 850"><i>PHB - Source: FHWA</i></p>
<p data-bbox="71 951 773 1255">An RRFB is a device that provides an irregular flashing pattern using amber light emitting diodes when activated by either a push button or pedestrian detection system. It serves as a supplement to a warning sign at an unsignalized crossing location by directing the driver's attention to the need to yield to a pedestrian. It does not assign right of way.</p> <p data-bbox="71 1308 743 1493">It may be mounted with a roadside sign or an overhead sign. RRFBs are not included in the 2009 Edition of the MUTCD, but they are currently approved for use in Connecticut under an FHWA interim approval.</p> <p data-bbox="71 1545 641 1619">RRFBs can be installed on two-lane or multi-lane roadways.</p>	<p data-bbox="807 951 1552 1556">A PHB is a traffic control signal used to help pedestrians safely cross at uncontrolled intersections and midblock crosswalks. It is often referred to in Connecticut as a HAWK signal. The beacon head consists of two red lenses above a single yellow lens. The lenses remain "dark" until a pedestrian desiring to cross the street pushes the call button to activate the beacon. The signal then initiates a yellow to red lighting sequence consisting of steady and flashing lights that directs motorists to slow and come to a stop. The pedestrian signal then flashes a WALK display to assign the right of way to the pedestrian. Once the pedestrian has safely crossed, the hybrid beacon again goes dark. Pedestrian hybrid beacons are MUTCD-approved traffic control devices.</p> <p data-bbox="807 1598 1511 1671">PHBs may be used on roads consistent with the criteria defined in the MUTCD.</p>

If you are looking for information on RRFBs, please see the resources section at the end of this brief for more information. For further information on PHBs, keep reading.



How does a PHB work?

The pedestrian hybrid beacon (PHB) is a traffic control device designed to help pedestrians safely cross busy or higher-speed roadways at midblock crossings and uncontrolled intersections. The beacon consists of two red lenses above a single yellow lens. Its operations are described below:

		
1. Dark until activated	2. Flashing yellow light for 3–6 s	3. Steady yellow light for 3–6 s
		
4. Steady red light during pedestrian interval	5. Alternating flashing red lights during pedestrian clearance interval	

More than 75 percent of pedestrian fatalities occur at non-intersection locations, and vehicle speeds are often a major contributing factor. As a safety strategy to address this pedestrian crash risk, the PHB is an intermediate option between a flashing beacon and a full pedestrian signal because it assigns right of way and provides positive stop control. It also allows motorists to proceed once the pedestrian has cleared their side of the travel lane, reducing vehicle delay.

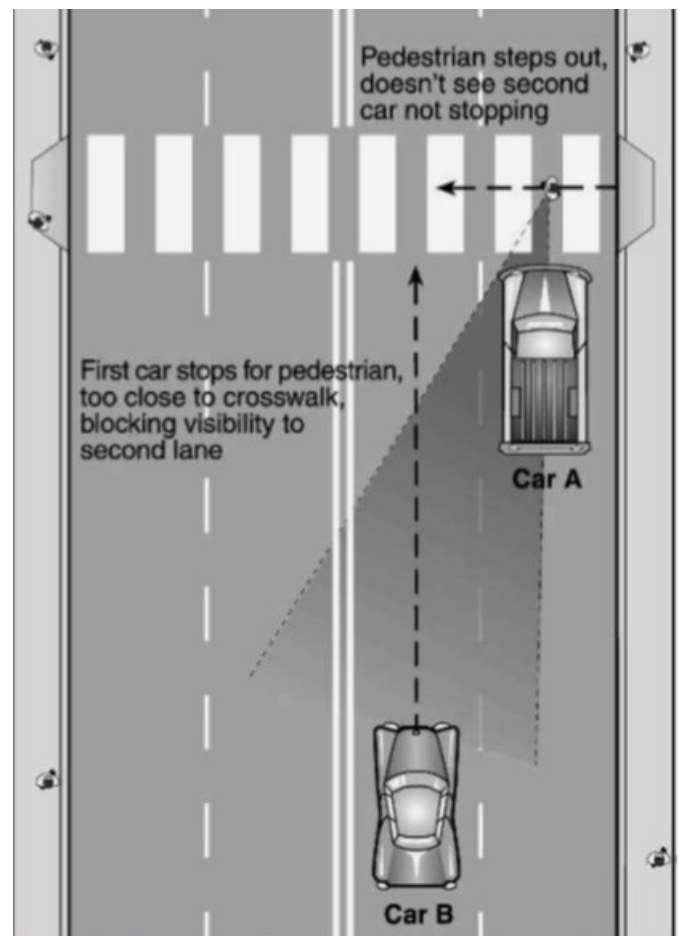


Source: AAA Foundation for Traffic Safety

Considerations for Implementation

Agencies should refer to [Section 4F.01](#) of the 2009 MUTCD for guidance on implementing PHBs. The MUTCD provides guidance on the pedestrian volume warrants, design features, and restrictions associated with the PHB. Other considerations include:

- PHBs are a candidate treatment for roads that generally have annual average daily traffic (AADT) above 9,000.
- Strongly consider a PHB for all midblock and intersection crossings where the roadway speed limits are equal to or greater than 40 miles per hour.
- PHBs can be used at both intersections and midblock locations.
- The PHB works well to counteract multiple threat crashes, which occur when a driver in one lane yields to a pedestrian crossing the street, but the driver in the next lane does not.
- PHBs are not widely implemented, so agencies should consider an education and outreach effort when implementing a PHB within a community.



Multiple Threat Crash
Source: FHWA Pedsafe

The FHWA publication *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations* provides the following matrix to aid with selection of pedestrian treatments at uncontrolled locations:

Roadway Configuration	Speed Limit								
	≤30 mph			35 mph			≥40 mph		
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
2 lanes*	1 2 3 4 5 6	1 3 5 6 7	1 3 5 6 7	1 3 4 5 6	1 3 5 6 7	1 3 5 6 7	1 3 4 5 6 7	1 3 5 6 7	1 3 5 6 7
3 lanes with raised median*	1 2 3 4 5	1 3 5 7	1 3 5 7	1 3 4 5 7	1 3 5 7	1 3 5 7	1 3 4 5 7	1 3 5 7	1 3 5 7
3 lanes w/o raised median†	1 2 3 4 5 6 7	1 3 5 6 7	1 3 5 6 7	1 3 4 5 6 7	1 3 5 6 7	1 3 5 6 7	1 3 4 5 6 7	1 3 5 6 7	1 3 5 6 7
4+ lanes with raised median‡	1 3 5	1 3 5 7	1 3 5 7	1 3 5 7	1 3 5 7	1 3 5 7	1 3 5 7	1 3 5 7	1 3 5 7
4+ lanes w/o raised median‡	1 3 5 6 7 8	1 3 5 6 7 8	1 3 5 6 7 8	1 3 5 6 7 8	1 3 5 6 7 8	1 3 5 6 7 8	1 3 5 6 7 8	1 3 5 6 7 8	1 3 5 6 7 8

*One lane in each direction †One lane in each direction with two-way left-turn lane ‡Two or more lanes in each direction

Given the set of conditions in a cell,

⊕ Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location.

Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location.

The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

- 1 High-visibility crosswalk markings, parking restriction on crosswalk approach, adequate nighttime lighting levels
- 2 Raised crosswalk
- 3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
- 4 In-Street Pedestrian Crossing sign
- 5 Curb extension
- 6 Pedestrian refuge island
- 7 Pedestrian Hybrid Beacon
- 8 Road Diet

This table was developed using information from: Zegeer, C. V., Stewart, J. R., Huang, H. H., Logerwey, P. A., Feaganes, J., & Campbell, B. J. (2005). Safety effects of marked versus unmarked crosswalks at uncontrolled locations: Final report and recommended guidelines (No. FHWA-HRT-04-100); Manual on Uniform Traffic Control Devices, 2009 Edition, Chapter 4F. Pedestrian Hybrid Beacons; the Crash Modification Factors (CMF) Clearinghouse website (<http://www.cmfclearinghouse.org/>); and the Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE) website (<http://www.pedbikesafe.org/PEDSAFE/>).

Costs:

FHWA estimates the cost of implementing a PHB to be \$21,000 to \$128,000, with an average per unit cost of \$57,680. This is significantly less expensive than a full traffic signal installation, but higher than the cost of an RRFB installation which is estimated at \$10,000 to \$15,000.

Portions adapted from FHWA-SA-17-065

References and Resources

CT DOT HAWK Information Sheet

<http://www.ct.gov/dot/lib/dot/documents/dtrafficdesign/safety/hawk.pdf>

Pedestrian Hybrid Beacon Guide – Recommendations and Case Study – FHWA

https://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa14014/fhwasa14014.pdf

MUTCD Section 4F.01: Application of Pedestrian Hybrid Beacons

<https://mutcd.fhwa.dot.gov/html/2009r1r2/part4/part4f.htm#section4F01>

Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations - FHWA

https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/guide_to_improve_uncontrolled_crossings.pdf

For information on RRFBs and other pedestrian treatments:

CT DOT RRFB Information Sheet

https://www.ct.gov/dot/lib/dot/documents/dtrafficdesign/safety/rectangular_rapid_flash_beacon_brochure.pdf

FHWA Safety page on RRFBs

https://safety.fhwa.dot.gov/intersection/conventional/unsignalized/tech_sum/fhwasa09009/

FHWA Interim Approval 21 for RRFBs

https://mutcd.fhwa.dot.gov/resources/interim_approval/ia21/index.htm

PedBikeInfo.com

http://www.pedbikeinfo.org/webinars/webinar_details.cfm?id=9

Informational Brief: Treatments for Uncontrolled Marked Crosswalks - FHWA

https://mutcd.fhwa.dot.gov/resources/interim_approval/ia11/informationalbrief/informationalbrief.pdf

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