



Guidance and best practices
for
selecting enhanced pedestrian
crossing treatments

Alan S. El-Urfali, P.E.

State Traffic Services Program Engineer

Pedestrian Crosswalk

316.003 F.S. Definitions -

Crosswalk. (a) That part of a roadway at an intersection included within the connections of the lateral lines of the sidewalks on opposite sides of the highway, measured from the curbs or, in the absence of curbs, from the edges of the traversable roadway. UVC adds: “ that part of a roadway included within the extension of the lateral lines of the existing sidewalk at right angles to the centerline.”

(b) Any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other markings on the surface.

FDOT Traffic Engineering Manual (TEM Section 3.8.8)

Marked crosswalk. Any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other markings on the surface. Marked crosswalks serve to highlight the right-of-way where motorists can expect pedestrians to cross and designate a stopping location.

TEM – Safety Considerations

- The location should be conducive to providing pedestrian safety and convenient for pedestrian access.
- The location must provide adequate stopping sight distance; i.e., parking restrictions near the marked mid-block crosswalk required. (PPM, section 2.7)
- If sidewalks connecting the crosswalk to pedestrian generators and attractors are not already present, they should be provided. (PPM, section 8.3.1)
- Crosswalk illumination shall be provided on all newly constructed mid-blocks or uncontrolled approach crosswalks except in environmentally sensitive areas or on facilities open during daylight hours only.
- When volumes exceed 12,000 ADT or where crossing distances exceed 60', a refuge island or raised median should be provided unless controlled by pedestrian signal or pedestrian hybrid beacon (PHB).
- Marked crosswalks are important for pedestrians with vision loss.
- Locations with nearby bus stops should be actively considered.

New PPM Requirements

Section 8.3.3.1

- Use Special Emphasis crosswalk markings at signalized intersections on all approaches, mid-block crossings, and school crossings per ***Design Standards, Index 17346, Sheet 9 & 10 of 14.***
- Use standard crosswalk markings for stop or yield-controlled intersections where pedestrian facilities are present as shown in ***Design Standards, Index 17346, Sheet 9 of 14.***

Enhanced Pedestrian Crossing Treatments

- Curb Extensions
- Raised Crosswalks
- Pedestrian Refuge Islands
- In-Pavement Warning Lights
- High Emphasis Crosswalk with Advance Yield or Stop Markings and Signs
- Rectangular Rapid Flashing Beacons (RRFB)
- Pedestrian Hybrid Beacons (PHB)

Curb Extensions

- Curb extensions significantly improve pedestrian crossings by reducing the pedestrian crossing distance.
- Visually and physically narrowing the roadway, improving the ability of pedestrians and motorists to see each other.
- Reduce the time that pedestrians are in the street, and allowing space for the installation of a curb ramp.



Raised Crosswalks

- Reduces vehicle speed
- Enhances pedestrian visibility
- Typically used for midblock crossings
- Eliminates the need for curb ramps



Pedestrian Refuge Islands

CMF o.685

- Allow pedestrians a safe place to stop at the mid-point of the roadway before crossing the remaining distance.
- Enhance the visibility of pedestrian crossings, particularly at unsignalized crossing points.
- Reduce the speed of vehicles approaching pedestrian crossings.
- Can be used for access management for vehicles (allowing only right-in/right-out turning movements).
- Provide space for supplemental signage on multi-lane roadways.
- Effective on multi-lane roads



In-Pavement Warning Lights

- In-pavement LED Solar products have evolved and are becoming more effective with less maintenance issues.
- Studies show short term improvements in driver yielding to peds and better yielding at night.
- Lights are generally visible to only the first car in a platoon.
- Headlights from oncoming traffic may obscure a driver's view of the entire crossing.
- Lights do not indicate direction of ped travel or if people are crossing simultaneously from both sides.



High Emphasis Crosswalk with Advance Yield or Stop Markings and Signs

CMF 0.75

- 316.130 (7)(b) F.S. mandates the driver of a vehicle to stop at any pedestrian crosswalk where signage so indicates.
- Typically used on uncontrolled multi-lane approaches.
- Can be used with other active devices such as RRFBs and PHBs.
- Design Standard Index 17346, Sheet 10 of 14.



Rectangular Rapid Flashing Beacons (RRFB)

CMF 0.526

- Post mounted RRFBs should be limited to roadways with four or fewer through lanes.
- Any new RRFB on a multilane undivided roadway should be installed overhead and supplemented with post mounted units.
- Use overhead R1-9a and post mount R1-5b signs.
- Use splitter/refuge island when possible.
- Use RRFBs with new flash pattern, WW+S showed better driver-yielding results.



Pedestrian Hybrid Beacons (PHB)

CMF 0.453

- Must meet MUTCD warrants.
- Must have R10-23 sign.
- Minimum Yellow Change Interval 3 sec. max 6 sec.
- Recommended minimum signal spacing of 600 ft.
- If within coordinated system, convert to full pedestrian signal.
- Install High Emphasis crosswalk and stop bars in accordance with DS17346.
- Install advance warning and regulatory signs for better compliance. (CMF 0.453)

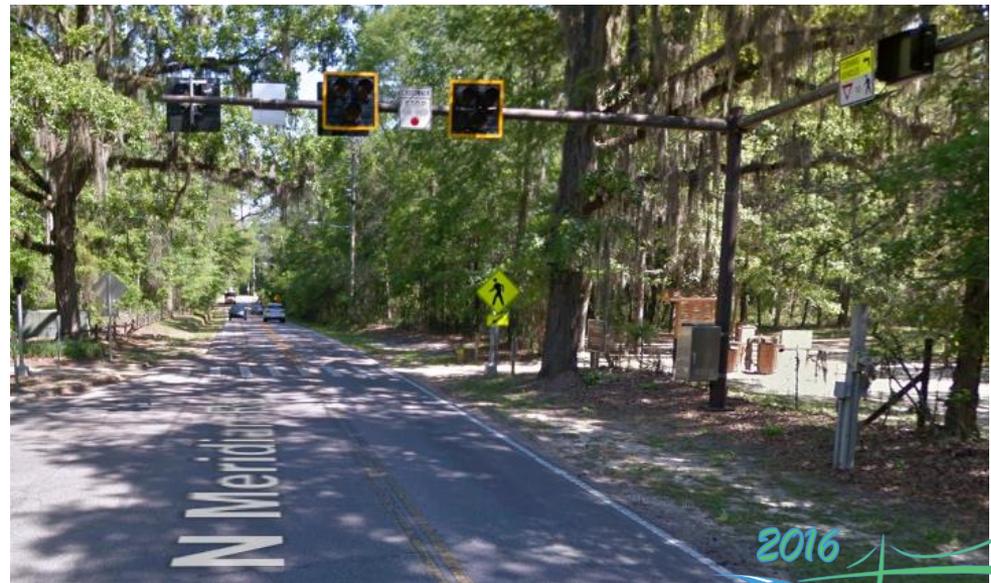


Figure 2B-2. Unsignalized Pedestrian Crosswalk Signs



R1-5



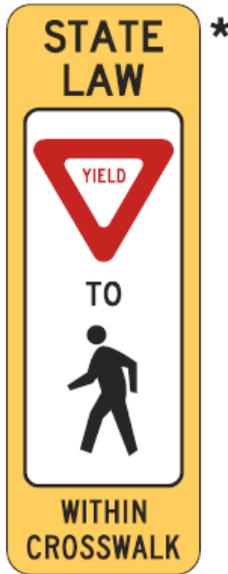
R1-5a



R1-5b



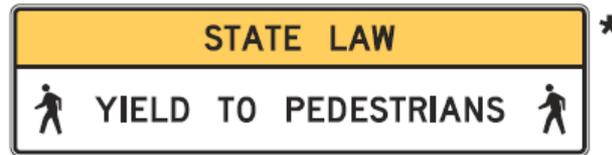
R1-5c



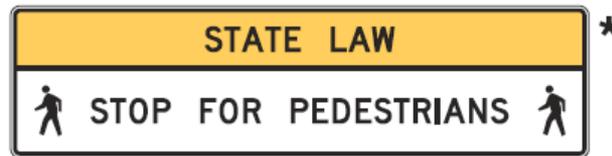
R1-6



R1-6a



R1-9



R1-9a

* The legend STATE LAW is optional. A fluorescent yellow-green background color may be used instead of yellow for this sign.

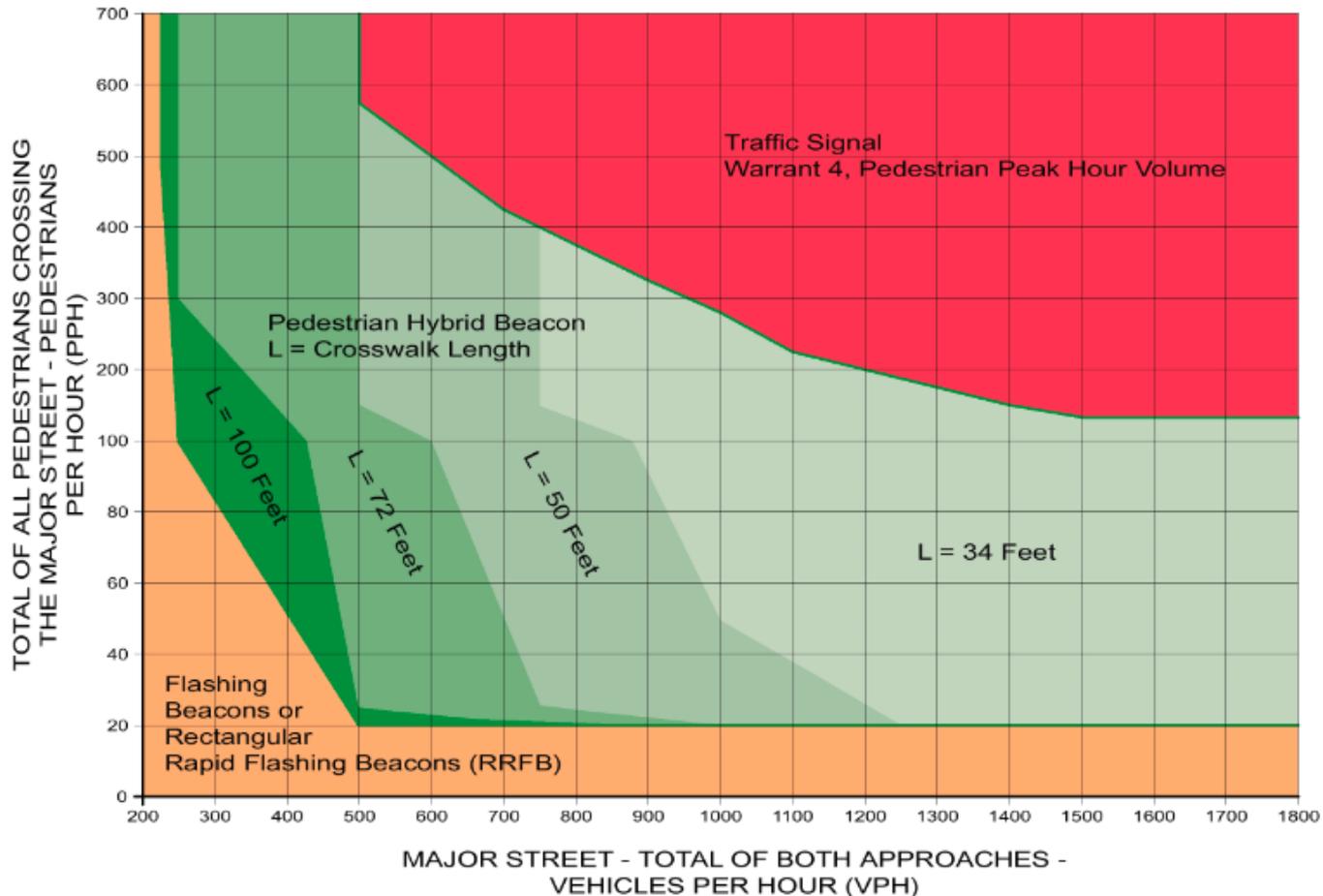
Treatment Selection Tools

Traffic Engineering Manual

Ch. 3.8

Guidelines for the Installation of Pedestrian Treatments on High-Speed Roadways

Speeds greater than 35 mph



Treatment Selection Tools

http://www.pedbikeinfo.org/pbcats_us

Crash Group	Countermeasures						
	Pedestrian Facility Design	Roadway Design	Intersection Design	Traffic Calming	Traffic Management	Signals and Signs	Other Measures
1. Dart/Dash	•	•	•	•	•	•	•
2. Multiple Threat/Trapped	•	•	•	•	•	•	•
3. Unique Midblock	•	•	•	•	•	•	•
4. Through Vehicle at Unsignalized Location	•	•	•	•	•	•	•
5. Bus-Related	•	•	•	•	•	•	•
6. Turning Vehicle	•	•	•	•	•	•	•
7. Through Vehicle at Signalized Location	•	•	•	•	•	•	•
8. Walking Along Roadway	•	•	•	•	•	•	•
9. Working or Playing in Roadway	•	•	•	•	•	•	•
10. Non-Roadway	•	•	•	•	•	•	•
11. Backing Vehicle	•	•	•	•	•	•	•
12. Crossing an Expressway	•	•	•	•	•	•	•

TECHBRIEF

PBCAT

PBCAT—Pedestrian and Bicycle Crash Analysis Tool Version 2.0

Publication No. FHWA-HRT-06-090

FHWA Contact: Ann Do, HRDS-06, 202-493-3319, ann.do@fhwa.dot.gov

This TechBrief provides a summary of the computer software, Pedestrian and Bicycle Crash Analysis Tool (PBCAT) Version 2.0, which replaces PBCAT Version 1.0. The application manual for the software, *Pedestrian and Bicycle Crash Analysis Tool (PBCAT): Version 2.0 Application Manual*, FHWA-HRT-06-089, will be published by the Federal Highway Administration (FHWA).

What is PBCAT?

In 2004, 4,641 pedestrians and 725 bicyclists were killed in traffic crashes, accounting for more than 12 percent of all traffic fatalities in the United States. An additional 68,000 pedestrians and 41,000 bicyclists were reported to be injured as a result of incidents involving motor vehicles.¹² PBCAT is a software application designed to assist State and local pedestrian and bicycle coordinators, planners, and engineers in addressing pedestrian and bicyclist crash problems.

PBCAT accomplishes this goal by enabling users to develop a database of details associated with crashes between motor vehicles and pedestrians or bicyclists. One of these details is *crash type*, which describes the pre-crash actions of the involved parties. After developing a database of crash information, PBCAT users can analyze the data, produce reports, and select countermeasures to address the problems identified by the software.

Why Crash Typing?

The development of effective countermeasures to prevent bicyclist and pedestrian crashes is hindered by computerized State crash files that contain insufficient details about the crashes. Analysis of these files often provides data that includes where pedestrian and bicyclist crashes occur, such as the city, street, type of street, or intersection; when crashes occur, such as the time of day or day of the week; and the characteristics of the victims, such as their age, gender, and severity of injuries. These data, however, do not provide adequate detail to determine the sequence of events that lead up to and cause crashes.



US Department of Transportation
Federal Highway Administration

Research, Development, and
Technology

Turner-Fairbank Highway
Research Center

6300 Georgetown Pike
McLean, VA 22101-2296

www.tfhrc.gov



Resources

WWW.Pedbikeinfo.org

Keys to connected ped/bike networks

Study identifies key principles of pedestrian and bicycle networks and highlights strategies being used by communities across the U.S. to enhance networks for nonmotorized travel.

Search the PBIC Website Search

FHWA debunks misconceptions

The [Bicycle and Pedestrian Funding, Design, and Environmental Review: Addressing Common Misconceptions](#) opens doors for installing ped/bike facilities.

Pedestrian and Bicycle Information Center
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Pedestrian and Bicycle Information Center
Yesterday at 4:53am
Take a look at what LA did to improve pedestrian safety:

NCHRP 17-56

Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments

Treatment	Crash Type	Recommended CMF		Study Basis
		Estimate	Standard error	
Refuge Island	Pedestrian	0.685	0.183	Median 2 Studies
	Total	0.742	0.071	Cross-section
	All Injury	0.714	0.082	Cross-section
	Rear End/Side Swipe Total	0.741	0.093	Cross-section
	Rear End/Side Swipe Injury	0.722	0.106	Cross-section
Advance Stop (AS)	Pedestrian	0.750	0.230	Median 2 Studies
	Total	0.886	0.065	Before-after
	Rear End/Side Swipe Total	0.800	0.076	Before-after
PHB	Pedestrian	0.453	0.167	Median 2 Studies
PHB+AS	Pedestrian	0.432	0.134	Median 2 Studies
	Total	0.820	0.078	Before-after
	Rear End/Side Swipe Total	0.876	0.111	Before-after
RRFB	Pedestrian	0.526	0.377	Cross-section

Questions?



"WELL, HE DIDN'T MAKE IT ACROSS...
BUT HE'S MADE IT A HECK OF A LOT
SAFER FOR THE REST OF US."