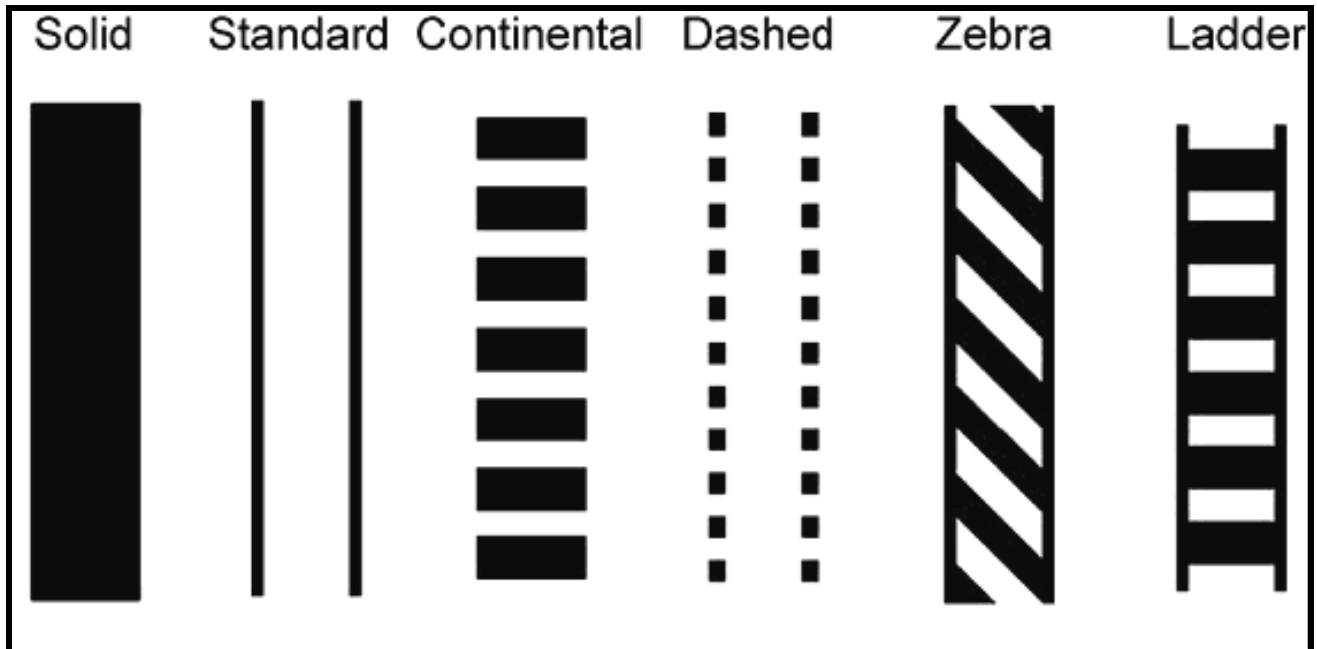




Crosswalk Marking

By Chris Bourque



Crosswalks are areas in the roadway where pedestrians are granted the right of way. They indicate the safest paths for pedestrians to cross.

Crosswalks may be marked or unmarked. They exist at all controlled intersections, whether marked or unmarked, and may only be established by markings at non-intersection locations.

Not all locations are safe for pedestrians to cross due to traffic volumes, speed limits, sight distances, etc., therefore, perform an engineering study before installing a marked crosswalk.

According to the Manual on Uniform Traffic Control Devices (MUTCD), colored paint between the white lines of a crosswalk marking is permitted, as long as the paint does not:

- Degrade the contrast of the white lines
- Use colors that may be misconceived by drivers as a traffic control device
- Contain retroreflective materials

(As interpreted by the FHWA Interpretation Letter 3-178(I)
http://mutcd.fhwa.dot.gov/resources/interpretations/3_178.htm)

Crosswalk markings may follow many patterns, including: solid, standard, continental, dashed, zebra, and ladder patterns. There is no conclusive evidence that links the type of crosswalk pattern to improved pedestrian safety.

Recommendations for Installing Marked Crosswalks and Other Needed Pedestrian Improvements at Uncontrolled Intersections

Roadway Type (Number of travel lanes and median type)	Vehicle Average Daily Traffic (ADT) ≤ 9,000			Vehicle ADT > 9,000 to 12,000		
	≤ 30 mph	35 mph	40 mph	≤ 30 mph	35 mph	40 mph
	2 Lanes	C	C	P	C	C
3 Lanes	C	C	P	C	P	P
Multilane (4 or more lanes) with raised median	C	C	P	C	P	N
Multilane (4 or more lanes) without raised median	C	P	N	P	P	N
Roadway Type (Number of travel lanes and median type)	Vehicle ADT >12,000 to 15,000			Vehicle ADT > 15,000		
	Speed Limit					
	≤ 30 mph	35 mph	40 mph	≤ 30 mph	35 mph	40 mph
2 Lanes	C	C	N	C	P	N
3 Lanes	P	P	N	P	N	N
Multilane (4 or more lanes) with raised median	P	P	N	N	N	N

C=Candidate sites for marked crosswalks. Marked crosswalks must be installed carefully and selectively after an engineering study is performed.

P=Possible increase in pedestrian crash risk may occur if crosswalks are added without other pedestrian facility enhancements. Closely monitor these locations and enhance with other pedestrian crossing improvements, if necessary, before adding a marked crosswalk.

N=Marked crosswalks alone are insufficient, since pedestrian crash risk may be increased due to providing marked crosswalks alone. Consider using other treatments, such as traffic calming, traffic signals with pedestrian signals where warranted, or other substantial crossing improvements to improve crossing safety for pedestrians.

Design Requirements for Crosswalk Pavement Markings

Treatment	Minimum Design Requirements	Maximum Design Requirements
Solid white transverse crosswalk lines	<ul style="list-style-type: none"> • 6-in line width • 6-ft gap between lines (crosswalk width) 	<ul style="list-style-type: none"> • 24-in line width • No maximum crosswalk width defined
Diagonal or longitudinal lines without transverse lines	<ul style="list-style-type: none"> • 6-ft crosswalk width • 12-in line width • 12-in spacing of lines 	<ul style="list-style-type: none"> • No maximum crosswalk width • 24-in line width • 5-ft spacing of lines (not to exceed 2.5 times the line width)

Marked vs. Unmarked

Crosswalk markings are intended to increase pedestrian safety, however, this is not always the case. According to a study by Charles Zegeer et. al., of the University of North Carolina, “under no condition was the presence of a marked crosswalk alone at an uncontrolled location associated with a significantly lower pedestrian crash rate compared to an unmarked crosswalk.” The study concluded that there was an increase in pedestrian related accidents under the following conditions:

- Multi-lane roads without raised medians and average daily traffic volume about 12,000;
- Multi-lane roads with raised medians and average daily traffic volume above 15,000.

The study analyzed five years of data on pedestrian crashes at 2,000 crosswalks; half of the sites were marked and half unmarked in comparable locations. All of the sites were “uncontrolled,” (there was no signal or stop sign regulating traffic). Marked crosswalks often give pedestrians a false sense of security.

There is evidence that enhancements such as roadway narrowing, raised medians, traffic signals, increasing overhead lighting, traffic calming, and curb extensions increase pedestrian safety. Consider these during an engineering study in place of or in addition to installation of marked crosswalks.

Specifications

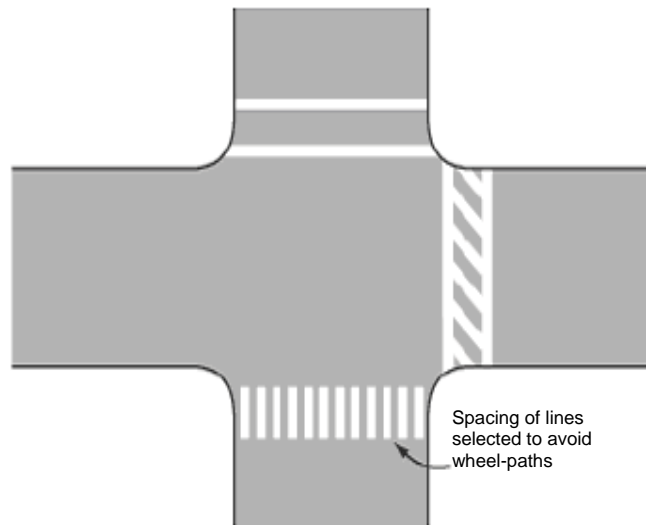
MUTCD places minimum and maximum standards on marking widths and spacing to enhance visibility of crosswalks. These standards coincide with those required by the NHDOT.

The MUTCD suggests the following guidelines for crosswalk marking:

- Crosswalks should be marked at all intersections where there is substantial conflict between vehicular and pedestrian movements.
- Marked crosswalks should be provided at other appropriate points of pedestrian concentration, such as at loading islands, mid block pedestrian crossings, or where pedestrians could not otherwise recognize the proper place to cross.

The drawing on the right is from the Federal Highway Administration (FHWA) website. It illustrates examples of crosswalk marking patterns and an example of spacing. Spacing should avoid wheel-paths.

Because non-intersection pedestrian crossings are generally unexpected by the road user, warning signs should be installed and adequate visibility should be provided by parking prohibitions. (Note: install street lights to help drivers identify pedestrians crossing or where pedestrians are crossing the roadway. Consider painting "Look Both Ways")



For added visibility, the area of the crosswalk may be marked with white diagonal lines at a 45-degree angle to the line of the crosswalk or with white longitudinal lines parallel to traffic flow. The New Hampshire Department of Transportation (NHDOT) suggests that when diagonal lines are used, the stripes should slope towards the edge of pavement from left to right.

When diagonal or longitudinal lines are used to mark a crosswalk, the transverse crosswalk lines may be omitted. This type of marking may be used at locations where substantial numbers of pedestrians cross without any other traffic control device, at locations where physical conditions are such that added visibility of the crosswalk is desired, or at places where a pedestrian crosswalk might not be expected.

Wherever possible, install marking designs to avoid wheel-paths.



Reference: UNH (University of New Hampshire), Technology Transfer Center, Technical Note #8, Winter 2007