



The When, Where and How of Mid-Block Crosswalks



Your community may have or may be considering the installation of a Midblock Crosswalk. As a motorist, you may enjoy driving on a high-speed wide street with few intersections and many lanes. This type of street design, found in many suburbs and commercial areas, may enable you to get from origin to destination quickly and easily. However, if instead of driving you must walk the same route your perception of that design may be very different. With intersections and pedestrian crossings few and far between, you may decide to cross in the middle of the block.

Crossing in mid-block creates a dangerous situation for

both pedestrians and drivers. Pedestrians may put themselves in danger if they misjudge the speed of approaching vehicles and the time it takes to safely cross the street; drivers may be startled and confused by the pedestrian crossing the street, causing a driver to slam on the brakes.

A study in the early 1990s involving several states showed that mid-block events were the second major grouping of pedestrian crash types and accounted for 26.5 percent of all pedestrian crashes (Transportation Research Board). Among this group, the most common crash type (1/3 of all) was the “mid-block dash” where a pedestrian would run into the street and the motorist’s view was not

obstructed (Transportation Research Board). While it’s unlikely that pedestrians will cross only at intersections, it is possible to help them cross roads in between intersections in a more visible and safe manner through the use of midblock crosswalks.

Midblock crossings are locations between intersections where marked crosswalks have been provided. The crosswalk may be signalized or unsignalized. They offer convenient locations for pedestrians to cross in areas without frequent intersection crossings. Installation of midblock crosswalks acknowledges that pedestrians prefer to travel to their destination using the shortest route possible. A midblock crossing creates a safer, more visible and more direct route without requiring the pedestrian to walk to the nearest intersection or cross at a random and sometimes dangerous location.

Where to consider a midblock crosswalk

Older neighborhoods, with narrow streets, slower moving vehicles, short blocks and many

controlled intersections do not typically need midblock crosswalks. However, in suburbs, long “superblocks” provide a good site for midblock crosswalks. Midblock crossings are also often placed where there is heavy pedestrian traffic near major destinations, such as schools, shopping centers, or transit stops.

Crossing design

The Federal Highway Administration (FHWA) provides various crosswalk recommendations depending on the road’s classification. On roads with low traffic volume and speeds up to 30 mph, midblock crosswalks can be kept simple and do not require signals or other special traffic control devices. When the distance between intersections increases, as well as the speed and traffic volume, midblock crosswalks may require the use of other control devices.

Medians and refuge islands. It may be necessary to add medians or refuge islands to help pedestrians cross safely. A median is a strip of land that separates traffic moving in opposite directions, and it may run for several blocks. Refuge islands are similar to medians, but are much shorter, usually 100-250 feet in length. These two types of traffic control serve many purposes. Medians and refuge islands provide pedestrians with a place to safely stop in the middle of the road, allowing pedestrians to watch for cars coming from only one direction at a time. Medians and refuge islands can help guide pedestrians to preferred crossing

locations. Refuge islands may help slow traffic, from, say, 40 mph to 30 mph. Raised medians landscaped with trees or shrubs also help to reduce traffic speed.

Signals. On streets with four lanes, traffic signals should be considered along with medians or refuge islands. According to the FHWA, traffic signals at midblock crossings are helpful or essential under the following conditions:

- On higher volume roadways.
- Where gaps are infrequent.
- In school zones.
- Where elderly or disabled pedestrians cross.
- Where speeds are high.

On roads with six or more lanes, signalization is necessary. The FHWA states that streets with this many lanes create a complex condition for pedestrians trying to cross the street. A high number of rear-end crashes can be expected, especially in areas of high density. Devices used to alert drivers must also be increased. At the minimum, pedestrian crossing signs must be 36 by 36 inches for speeds of 40 mph. Pavement word symbols can be added to enhance pedestrian visibility, and zebra or ladder style crossings should be considered. The FHWA also suggests the use of large overhead signs, flashing beacons, bulb-outs or curb extensions which reduce the distance necessary to cross the street, and even flashing overhead signs in these situations.

Design specifics

Section 3I.06 of the *Manual on Uniform Traffic Control Devices* (MUTCD) suggests referencing the American Disabilities Act *Accessibility Guidelines for*

Buildings and Facilities (ADAAG) for the minimum width for refuge islands and design and placement of detectable warning surfaces. Section 4.7.11 of the ADAAG specifies raised islands in crossings shall be cut through level with the street or have curb ramps at both sides and a level area at least 48 in long between the curb ramps in the part of the island intersected by the crossings.

Another technique used to help make midblock crosswalks safer is the use of staggered, or Z-crossing treatments in which the crosswalk is split by a median and is offset on either side of the median (FHWA). The crossing path is not a straight line. This forces the pedestrian to turn while in the median and face oncoming traffic before turning again to finish crossing the street. One issue with staggered crosswalks is it presents a challenge for the visually impaired who are “thrown off course by changes in the direction of the walkway leading to the road” (FHWA). A solution is to provide railings or detectable warnings to help realign the pedestrian to the roadway just before crossing the street.

Passive and active sensors

A number of electronic technologies can be used to help pedestrians safely cross midblock crosswalks. If signals are to be used, the sensor may be active or passive.

Active sensors require the pedestrian to push a button. Active sensors work best when sensors are “hot,” meaning the response is immediate. If a pedestrian presses the button and the signal does not

change quickly, he or she may cross when traffic allows, without waiting for the signal to change. Then when the signal does finally change, a driver who is stopped at the crosswalk may become frustrated and disrespectful of the crosswalk when no pedestrians are visible. A slow sensor response can also cause pedestrians to avoid using crosswalk altogether. If a median or refuge island is used, a push button should be installed in the median if it is possible that some pedestrians will not be able to cross the whole street at one time (FHWA).

A passive sensor uses an infrared detector to determine the presence of a pedestrian in either the curbside area or the crosswalk. It does not require a pedestrian to push a button to activate the signal. If a pedestrian is detected in the crosswalk, the sensor can extend the time allowed for a pedestrian to cross the street. Passive signals provide an advantage over active signals by ensuring that the signal will be activated by all pedestrians, even those who are unable or unwilling to push the button.

Crosswalk lighting

Adequate lighting helps to warn oncoming drivers of pedestrians crossing the street at midblock locations and also helps guide pedestrians across the street at night. The FHWA's *Pedestrian Safety - Report to Congress* cites several new examples of lighting available for use at midblock crosswalks, from simple to high-tech:

In-pavement lights. These are amber lights embedded in the pavement on both sides of the



crosswalk. These lights are directed towards oncoming traffic. In-pavement lights can be activated by passive or active sensors. Once activated, the lights flash at a constant rate, warning motorists of pedestrians in the vicinity. These lights are typically at crosswalks without stop control devices.

Overhead lighting. This system provides pedestrians with light to cross the street at night and warns oncoming vehicles of the potential for pedestrians. Overhead lighting can be activated passively or by pushing a button.

LED warning systems. These operate in a similar way to the overhead lighting system but provide an LED sign that warns approaching drivers that a pedestrian is crossing the street. In a study performed in Clearwater, Florida, the use of LED warning lights increased driver yielding behavior of 30 to 40 percent during the day and 8 percent at night. LED warning lights can be used in conjunction with overhead lighting for increased safety during the night.

High-intensity activated

crosswalk, or HAWK. This relatively new type of signal uses both traditional traffic and pedestrian signal heads but in a different configuration. It includes a sign instructing motorists to “stop on red” and a “pedestrian crossing” overhead sign. It can be activated passively or by a pedestrian pushing a button. When activated, an overhead signal begins flashing yellow and then solid yellow, advising drivers to prepare to stop. It then switches to a solid red light and shows the pedestrian a “Walk” indication. Finally, it shows a flashing red signal indicating that motorists may proceed when safe after coming to a complete stop. The pedestrian sees a flashing “Don’t Walk” sign indicating the number of seconds left to cross.

Challenges with midblock crosswalks

Drivers do not expect to see pedestrians crossing at midblock locations. Because of this, it is important to have adequate lighting and signage to ensure drivers have the necessary time to

stop. Midblock crossings that span many lanes may be a challenge for many pedestrians. As stated above, you must provide medians or refuge islands to help reduce the number of lanes that pedestrians must cross at once. Also, the use of curb extensions can reduce the distance that a pedestrian must walk to cross the street.

Midblock crosswalks can be difficult to use safely for those who are visually impaired. If a midblock crossing is not signalized, people with visual impairments are often unable to tell when there is a gap in traffic or whether all vehicles in approaching lanes have stopped, as the sound of one idling car can mask the sound of approaching cars. (FHWA's *Designing Sidewalks and Trails for Access*). If the crosswalk is signalized, pedestrians who are visually impaired are often unable to determine when it is their turn to cross the street because their customary cue at intersections, the surge of traffic in the street beside them, isn't present (FHWA's *Designing Sidewalks and Trails for Access*). To help, an audible indicator that provides timing information should be installed.

Manual of Uniform Traffic Control Devices Guidance

The Manual on Uniform Traffic Control Devices for Streets and Highways, 2009 Edition (MUTCD) section 3B-18 offers the following guidance: "Crosswalk lines should not be used indiscriminately. An engineering study should be performed before a marked crosswalk is installed at a location away from a traffic control signal or

an approach controlled by a stop or yield sign. The engineering study should consider the number of lanes, the presence of a median, the distance from adjacent signalized intersections, the pedestrian volumes and delays, the average daily traffic (ADT), the posted or statutory speed limit or 85th percentile speed, the geometry of the location, the possible consolidation of multiple crossing points, the availability of street lighting and other appropriate factors. New marked crosswalks alone, without either measures designed to reduce traffic speeds, shorten crossing distances, enhance driver awareness of the crossing, and or/provide active warning of pedestrian presence should not be installed across uncontrolled roadways where the speed limit exceeds 40 mph and either:

A: The roadway has four or more lanes of travel without a raised median or pedestrian refuge island and an ADT of 12,000 vehicles per day or greater; or

B: The roadway has four or more lanes of travel and a raised median or pedestrian refuse island and an ADT of 15,000 vehicles per day or greater.

Because non-intersection pedestrian crossings are generally unexpected by the road user, warning signs (see Section 2C.50) should be installed for all marked crosswalks at non-intersection locations and adequate visibility should be provided by parking prohibitions."

Section 4D.01 of the MUTCD specifies that midblock crosswalks shall not be signalized if they are located within 300 feet

of the nearest traffic control signal unless the proposed traffic control signal will not restrict the progressive movement of traffic. Further, a midblock crosswalk location should not be controlled by a traffic control signal if the crosswalk is located within 100 feet from side streets or drive-ways that are controlled by stop signs or yield signs. The MUTCD suggests an engineering study be completed to determine the need for a control signal at a midblock crosswalk.

Connecticut Department of Transportation Guidance

The Connecticut Department of Transportation has guidance that should be incorporated in addition to the MUTCD. Midblock crosswalks are required to be a minimum of eight feet wide, with 16 bars and 24 spaces and to be installed as a high visibility type. Yield lines and signs are now required.

The Connecticut Department of Transportation has provided valuable guidance and details for the installation of sidewalks and crosswalks in the 2009 "Connecticut Statewide Bicycle and Pedestrian Plan Update" and its Appendix F "Design Guideline Toolbox" section 1.6 with subsections that are titled:

- Curb Extensions/Neckdowns/Bulbouts
- Curb Ramps/Landings
- Raised Median/Refuge Island
- Crosswalk Treatment
- Raised Pedestrian Crossing
- Pedestrian Signal

Pedestrian Laws and Regulations

You can refer to chapters 248 and 249 of the Connecticut General Statutes for laws and regulations related to Vehicle Highway Use, Traffic Control and Highway Safety including but not limited to section 14-300 on Crosswalks. Unless a crosswalk is installed, the pedestrian is always required to yield to the motorist. When a crosswalk is installed, the motorist is required to yield when a pedestrian is in a crosswalk.

Other types of Crosswalk Enhancements

Some additional examples of Crosswalk Enhancement Treatment are suggested in the Transportation Research Board NCHRP Report 562 include:

- Advanced Signing
- Advanced Stop Line and Sign
- Roadway Narrowing
- Markings and Crossing Signs
- In Roadway Warning Lights
- Amber Flashing lights mounted flush to the pavement
- Overhead Flashing Amber Beacons
- Traffic Signal
- Pedestrian Beacon

Estimates

Some estimates that have been provided for various treatments by both the Federal Highway Administration (FHWA) and University of North Carolina (UNC) Highway Safety Center;

Estimates Provided by FHWA 2014				
Treatment Type	Cost (Low)	Cost (High)	NCHRP 500 Performance Rating	Crash Modification Factor
Provide Crosswalks at Targeted Locations	\$0	\$5,000	Proven & Tried	NA
Install Rectangular Rapid Flash Beacons (RRFBs)	\$5,001	\$20,000	Proven	NA
Install Curb Extensions	\$20,001	\$50,000	Tried	NA
Install Pedestrian Hybrid Beacons or High Intensity Crosswalk (HAWK)	\$20,001	\$100,000	Proven	0.712
Use of Supplemental Signs	\$0	\$5,000	Tried	NA
Source Manual for Selecting Safety Improvements on High Risk Rural Roads FHWA HAS August 2014				

Estimates Provided from UNC Highway Safety Center 2013

Treatment Type	Cost (Min.)	Cost (Median)	Cost (Max.)	Number of Sources (Observations)
Median Island	\$2,140	\$10,460	\$41,170	17 (19)
Raised Crosswalks	\$1,290	\$7,110	\$30,880	14 (14)
Curb Extension (Bulb Out)	\$2,700	NA	\$71,000	19 (28)
Pedestrian Beacon (Flashing Beacon)	\$360	\$5,170	\$59,100	16 (25)
Pedestrian Beacon (RRFB)	\$4,520	\$14,160	\$52,310	3 (4)
Overhead Flasing Amber Beacons (Pedestrian Hybrid Beacon)	\$21,440	\$51,460	\$128,660	9 (9)

Source Costs for Pedestrian and Bicyclist Infrastructure Improvements UNC Highway Safety Center
October, 2013

Sources:

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- Transportation Research Board. Effectiveness of Various Mid-block Crossing Treatments. <http://rns.trb.org/dproject.asp?n=13454>. Accessed August 24, 2011.
- Transportation Research Board. NCHRP Report 562 http://www.nap.edu/catalog.php?record_id=13962
- Federal Highway Administration University Course on Bicycle and Pedestrian Transportation. Lesson 12: Midblock Crossings. July 2006. <http://www.fhwa.dot.gov/publications/research/safety/pedbike/05085/chapt12.cfm>
- Manual on Uniform Traffic Control Devices; 2009 Edition. <http://mutcd.fhwa.dot.gov/>
- ADA Accessibility Guidelines for Buildings and Facilities (ADAAG). September 2002. <http://www.access-board.gov/adaag/html/adaag.htm>
- Federal Highway Administration Safety. Pedestrian Safety - Report to Congress. August 2008. http://safety.fhwa.dot.gov/ped_bike/legis_guide/rpts_cnrgs/pedrpt_0808/chap_3.cfm. Designing Sidewalks and Trails for Access. <http://www.fhwa.dot.gov/environment/sidewalk2/>. Accessed August 24, 2011.
- Evaluating Active and Passive Crosswalk Warnings at Unsignalized Intersections and Mid-Block Sites. October 2009. <http://www.lrrb.org/pdf/200903TS.pdf>
- State of Connecticut ct.gov
- <http://cga.ct.gov/2011/pub/chap248.htm> <http://cga.ct.gov/2011/pub/chap249.htm> <http://www.ct.gov/dot/lib/dot/documents/dbikes/2009appendixf.pdf>
- UNC Highway Safety Research Center. Costs for Pedestrian and Bicyclist Infrastructure Improvements Prepared for the Federal Highway Administration and supported by the Robert Wood Johnson Foundation through its Active Living Research Program October, 2013 <http://trid.trb.org/view.aspx?id=1266314>
- Federal Highway Administration. Manual for Selecting Safety Improvements on High Risk Rural Roads. <http://safety.fhwa.dot.gov/hsip/hrrr/manual/>

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