



Tech Brief Series

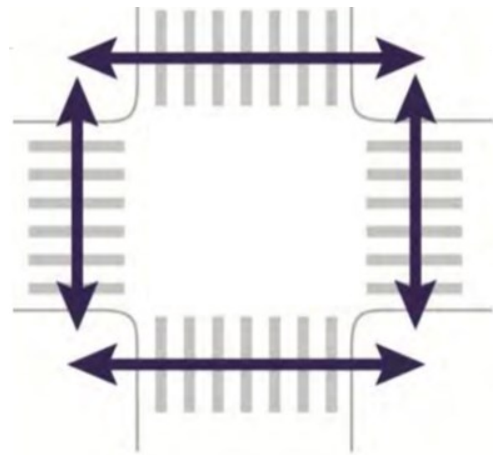
Tech Brief - 2018-5

Concurrent Pedestrian Phasing and Leading Pedestrian Interval (LPI)

Concurrent vs. Exclusive Pedestrian Phase:

Historically, CTDOT and most municipalities have used exclusive pedestrian phasing at signalized intersections. An exclusive pedestrian phase allows pedestrians to cross the street when vehicles are stopped on all approaches.

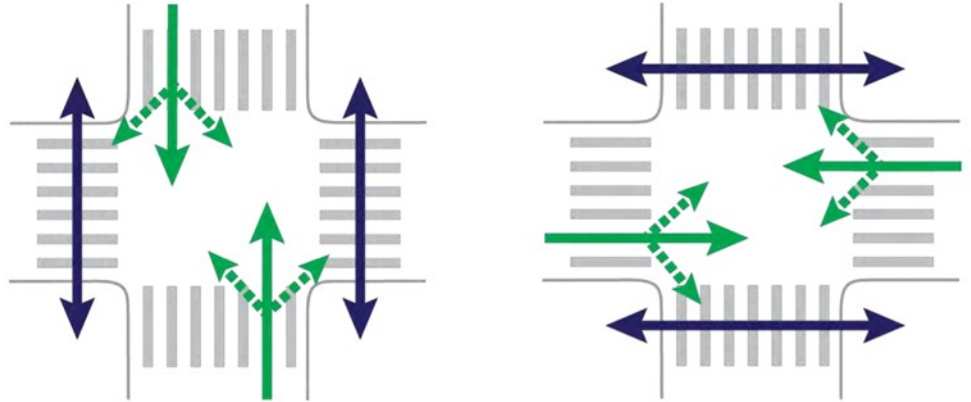
Exclusive Pedestrian Phase



Exclusive pedestrian phasing has been shown to reduce the overall number of pedestrian crashes at an intersection. However, a UConn study published in 2017 has shown that while the overall number is reduced, crashes involving pedestrians at intersections with exclusive pedestrian phasing tend to be more severe. Pedestrians are sometimes unwilling to wait through all the vehicle phases to cross during the pedestrian phase, creating conflicts with vehicles. Another tradeoff to utilizing exclusive pedestrian phasing is that doing so may increase pedestrian and vehicular delay.

With concurrent phasing, pedestrians cross with the parallel vehicle phase, and vehicles may turn left or right across the pedestrian crosswalks after yielding to pedestrians in the crosswalks.

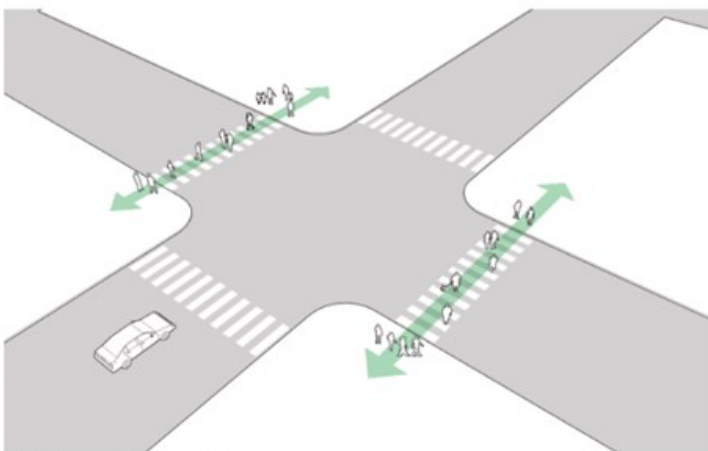
Concurrent Pedestrian Phase



This type of pedestrian phasing requires that drivers and pedestrians be more aware of potential conflicts. Crashes that do occur under concurrent phasing tend to involve pedestrians and turning vehicles. Turning speeds tend to be lower than through vehicle speeds, reducing the severity of the collision.

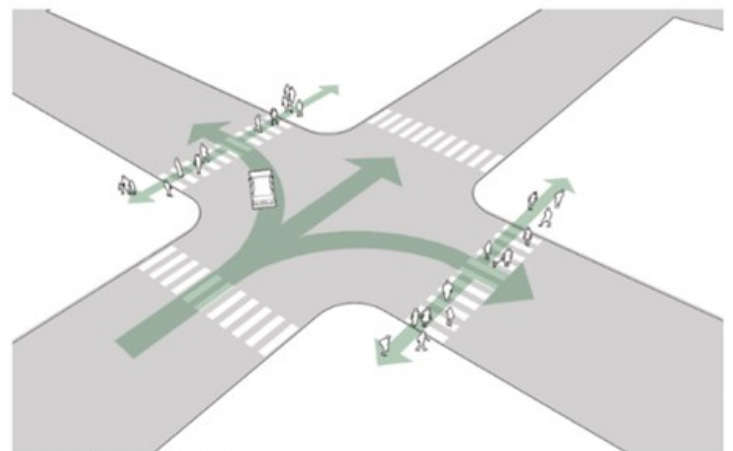
Leading Pedestrian Interval

A Leading Pedestrian Interval (LPI) typically gives pedestrians a 3 to 7 second head start when entering an intersection with a corresponding green signal in the same direction of travel.



Phase 1: Pedestrians only

Pedestrians are given a minimum 3–7 second head start entering the intersection.



Phase 2: Pedestrians and cars

Through and turning traffic are given the green light. Turning traffic yields to pedestrians already in the crosswalk.

LPIs enhance the visibility of pedestrians in the intersection and reinforce their right-of-way over turning vehicles, especially in locations with a history of conflict .

Benefits & Considerations

- LPIs increase the visibility of crossing pedestrians and give them priority within the intersection.
- LPIs are a proven safety countermeasure and have been shown to reduce pedestrian-vehicle collisions as much as 60% at treated intersections.
- LPIs typically require adjustments to existing signal timing that are relatively low cost compared to other countermeasures.

Application

Use LPIs at intersections where heavy turning traffic comes into conflict with crossing pedestrians during the permissive phase of the signal cycle. LPIs are typically applied where both pedestrian volumes and turning volumes are high enough to warrant an additional dedicated interval for pedestrian-only traffic.

LPIs are critical at intersections where heavy right or left turning volumes create consistent conflicts and safety concerns between vehicles and pedestrians.

LPIs should give pedestrians a minimum head start of 3 to 7 seconds, depending on the overall crossing distance. Intervals of up to 10 seconds may be appropriate where pedestrian volumes are high, or the crossing distance is long. To increase the effectiveness of a LPI and improve visibility of pedestrians at high-conflict intersections, install a curb extension at the intersection.

Where a bikeway on the through movement conflicts with turning traffic, use a leading bicycle interval along with the leading pedestrian interval. A leading bicycle interval clears the intersection of all cyclists quickly and can help prevent right hook collisions.





Concurrent Pedestrian Phase Resources:

“Safety Effects of Exclusive and Concurrent Signal Phasing for Pedestrian Crossing”, John Ivan, Kevin McKernan, Yaohua Zhang, Nalini Ravishanker, Sha Mamun—UConn

http://www.pedbikeinfo.org/trbped/documents/2015/2015_John_Ivan-Safety_of_Exclusive_and_Concurrent_Pedestrian_Phasing.pdf

Leading Pedestrian Interval Resources:

MUTCD Chapter 4E: Pedestrian Control Features

<https://mutcd.fhwa.dot.gov/htm/2009/part4/part4e.htm>

“Safety Effectiveness of Leading Pedestrian Intervals Evaluated by a Before-After Study with Comparison Groups”, Aaron C. Fayish and Frank Gross, Transportation Research Record 2198 (2010)

https://nacto.org/docs/usdq/safety_effectiveness_of_lpi_fayish.pdf

See LPI in Action in the City of Stamford

<https://www.stamfordct.gov/stamford-street-smart/pages/leading-pedestrian-interval>

PEDSAFE Case Studies—FHWA:

- St. Petersburg, FL

http://www.pedbikesafe.org/pedsafe/casestudies_detail.cfm?CM_NUM=12&CS_NUM=66

- San Francisco, CA

http://www.pedbikesafe.org/pedsafe/casestudies_detail.cfm?CM_NUM=12&CS_NUM=97

- Miami-Dade County, FL

http://www.pedbikesafe.org/pedsafe/casestudies_detail.cfm?CM_NUM=12&CS_NUM=101

- Reston, VA

http://www.pedbikesafe.org/pedsafe/casestudies_detail.cfm?CM_NUM=12&CS_NUM=102



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