NCHRP 17-113 COUNTERMEASURES

Modify Signal Phasing (Implement a Leading Pedestrian Interval)

PEDESTRIANS AND BICYCLISTS

A Leading Pedestrian Interval (LPI) gives pedestrians a 3–7 second head start, reducing crashes by increasing their visibility before vehicles begin turning.

Implementation Strategy

How and Where to Apply

- LPIs are best applied at signalized intersections with high pedestrian activity and a history of conflicts between turning vehicles and crossing pedestrians, especially in urban areas or near schools and transit stops.
- Implement LPIs by adjusting signal timing to give pedestrians a 3–7 second walk phase before the vehicle green, ensuring proper signal programming and clear pedestrian signals per **MUTCD** guidelines.

Use in a Safe System Approach

LPIs support the Safe System Approach by protecting pedestrians through signal timing that creates safer, more predictable crossings and reduces vehicle conflicts, especially for vulnerable road users.

Key Stakeholders

Agency maintenance personnel, DOT, Active road users

Proactive Implementation

Proactive implementation of LPIs involves identifying intersections with high pedestrian volumes or turning-vehicle conflicts before crash patterns emerge. Traffic signal timing plans should be reviewed and adjusted to include a pedestrian lead time of 3–7 seconds. This early action improves safety by increasing pedestrian visibility and reducing the risk of vehicle-pedestrian collisions.

Countermeasure Overview

Objective: Reduce Pedestrian Exposure to Vehicular Traffic.

Strategy: Install or Upgrade Traffic and Pedestrian Signals.

Targeted Solution

CONTRIBUTING FACTORS	▪ Limited Visibility ▪ Driver Inattention ▪ Failure to Yield
TARGET CRASH TYPE	▪ Speeding ▪ Red light running
ROAD FACILITY TYPE	▪ Principal Arterial Other
AREA TYPE	▪ Urban

Safety Linkage

NCHRP 500 Series

Pedestrian and Bicyclist

AASHTO'S TOWARD ZERO DEATHS

Safer Drivers and Passengers

SAFE SYSTEM APPROACH

Safe Road Users

SAFE SYSTEM ROADWAY DESIGN

TIER 1
TIER 2
TIER 3
TIER 4

Tier 3

Selected Related Countermeasures

- CM1 LED-enhanced signal lenses
- CM2 High-visibility signal backplates
- CM3 Advance warning flashing beacons

Cost: $ (Moderate to High)

Service Life: 10 years

Benefit-Cost Ratio: 1:207 :1

Leading Pedestrian Interval. Source: MD.gov

Safety Benefits

59% Reduce in all types of crash severities[1]

28% Reduce fatal and severe injury severity crashes [1]

[1] CMF ID: 1993
[2] CMF ID: 9908

Resources

- FHWA proven-safety-countermeasures
- USDOT