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.
- Suits busy urban crossings but can disrupt flow and raise rear-end risks in rural or coordinated corridors.

Use in a Safe System Approach

LPIs support the Safe System Approach by protecting pedestrians through safer signal timing. They address human vulnerability and reduce vehicle conflicts, especially for those at greater risk.

Key Stakeholders

State DOTs, MPOs, traffic signal engineers, pedestrian advocacy groups, community associations, 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/ Distraction ▪ Failure to Yield
TARGET CRASH TYPE	▪ Speeding ▪ Red light running
ROAD FACILITY TYPE (ARTERIAL, COLLECTOR, LOCAL)	▪ 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: 1.2:1 to 1.5:1

Modify Signal Phasing. Source: City of Long Beach, CA.

Safety Benefits

28% Reduces crashes of all types and severity levels K, A, B, and C on rural roads (CMF ID: 9908)

17% Reduces all type of crashes and K, A, B, C severity levels on urban and suburban roads (CMF ID: 9902)

Resources

- FHWA proven-safety-countermeasures
- USDOT