NCHRP 17-113 COUNTERMEASURES

Increase All Red Clearance Interval

INTERSECTIONS

An all-red clearance interval is the period during which all traffic signal indications are red, allowing vehicles that have entered the intersection at the end of the yellow interval to clear before cross traffic receives a green signal.

Implementation Strategy

How and Where to Apply

- This treatment is most applicable at signalized intersections with a documented history of red-light running or angle crashes.
- It is especially useful at intersections with wide cross-sections, high approach speeds, or where clearance behavior studies show that vehicles often remain in the intersection during phase transitions.
- Best suited for wide, high-volume intersections to cut angle crashes; not suited for low-volume or closely spaced signals where delays outweigh benefits.

Use in a Safe System Approach

Increasing the all-red interval supports the Safe System Approach by managing human error and providing forgiving infrastructure, reducing the risk of severe right-angle collisions at signal changes.

Key Stakeholders

State DOTs, MPOs, traffic signal engineers, safety advocacy groups, engineering consultants, law enforcement agencies.

Proactive Implementation

Agencies can implement increased all-red intervals proactively during regular signal retiming cycles or based on systemic risk analysis. Intersections with high approach speeds, poor compliance with yellow intervals, or limited visibility benefit most from this low-cost measure.

Countermeasure Overview

Objective: Reduce frequency and severity of intersection conflicts through traffic control and operational improvements.
Strategy: Optimize clearance intervals.

Targeted Solution

CONTRIBUTING FACTORS	▪ Red-light running ▪ Driver misjudgment
TARGET CRASH TYPE	▪ Speeding ▪ Red light running
ROAD FACILITY TYPE	▪ Urban arterial ▪ Rural major ▪ Minor arterial
AREA TYPE	▪ Urban

Safety Linkage

NCHRP 500 Series

Unsignalized Intersection

AASHTO'S TOWARD ZERO DEATHS

Safer Infrastructure

SAFE SYSTEM APPROACH

Safe Roads

SAFE SYSTEM ROADWAY DESIGN

TIER 1
TIER 2
TIER 3
TIER 4

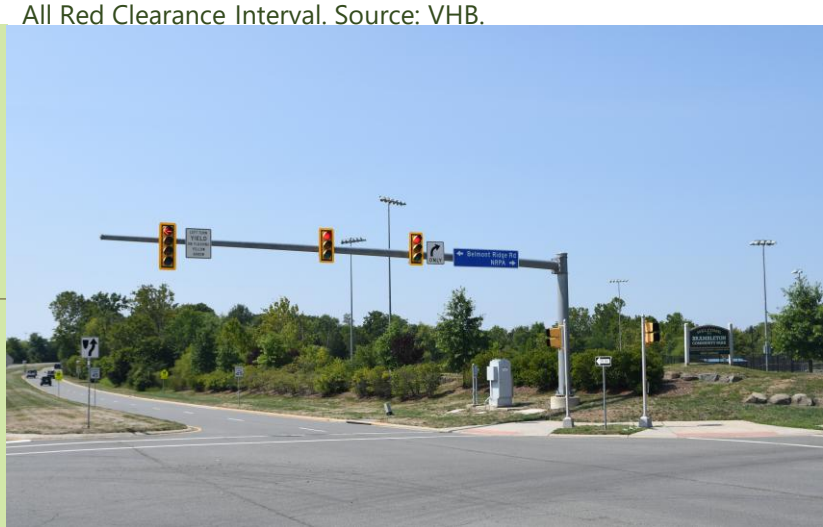
Tier 3

Selected Related Countermeasures

- CM1 Increase Yellow Change Interval
- CM2 Improve Signal Visibility
- CM3 Install Dynamic Signal Warning Flashers

Cost: $ (Low)
Service Life: 10 years
Benefit-Cost Ratio: 143.0:1

All Red Clearance Interval. Source: VHB.



Safety Benefits

20% Reduces all types of crashes and severity levels on urban roads (CMF ID: 4211)

14% Reduces all types of crashes and severity levels K, A, B, and C on urban roads (CMF ID: 4212)

Resources

- FHWA Signalized Intersections: Informational Guide (FHWA-HRT-04-091)
- MUTCD Section 4D.26: Clearance Intervals
- ITE Traffic Signal Change and Clearance Intervals: Recommended Practice
- NCHRP Report 731: Guidelines for Timing Yellow and All-Red Intervals