NCHRP 17-113 COUNTERMEASURES

Improve Signal Visibility

INTERSECTIONS

Improving signal visibility includes a range of enhancements such as increasing signal lens size, adding new or upgraded back-plates, and installing additional signal heads to ensure better detection and recognition of traffic signals.

Implementation Strategy

How and Where to Apply

- This countermeasure is appropriate for signalized intersections where drivers may have difficulty detecting or interpreting the traffic signal.
- It is especially effective at intersections with crash histories involving red-light running or signal non-compliance.
- Locations with skewed geometry, high-speed approaches, or visual obstructions such as tree cover, signage, or glare are strong candidates.

Use in a Safe System Approach

This treatment aligns with the Safe System principles of visibility, redundancy, and crash prevention. Enhancing signal visibility helps reduce the likelihood of high-speed intersection crashes by supporting clear and timely driver recognition, particularly at locations where human error or distraction may compromise safety.

Key Stakeholders

Agency maintenance personnel

Proactive Implementation

Agencies can prioritize locations based on a systemic risk-based approach that considers factors such as long approach distances, skewed geometry, sun glare patterns, background clutter (e.g., trees or signage), and high speeds. Signal visibility audits, nighttime field reviews, and public complaints related to missed or unclear signals can also help identify candidate locations for implementation.

Countermeasure Overview

Objective: Improve driver awareness of intersections and signal control

Strategy: Improve visibility of signals and signs at intersections

Selected Related Countermeasures

- CM1 Install Dual Red Signal Lenses
- CM2 Improve Intersection Illumination
- CM3 Install Advance Signal Warning Flashers

Cost: $ (Moderate)

Service Life: 10 years

Targeted Solution

CONTRIBUTING FACTORS	▪ Reduced visibility ▪ Signal non-compliance
TARGET CRASH TYPE	▪ Angle ▪ Rear-end ▪ Turning
ROAD FACILITY TYPE	▪ Urban arterial ▪ Freeways
AREA TYPE	▪ Urban

Safety Linkage

NCHRP 500 Series	SAFE SYSTEM APPROACH
Unsignalized Intersection	Safe Roads
AASHTO'S TOWARD ZERO DEATHS	SAFE SYSTEM ROADWAY DESIGN
Safer Infrastructure	Tier 4

Increase signal visibility through retroreflective backplate Source: ftr

Safety Benefits

13% Reduction in all crashes

10% Drop in total collisions after installing larger signal lenses

[1] CMF ID: 4113
[2] CMF ID: 4111

Resources

- MUTCD Chapter 3B: Pavement and Curb Markings
- Unsignalized Intersection Improvement Guide
- FHWA Safety Evaluation of STOP AHEAD Pavement Markings