NCHRP 17-113 COUNTERMEASURES

Increase Retroreflectivity of STOP Signs

INTERSECTIONS

STOP signs that are more retroreflective help improve driver awareness of intersections.

Implementation Strategy

How and Where to Apply

- Increase the retroreflectivity of STOP signs at intersections with high nighttime crash rates, or poor visibility. Upgrades should be targeted at rural, suburban, and low-lit urban intersections.
- Enhanced retroreflective materials improve nighttime sign visibility, recognition distance, and driver reaction time, especially in dark or wet conditions.
- Best suited for improving safety in areas with low visibility; avoid in locations where it could cause driver distraction or be unnecessarily costly.

Use in a Safe System Approach

Increasing the retroreflectivity of STOP signs supports Safer Roads by accommodating human mistakes and vulnerabilities. By improving visibility, it builds redundancy to prevent missed compliance and upholds the principle that death and serious injuries are unacceptable.

Key Stakeholders

State DOTs, MPOs, engineering consultants, safety advocacy groups.

Proactive Implementation

Agencies should proactively assess and replace STOP signs with enhanced retroreflectivity levels using night-time visual inspection, mobile retroreflectometers, or sign management systems. Research in Virginia found that upgraded retroreflective STOP signs can reduce total crashes and improve driver compliance without additional infrastructure changes.

Countermeasure Overview

Objective: Improve driver awareness of intersections as viewed from the intersection approach.
Strategy: Provide improved maintenance of STOP signs.

Targeted Solution

CONTRIBUTING FACTORS	▪ Reduced visibility ▪ Driver inattention/ distraction ▪ Non-Compliance
TARGET CRASH TYPE	▪ Angle ▪ Rear-end ▪ Turning
ROAD FACILITY TYPE	▪ All
AREA TYPE	▪ All

Safety Linkage

NCHRP 500 Series

Intersection

AASHTO'S TOWARD ZERO DEATHS

Safer Infrastructure

SAFE SYSTEM APPROACH

Safer Roads

SAFE SYSTEM ROADWAY DESIGN

TIER 1
TIER 2
TIER 3
TIER 4

Tier 4

Selected Related Countermeasures

- CM1 LED-embedded STOP signs
- CM2 STOP ahead pavement markings
- CM3 Larger STOP sign sizes

Cost: $ (Low)
Service Life: 15 years

Retroreflective STOP Sign. Source: FHWA.

Safety Benefits

9% Reduces all types of crashes and severity levels K, A, B, and C on all types of roads (CMF ID: 6052)

7% Reduces all types of crashes and K, A, B, C severities on all types of roads (CMF ID: 6065)

Resources

- Evaluation of Retroreflective Material on Stop Sign Posts in Virginia
- Retroreflective Requirements for Traffic Signs