NCHRP 17-113 COUNTERMEASURES

Improve Street Lighting Illuminance Uniformity

INTERSECTIONS

Improving street lighting means enhancing brightness and uniform light coverage on roads and walkways.

Implementation Strategy

How and Where to Apply

- Implement on roadway segments and intersections with high rates of nighttime crashes, especially where poor visibility, dark spots, or glare have been identified as contributing factors.
- Prioritize locations with significant pedestrian activity, including school zones, public transit stops, commercial corridors, and mixed-use areas where improved lighting can enhance safety and comfort.
- Not recommended in areas with low nighttime traffic or where installation costs outweigh potential crash reduction and safety improvements.

Use in a Safe System Approach

Improving lighting uniformity enhances safe roads and users by reducing glare and dark spots, addressing human mistakes, supporting shared responsibility, and providing proactive, redundant safety for nighttime travel.

Key Stakeholders

State DOTs, MPOs, engineering consultants, construction contractors, safety advocacy groups, maintenance agencies, municipal public works departments, utility companies.

Proactive Implementation

Proactive implementation involves upgrading to LED lights with full-cutoff optics to reduce glare and improve light distribution. It includes optimizing pole spacing, height, and fixture angles to meet IES guidelines, ensuring adequate lighting for both roadways and pedestrian zones. These improvements should be guided by photometric analysis and integrated into broader street redesign or resurfacing projects.

Countermeasure Overview

Objective: Improve Reflectorization/Conspicuity of Pedestrians.
Strategy: Adjust lighting design and pole placement to reduce dark spots and glare.

Targeted Solution

CONTRIBUTING FACTORS	▪ Low visibility ▪ Driver distraction ▪ Reduced reaction time
TARGET CRASH TYPE	▪ Nighttime ▪ Crossing
ROAD FACILITY TYPE (ARTERIAL, COLLECTOR, LOCAL)	▪ N/A
AREA TYPE	▪ All

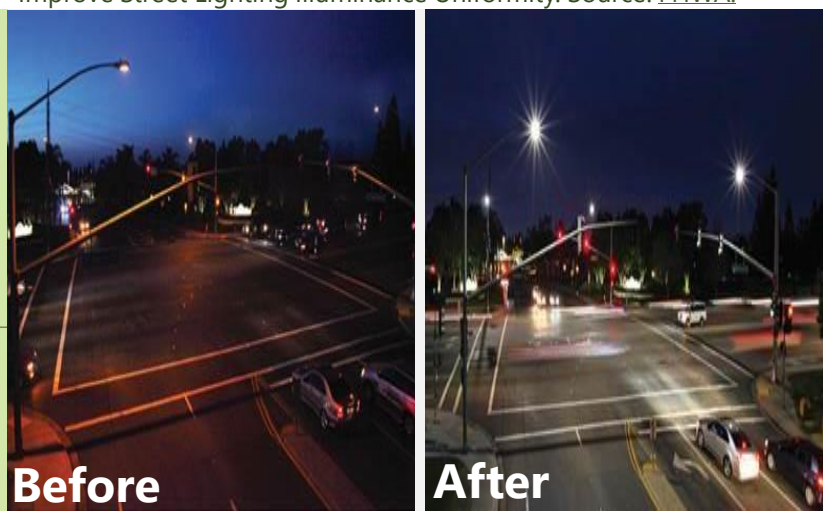
Safety Linkage

NCHRP 500 Series	SAFE SYSTEM APPROACH
Intersection	Safe Road
AASHTO'S TOWARD ZERO DEATHS	SAFE SYSTEM ROADWAY DESIGN (TIER 1, TIER 2, TIER 3, TIER 4)
Safer Vulnerable Users	Tier 4

Selected Related Countermeasures

- CM1 High-Visibility Crosswalk Enhancements
- CM2 Roadway Segment Lighting
- CM3 Intersection Conflict Warning Systems

Cost: $$ (Moderate)
Service Life: 15 years



Improve Street Lighting Illuminance Uniformity. Source: FHWA.

Safety Benefits

02%

Reduces nighttime crashes and all severity levels on roads (CMF ID: 8797)

Resources

- NCHRP Review: Continuous vs. Interchange-Only Lighting
- NCHRP Literature Review – Pedestrian Crash Reduction with Lighting