NCHRP 17-113 COUNTERMEASURES

Improve Street Lighting Illuminance and Uniformity

ROADWAY DEPARTURE

Improving street lighting illuminance and uniformity increases nighttime visibility, helping reduce run-off-road and other low-light crashes.

Implementation Strategy

How and Where to Apply

- This treatment is best suited for rural roads, curves, and segments with high rates of nighttime or run-off-road crashes.
- It can be implemented during corridor upgrades, safety retrofits, or lighting replacements.
- To protect vulnerable users, lower the risk of serious crashes, and prevent over lighting, use consistent, glare-free lighting at intersections, crosswalks, and transit areas.

Use in a Safe System Approach

This countermeasure supports Safer Roads and Safer Drivers by improving visibility under low-light conditions. Uniform lighting helps detect hazards earlier recognizing that humans make mistakes and are vulnerable while reducing glare and fatigue to add redundancy and create more forgiving roads.

Key Stakeholders

State DOTs, MPOs, utility companies, engineering consultants, community associations, safety advocacy groups.

Proactive Implementation

To find areas where inadequate lighting poses a safety risk, agencies can use pedestrian exposure data, night/day crash ratios, or roadway lighting assessments. Systemic safety can be enhanced by converting non-uniform lights or upgrading to uniform, glare-free LED systems, particularly along rural highways, intersections, crosswalks, and transit stops.

Countermeasure Overview

Objective: Reduce the severity of the crash with safer night visibility.
Strategy: Improve design of roadside hardware and install uniform, efficient lights at risk sites.

Targeted Solution

CONTRIBUTING FACTORS	▪ Reduced visibility
TARGET CRASH TYPE	▪ Nighttime
ROAD FACILITY TYPE	▪ Arterial ▪ Collector
AREA TYPE	▪ Urban ▪ Suburban

Safety Linkage

NCHRP 500 Series

Run-off Road

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 4

Selected Related Countermeasures

- CM1 Intersection lighting upgrades
- CM2 Wider longitudinal pavement markings
- CM3 Delineators edge enhancements on curves

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

Street Lighting. Source: Lighting.

Safety Benefits

42% Reduce crashes of all types and severities on urban and suburban roads (CMF ID: 11027)

32% Reduce crashes of all types and severities on urban and suburban roads (CMF ID: 11026)

Resources

- FHWA Lighting Handbook
- NCHRP Report