NCHRP 17-113 COUNTERMEASURES

Change Right-turn Lane Geometry to Increase Line of Sight (Approach Level)

INTERSECTIONS

This countermeasure involves modifying the geometry of a right-turn lane from the approach level to improve the driver's ability to detect cross traffic, pedestrians, and bicyclists.

Implementation Strategy

How and Where to Apply

- Apply at intersections with wide-radius or skewed right-turn lanes where drivers have difficulty detecting crossing pedestrians or bicyclists
- Use at urban or suburban intersections with frequent turning conflicts, visibility obstructions, or documented right-turn-related crashes.
- The **FHWA** states "Modifying right-turn lane geometry such as sharpening approach angles and reducing radius can significantly improve safety by increasing drivers' line of sight to approaching traffic and pedestrians"

Use in a Safe System Approach

Supports the Safe System Approach by addressing Safer Intersections and Safer Speeds. By improving visibility and turning geometry, this countermeasure helps reduce both crash likelihood and severity in areas where user interaction is frequent and varied.

Key Stakeholders

State and Local Departments of Transportation (DOTs), Traffic Engineers and Planners.

Proactive Implementation

Proactive implementation involves identifying intersections with wide-radius or skewed right-turn lanes, even before crash patterns emerge, and redesigning them to improve visibility and reduce speeds. This anticipatory strategy aligns with Vision Zero and Safe System principles by addressing latent risks through low-cost geometric modifications during routine resurfacing, signal upgrades, or corridor redesigns, ensuring safer conditions for all users especially pedestrians and cyclists without waiting for severe crashes to occur.

Countermeasure Overview

Objective: Reduce the frequency and severity of intersection conflicts through geometric design improvements

Strategy: Realign intersection approaches to reduce or eliminate intersection skew

Selected Related Countermeasures

- CM1 Channelized Island Redesign
- CM2 Corner Extensions (Curb Extensions/Bulb-outs)
- CM3 Curb Radius Reduction

Cost: $ (High)

Service Life: 20 years

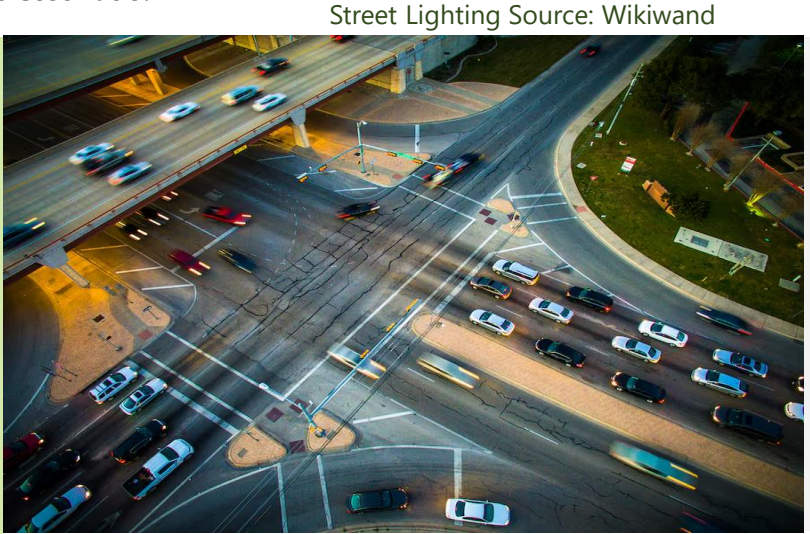
Benefit-Cost Ratio:

Targeted Solution

CONTRIBUTING FACTORS	▪ Failure to yield ▪ Misjudgment of safe gaps ▪ Limited sight distance
TARGET CRASH TYPE	▪ Right-turn
ROAD FACILITY TYPE	▪ All
AREA TYPE	▪ All

Safety Linkage

NCHRP 500	SAFE SYSTEM APPROACH
Unsignalized Intersection	Safe Roads
AASHTO'S TOWARD ZERO DEATHS	SAFE SYSTEM ROADWAY DESIGN TIER 1 TIER 2 TIER 3 TIER 4
Safer Infrastructure	Tier 4



Street Lighting Source: Wikiwand

Safety Benefits

60% Reduce right turn crashes for urban types of roads [1]

59% Reduce right turn crashes for all types of crash severity [2]

[1] CMF ID: 8499
[2] CMF ID: 8498

Resources

- FHWA – Proven Safety Countermeasure
- FHWA – Handbook for Designing Roadways
- TxDOT – Roadway Design Manual