NCHRP 17-113 COUNTERMEASURES

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

INTERSECTIONS

Modifying the geometry of right-turn lanes at intersections to improve the driver's line of sight is a safety-focused design strategy aimed at reducing crash risk, particularly between vehicles and pedestrians or bicyclists.

Implementation Strategy

How and Where to Apply

- Apply at intersections with documented pedestrian or cyclist crashes where drivers make free-flow or channelized right turns without adequate visibility of crosswalks.
- Use at skewed or high-speed approaches where turning angles and visual obstructions limit drivers' view of cross traffic.
- The **FHWA** states "Installing dedicated right-turn lanes to improve safety at intersections, particularly where significant turning volumes exist or where there's a history of turn-related crashes. They emphasize considering pedestrian and bicyclist safety when adding turn lanes"

Use in a Safe System Approach

This treatment supports the Safe System Approach through Safer Intersections and Safer People principles. It anticipates human error, prioritizes visibility, and encourages behavior that leads to safer speeds and more consistent yielding at crossings

Key Stakeholders

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

Proactive Implementation

Proactive implementation involves identifying intersections with potential visibility issues or pedestrian conflict risks even in the absence of high crash history and redesigning right-turn lanes to improve sightlines, reduce speeds, and enhance safety. This approach supports Vision Zero goals by anticipating human error and addressing risk factors before severe incidents occur, especially during routine upgrades or signal projects.

Countermeasure Overview

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

Strategy: Provide offset right-turn lanes at intersections

Targeted Solution

CONTRIBUTING FACTORS
- Failure to yield
- Misjudgment of safe gaps
- Limited sight distance

TARGET CRASH TYPE
- Right-turn

ROAD FACILITY TYPE (ARTERIAL, COLLECTOR, LOCAL)
- All

AREA TYPE
- All

Safety Linkage

NCHRP 500

Unsignalized Intersection

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 Right-Turn on Red (RTOR) Restriction

CM2 Corner Extensions (Curb Extensions/Bulb-outs)

CM3 Curb Radius Reduction

Cost: $ (Moderate to High)

Service Life: 20 years

Benefit-Cost Ratio:

Street Lighting Source: AutoDeal

Safety Benefits

44% Reduce all crashes for all types of roads [1]

44% Reduce all crashes for all types of roads [2]

[1] CMF ID: 8497
[2] CMF ID: 8496

Resources

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