NCHRP 17-113 COUNTERMEASURES

# Install Intersection Conflict Warning Systems (ICWS) for Four-lane at Two-lane Intersections

INTERSECTIONS

ICWS are dynamic systems deployed at unsignalized intersections—specifically where a four-lane major road intersects a two-lane minor road.

## Implementation Strategy

### How and Where to Apply

- Apply ICWS at rural or suburban intersections where a two-lane minor road intersects a high-speed, four-lane divided highway.
- Use at unsignalized crossings where signal installation is not justified but drivers experience difficulty judging safe gaps due to multilane traffic and limited visibility.
- The **FHWA** states "Intersection Conflict Warning Systems have been proven to reduce crashes at unsignalized intersections by providing timely alerts to drivers about potential conflicts."

### Use in a Safe System Approach

This treatment aligns with the Safe System Approach by improving driver awareness at conflict points and reducing high-severity crashes. It supports Safer Intersections and Safer People by recognizing human limitations in complex crossing scenarios and providing advanced warning before conflict occurs.

### Key Stakeholders

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

### Proactive Implementation

ICWS involves identifying intersections with crash risks or operational challenges—before severe incidents occur—using crash data, traffic volume, and gap acceptance analysis. It prioritizes prevention by deploying warning systems at unsignalized crossings, especially where traditional signal warrants are unmet but multilane traffic complicates safe crossing decisions.

## Countermeasure Overview

**Objective:** Improve driver awareness of intersections as viewed from the intersection approach.

**Strategy:** Install larger regulatory and warning signs at intersections.

## Targeted Solution

| | |
|---|---|
| CONTRIBUTING FACTORS | ▪ Failure to yield<br>▪ Misjudgment of safe gaps<br>▪ Limited sight distance |
| TARGET CRASH TYPE | ▪ Angle<br>▪ Rear-end<br>▪ Turning |
| ROAD FACILITY TYPE | ▪ N/A |
| AREA TYPE | ▪ Rural |

## Safety Linkage

| | |
|---|---|
| NCHRP 500 | SAFE SYSTEM APPROACH |
| Unsignalized Intersection | Safe Roads |
| AASHTO'S TOWARD ZERO DEATHS | SAFE SYSTEM ROADWAY DESIGN |
| Safer Infrastructures | Tier 4 |

TIER 1
TIER 2
TIER 3
TIER 4

## Selected Related Countermeasures

CM1 Intersection Lighting Enhancements

CM2 Offset Minor Road Improvements

CM3 Dynamic Speed Feedback Signs

**Cost:** Moderate

**Service Life:** 10 years

**Benefit-Cost Ratio:** 27:1

Street Lighting . Source: eco ledmart

## Safety Benefits

**45%** Reduces injury crashes at rural, stop-controlled four-lane by two-lane intersections.[1]

**28%** Reduces all types of crashes at rural, stop-controlled four-lane by two-lane intersections.[2]

[1]CMF ID: 8448
[2]CMF ID: 8447

### Resources

- FHWA: Safety Evaluation of Intersection
- NCHRP Report 841. Development of Crash Modification Factors
- FHWA: Proven Safety Countermeasures