Warning Signing Countermeasures:

1.B Advance Intersection Warning Signs

Tried

CRF = 30% Urban

CRF = 40% Rural

*NCHRP 500, Objective 17.1 E1 – Improve Visibility of Intersections by providing enhanced signing

Warning Signing Countermeasures:

1. C. Enhanced Countermeasures for Intersections on Curves

   - Add Location of Side Roads

Tried

Warning Signs:

- **in General CRF = 25%**
- **for Curves CRF = 22%**

Warning Signing Countermeasures:

1.C Enhanced Warning Signing

- **Increasing Size of Sign 36” x 36” rather than 30” x 30”**

Tried

Oversize

CRF = 15%

*NCHRP 500, Objective 17.1 E5 – Install larger warning signs at Intersections

Warning Signing Countermeasures:

1.C Enhanced Warning Signing

- **Increasing Size of Sign by Mounting on Large Background**

*NCHRP 500, Objective 17.1 E5 – Install larger warning signs at Intersections

Tried

Oversize
CRF = 15%

Warning Signing Countermeasures:

1.D Enhanced Advance Warning for Right-of-Way Controls -**“Doubling-Up”**

“Double-Up” of Advance Warning Signs, Winston-Salem, NC

Tried

CRF= 31%

Warning Signing Countermeasures:

1.D Enhanced Advance Warning Signing for Right-of-Way Controls – “Doubling Up”

“Staggered” Doubled-Up Stop Aheads

Warning Signing Countermeasures:

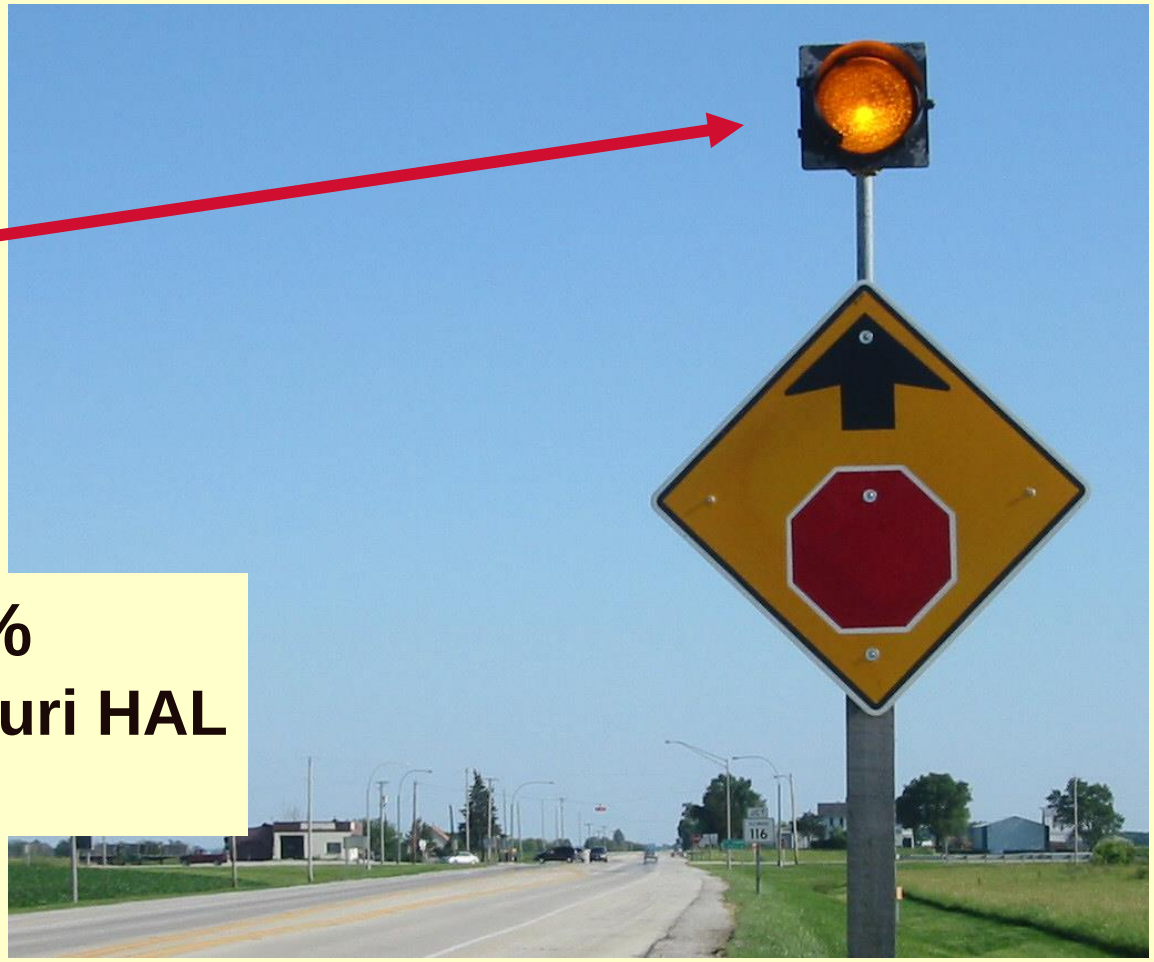
1.D Enhanced Advance Warning Signing for Right-of-Way Controls – “Doubling-Up”

2 Pairs of Doubled up Stop Aheads

Warning Signing Countermeasures:

1.E Flashers for Intersection Warning Signs

Stop Ahead
with Flasher



Tried

CRF= 25% to 28%
All Crashes, *Missouri HAL Manual, *Bonneson

Warning Signing Countermeasures:

1.F Flashers for Intersection Warning Signs– **Be Prepared to Stop**

Tried

29 – 67% reduction in RLR crashes, Bonneson
73% decrease in Fatal/Injury angle crashes, SIG

Intersection Lighting Countermeasures

1. Lighting

-Installation of lighting of rural intersections reduced crashes by 25 to 50% - MN study
- Highest Benefit to Cost of any Safety Measure

Proven

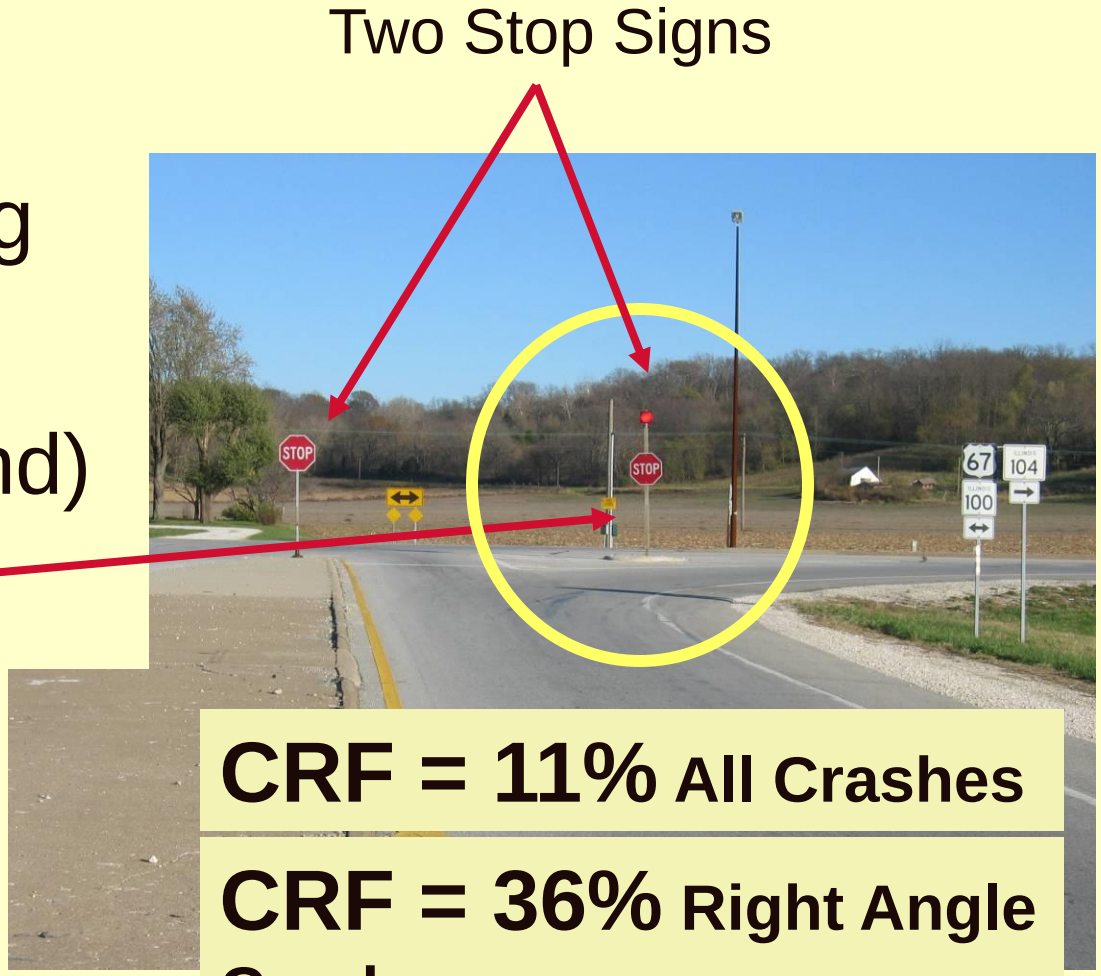
NCHRP 500, Strategy 17.1 E2-Improve Visibility of Intersection by Providing Lighting (P)

Regulatory & Guide Signing and Markings Countermeasures:

1. Right-of-Way Control Signing

   B. Visibility

(Stop Sign in Island)



NCHRP 500, Strategy 17.1 E3 – Install Splitter Islands on Minor Road Approaches

CRF = 11% All Crashes

CRF = 36% Right Angle Crashes

Regulatory & Guide Signing and Markings Countermeasures:

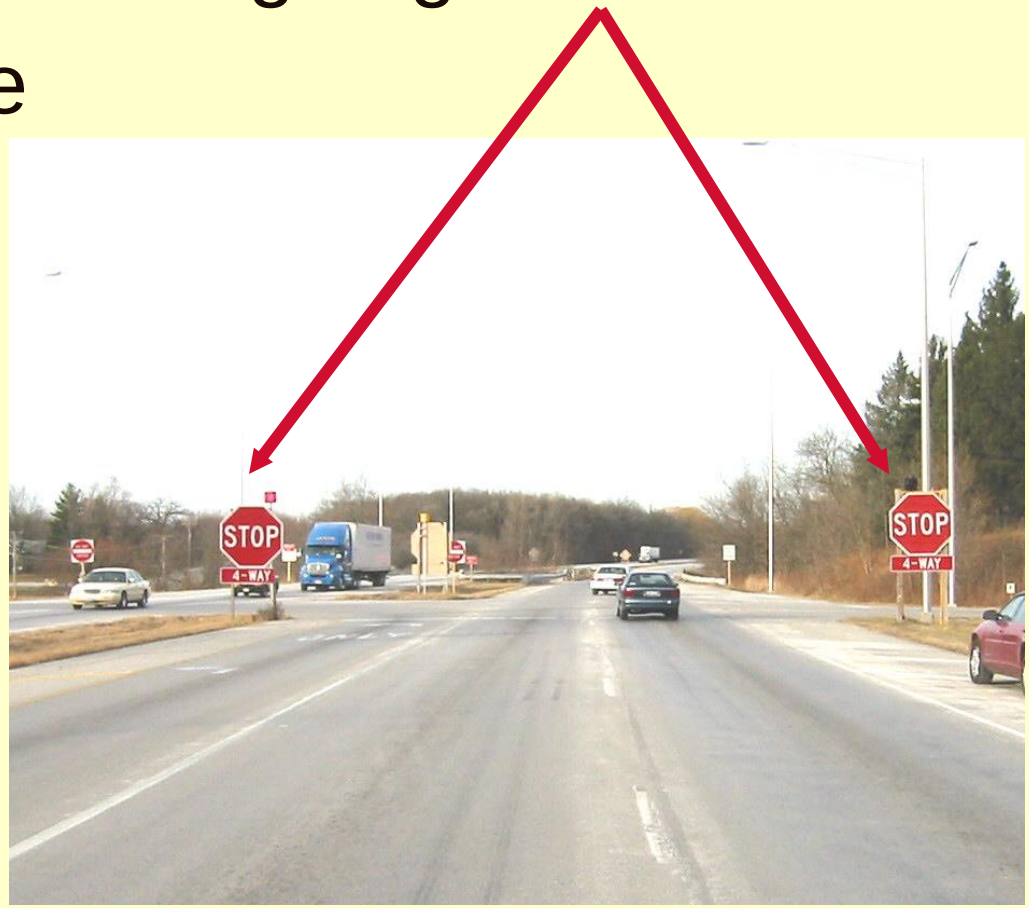
1. Right-of-Way Control Signing

   C. Increase Size

- **Oversized and "Doubled up" Stop Signs**

Tried

*NCHRP 500, Objective 17.1 E5 – Install larger regulatory signs



Regulatory & Guide Signing and Markings Countermeasures:

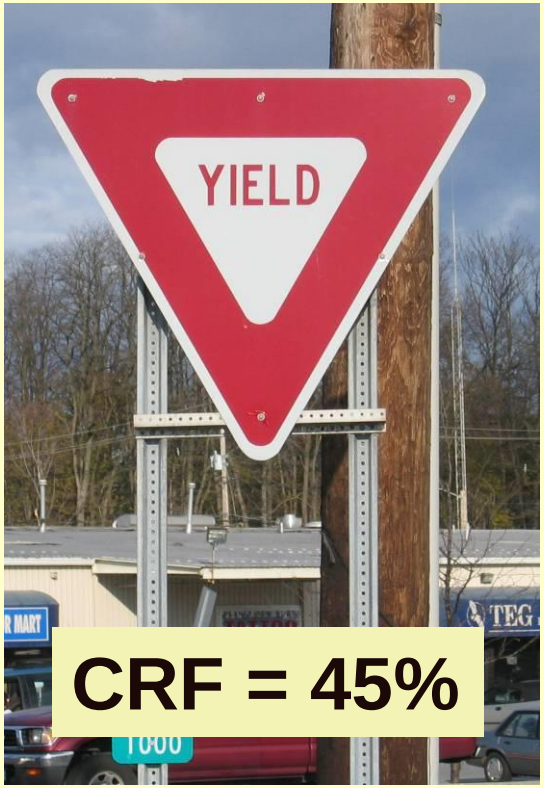
Plaques

Regulatory & Guide Signing and Markings Countermeasures:

1. Right-of-Way Control Signing

   E. Install YIELD or STOP Control

Tried



CRF = 45%

2-Way STOP CRF = 35%

***Missouri HAL Manual**

Regulatory & Guide Signing and Markings Countermeasures:

1. Right-of-Way Control Signing

   F. Overhead Mounted Stop Signs

Tried

*NCHRP 500, Strategy 17.1 E8 – Overhead Mounted Stop Signs

Regulatory & Guide Signing and Markings Countermeasures:

1. Right-of-Way Control Signing

   F. Stop Beacons

Tried

*NCHRP 500, Strategy 17.1 E11 – Flashing Beacons at Stop-Controlled Intersections

STOP Beacon Mounted on Top of Stop Sign

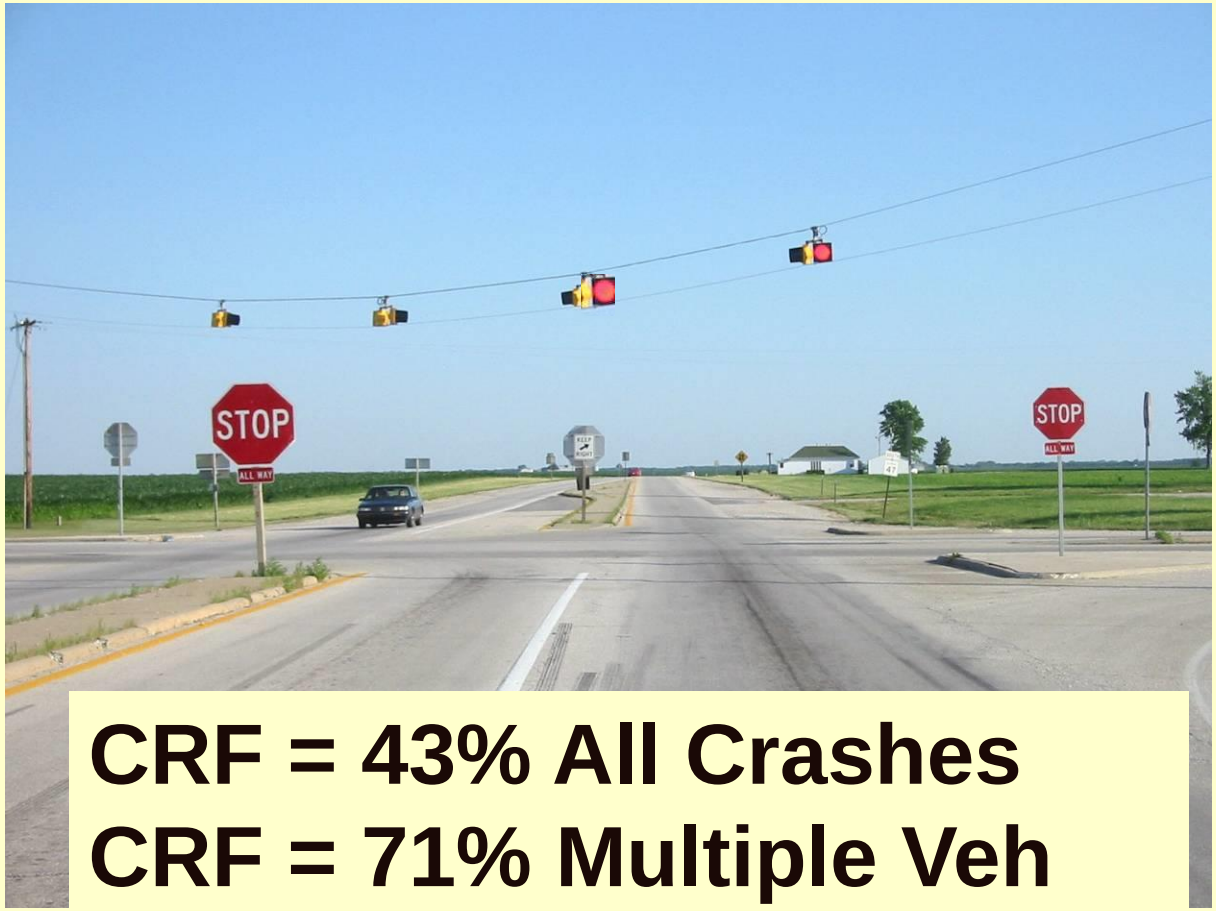
Regulatory & Guide Signing and Markings Countermeasures:

1.F Stop Beacons

Overhead
Simultaneous
Flashing Stop
Beacons

Tried

-Most
Effective
Application

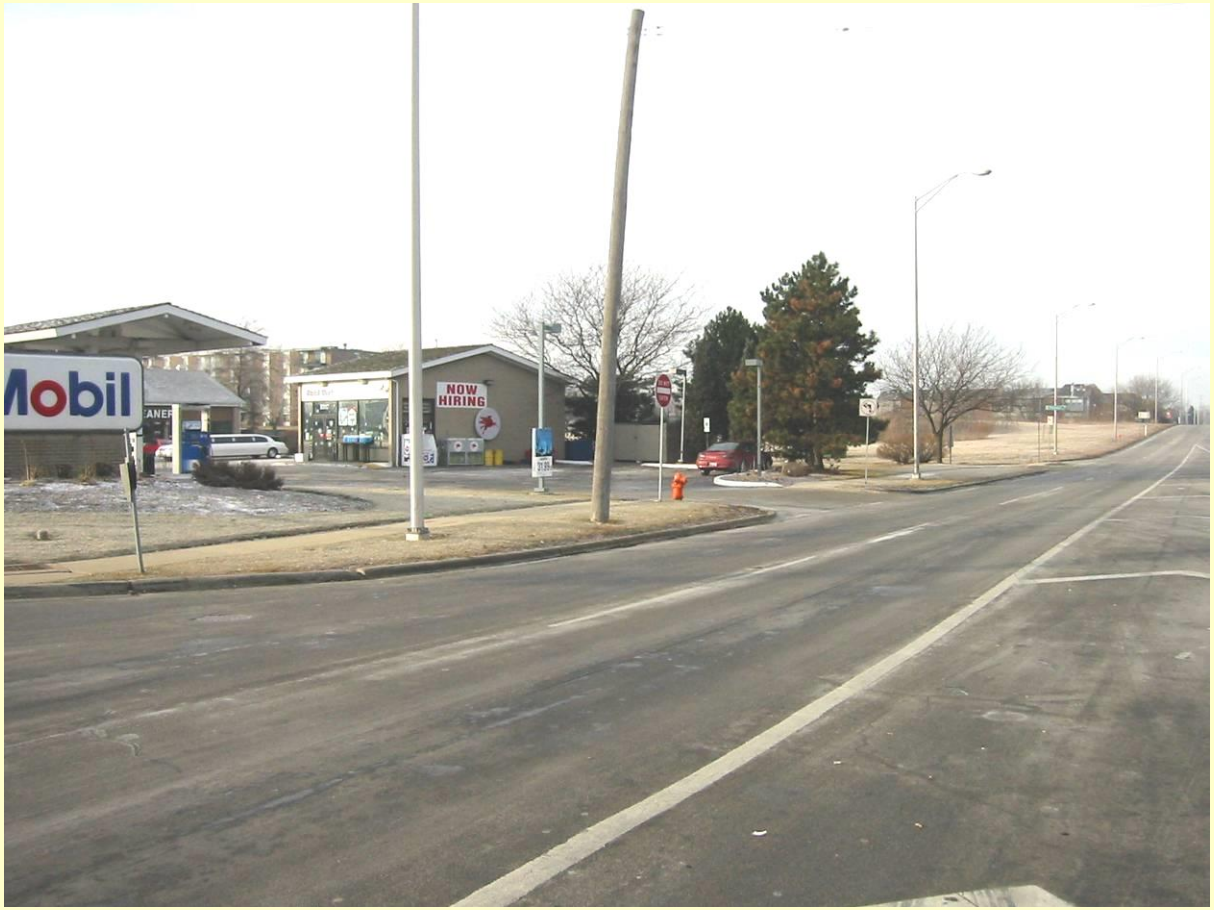


CRF = 43% All Crashes
CRF = 71% Multiple Veh

Regulatory & Guide Signing and Markings Countermeasures – Example:

High Crash Location:

62 crashes at Gas Station Driveway in 18 months



Regulatory & Guide Signing and Markings Countermeasures – Example:

Solution:
Traffic Pylons on centerline

Intersection Safety Example:

- **Ohio – 90th Worst Intersection for State – 184 crashes in 3 years**

Intersection Safety Example:

Identify Underlying Crash Cause:

- **AIRS Crash Data identified 85% of Crashes were Red Light Running**

Apply two guiding principles for design and operation of an intersection:

- **Clarify**
- **Simplify**

Intersection Safety Example:

- Removed 7 signs including 2 overhead guide signs from overpass
- Signal Heads Positioned over Lanes into Driver's Line of Sight
- Lowered signal heads on Mast Arms
- Added Supplemental Left Hand Signal
- Added Back Plates to Signal Heads
- Removed two street light poles

Intersection Safety Example:

- **Ohio – Crashes reduced to total of 7 in 2 years**

New Technology and Low Cost Initiatives for Safer Intersections

Questions?

Fred Ranck, FHWA

fred.ranck@fhwa.dot.gov