THE J-TURN INTERSECTION

Design Concept Basics

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DEFINING THE PROBLEM
With Traditional Expressway Intersection Design

• Typical Problem: Far-Side Right-Angle Collisions
DEFINING THE PROBLEM
With Traditional Expressway Intersection Design

Typical Far-Side Right-Angle Collision

* Courtesy of University of Minnesota Intersection Surveillance System Test Bed at US-52 & CSAH-9, Goodhue County, MN
US-151 & Springville Rd.
LOCATION: Linn County
TIME PERIOD: 1-1-2001 To 12-31-2007
ANNUAL CRASH FREQUENCY = 3.57
TOTAL CRASHES = 25

CRASH SEVERITY SUMMARY:
- Fatal = 1
- Injury A (Major) = 4
- Injury B (Minor) = 2
- Injury C (Possible) = 7
- PDO = 11

LEGEND:
- C = Clear or Cloudy
- R = Rain
- S = Snow or Sleet
- X = Unknown
- L = Daylight
- Dn = Dawn
- Du = Dusk
- D = Dark
- X = Unknown
- D = Dry
- W = Wet
- S = Snow or Ice
- X = Unknown

EXAMPLE
- DATE
- TIME
- LIGHT
- WEATHER
- SURFACE
- SEVERITY
- Fatal
- Major Injury
- Minor Injury
- Possible Injury
- PDO
CRASH TYPES: US-151 & Springville Road

Far-Side Right-Angle Crashes ARE a Problem!

62% of Right-Angle Crashes are “Far-Side” Collisions Statewide (Iowa)
CRASH SEVERITY: US-151 & Springville Road

More Severe Crashes Occur at US-151 & X20
DEFINING THE SOLUTION

Problems with Traditional Approaches:

**INTERCHANGES**
1) Expensive
2) Years to Develop
   (Planning to Construction)
3) Not Enough Traffic Volume to Warrant

**SIGNALIZATION**
1) Reduce Expressway Mobility
2) Not Anticipated by Expressway Drivers
3) Don’t Necessarily Improve Safety
   (Change Crash Types)
DEFINING THE SOLUTION:
The J-Turn Intersection

The J-Turn Intersection utilizes a directional median opening which closes the median to minor road traffic, but still allows all maneuvers (including left-turns) from the expressway.
J-TURN INTERSECTION
MARYLAND TESTIMONY
DEFINING THE SOLUTION:
The J-Turn Intersection

Closing the median eliminates direct crossing and left-turn maneuvers from the minor road, thus preventing far-side right-angle collisions.
DEFINING THE SOLUTION:
The J-Turn Intersection

All minor road traffic must turn right at the main intersection. Minor road drivers who wish to cross or turn left must do so indirectly via a downstream U-turn.
DEFINING THE SOLUTION:
The J-Turn Intersection

The J-Turn Intersection reduces the total number of intersection conflict points from 42 to 24.

Typical Rural 4-Legged, 4-Lane Divided Expressway Intersection

42 Total Conflict Points
- 24 Crossing
- 10 Merge
- 8 Diverge
DEFINING THE SOLUTION:
The J-Turn Intersection

The J-Turn Intersection reduces the total number of intersection conflict points from 42 to 24.
J-TURN INTERSECTION SAFETY EVALUATION

MARYLAND (US-301 & MD-313)

4 Years Before, 6 Years After

- 92% crash reduction overall (8.25 to 0.67 crashes/year)
- 100% reduction in right-angle collisions (22 to 0)
- 100% reduction in fatal/injury crashes (23 to 0)

All statistically significant reductions (90% confidence).
J-TURN INTERSECTION
SAFETY EVALUATION

North Carolina (3 Site Average)

- 57% Crash reduction overall
- 97% reduction in right-angle collisions
- 100% reduction in far-side right-angle collisions
- 55% reduction in fatal/injury crashes
At US-151 & Springville Road, a J-Turn Intersection could potentially prevent 72% (18/25) of the collisions which occurred there over the last 7 years, including ALL of the most severe collisions (1 fatal, 4 major injury, and 2 minor injury).