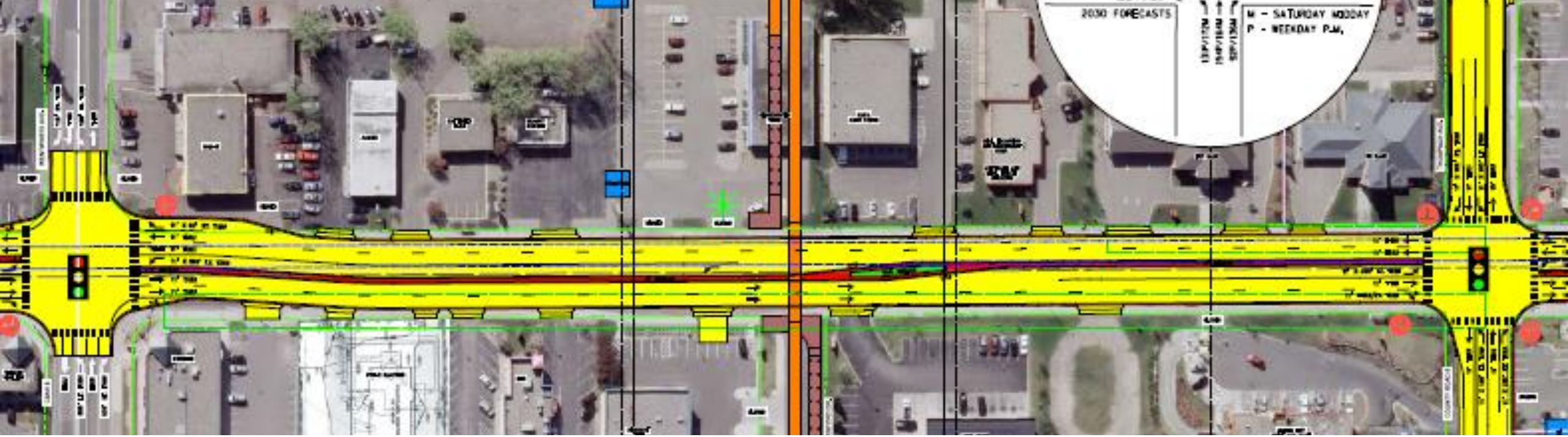


Roberts Street Traffic Safety

ROBERT STREET IMPROVEMENTS
CITY OF WEST SAINT PAUL

Derek Leuer, PE | Traffic Safety Engineer

Office of Traffic, Safety and Technology

February 28, 2017

DEPARTMENT OF TRANSPORTATION

Agenda

- Roberts Street – Before Construction Crash Data
- Mitigating Crashes
- U-Turns and Other Maneuvers
- Similar Concepts
- HSIS Study and Findings
- Questions/Comments/ Discussion

Roberts Street – Before Construction Crash Data

- 2008-2010: 430 Crashes on the Corridor
- 278 Property Damage Crashes, 150 Injury Crashes, 2 Fatal Crashes
- Crash rates statistically significantly higher then average

Roberts Street – Before Construction Crash Data

- 2006-2014: 1,100+ Crashes on the Corridor (~120 crashes/year)
- 9 Serious Injury Crashes, 3 Fatal Crashes
- Consistently regarded as a high-crash corridor
- http://wspmn.gov/DocumentCenter/Index/124

Roberts Street – Before Construction Crash Data

Crash Diagrams

- 37% Rear-End
- 27% Right Angle
- 12% Left Turning
- 4% Right Turning
- 20% Other

Mitigating Crashes

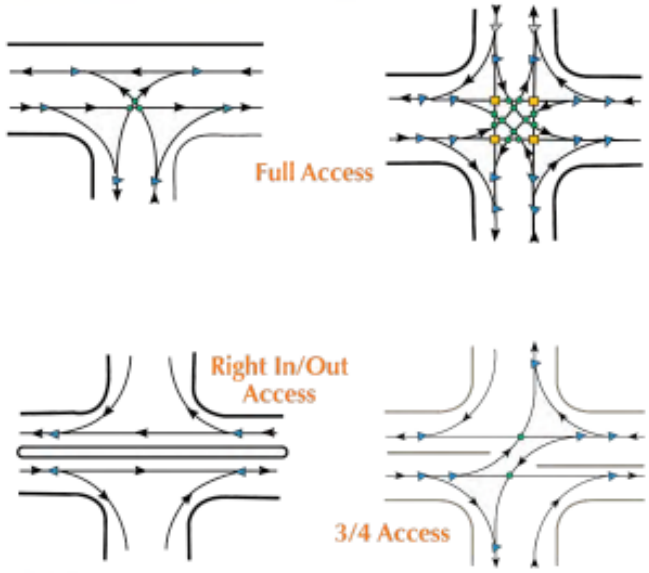
- Numerous Strategies and Countermeasures to lower Crash Frequency
  - Short Term, Long Term
  - Low Cost, High Cost
- Strategies can be deployed to:
  - lower frequency of crashes
  - lower crash severity
  - Lower certain crash types (right-angle, pedestrian, etc.)
- There is NO strategy that is 100% effective at eliminating 100% of crashes

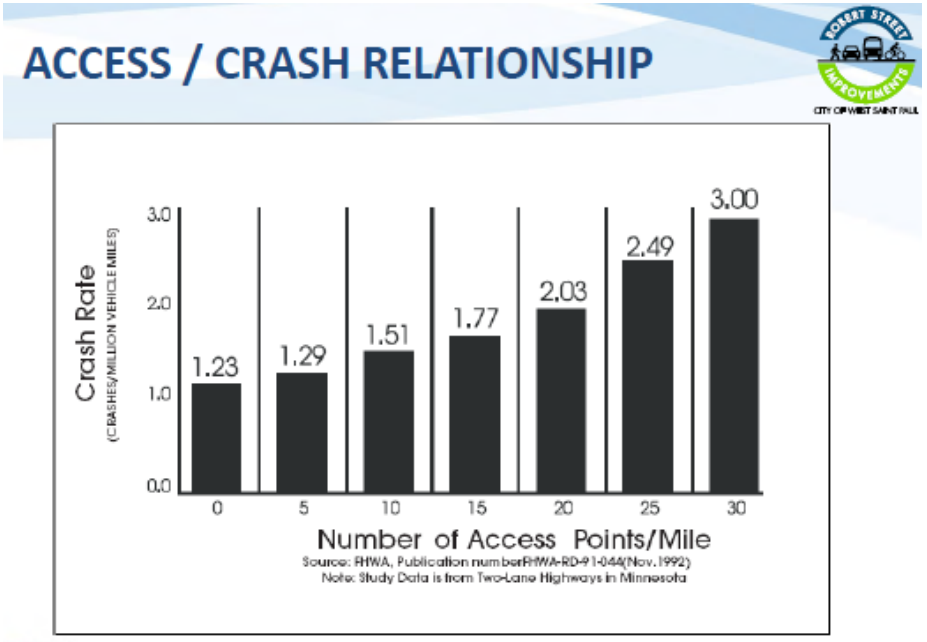
Mitigating Crashes

- Since there is NO strategy that is 100% effective:
  - Reduce Severity of Crashes
  - Potentially trade severe crashes for more property damage crashes
- Most Severe Crashes in Urban Area are typically:
  - Right Angle Intersection Crashes (Signalized and Unsignalized)
  - Left Turning Related Crashes (from the minor road/access)
  - Crashes with Bike/Pedestrians

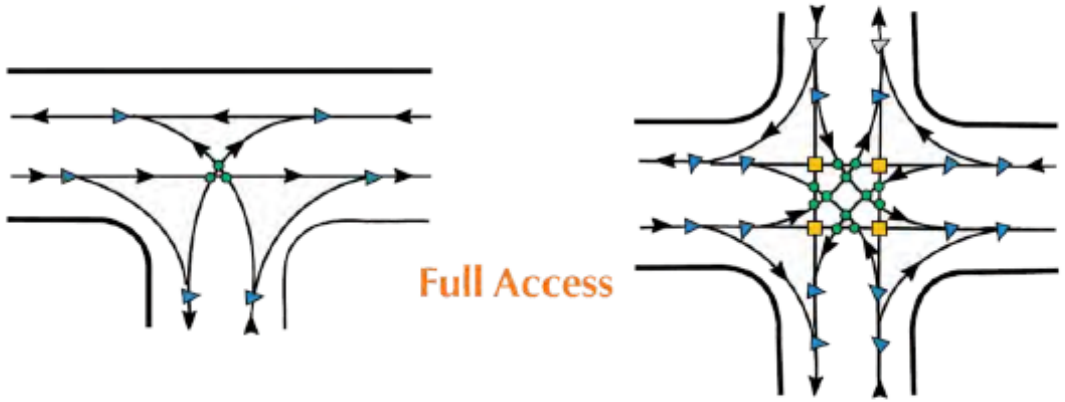
Mitigating Crashes

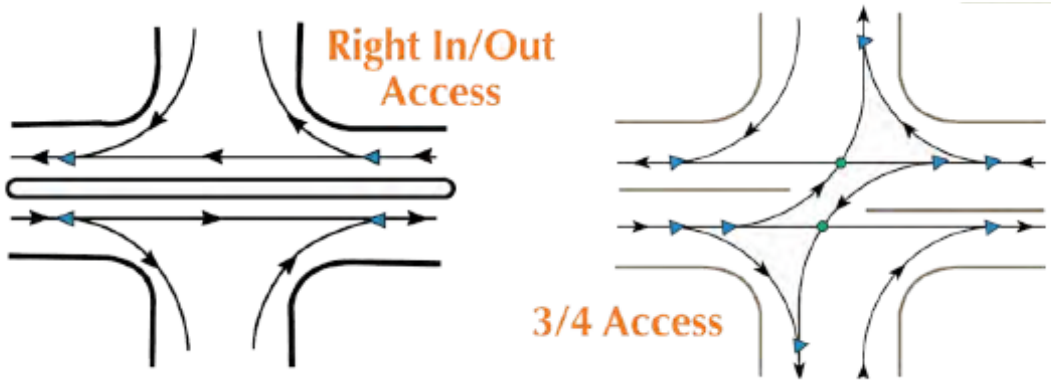
- Strategies for reducing severe crashes in Urban Areas:
  - Access Management (medians)
  - Reducing Speed (medians, narrower lanes, “urban feel”)
  - Reduce conflict points (potential for mistakes)





Mitigating Crashes

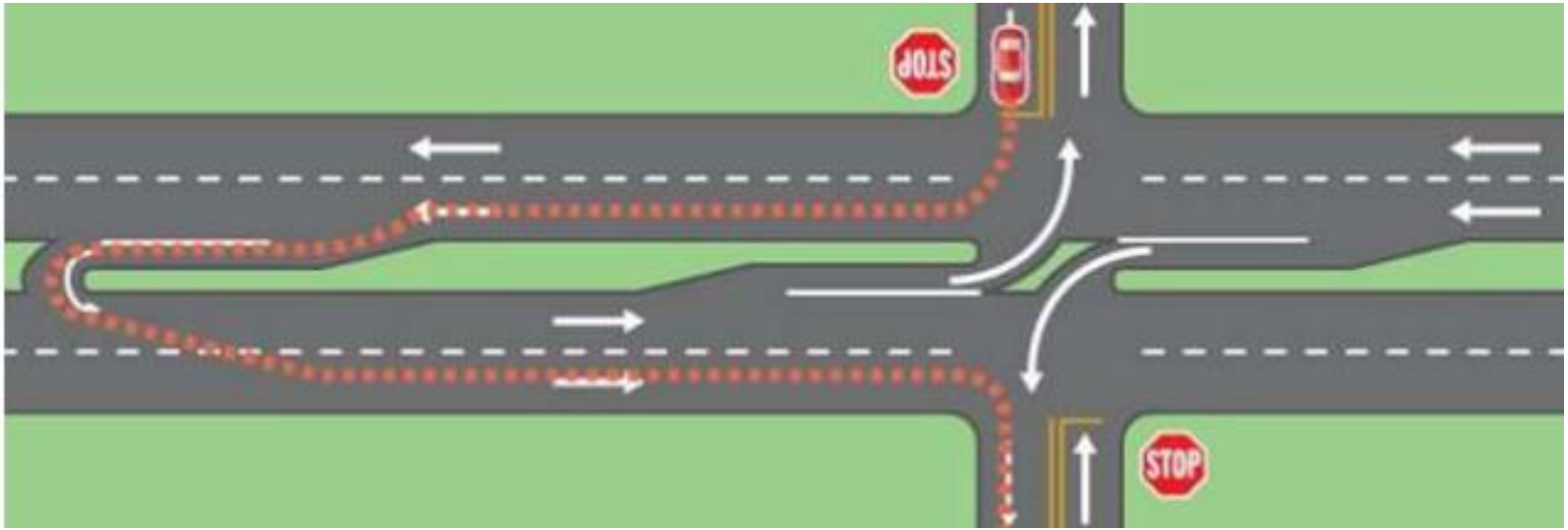




	Crossing	Turning	Merge/ Diverge	Total	Typical Crash Rate (crashes per mil... entering vehicles)
Full Access +	4	12	16	32	0.3 [1]
Full Access T	0	3	6	9	0.3 [2]
3/4 Access	0	2	8	10	0.2 [3]
Right In/Out Access	0	0	4	4	0.1 [3]

[1] 2004-2006 Minnesota TIS Crash Data
[2] Estimated based on Publication FHWA-RD-91-048
[3] Estimated based on a limited sample of Mn/DOT data

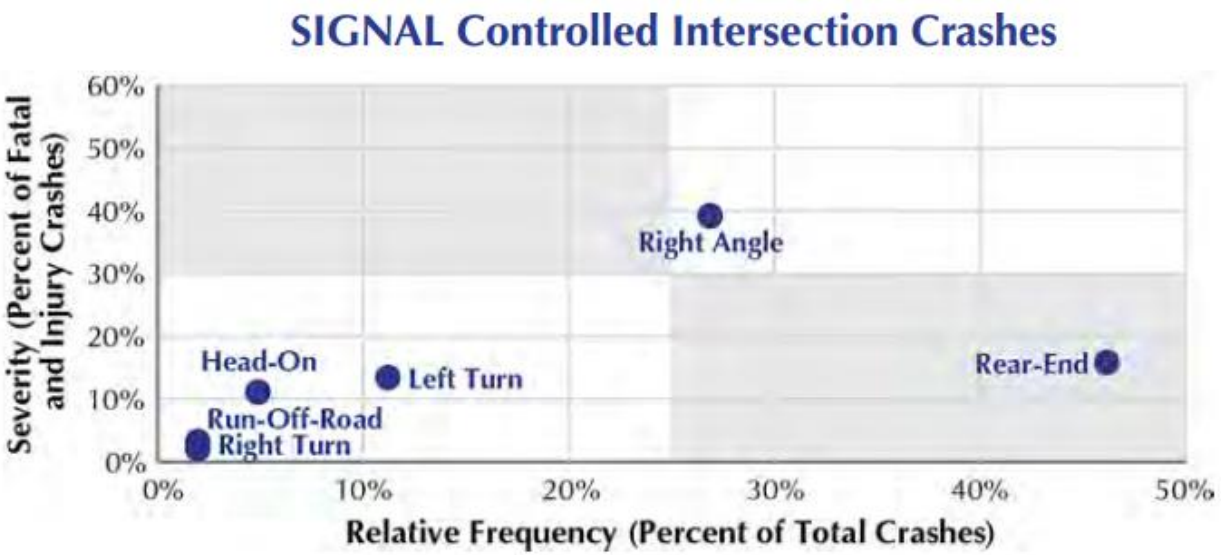
U-Turns and other Maneuvers



U-Turns and other Maneuvers

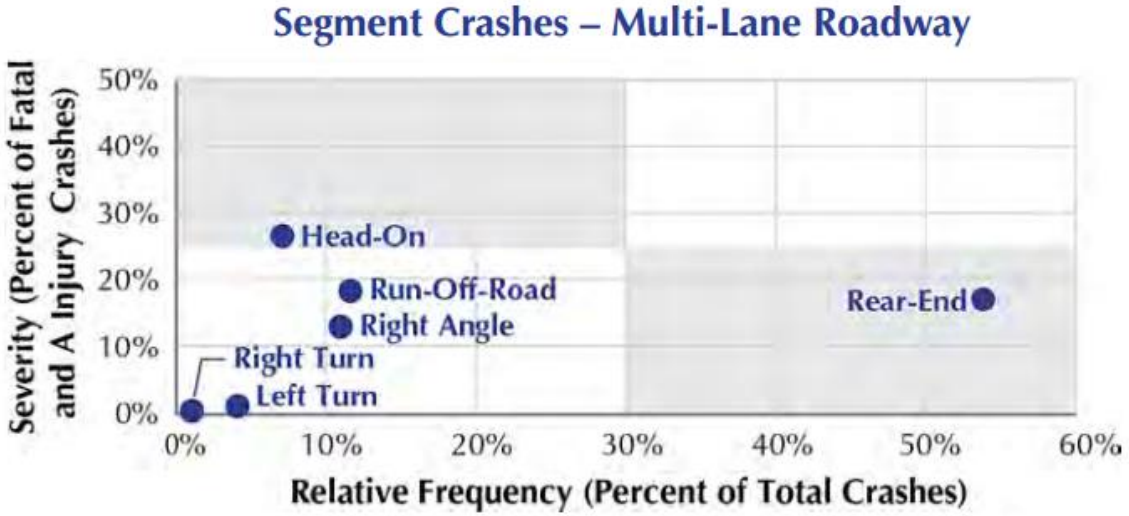
- U-Turns have many similarities to Right Turn maneuvers
  - Tend to complete the maneuver while going slow
  - With a signalized u-turn, your only working with one direction of travel
  - Collisions that do occur happen at slow speeds and shallow angles
- Right Turn Collisions are a small percentage of crashes
  - 0.5%-2%
  - 1% of severe intersection crashes are right-turn related
    - 54% are bicycle or pedestrian related

U-Turns and other Maneuvers

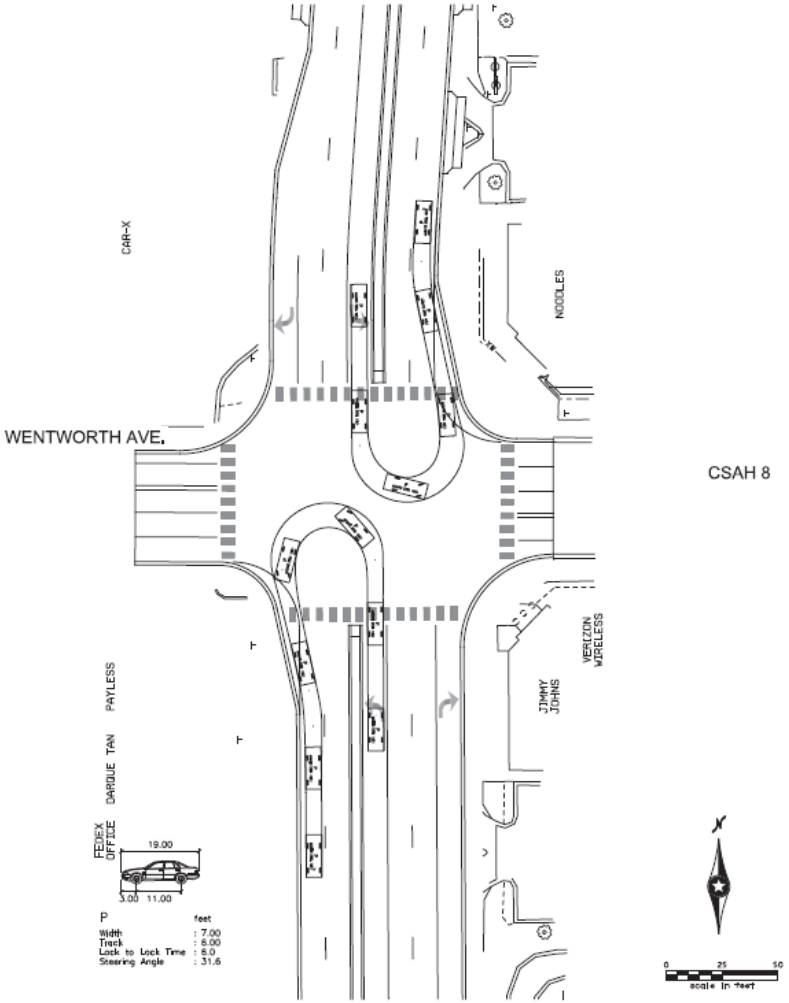


Severe & Not Frequent	Severe & Frequent
Not Severe & Not Frequent	Not Severe & Frequent

Severity/Frequency Combinations



U-Turns and other Maneuvers



- Tight Urban Corridors are a difficult design environment
  - Typically can't accommodate every move for everyone
  - Choices need to be made
- Several parties helped decide the priorities
  - Passenger Cars can comfortably make the u-turn
  - 68% of vehicles meet this definition
  - Wide variety of SUV's and Pick-ups should work (up to 93%)
- Bicycles not given specific space

U-Turns and other Maneuvers

Why UPS drivers don't turn left and you probably shouldn't either

January 20, 2017 6.58am EST

Shutterstock

Email
Twitter 169
Facebook 2.1k
LinkedIn 369

It might seem strange, but UPS delivery vans don't always take the shortest route between stops. The company gives each driver a specific route to follow and that includes a policy that drivers should never turn through oncoming traffic (that's left in countries where they drive on the

Author

Graham Kendall
Professor of Computer Science and Provost/CEO/PVC, University of Nottingham

Why Not?

- Software set up to direct driver to turn right 90% of the time! (Avoid Left!)
- Saves about 10M gallons fuel/year
- Decreased Safety Hazard
- Has cut the number of trucks by 1,100
- 350,000 more packages delivered!

http://theconversation.com/why-ups-drivers-dont-turn-left-and-you-probably-shouldnt-either-71432

Similar Concepts

A Study of the Traffic Safety at

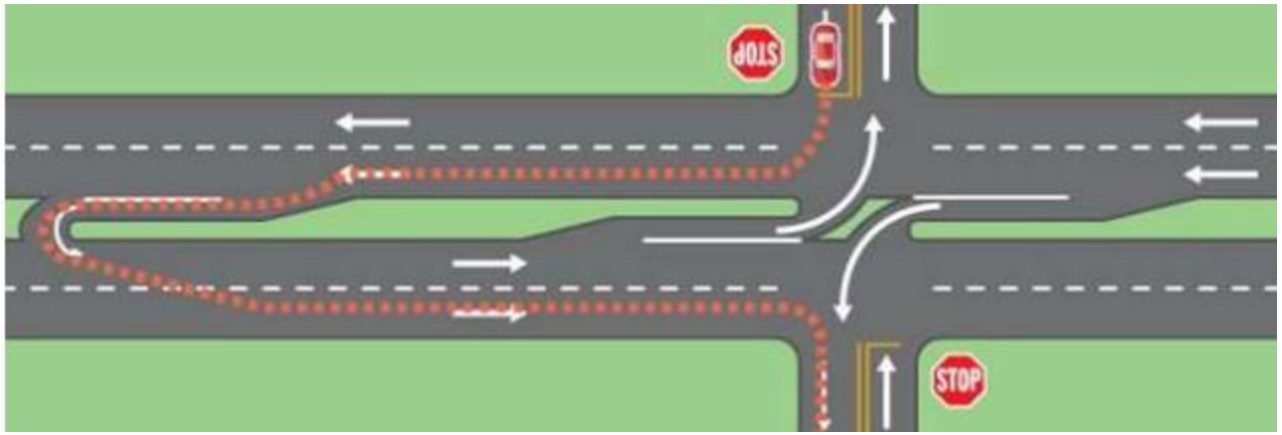
Reduced Conflict Intersections

In Minnesota

(Photograph courtesy of Bolton and Menk, Inc. 2013. Cologne, MN)

Office of Traffic, Safety and Technology
Minnesota Department of Transportation

Derek Leuer, P.E.
Katie Fleming, M.A.
10/18/2016



Findings

- **A 100% reduction of fatal and serious injury right-angle crashes**
- **A 77% reduction of all severity right-angle crashes**
- **A 50% reduction of injury crashes**

http://www.dot.state.mn.us/roadwork/rci/docs/trafficsafetyatrcistudy.pdf

Operational and Safety Effects of U-Turns at Signalized Intersections

Daniel Carter, Joseph E. Hummer, Robert S. Foyle, and Stacie Phillips

http://trrjournalonline.trb.org/doi/pdf/10.3141/1912-02

Highway Safety Information System

HSIS Study and Findings

- 78 Sites were selected
  - North Carolina
    - 54 sites were random
    - 24 recommended
  - Signalized Intersections
  - Presence of a Median
  - 2 lanes of receiving traffic
  - U-Turns were legal
  - 3 years of crash data

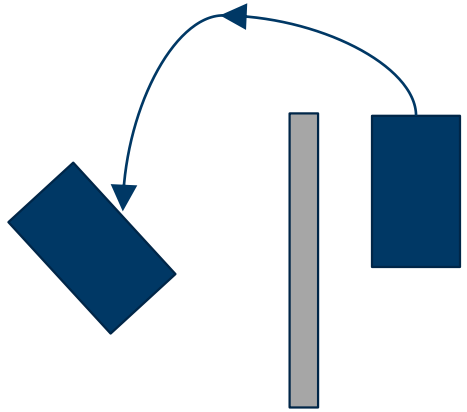
- Findings
  - 65/78 sites had NO U-turn crashes
  - One site had 3 crashes/year
  - Average = 0.18 crashes/site/year
  - 41 total crashes
- Roberts Street “Before”
  - 23 Intersections
  - 10 Years (2005-2014)
  - 1,025 Intersection Crashes
  - 4.5 Crashes/Intersection/Year

HSIS Study and Findings

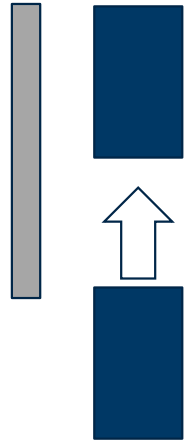
- Findings
  - 41 Crashes Total
    - 22 were “right angle”
    - 11 were “rear end”
    - 8 were “sideswipe”
- Roberts Street “Before”
  - 4.5 Crashes/Intersection/Year

  vs.

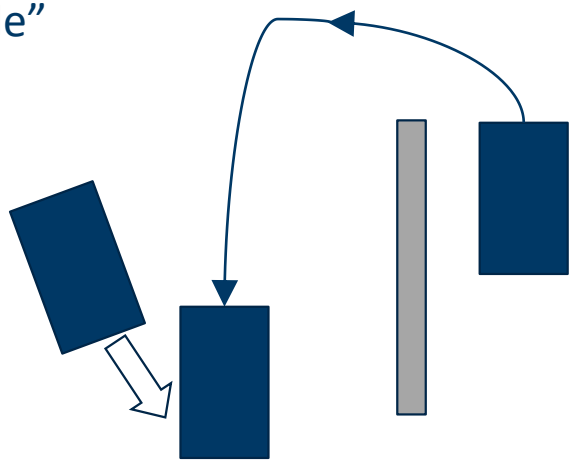
  - 0.18 Crashes/Intersection/Year



“right angle”



“rear end”



“sideswipe”

Questions? Comments?

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Thank you again!

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