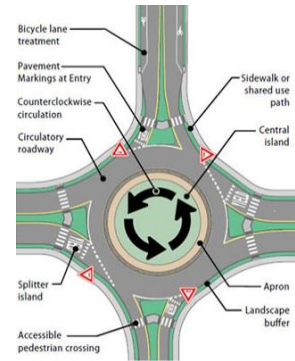
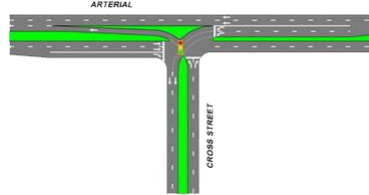


You Expect Me to Drive Through That?



Victor Lund, PE
 Traffic Engineer
 St. Louis County
 2017 Minnesota TZD Conference
 October 27, 2017

Pre-Survey

- How many people support/do not support innovative intersections like J-Turns or roundabouts?
- Do these types of innovative intersections harm, improve or have no effect on emergency response time?
- Should emergency response time control the overall decision to implement an innovative intersection?



Our Goal is TZD

- The safety of the traveling public is the first priority
- The goal is “Toward Zero Deaths”
- As traffic safety professionals, our common belief is that traffic fatalities are unacceptable



National Fatality Clock 2015 Traffic Fatalities – 35,092

- 4 fatalities per hour
- 96 fatalities per day
- 675 fatalities per week
- 2,924 fatalities per month

Data Source: 2015 Motor Vehicle Crashes, NHTSA

Why the Focus on Intersections?

- The most common type of crashes at intersections are rear-end and right-angle
- At stop-controlled intersections, right-angle crashes are 4 times as likely to involve a serious injury or fatality versus a rear-end crash
- Right-angle crashes account for 21% of all fatal crashes in Minnesota¹

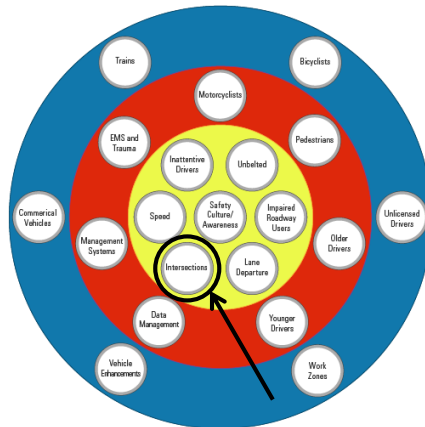


Image Source: Minnesota Strategic Highway Safety Plan

1. Minnesota Traffic Engineering Fundamentals Handbook

What Makes Intersections Dangerous?

- Intersections are composed of conflict points
- Conflict points can be classified as high and low severity
- High severity conflict points are “crossing” type conflicts that result in right-angle crashes; these crashes typically result in injury or death

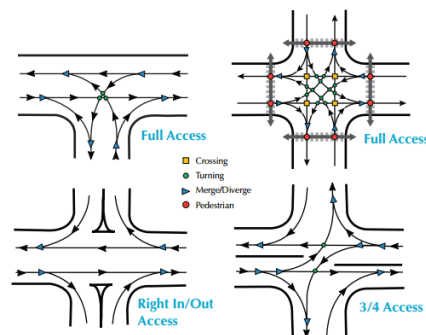


Image Source: Minnesota Traffic Engineering Fundamentals Handbook

How Can We Improve Intersection Safety?

- Intersection safety is primarily a function of traffic volume (exposure) and conflict points...we can't do anything about the traffic volume
- The most effective method to improve intersection safety is focused on reducing the number and severity of conflict points
- This method leads to the development of innovative intersection designs...

A National Perspective

- Intersection safety is a focus area of the Federal Highway Administration (FHWA) Office of Safety
- FHWA promotes local communities to consider innovative intersection designs to improve safety and efficiency



Source: safety.fhwa.dot.gov

Innovative Intersection Designs

- Roundabouts
- Continuous Green T
- Reduced Conflict Intersection (J-Turn)
- Diverging Diamond Interchange

These designs reduce the number and severity of conflict points

Safety is ultimately improved

What are the Impacts to Emergency Response?

- Proposed innovative intersections have elicited concerns from emergency responders that generally center on the following areas...
 - The emergency response time will be increased
 - Drivers don't know how to perform an avoidance maneuver when an emergency vehicle is approaching the intersection
 - The proposed innovative intersection will result in more negative consequences than beneficial improvements

Emergency Response Time

- Generally, innovative intersections can promote a better response time for emergency responders...this is because traffic flow is improved
- In some instances, emergency response time may be marginally increased
- A “balanced” approach must be considered...Significant improvement in traffic safety vs. marginal increase (sometimes) in emergency response time



Emergency Response Time

- The average time for the side street to cross US-53 during low volume conditions is...
 - 36 seconds for a traditional divided highway intersection (red dotted line)
 - 67 seconds for a J-Turn intersection (yellow dotted line)*
- A J-Turn adds an average of 30 seconds to the through movement
- Emergency responders are concerned with the “Golden Hour” not “Golden Seconds”





Avoidance Maneuvers

- Avoidance maneuvers at innovative intersection designs follows the same rule of thumb as anywhere else...leave the traveled way as soon as possible to allow the emergency vehicle to pass
- Specific maneuvers...
 - Roundabouts: vehicles must exit the roundabout at the nearest exit and pull over on the side of the road
 - J-Turn: vehicles on the side street or in turn lanes complete the same maneuver as a traditional divided highway intersection
 - Continuous Green T: vehicles perform the same maneuvers as a traditional traffic signal
 - Diverging Diamond Interchange: vehicles perform the same maneuvers as a traditional traffic signal



More Negative Consequences?

- A study by MnDOT found that J-Turns in Minnesota at 12 locations have eliminated fatal crashes and serious injury crashes (total study time = 12 years before and 12 years after)
- Roundabouts reduce injury and fatal crashes up to 90 percent
- Contrast this safety record of innovative intersections with a 30 second increase in response time...are there negative consequences? A local enforcement officer noted his professional experience has never shown this to be the case.¹

¹. Personal testimony provided to Victor Lund



Anecdotal Information

- A J-Turn constructed in Maryland included a fire station on one side of the highway and a community on the other side
- Mountable curb was added at the main intersection to allow emergency vehicles to make a direct crossing
- After some time, the fire chief directed the emergency responders to use the J-Turn as designed instead of cutting across as this was found more beneficial

Source: Howard Preston, Contributing Author to NCHRP Report 650



Open Discussion

- What is your personal experience with innovative intersections? Favorable/not favorable?
- Do innovative intersections play a beneficial role in TZD?
- Do innovative intersections compete with emergency response time (mutually exclusive) or are they complimentary of each other?
- What type of messaging could help alleviate concerns of emergency response professionals when a new innovative intersection is proposed?



Post-Survey

- How many people support/do not support innovative intersections like J-Turns or roundabouts?
- Do these types of innovative intersections harm, improve or have no effect on emergency response time?
- Should emergency response time control the overall decision to implement an innovative intersection?