Roundabouts: First Responder Perspectives

September 24, 2020

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Kimley»Horn

Welcome and Introduction

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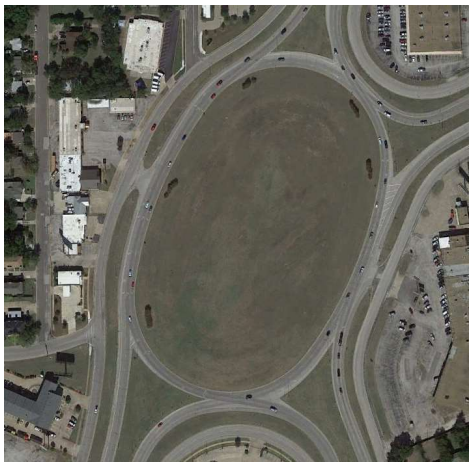
Today's Webinar

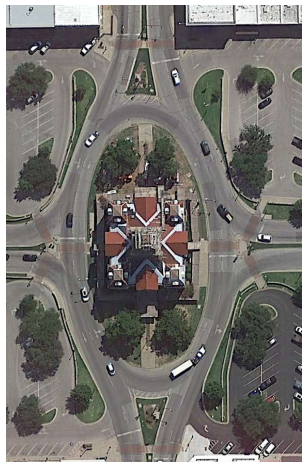
- Reference Slides
- Literature Review / Background
- Survey Request and Results
- Feedback and Recommendations
- Recommendations - Discussion
- Questions & Answers

Reference Slide:
“Modern” Roundabouts

Circular Intersections

- Rotaries
- Signalized Traffic Circles
- Neighborhood Traffic Circles
- Modern Roundabouts

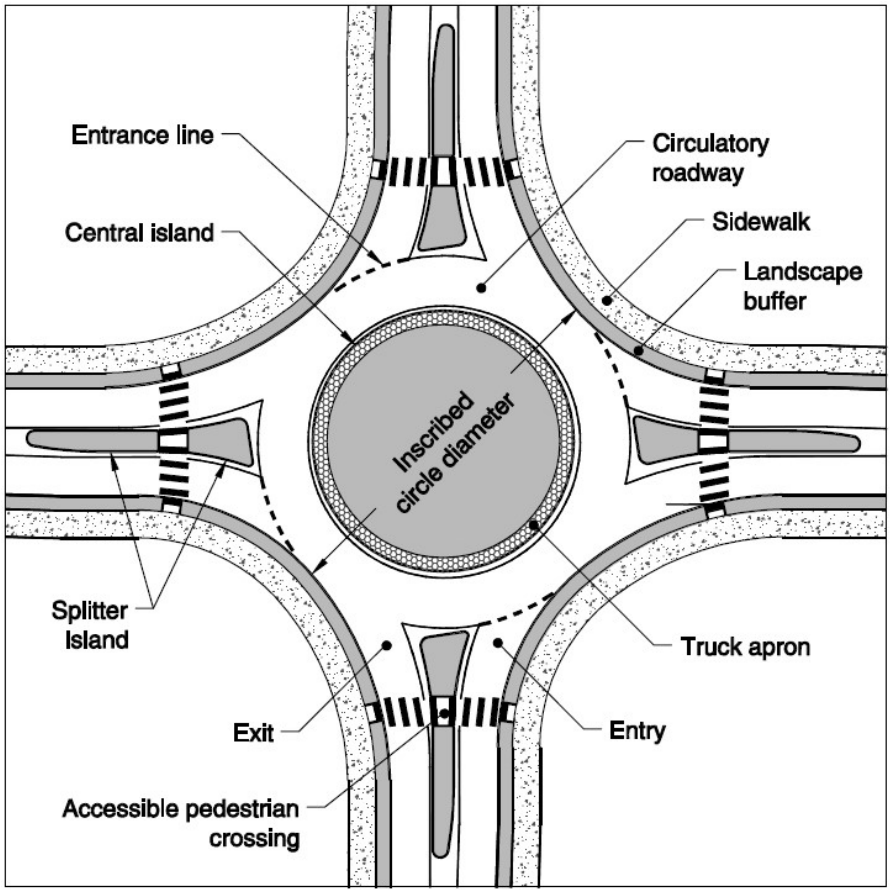




Reference Slide: “Modern” Roundabouts

Modern Roundabouts

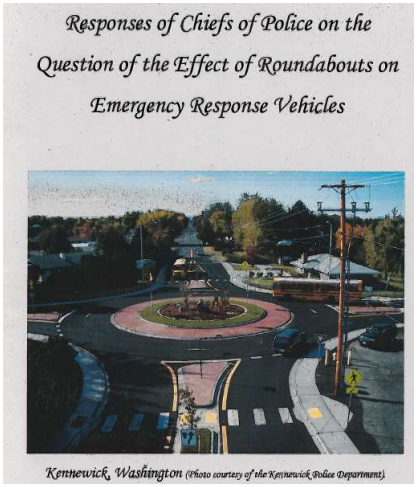
Reference Slide:
Modern Roundabouts Elements



Source: NCHRP 672

Literature Review

- March 2005: Richard M. Stadtherr sent a request to 110+ agencies with constructed roundabouts
  - Asked: what is the effect of roundabouts on emergency vehicles, particularly fire trucks?
- 55 responses, majority in favor of roundabouts



Purpose of the July 2020 Survey

- Gain a larger sample size of respondents now that more than 7,000 roundabouts have been built in the United States
- Have perceptions and experiences changed since 2005?
- What are the issues at roundabouts for first responders that engineers should be aware of?

The Request

FIRST RESPONDER ROUNDABOUT SURVEY

Let your voice be heard!

Survey will be used to:

- Better understand how first responders view roundabouts for safety, ease of travel, and benefit to the community
- Implement changes to improve first responders' experiences with roundabouts
- Share survey results with hundreds of roundabout engineers

Complete the 5-minute survey at
https://tinyurl.com/Roundabout-Survey

Or use the QR code:

PLEASE SHARE THIS SURVEY WITH OTHER FIRST RESPONDERS!
THANK YOU!

Kimley»Horn

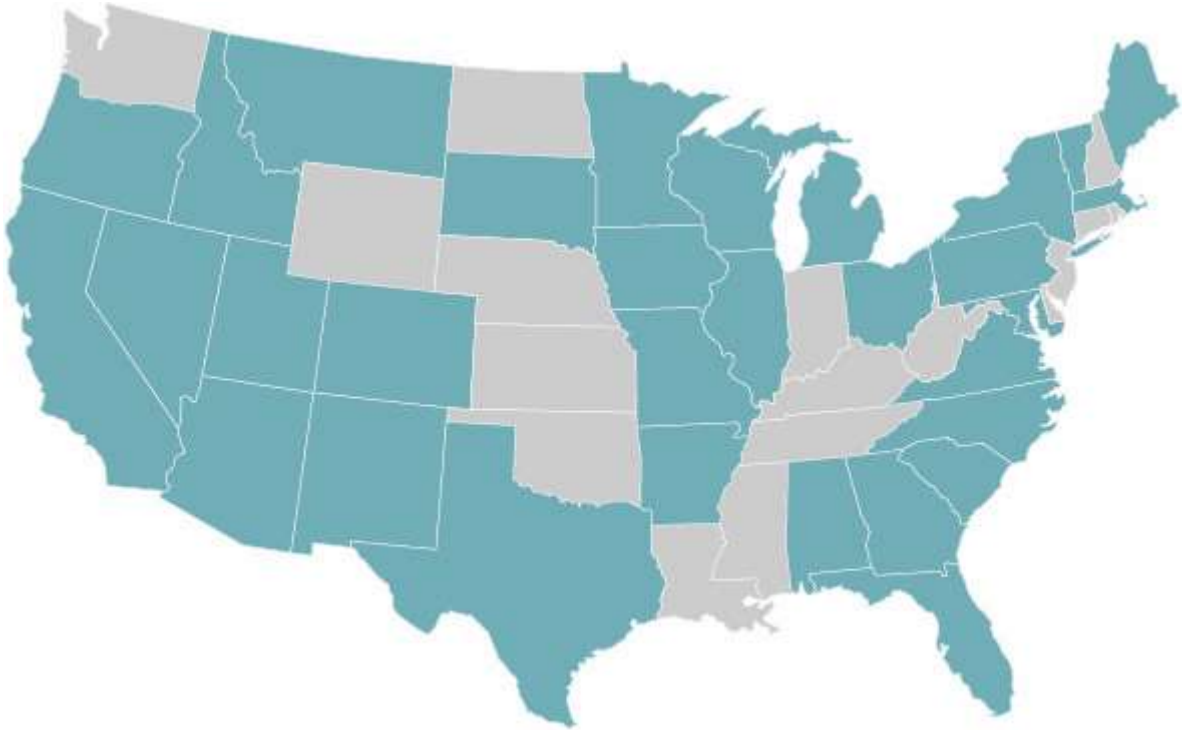
The Request

- Link to feedback survey sent to 500+ agencies with roundabouts via email
- Shared on social media (Twitter, Facebook, LinkedIn, kimley-horn.com, etc.)
- Shared with police associations, fire associations, and state patrols
- Survey was activated on June 29th and closed on July 31st (33 days)

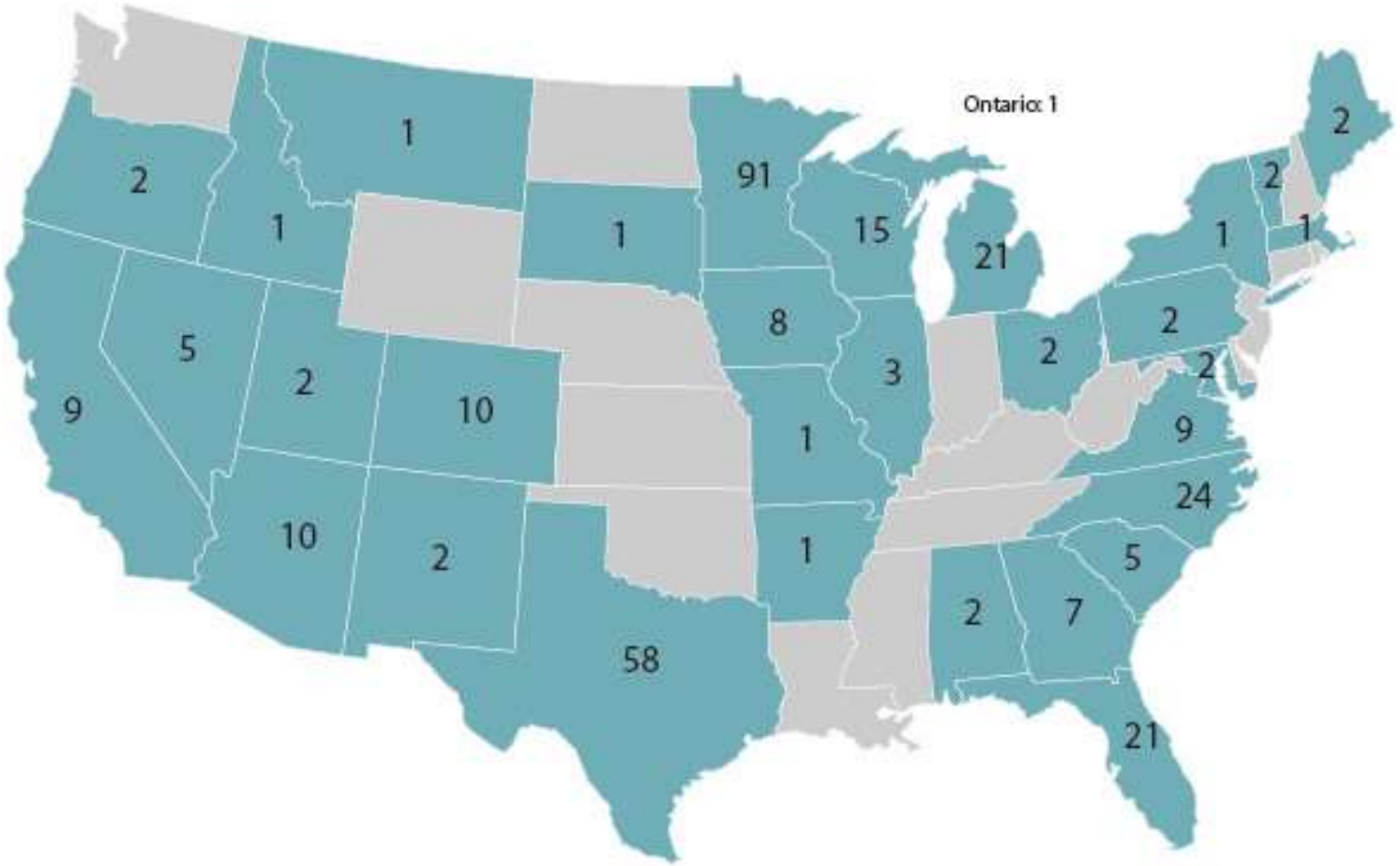
The Results – Number

323 responses from the United States and Canada:

- 32 U.S. states and Ontario



The Results – Location



The Results – Profession

FIRE
189

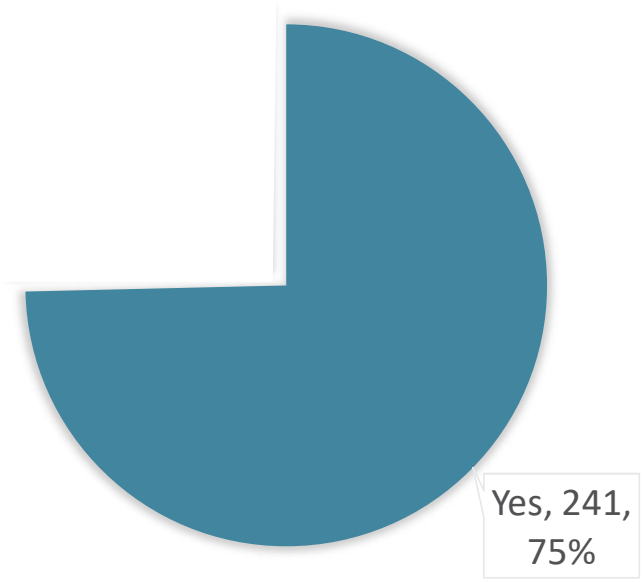
POLICE
110

EMT
20

OTHER
4

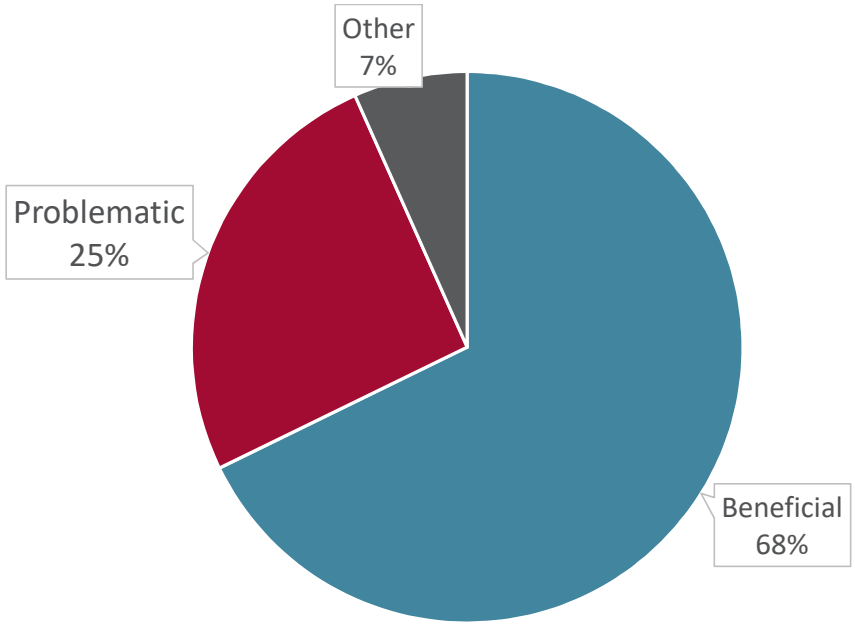
The Results – Qualifying Question

241 of 323 (74.6%) claim they encounter roundabouts during working hours.



The Results – Consensus

Where consensus has been reached, are roundabouts beneficial or problematic?



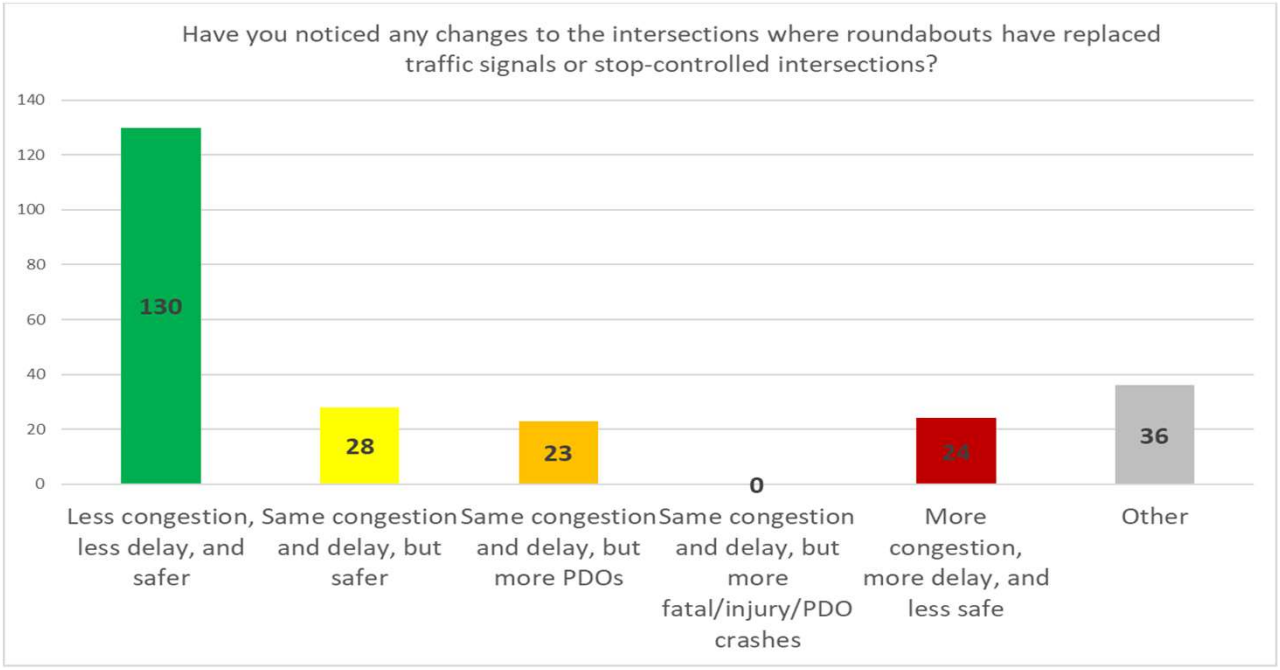
The Results – Education by All

Congratulations to the following agencies/departments for including your first responders in roundabout-related education!

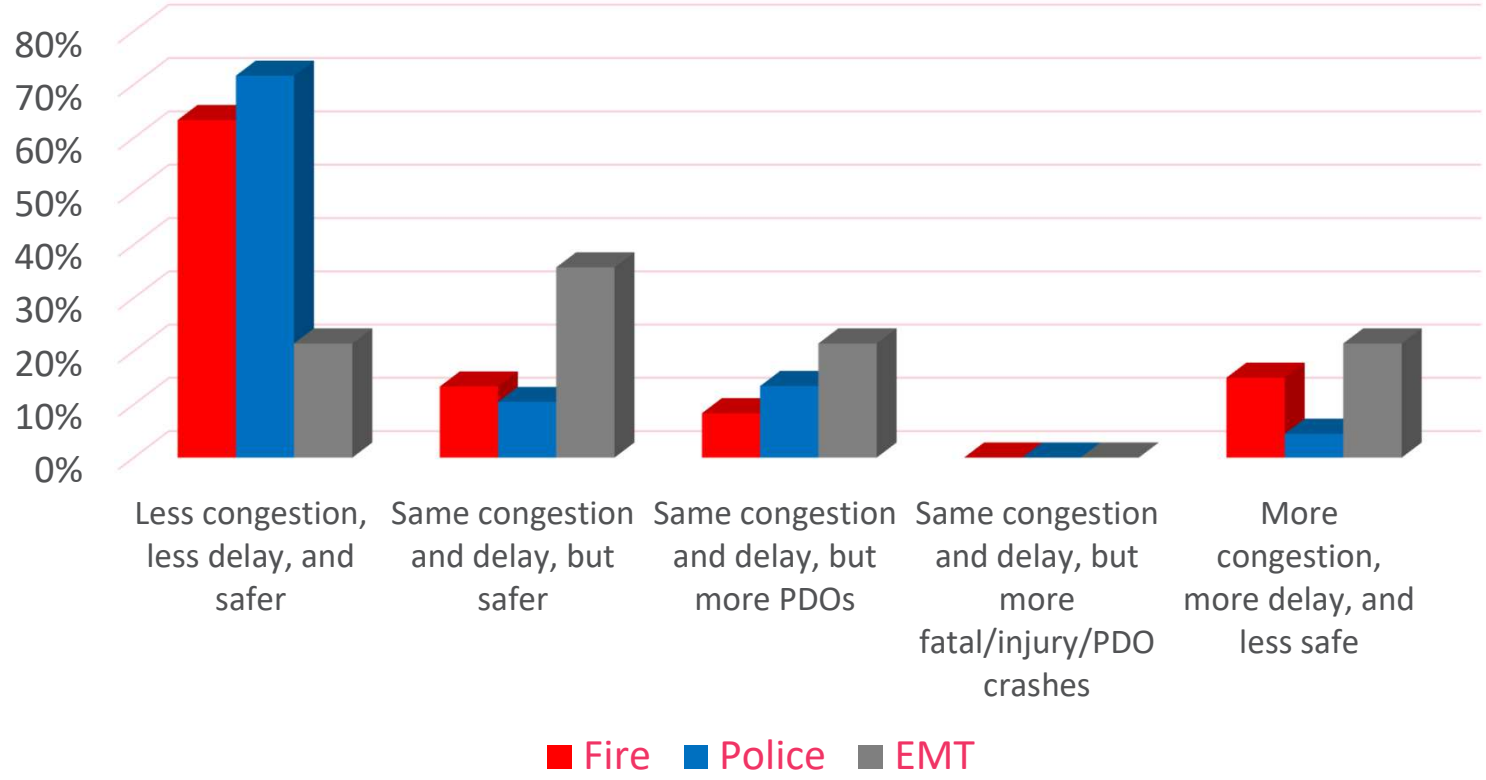
Rocklin	California
Carbondale Police	Colorado
South Trail Fire District	Florida
Ann Arbor, MI Police	Michigan
Scott County Sheriff's Office	Minnesota
Minnesota State Patrol - Mankato	Minnesota
De Pere	Wisconsin
Suamico Fire Department	Wisconsin
Ashland Fire Department	Wisconsin

The Results – Changes to Intersections

Have you noticed any changes to the intersections where roundabouts have replaced traffic signals or stop-controlled intersections?

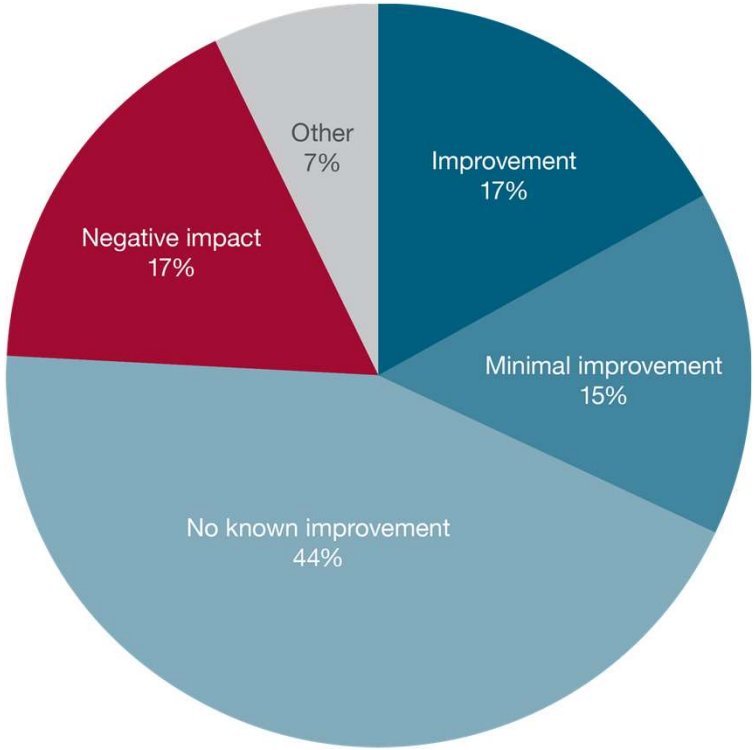


The Results – Changes to Intersections by Profession

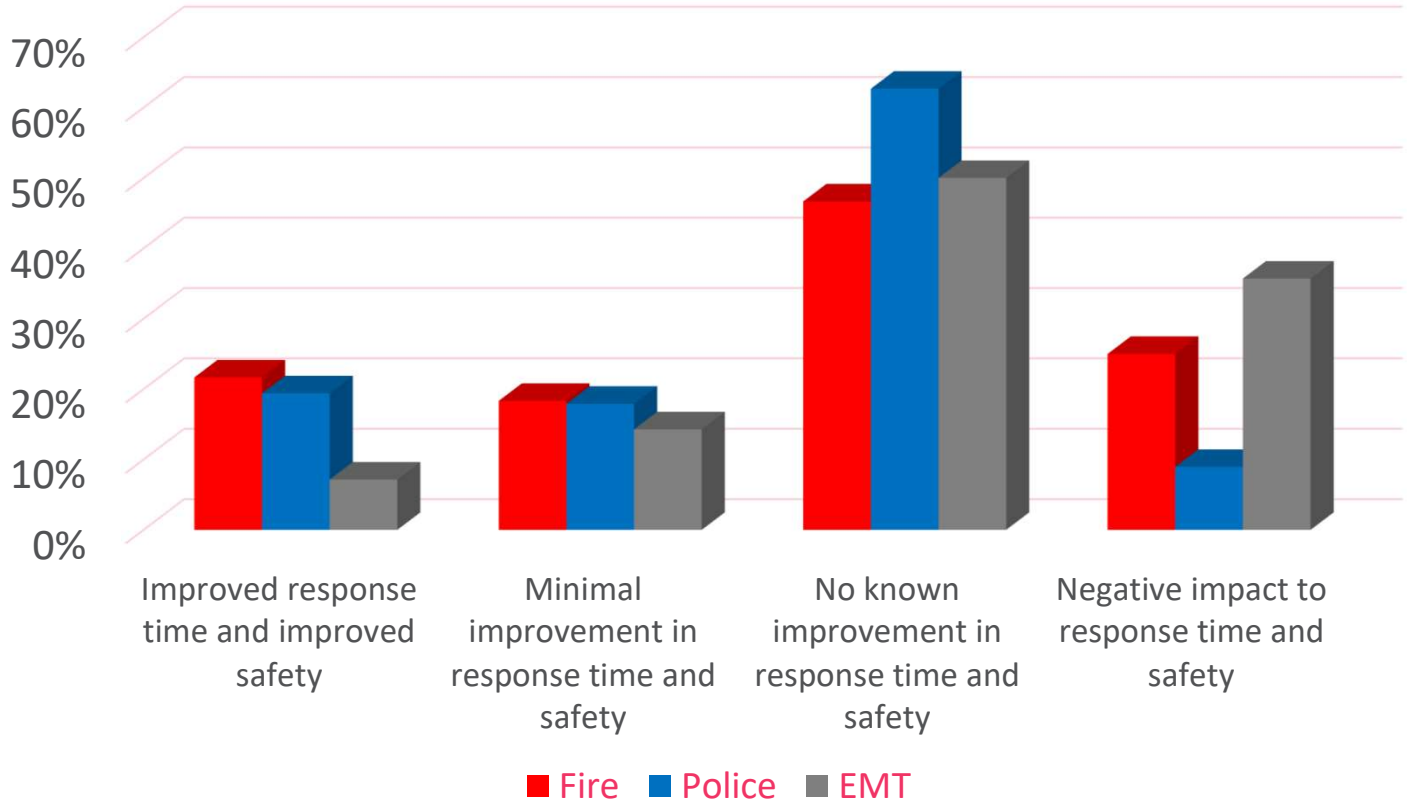


The Results – Responding to Calls

Have roundabouts impacted your ability to respond to a call for service?



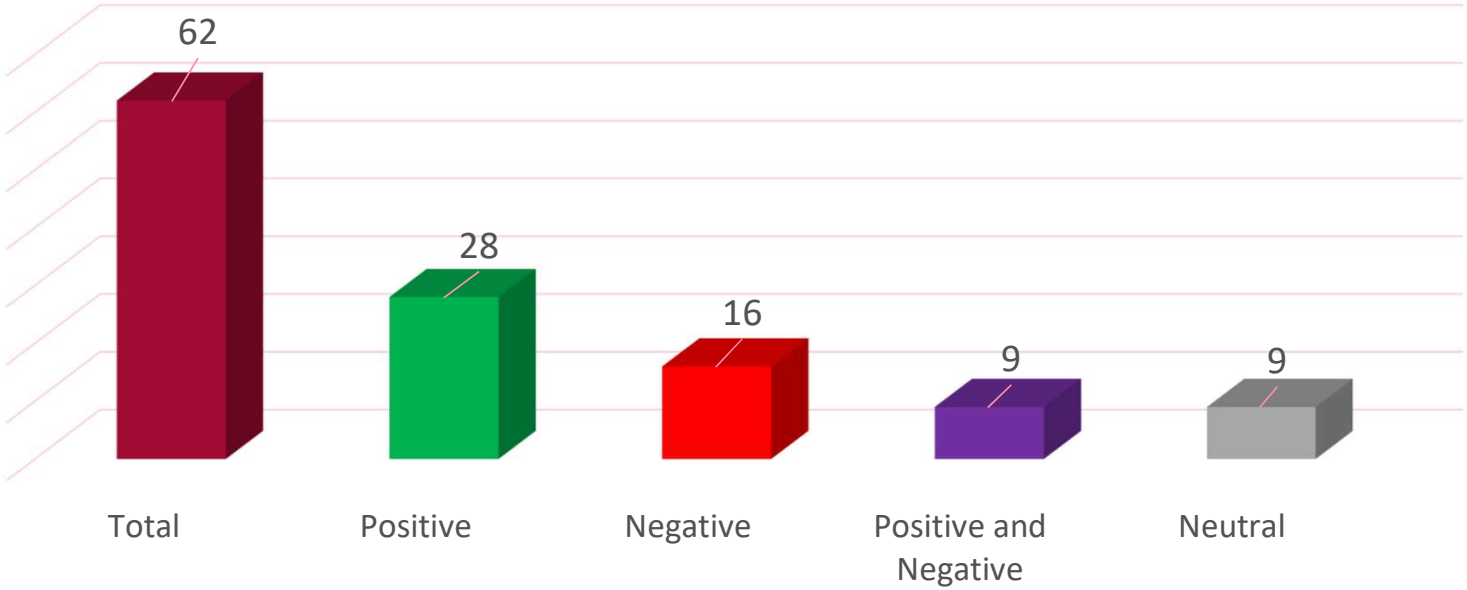
The Results – Responding to Calls by Profession



The Results – Testimonials

62 responses

- Included within the PDF handout



The Results – Recommendations
(What we learned from this survey)

1. Educate drivers how to respond to emergency vehicles in RABs and how to drive RABs in general
2. Mountable surfaces / rolled curbs help first responders get around stopped traffic
3. Too many signs confuse drivers and can restrict sight
4. Need large enough radii for 50-foot+ apparatus (ladder truck)
5. Avoid restricting sight through the center landscaped island

The Results – Recommendations
(What we learned from this survey)

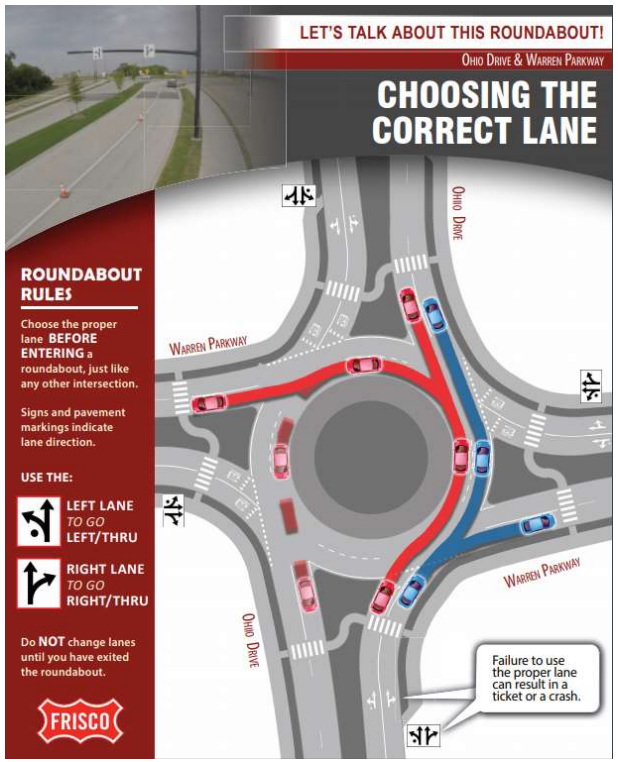
6. Lack consistency and uniformity city-wide
7. Accommodate overhang and swing-out of 3-4 feet
8. Include emergency responders in the design process
9. Need to factor in snow accumulation in the design

Engineering Guidelines for RABs

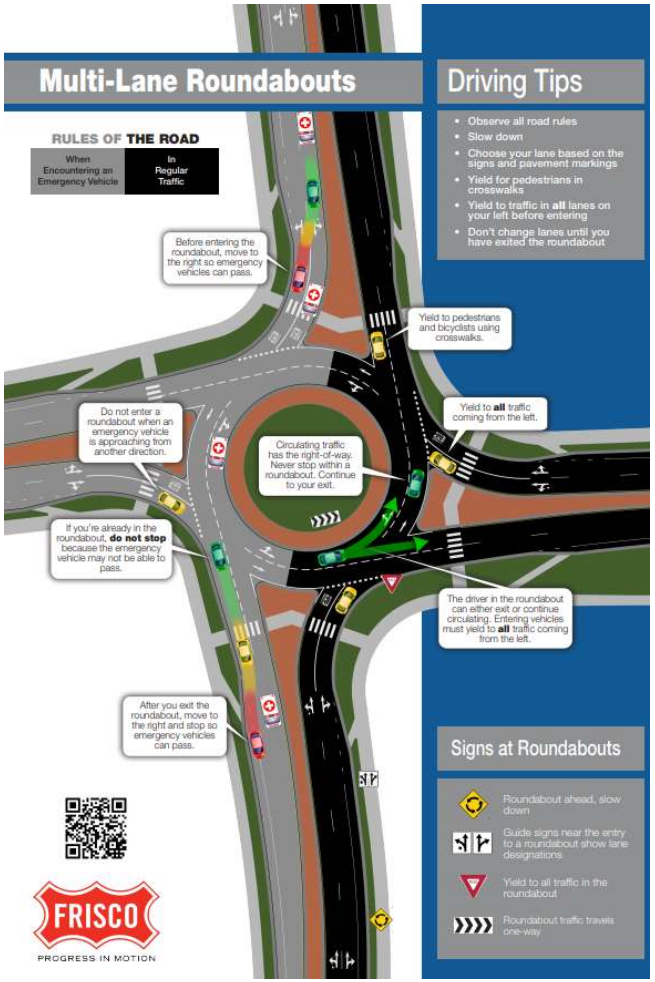
Abundance of Trade-offs

- Project budgets vs public education
- Speed control vs accommodation
- Purposeful mounding of the center island vs too much visibility
- Complexity vs operational capacity
- Pedestrian and bicycle accommodation at the entries and exits
- Optional vs required vs preferred signage
- Largest anticipated vehicle on-pavement vs truck apron use
- Adequately inform motorists vs sign clutter/confusion
- Truck apron: discourage passenger car use vs accommodate emergency vehicles

1. Educate Drivers

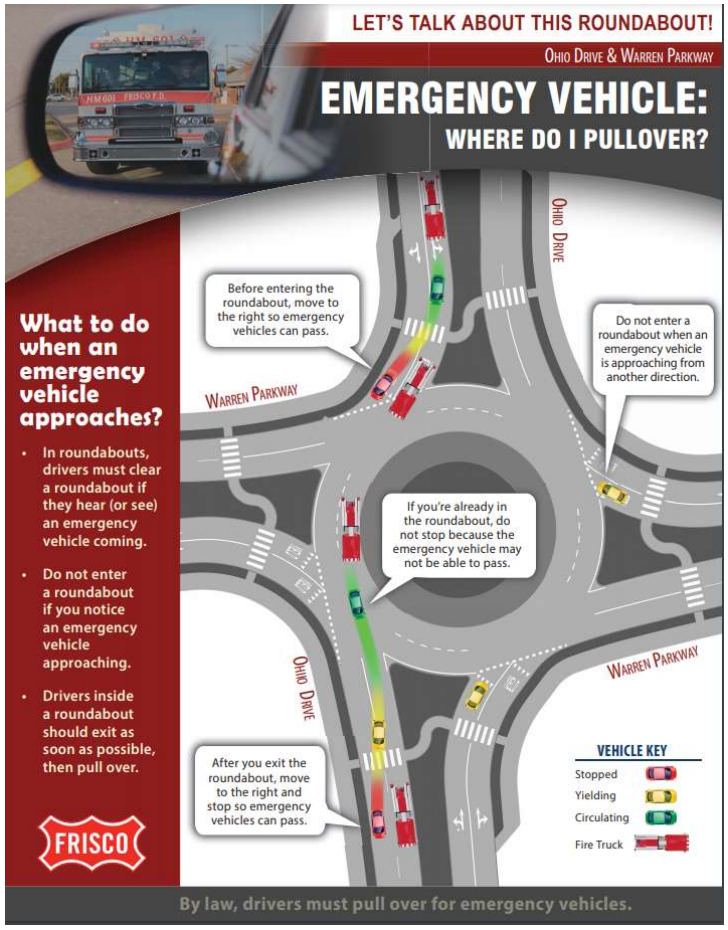


Source: City of Frisco, TX



Source: City of Frisco, TX

1. Educate Drivers

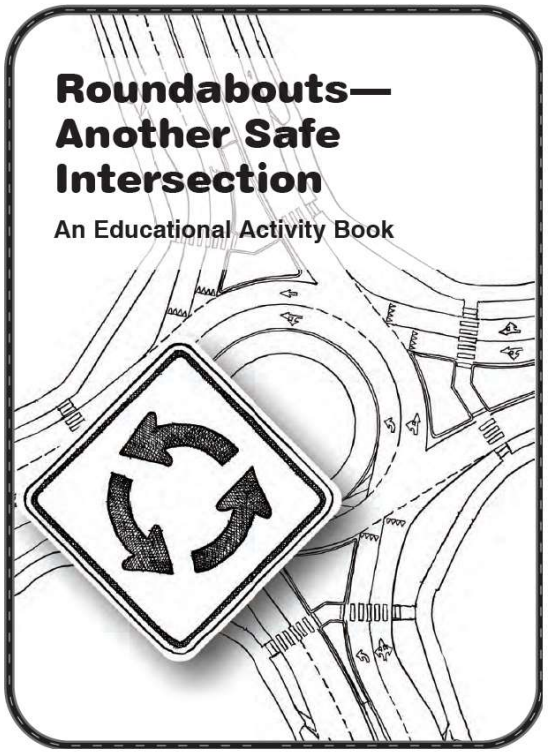


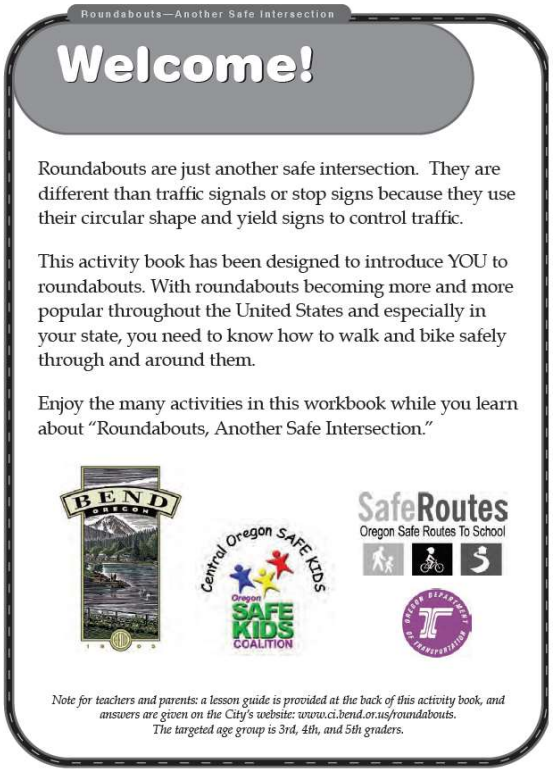
Source: City of Frisco, TX

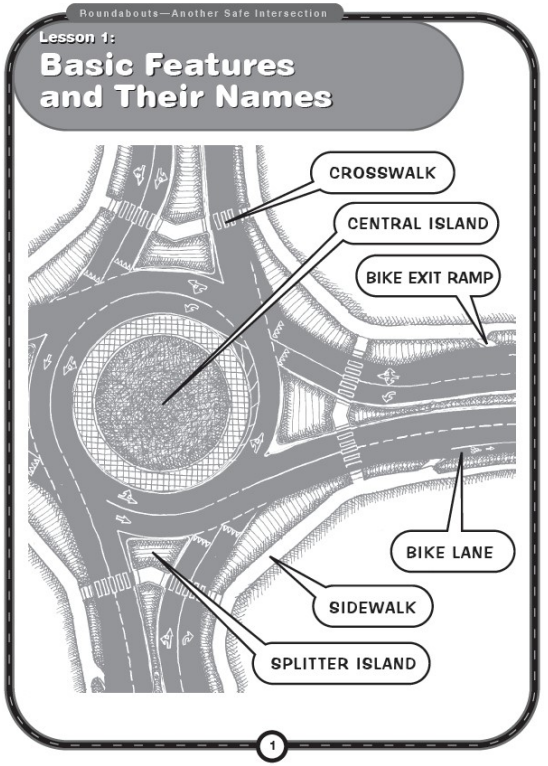
1. Educate Drivers (and future drivers)

Roundabout Children's Activity Book

Source: City of Bend, OR







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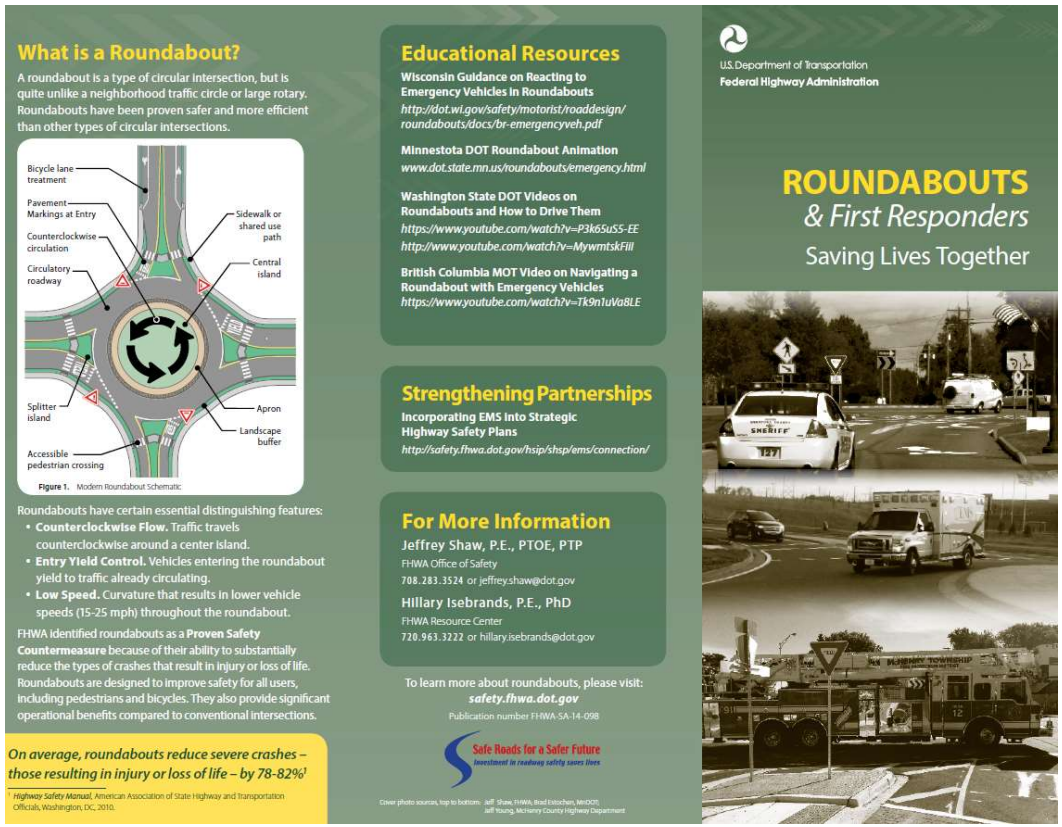

What is a Roundabout?

A roundabout is a type of circular intersection, but is quite unlike a neighborhood traffic circle or large rotary. Roundabouts have been proven safer and more efficient than other types of circular intersections.

Figure 1. Modern Roundabout Schematic

Roundabouts have certain essential distinguishing features:

- **Counterclockwise Flow.** Traffic travels counterclockwise around a center island.
- **Entry Yield Control.** Vehicles entering the roundabout yield to traffic already circulating.
- **Low Speed.** Curvature that results in lower vehicle speeds (15-25 mph) throughout the roundabout.

FHWA identified roundabouts as a **Proven Safety Countermeasure** because of their ability to substantially reduce the types of crashes that result in injury or loss of life. Roundabouts are designed to improve safety for all users, including pedestrians and bicycles. They also provide significant operational benefits compared to conventional intersections.

On average, roundabouts reduce severe crashes – those resulting in injury or loss of life – by 78-82%[1]

[1] *Highway Safety Manual*, American Association of State Highway and Transportation Officials, Washington, DC, 2010.

Educational Resources

Wisconsin Guidance on Reacting to Emergency Vehicles in Roundabouts
http://dot.wi.gov/safety/motorist/roaddesign/roundabouts/docs/br-emergencyveh.pdf

Minnesota DOT Roundabout Animation
www.dot.state.mn.us/roundabouts/emergency.html

Washington State DOT Videos on Roundabouts and How to Drive Them
https://www.youtube.com/watch?v=P3k65uS5-EE
http://www.youtube.com/watch?v=MywmtskFiII

British Columbia MOT Video on Navigating a Roundabout with Emergency Vehicles
https://www.youtube.com/watch?v=Tk9n1uVa8LE

Strengthening Partnerships

Incorporating EMS into Strategic Highway Safety Plans
http://safety.fhwa.dot.gov/hsip/shsp/ems/connection/

For More Information

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FHWA Resource Center
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To learn more about roundabouts, please visit:
safety.fhwa.dot.gov

Publication number FHWA-SA-14-098

Safe Roads for a Safer Future
Investment in roadway safety saves lives

Cover photo sources, top to bottom: Jeff Shaw, FHWA; Brad Estochen, MnDOT; Jeff Young, McHenry County Highway Department

U.S. Department of Transportation
Federal Highway Administration

ROUNDABOUTS
& First Responders
Saving Lives Together

Source: Federal Highway Administration

1. Educate Drivers

Shared Mission – Shared Benefits

Saving lives and preventing serious injuries are the highest priority of both first responders and highway agencies. Roundabouts are safer intersections that result in fewer severe crashes requiring emergency response.

Safer intersections are important for first responder occupational safety and health, too. Studies show that most fatalities resulting from a crash involving a fire truck occur at, or are related to, an intersection. Further, angle crashes are the most common fatal crash type involving fire trucks.[2] The International Association of Fire Fighters (IAFF) and others cite intersections as high risk locations for all emergency response disciplines.[3]

Source: Howard McCulloch, NYSDOT

Roundabouts are also a very efficient type of intersection. They do not have the same stop-and-go conditions as traditional intersections.

- Roundabouts keep people moving, but at speeds where injury risk is greatly reduced.
- Roundabouts can reduce or eliminate lines of stopped traffic typical of stop signs and traffic signals, making them easier to navigate throughout the day and night.
- Unlike traffic signals, roundabouts don't depend on electricity to function, so they are not susceptible to power outages.

[1] *Highway Safety Manual*, American Association of State Highway and Transportation Officials, Washington, DC, 2010.

[2] Campbell, K.L., *Traffic Collisions involving Fire Trucks in the United States*, UM-TRI-99-26, Ann Arbor, MI: University of Michigan Transportation Research Institute, Ann Arbor, MI, 1999

[3] International Association of Fire Fighters (IAFF), *Best Practices for Emergency Vehicle and Roadway Operations Safety in the Emergency Services*, Washington, DC 2010

[4] Bailey, E.D., Sweeney, T., Considerations in Establishing Emergency Medical Services Response Time Goals, National Association of EMS Physicians, Lenexa, KS, 2003

Designing for First Responders

Source: Jeff Young, McHenry County Highway Department

Roundabouts are not designed to inhibit traffic. Rather, they are optimized for the safety and efficiency of all users. Roundabouts can be designed for large trucks, including a special purpose apparatus such as a ladder truck. This is accomplished by using features such as:

- Wider entry and exit lanes for efficient movement of traffic through the roundabout.
- Mountable aprons and curbs intended for use by vehicles with a wide and/or long wheelbase.
- Curvature and radii that allow for easy turning movements, including u-turns.

Source: Brad Estochen - MnDOT

"Before the first roundabout was constructed in our city, our station arranged to visit one nearby so that we could experience it firsthand. That answered a lot of questions and helped build confidence in roundabouts."

- **Brad Estochen**
  Minnesota DOT Safety Engineer &
  Firefighter and EMT for the City of Woodbury

Frequently Asked Questions

When the first roundabout in a community is proposed, it is natural for first responders to have questions and concerns. Several of the most common questions are addressed below:

Q: Will all our vehicles be able to maneuver through a roundabout?
A: Roundabouts work for many types of large vehicles. Partnering with the road agency to conduct a "test drive" (laying out the roundabout in a large open area using cones and temporary devices) can help evaluate and influence the design.

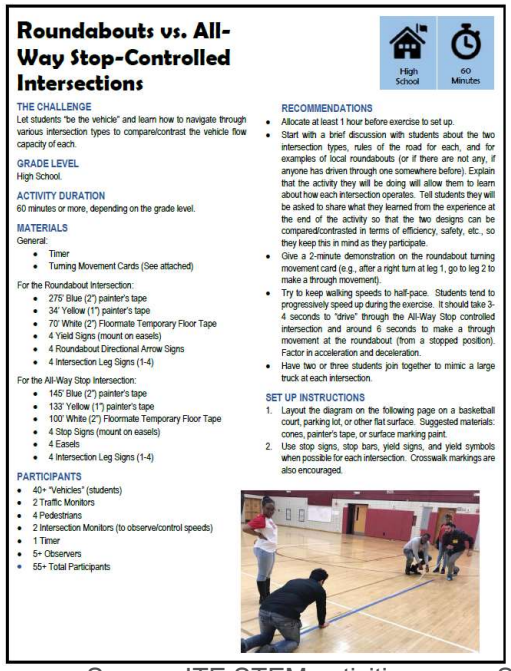
Q: What about emergency response times?
A: At any intersection, traffic conditions vary throughout the day. Roundabouts can actually improve travel times by eliminating unnecessary stops and delays. Furthermore, the IAFF and other public health and safety organizations recognize that small differences in travel times rarely, if ever, impact incident or patient outcomes.[3,4]

Q: How will drivers in our community know how to react to approaching emergency vehicles?
A: In this way, roundabouts are no different from other intersections – drivers must clear the intersection, pull off to the right, and let the emergency vehicle pass. To help educate drivers, there are many excellent resources available from states and cities where roundabouts are common. First responders can contribute to general roundabout education and outreach in a community by helping explain to the public how to react when an emergency vehicle approaches.

Q: Why consider roundabouts when we have traffic signal preemption in our city?
A: The use of preemption devices at signalized intersections remains a worthwhile option. However, in addition to being safer, roundabouts are viable in many places where traffic signals are not. Furthermore, even where signal preemption is used, first responders must obey state laws and department policies, and proceed cautiously – likely at speeds comparable to a roundabout.

Source: Federal Highway Administration

Public Education and Outreach is Paramount!



Roundabouts vs. All-Way Stop-Controlled Intersections

High School | 60 Minutes

THE CHALLENGE
Let students "be the vehicle" and learn how to navigate through various intersection types to compare/contrast the vehicle flow capacity of each.

GRADE LEVEL
High School.

ACTIVITY DURATION
60 minutes or more, depending on the grade level.

MATERIALS
General:
- Timer
- Turning Movement Cards (See attached)

For the Roundabout Intersection:
- 275' Blue (2") painter's tape
- 34' Yellow (1") painter's tape
- 70' White (2") Floormate Temporary Floor Tape
- 4 Yield Signs (mount on easels)
- 4 Roundabout Directional Arrow Signs
- 4 Intersection Leg Signs (1-4)

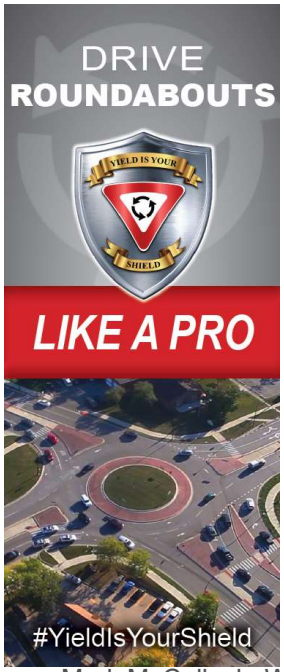
For the All-Way Stop Intersection:
- 145' Blue (2") painter's tape
- 133' Yellow (1") painter's tape
- 100' White (2") Floormate Temporary Floor Tape
- 4 Stop Signs (mount on easels)
- 4 Easels
- 4 Intersection Leg Signs (1-4)

PARTICIPANTS
- 40+ "Vehicles" (students)
- 2 Traffic Monitors
- 4 Pedestrians
- 2 Intersection Monitors (to observe/control speeds)
- 1 Timer
- 5+ Observers
- 55+ Total Participants

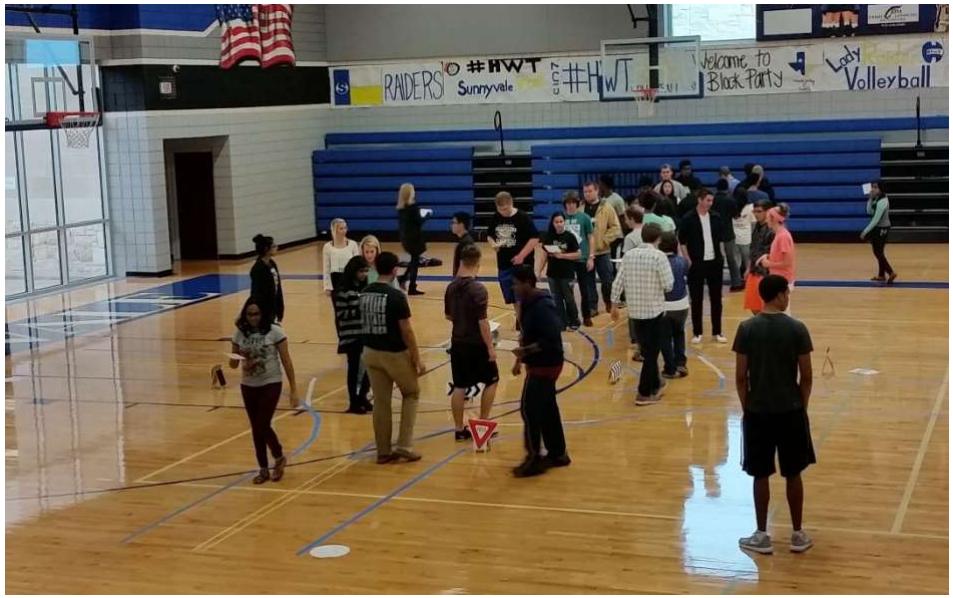
RECOMMENDATIONS
- Allocate at least 1 hour before exercise to set up.
- Start with a brief discussion with students about the two intersection types, rules of the road for each, and for examples of local roundabouts (or if there are not any, if anyone has driven through one somewhere before). Explain that the activity they will be doing will allow them to learn about how each intersection operates. Tell students they will be asked to share what they learned from the experience at the end of the activity so that the two designs can be compared/contrasted in terms of efficiency, safety, etc., so they keep this in mind as they participate.
- Give a 2-minute demonstration on the roundabout turning movement card (e.g., after a right turn at leg 1, go to leg 2 to make a through movement).
- Try to keep walking speeds to half-pace. Students tend to progressively speed up during the exercise. It should take 3-4 seconds to "drive" through the All-Way Stop controlled intersection and around 6 seconds to make a through movement at the roundabout (from a stopped position). Factor in acceleration and deceleration.
- Have two or three students join together to mimic a large truck at each intersection.

SET UP INSTRUCTIONS
1. Layout the diagram on the following page on a basketball court, parking lot, or other flat surface. Suggested materials: cones, painter's tape, or surface marking paint.
2. Use stop signs, stop bars, yield signs, and yield symbols when possible for each intersection. Crosswalk markings are also encouraged.

Source: ITE STEM activities



Source: Mark McCulloch, WCRC



Source: Brian Moen

1. Educate Drivers - Discussion

What have you seen work well in your community/agency for public outreach and education?

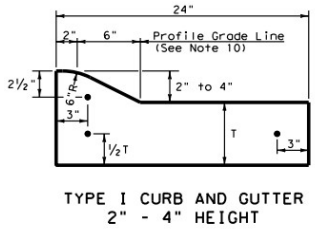
Are first responders aware that FHWA and many other agencies have readily-available information that can be used to talk to the public about roundabouts?

Are first responders in communities new to roundabouts being given the proper training on how to drive a roundabout? Or how to enforce a roundabout?

Common infractions are failure-to-yield and improper lane changing within a roundabout. Have you noticed any additional recurring driver errors at roundabouts?

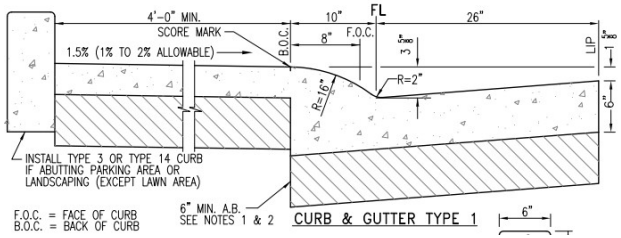
2. Mountable Curbs

Abundance of Mountable Curb Details

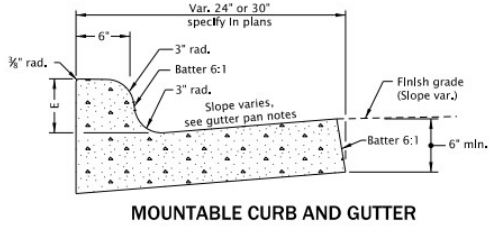


TYPE I CURB AND GUTTER
2" - 4" HEIGHT

Texas DOT

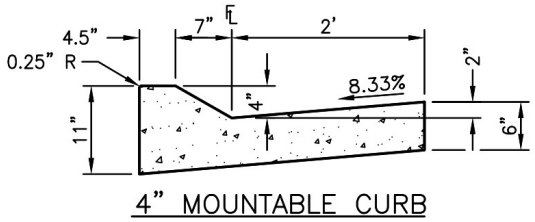


Sacramento, CA



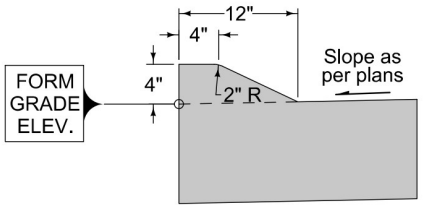
MOUNTABLE CURB AND GUTTER

Oregon DOT



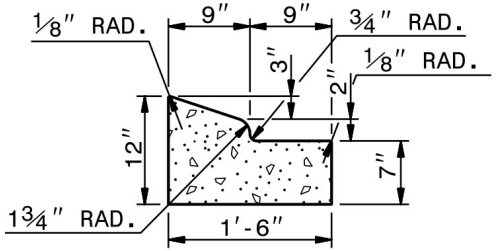
4" MOUNTABLE CURB

Denver, CO



4" SLOPED CURB

Iowa DOT



1'-6" CURB AND GUTTER

North Carolina DOT

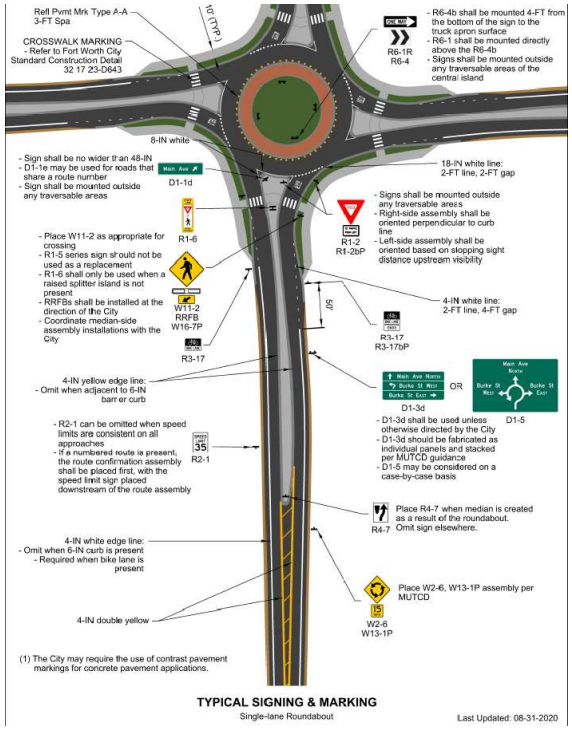
2. Mountable Curbs - Discussion

Do you know of a roundabout where the curb type works very well for fire trucks?

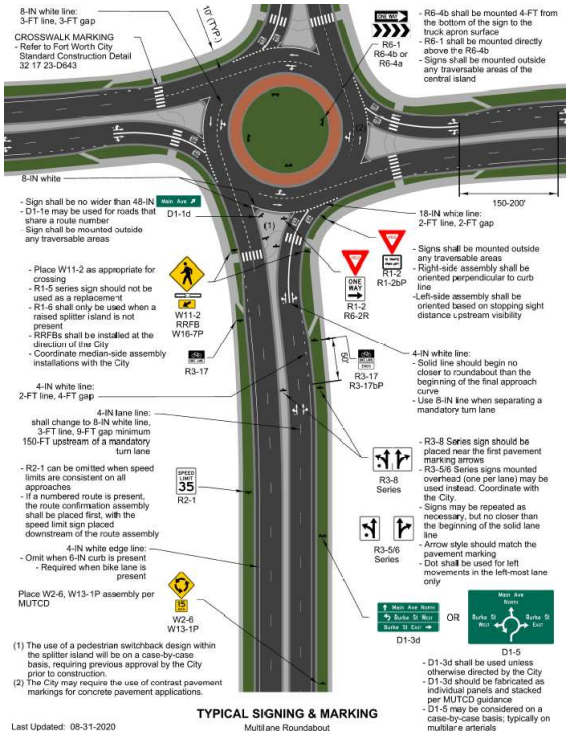
Do you know of a roundabout where the curb type does not function well?

3. & 6. Agency-wide Uniformity

Pavement Marking and Signing Exhibits (city-wide)



Source: Fort Worth, TX



Source: Fort Worth, TX

3. & 6. Agency-wide Uniformity - Discussion

What uniformity issues are you encountering at your Roundabouts? (lane assignments, pavement markings, signage, landscaping, illumination, etc.)

Does your agency have “templates” to standardize roundabout treatments?

4. Large Enough Designs

Specifications for your Engineering/Public Works Dept.

MCKINNEY FIRE DEPARTMENT

FIRE PREVENTION DIVISION, FIRE MARSHAL'S OFFICE

INFORMATION NOTICE 2011-04

SUBJECT: Fire Apparatus Specifications for AutoTURN Exhibits

EFFECTIVE: December 5th, 2016 (REV. 5)

SCOPE:

We recognize that the design of fire apparatus access roads can sometimes be a challenge for roadways that utilize unique geography or traffic calming. To assist those working on these types of projects, we have developed a guideline of our requirements and apparatus specifications to assist those designing with AutoTURN.

APPARATUS SPECIFICATIONS:

When providing AutoTURN exhibits for review, both vehicles shall be modeled separately and referred to as E-One Exhibit and Pierce Exhibit. All possible turning movements shall be depicted.

E-One Truck	
Cramp Angle	45 degrees
Wheelbase	240 in.
Length	43 ft.
Width	10 ft. 6 in.
Height	14 ft.
Front Overhang	107 in.
Rear Overhang	157 in.
Outrigger Spread	14 ft.

Pierce Truck	
Cramp Angle	40 degrees
Wheelbase *	258 in.
Length	42 ft.
Width	10 ft. 6 in.
Height	14 ft.
Front Overhang	97 in.
Rear Overhang **	124 in.
Outrigger Spread	16 ft.
Wall-to-Wall Radius	44 ft. 10 in.
Curb-to-Curb Radius	40 ft. 1 in.

Source: City of McKinney, TX

** Measured to centerline of rear dual axle.*

*** Measured from centerline of rearmost axle to rearmost point on the apparatus.*

DRAWINGS

Apparatus design specifications are provided as attachments to this Information Notice.

APPROVED:

Andrew Barr, CFPS
Deputy Fire Marshal

4 Large Enough Designs

Trucks at Roundabouts Legislation (WI, IN, WA)

Wisconsin 2016

State of Wisconsin

2015 Assembly Bill 451

Date of enactment: **February 4, 2016**
Date of publication*: **February 5, 2016**

2015 WISCONSIN ACT 139

AN ACT *to create* 346.13 (5) and 346.18 (8) of the statutes; **relating to:** right−of−way in roundabouts.

The people of the state of Wisconsin, represented in senate and assembly, do enact as follows:

SECTION 1. 346.13 (5) of the statutes is created to read:

346.13 **(5)** Notwithstanding sub. (1), the operator of a vehicle or combination of vehicles with a total length of not less than 40 feet or a total width of not less than 10 feet may, with due regard for all other traffic, deviate from the lane in which the operator is driving to the extent necessary to approach and drive through a roundabout.

SECTION 2. 346.18 (8) of the statutes is created to read:

346.18 **(8)** ROUNDABOUT. (a) The operator of a vehicle shall yield the right−of−way to any vehicle or combination of vehicles with a total length of not less than 40 feet or a total width of not less than 10 feet when approaching or driving through a roundabout at approximately the same time or so closely as to constitute a hazard of collision and, if necessary, shall reduce speed or stop in order to so yield.

(b) If 2 vehicles or combinations of vehicles each having a total length of not less than 40 feet or a total width of not less than 10 feet approach or drive through a roundabout at approximately the same time or so closely as to constitute a hazard of collision, the operator of the vehicle or combination of vehicles on the right shall yield the right−of−way to the vehicle or combination of vehicles on the left and, if necessary, shall reduce speed or stop in order to so yield.

Indiana 2017

HOUSE ENROLLED ACT No. 1039

AN ACT to amend the Indiana Code concerning motor vehicles.

Be it enacted by the General Assembly of the State of Indiana:

SECTION 1. IC 9-13-2-157.5 IS ADDED TO THE INDIANA CODE AS A **NEW** SECTION TO READ AS FOLLOWS [EFFECTIVE JULY 1, 2017]: **Sec. 157.5. "Roundabout" means a circular intersection or junction in which road traffic flows almost continuously in one (1) direction around a central island.**

SECTION 2. IC 9-21-8-10 IS AMENDED TO READ AS FOLLOWS [EFFECTIVE JULY 1, 2017]: Sec. 10. A vehicle passing around a ~~rotary traffic island~~ **roundabout** shall be driven only to the right of the ~~rotary traffic~~ **roundabout's central** island.

SECTION 3. IC 9-21-8-10.5 IS ADDED TO THE INDIANA CODE AS A **NEW** SECTION TO READ AS FOLLOWS [EFFECTIVE JULY 1, 2017]: **Sec. 10.5. (a) When approaching or driving through a roundabout, a person driving a vehicle shall yield the right-of-way to the driver of a vehicle with a total length of at least forty (40) feet or a total width of at least ten (10) feet that is driving through the roundabout at the same time or so closely as to present an immediate hazard, and shall slow down or stop if necessary to**

Washington 2020

(5) Pursuant to subsection (1) of this section, the operator of a commercial motor vehicle as defined in RCW 46.25.010 may, with due regard for all other traffic, deviate from the lane in which the operator is driving to the extent necessary to approach and drive through a circular intersection.

4. Large Enough Designs - Discussion

What is the ideal diameter, or turning radius, for your largest vehicle in your fleet?

As a follow-up to this survey, would you be willing to provide your largest apparatus specifications to your local engineering/public works department?

5. Central Island Landscaping

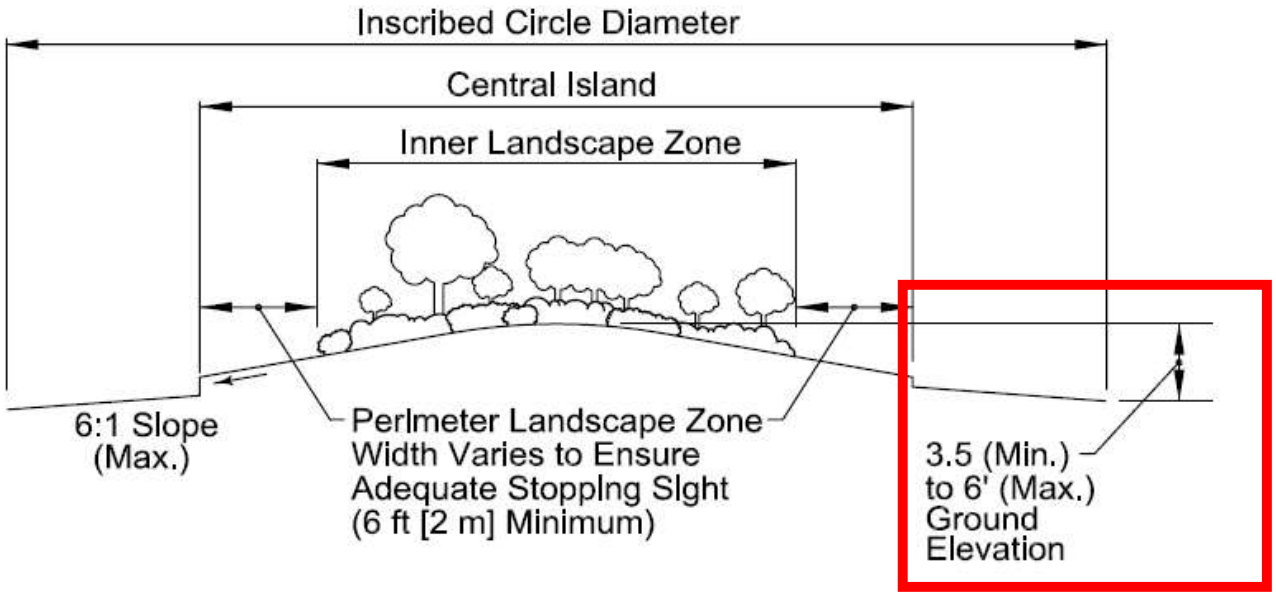


Exhibit 9-4
Central Island
Landscaping Profile

Source: NCHRP Report 672

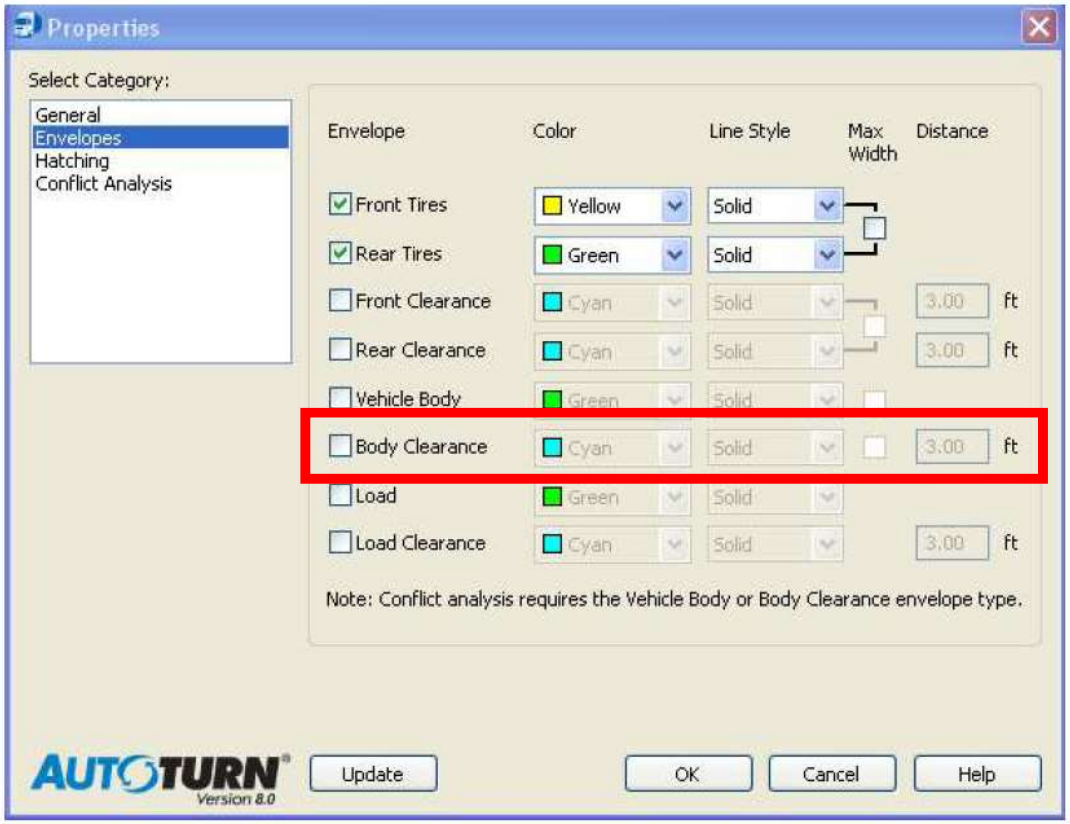
5. Central Island Landscaping

5. Central Island Landscaping - Discussion

What eye height are your fire truck/ambulance drivers positioned at? How does this impact the design at a roundabout?

Is there a “sweet spot” where engineers can provide enough forward visual blockage in the landscaped center island while maintaining sight across for first responders and motorist visibility?

7. Overhang and Swing-Out



7. Overhang and Swing-Out

What would you prescribe to be the ideal dimensions for overhang and swing-out for vehicle body envelopes in your fleet?

Are there signs that you typically encounter at a roundabout that encroach upon your operations?

8. Include in the Design Process

8. Include in the Design Process

What would be your response if an engineer called you up and asked to meet with you to discuss a roundabout design?

How many departments have readily-available information regarding the largest vehicle in their fleet?

Would you be interested in a knowledge exchange to discuss roundabouts with local engineers and how designs can be improved to help your operations?

9. Snow Accumulation

Source: https://www.youtube.com/watch?v=WfLY8xvvm2E

The Results – Testimonials

- “Accident rates are far lower than a normal intersection, property damage is less, and injuries all but ended at roundabouts. We have 10 roundabouts currently with several more planned for road reconstruction locations.”

- “After an initial challenge with traffic adjusting to the new intersection design, I think we have seen a huge change in safety. The crashes are less, and certainly less severe.”

- “Again, we're pretty indifferent to our one roundabout.”

- “As a member of my city’s apparatus committee, the roundabouts in my station’s territory have had an influence on my recommendations regarding overall apparatus length, wheelbase, and steering cramp angle. Roundabouts and multi-use “walkable” developments have unique challenges that are not lost upon those of us in the apparatus world.”

The Results – Testimonials

- “As I stated earlier, I think the smaller intersections they are fine, but in some bigger intersections like (Hwy 68 and Hwy 1), I've heard / seen cars get confused and get stuck for a few passes.”

- “Crashes have not been reduced due to implementing of them. People are still confused on rules and how to handle them. The good is that the crashes we see now are not t bone /90 degree crashes and they are at lower speeds”

- “Divided highway and roundabout intersections have reduced number of fatal crashes in our district”

The Results – Testimonials

- “Emergency response vehicles often use the oncoming lane to get through an intersection when there is congestion. In a single lane roundabout I would see an issue in getting back into the correct lane with a large fire apparatus.”

- “Generally good. Probably less crashes, especially almost no severe ones.”

- “I am not in favor of roundabouts from a first responder perspective.”

The Results – Testimonials

- “Generally speaking, I think the traffic circles in our territory are perceived negatively by both the public and other firefighters. I've lived in this territory for 15 years and worked here for over 10, so I was here before the area was heavily developed and before the traffic circles existed. So realistically, I think I've got a better grasp on the effect they've had on traffic flow than most of the people in this area. Yes, there is a lot of traffic congestion in the areas where the traffic circles were installed, that's why they were put in in the first place. But I think most of the negative sentiment comes from people who didn't travel regularly in the area BEFORE the traffic circles were installed. Traffic was much worse before and there were more accidents. And there's definitely more than twice as much traffic now than there was 15 years ago, there's no doubt in my mind the traffic circles have had a profound positive impact on traffic in my area. It's also my personal opinion that if traffic lights had been installed instead of traffic circles, it would have led to more congestion than what we currently experience. So yes, we do have too much traffic at a couple of traffic circles on our busier roads, but the traffic circles aren't to blame. The culprit is heavy development over a very short period of time without accompanying infrastructure to support it...the traffic circles work well.”

The Results – Testimonials

- “I believe the roundabouts in our response area have had a positive impact on fire department response. It is well known that the number one location for accidents involving fire apparatus is at intersections. Roundabouts limit the hazards of crossing an intersection especially when requesting the right of way (clearing intersection for red light).”
- “I believe, like anything, there has been an adjustment period for us getting comfortable with the roundabouts. Once folks get used to them we have seen improvements in traffic flow and have not seen many negative effects. Also, like any roadway, as long as there is ample room for vehicles to get out of the way of emergency vehicles, even when traffic is stopped they can still move.”

The Results – Testimonials

- “I believed that the roundabouts have reduced traffic crashes and reduced speed.”

- “I feel they are beneficial in keeping traffic moving and reducing the seriousness of traffic crashes”

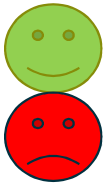
- “I have driven through many European Countries with roundabouts. Ireland, Scotland, Germany, Austria, Switzerland, and others. Roundabouts done properly work. When there is no education, they are mixed with traffic lights and pedestrian crossings in close proximity they do not. That is the situation in Sedona. Traffic volume compounds the problem and the roundabouts get blamed. I like the idea, but the radius needs to be big enough for fire apparatus, the curbs need to be rolled to negotiate cars that do not pull right and stop but just stop. Overall, I think the issue is education and full commitment to everything needed to make them effective. Without that, like most piecemeal solutions, they will continue to be a source of frustration.”

The Results – Testimonials

- “I have never been a fan of roundabouts as they seem to confuse people with which lane to enter that will take them the direction they need to go and people seem to have a hard time trying to merge in when a car is already coming around. I could be a simple fix with better lane markings or it could be lack of experience navigating roundabouts.”

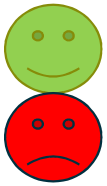
- “I have no issues with roundabouts if I'm familiar with the area. However, I have been confused in other areas with larger roundabouts as the signage is not posted far enough from the roundabouts to prepare for any possible lane changes. I do believe they relieve congestion and for the most part are safer.”

The Results – Testimonials



- “I have run many MVA's on areas that were T-intersections then roundabouts were installed and MVA's incidents dropped off sharply, a very good thing. Area is not a high vehicle flow area but did improve flow with no stopping. Vehicles were constantly getting t-boned. Then moved stations to a area that have roundabouts that have to many signs, traffic is so congested we plan to go a different route during rush hour. During rush hour traffic is so heavy that exit ramps become backed up, roundabouts do not move and then throw in the trains that cross over road, no vehicles move for awhile and traffic becomes more congested.”

The Results – Testimonials



- “I have to admit that they are safer for the general publc driving, but truckers hate them and fire departments find them to slow our response when required to drive through them. wish there were a safe way to have a larger truck pass through them.”

- “I personally like them. I know of several locations where they've been added and they have drastically reduced congestion.”

- “I really like how they flow , hardly ever have to wait , and people seem to be getting the hang of how they work, i believe after people get used to them , they reduce accidents”

The Results – Testimonials

- “I think roundabouts are a good idea for smaller intersection that see a lot of traffic.”

- “I think the general public is confused by the yield principle to begin with, no hard stops keeps people rolling into each other’s way.”

- “I was raise in New England were they have several roundabouts. Citizens need to understand and learn how to negotiate driving into and through roundabouts.”

- “I’m against round about in the sense that people don’t know how to navigate them properly.”

The Results – Testimonials

- “If planned properly for the amount of traffic, roundabouts work great. They have been using them in European countries longer than us with great success. It all comes done to proper planning and understanding the future traffic growth for a given intersection.”

- “In two years we havnt made a fatality wreck at a round about vs red lights. In fact very few wrecks period. Really only the drunks that try to go over them.”

- “Most drivers are already distracted with phones or radios that they do not pay attention or signal when exiting the roundabout. I have personally had to take the roundabout twice due to a distracted driver on the way to an emergency call.”

The Results – Testimonials

- “Most of the roundabouts I have driven through are easily navigated. As far as accidents go, that is just a toll of the dice. People will still drive like idiots regardless of how much safer it is compared to a stop light.”

- “My experience and our agency experience with roundabouts has been nothing but a negative one. Our response times have increased by several minutes due to the installation of the roundabouts. We are constantly faced with traffic flow/congestion along the streets where roundabouts have been installed.”

The Results – Testimonials

- “Not enough experience to comment - has only been anecdotal. I would defer to studies as my opinion is based on two neighborhoods in one city”
- “Not enough experience with them.”
- “not sure I have anything anyone else wishes to hear?”
- “Our experience has been both positive and negative in the case of our multi-lane roundabout: reducing serious injury and fatal crashes is very positive/important, but significantly increasing non-injury, property/vehicle damage crashes is a downside from a resource management perspective. We spend a lot of time policing the multi-lane roundabout, albeit not as much as we did during the first two or three years after it was constructed. Police and Fire personnel feel the roundabout works well overall with traffic flow/management, but there are still periods of congestion during rush hour. Public education/awareness and effective roundabout design are critical components of successful roundabout projects, especially for multi-lane roundabouts.”

The Results – Testimonials

- “Our fire department has had no issues with the roundabout in our jurisdiction.”
- “Our organization follows a chain of command where I would need to get that or refer you to some one else.”
- “Our roundabouts have allowed for a freer flow of traffic with minimal property damage accidents, annually.”
- “Roundabouts in general provide a much safer environment for all drivers, however more education is needed on what vehicles should do when they see an emergency response vehicle.”

The Results – Testimonials

- “Roundabouts in our jurisdiction have drastically reduced proper damage traffic crashes and injury crashes. I policed old intersections and averaged a crash each week and several injury crashes per year. Since roundabouts I have not investigated a single injury crash.”
- “Roundabouts reduce the intersection speeds, from our experience, and make it safer for emergency vehicles as compared to lighted intersections with risk of higher speed t-bone type accidents. Anecdotally there seems to be fewer moderate to major accidents in our roundabouts, because of the slower speeds. Negotiating roundabouts going code 3 is much easier, generally, than trying to negotiate a red light with heavy or stopped traffic, with emergency vehicles occasionally needing to take on-coming traffic or go through a red light.”

The Results – Testimonials

- “Roundabouts work great in Europe because everyone knows the laws and rules of entering and exiting. Most people in the US have never been taught on the proper use and etiquette of roundabouts.”

- “Seems to have helped with traffic”

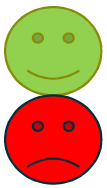
- “Still in the review/understanding part. Concern is that the traffic issues will only be pushed down the road.”

- “sure - they are better than stop lights”

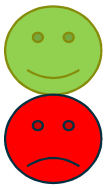
- “The city calls them “traffic calming devices”. We call them “emergency response delay devices”.”

The Results – Testimonials

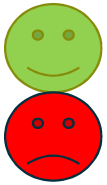
- “The Fire Department sees little involvement with large accidents at roundabouts. It has reduced the lag of traffic at many intersections throughout the community.”
- “The roundabouts have been in place about 7 years. Prior to that we average one fatality per year on a high speed motor vehicle accidents. Since the roundabouts, we have had only one death. This was from a motorcycle that did not slow down for the roundabout and when they hit the curb, his passenger fell of the back hitting their head on the concrete with no helmet. All other accidents have been minor and deflective in nature due to the curvature of the roundabouts. It has lengthened our response times and I do have some concern of the large engines constantly turning left and creating a repetitive stress on the apparatus, however I do not have any study or document to support this.”



The Results – Testimonials



- “The roundabouts in Las Vegas are is less congested areas. I have not had any issues with roundabouts here. I have experienced merging issues in other cities when the roundabout has a lot of vehicle traffic.”



- “The roundabouts seem beneficial in traffic flow. The median splitters have not done their job in reducing speed.”

The Results – Testimonials

- “The roundabouts that are in our region seem to be poorly planned and thought out, and crammed into tight locations. If they are placed in wide open locations with know growth patterns and then made large enough to handle the growth, then I seen nothing wrong with them. However in our region, they seem to be the "duct tape" fix used by ALL MNDOT engineers as the latest fad to fix poorly planned and laid out road networks. IF the roundabout is made with some sort of elevated island, i see this as extremely dangerous as vehicles cannot see across them to see what kind of traffic load is utilizing the roundabout. If you leave it flat and bare, then many simply drive straight through the center. Lets look at pre-planning our communities better rather than duct taping the know problems 40 years later. BTW if Winona had a rail overpass we wouldnt need at least one of the proposed roundabouts.....”

The Results – Testimonials

- “Traffic flows better so there is less chance of a block up during an emergency response. I have not responded to an injury accident at a roundabout intersection in my memory.”

- “Very hard to drive a ladder truck going around a roundabout especially since it is top heavy. Many citizens are confused on how to handle them and no consistency on the merging lanes.”

- “We are more concerned about the reductions in deaths and serious injury crashes at these rural intersections than any difficulties with driving through them. We have had roundabouts for 15 years and have seen remarkable safety improvements to our roadways”

The Results – Testimonials

- “We as emergency vehicle operators hate them, they cause huge clusters because people get into a panic and don’t understand how to properly yield / go at appropriate times. When an emergency vehicle is driving emergent, it clogs up the appropriate late of traffic as people are afraid to move out of the way due to oncoming traffic. Taking on the opposite lane is more hazardous for similar reasons. Drivers are so focused on proper yielding and following the flow of traffic that they don’t react quickly enough to emergency vehicles.”

The Results – Testimonials

- “We can objectively say that roundabouts are safer for the general public both in terms of vehicle-vehicle collisions and vehicle-pedestrian collision, and as public safety providers we should support any measure that increases public safety. That being said, anyone who complains roundabouts interfere with responses times are is just full of shit and are frankly bullshitting themselves and the general public. First off, driving anywhere lights and sirens (Code 3) is totally overrate, it almost never saves you time, it only helps prevent delays. If you're averaging 60 mph over 1 mile then that will take you 60 seconds to complete, but let's say you have to slow down to go through a roundabout and you only average 55 mph, now your response time is 65 seconds - totally negligible. FEMA's Emergency Vehicle Operations Course outlines that all emergency vehicles should stop at stop signs/red lights regardless, so if you're replacing a stop control intersection, you're not losing anything because half the time you should be stopping anyway. All of the emergency vehicle-to-traffic signal systems I am aware of/have used, only provide for an all way red at intersection while emergency vehicles are approaching - so you're suppose to stop anyway. I can tell you after working Fire/EMS for almost a decade, any cop, EMT or firefighter that tells you 30 seconds can mean the difference between life and death is an idiot. Follow any patient from the ambulance to the ER, 99% of the time you put them in a bed and then the Emergency Department ignores them for half an hour because they're not really actively dying. During my last round of clinical rotations I had two patients who were shot, but they weren't mortally wounded or actively dying, so after a quick assessment, they were left in their emergency beds until surgery could be scheduled to remove the bullet fragments. The point of that story is that those EMTs brought those guys in code 3, flying through town, risking their lives and the lives of other drivers and pedestrians because it seemed like an emergency, and it really wasn't. Showing up to the ER 1 minute, 5 minutes later, or even an hour later wouldn't have made any difference at all. That's what I mean when I say anyone who tells you roundabouts negatively effect public safety are full of shit. In all over my years driving code 3 through a roundabout I think maybe once or twice did I have to mount the curb to get around somebody, and I think in both of those cases they were just old people who were startled/confused so they stopped in the middle of the roundabout. I strongly support roundabouts because they improve safety/survival for the population as a whole - and that should be our goal as emergency service providers.”

The Results – Testimonials

- “We have a seen a decrease in crashes at intersection that have been converted to roundabouts.”

- “We have had many days where we were almost struck in the roundabout. People pay no regard to the firetruck in the circle and pull in front of us on a regular basis. We have no way to navigate with all the concrete and the roundabout traffic has nowhere to pull off the allow us to pass.”

- “We have had one squad related accident in a roundabout. Our officer was at fault, there were no injuries and minimal damage to either vehicle.”

The Results – Testimonials

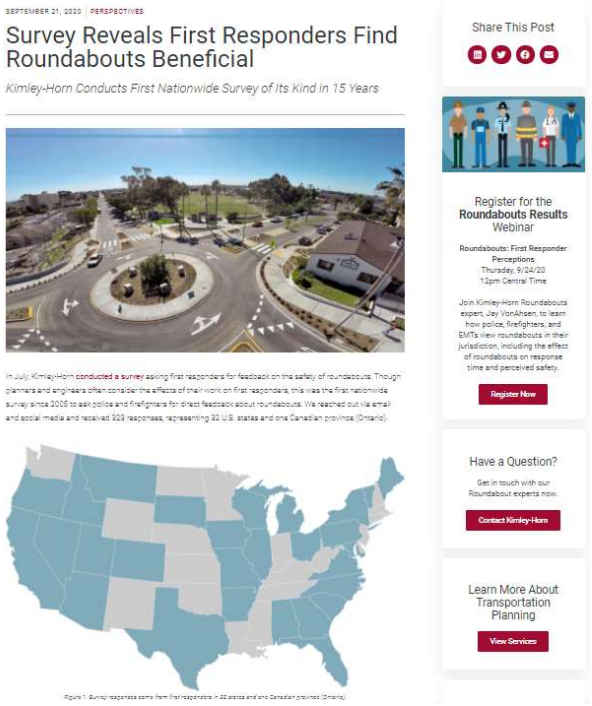
- “We would have many PI accidents as well as fatal PI's at this intersection. Since the installation of this roundabout 3 years ago, we have had no accidents. this particular roundabout is large and flat and very well lit up (12 LED street lights). It's large enough for farm equipment and any emergency vehicle.”
- “When driving, I like the roundabouts during emergency response because I only have to clear the traffic coming left upon entering, unlike an intersection where I might have to clear multiple lanes of traffic from two different directions and have some blind spots when it is a 6 lane road with a median.”

The Results – Testimonials

- “With less traffic queueing, round abouts make traveling through difficult intersections much easier. We are also seeing less right angle collisions.”

Resources

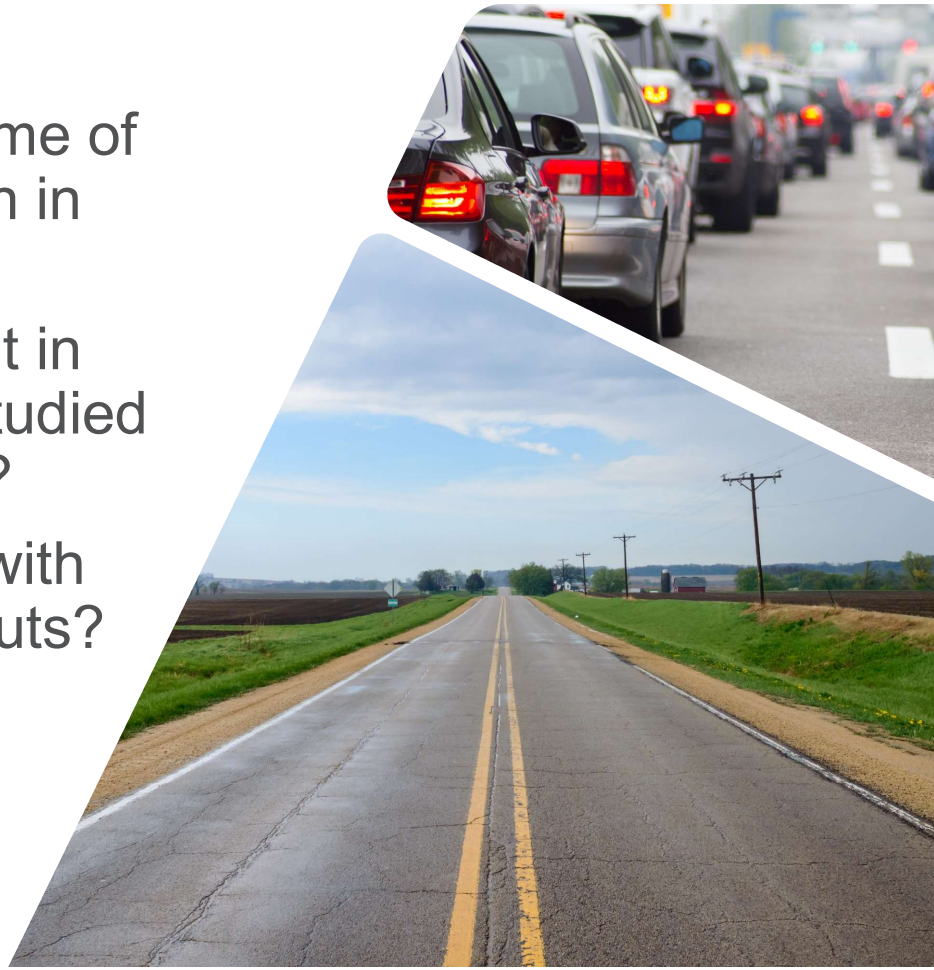
Kimley-Horn Thought Leadership Page



https://www.kimley-horn.com/survey-reveals-first-responders-find-roundabouts-beneficial/

Questions

- Would your agency like to receive some of the public outreach documents shown in this presentation?
- Do you have a dangerous roundabout in your community you feel should be studied to see if improvements can be made?
- How else can engineers collaborate with first responders to improve roundabouts?



Thank you!

September 24, 2020

J.L. VonAhsen

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Kimley»Horn