



U.S. Department of Transportation
Federal Highway Administration

ROUNDAABOUTS & First Responders

Saving Lives Together



Strengthening Partnerships

Wisconsin Guidance on Reacting to Emergency Vehicles in Roundabouts
<https://wisconsin.dot.gov/Documents/safety/safety-eng/roundabouts/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=Mywmtskfrill>

British Columbia MOT Video on Navigating a Roundabout with Emergency Vehicles
<https://www.youtube.com/watch?v=Ik9n1uVa8LE>

Strengthening Partnerships

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

For More Information

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

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

Cooperatives: Capital Highway, Jeff. A. V. Hwy. Paul LaBarr, Bill D. Jeff. Wang, Wash. County Highway Department

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.

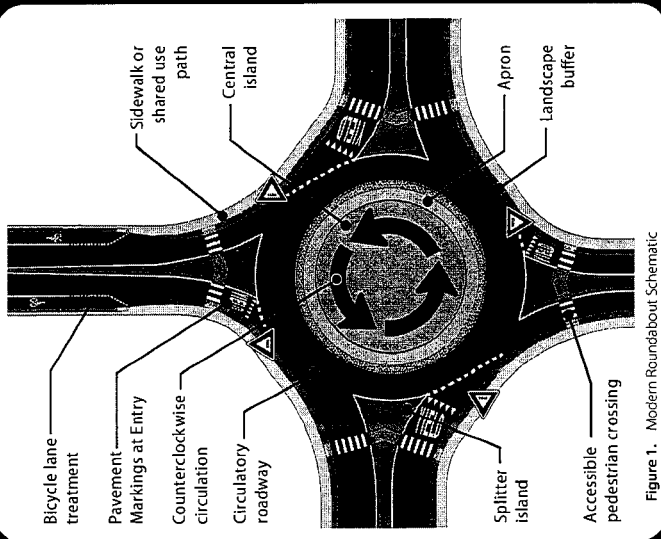


Figure 1. Modern Roundabout Schematic

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 Highway Safety Manual, American Association of State Highway and Transportation Officials, Washington, DC, 2010.

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, WISDOT

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.

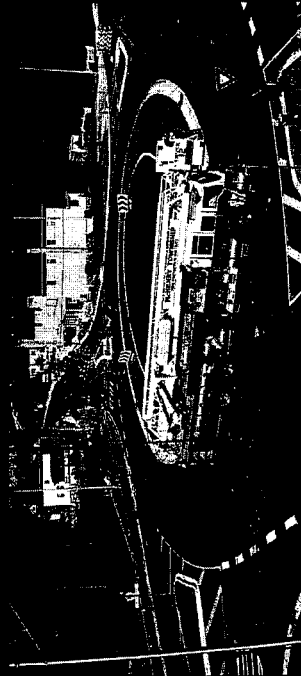
¹ Highway Safety Manual, American Association of State Highway and Transportation Officials, Washington, DC, 2010.

² Campbell, K.L., *Traffic Collisions Involving Fire Trucks in the United States*, UMTRI-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

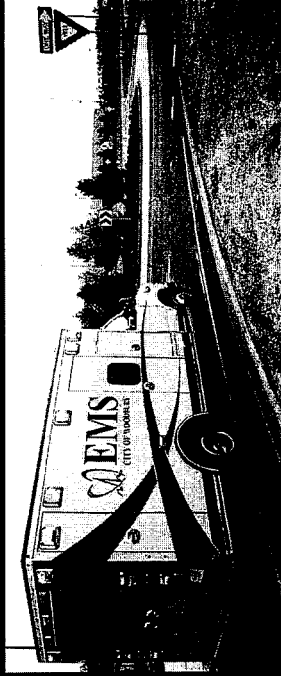
Designing for First Responders



Source: Jeff Touhy, Adams 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.



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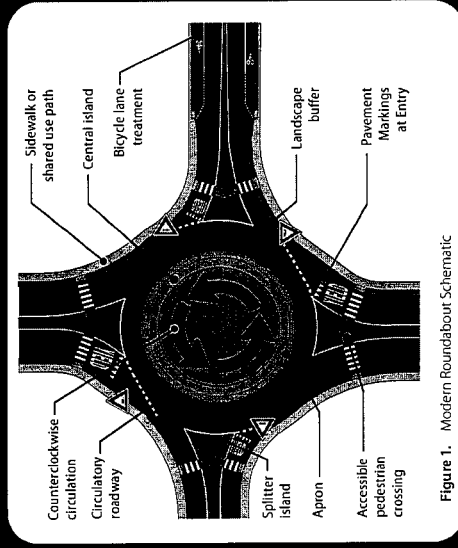


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Cover image source: Washington State Department of Transportation (WSDOT)

State Hwy 55 at County Hwy KK

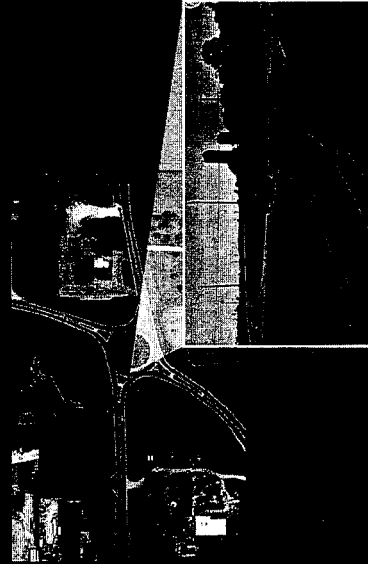
Calumet County, Wisconsin

The intersection of State Trunk Highway 55 (STH 55) and County Trunk Highway KK (CTH KK) was originally a two-way stop-controlled intersection with a 55 mph posted speed limit on each approach. In a five-year period (2001-2005), 30 crashes occurred at the intersection resulting in 17 people injured and one person killed.

The Wisconsin Department of Transportation (WisDOT) added intersection warning signs along STH 55 in advance of CTH KK and lowered the approach posted speed limits to 45 mph, but crashes continued to occur.

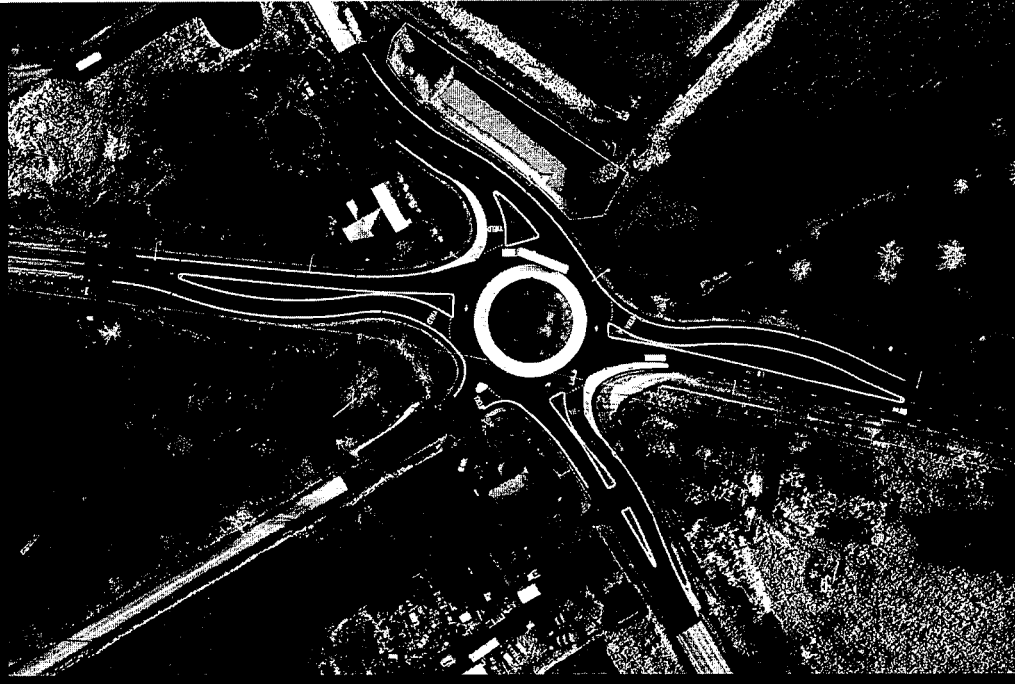
In 2006, WisDOT decided to reconstruct the intersection as a roundabout. They modified the design to account for the high-speed approaches by providing longer splitter islands and pavement markings, along with enhanced signing. These features help drivers recognize the roundabout well in advance, and to reduce their speed accordingly.

In the six-year period after construction, WisDOT reports there have been 11 total crashes resulting in one person injured and zero fatalities. These significant reductions in crashes made this project a success for WisDOT, and helped them move forward with other roundabouts along rural highways throughout the state.



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.

ROUNDABOUTS & Rural Highways



Common Problems/Concerns

Crashes at rural intersections often involve high speeds, which tend to result in severe injuries or fatalities. Roughly 1/3 of annual intersection fatalities in the U.S. occur along rural, two-lane highways.

In many rural environments, drivers can miss a stop sign or traffic signal, leading to running through a stop sign or red light and resulting in an angle crash.

For a driver turning left across oncoming traffic, it can sometimes be difficult to judge the speed of the approaching vehicle, resulting in misjudged gaps, and potentially severe crashes.

It doesn't seem like people would slow down for a roundabout along rural highways. Motorists will just drive right into or over the roundabout because they won't be able to slow down in time.

In the northeastern U.S., circles are being signalized or removed because they do not work.

Why build something "different", when all that is needed is either stop signs or a traffic signal?

Why Consider a Roundabout

Roundabouts are geometrically designed for drivers to negotiate the intersection at speeds in the range of 15-25 mph, regardless of the posted speed limits on approaches.

Because roundabouts require vehicles to yield and then navigate around a raised, circular island, the possibility of an angle crash is significantly reduced.

With roundabouts, there is no need to make a turn across opposing traffic. Entering vehicles yield to traffic already in the circle, and proceed when there is a safe gap.

High-speed approaches to roundabouts include advance signing, pavement markings and raised channelization. With proper design, drivers adjust their speeds, slow on approach, and navigate the roundabout safely.

The old traffic circles and rotaries that are common in the northeastern U.S. are not modern roundabouts.

Improvements like stop signs and signals, while very familiar, aren't always the safest choice. With intersections representing about one-quarter of annual U.S. traffic fatalities and roughly half of all injury crashes, safer designs are needed that improve mobility while saving lives.

Real World Results*

Roundabouts constructed at intersections along high-speed, two-lane rural highways reduced overall crashes by up to 68% and reduced injury crashes by up to 88%.

Roundabouts constructed at intersections along high-speed, two-lane rural highways eliminated 83% of angle-type crashes.

There were 11 fatal crashes in the 5 year "before" period and ZERO fatal crashes in the 5 year "after" period at 19 roundabouts constructed along high-speed, two-lane rural highways in six different states (KS, MD, MN, OR, WI, and WA).

Researchers compared traffic speeds of approaches to roundabouts and stop-controlled intersections. At 100 feet before the yield or stop lines, the speed of traffic at the roundabouts was 2.5 mph lower than at the stop-controlled locations.

Roundabouts are designed for slower speeds, require entering traffic to yield to vehicles already in the circular roadway, and to eliminate the need to weave or change lanes to exit.

Since the late 1990s, an ever growing number of State DOTs and local road agencies are finding that roundabouts work in their jurisdictions. Their potential for saving lives is too significant to ignore.

* Sources:

Lesnar, G.S., H.S. Hallmark, & H. Williams. "Effects of Approach Speed at Rural High-Speed Intersections." Transportation Research Board, Volume 2462, Transit Labor Research Board, National Research Council, Washington, DC, 2014
Islands, H. and S. Hallmark. "Statistical Analysis and Development of a Crash Prediction Model for Roundabouts on High-Speed Rural Roadways." Transportation Research Record, Journal of the Transportation Research Board, Volume 2489, Transportation Research Board, National Research Council, Washington, DC, 2012.