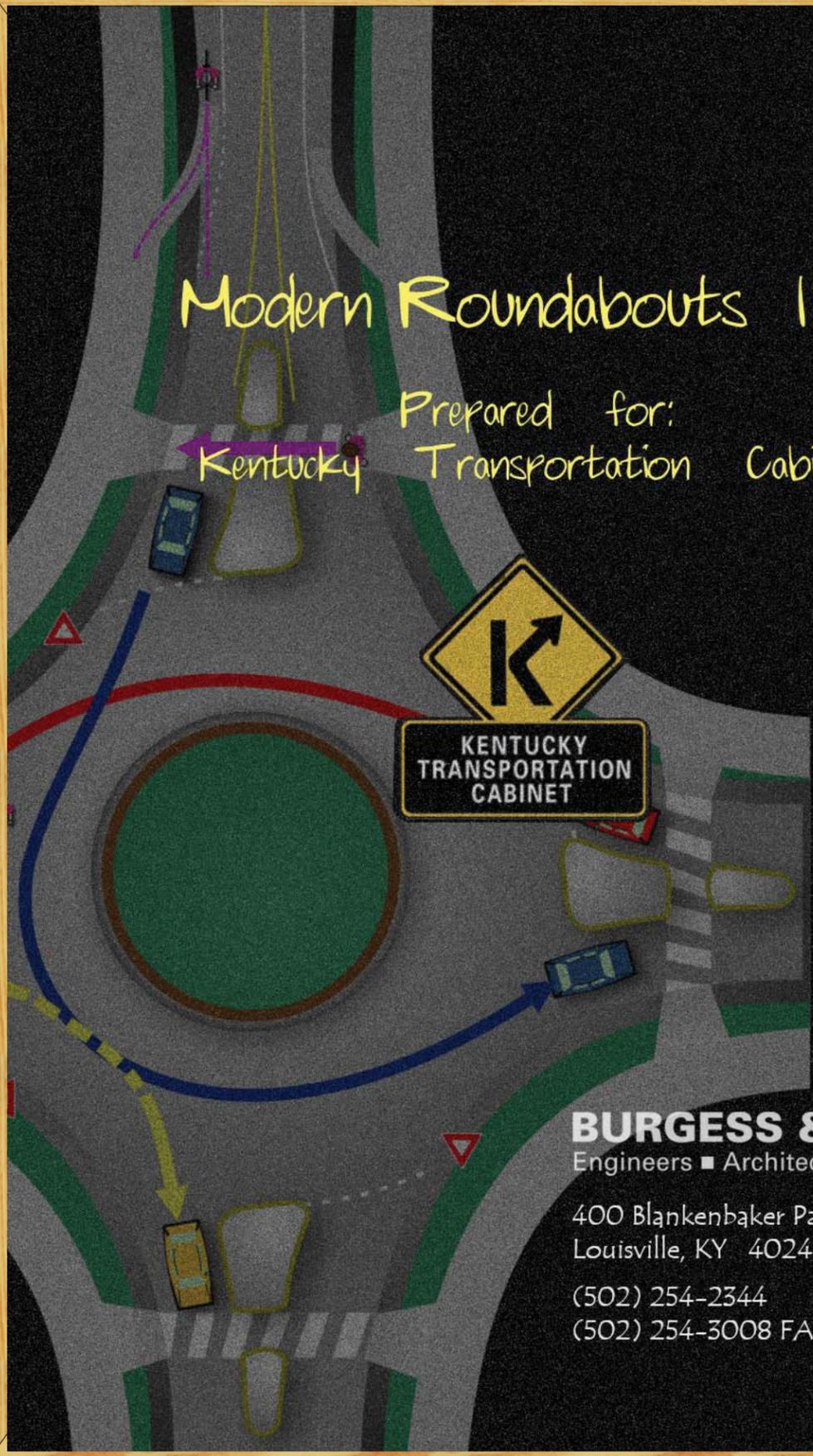


Modern Roundabouts 101

Prepared for:
Kentucky Transportation Cabinet

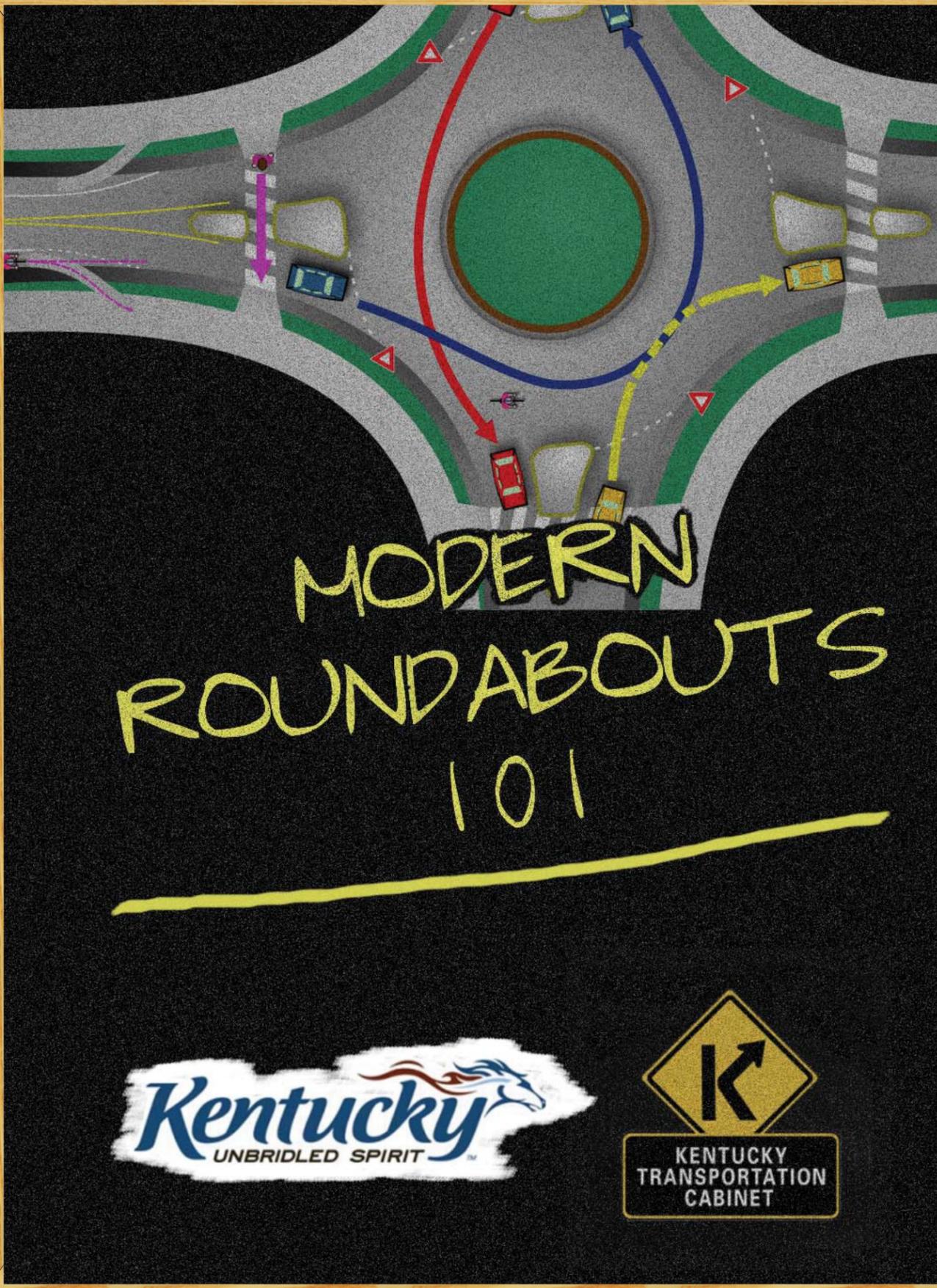


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MODERN ROUNDABOUTS 101



WHAT IS A MODERN ROUNDABOUT?

A modern roundabout is an unsignalized one-way circular intersection engineered to maximize safety and minimize traffic delay. Modern roundabouts can range in diameter from 45 – 200 feet with operating speeds typically ranging from 15 – 25 mph. Modern roundabouts are not traffic circles, rotaries, or neighborhood traffic calming circles. Traffic circles and rotaries are large diameter circles (>300 feet), which fell out of favor in the 1950's due to high vehicle speeds (>30 mph) and confusing weaving maneuvers exasperated by entering vehicles often given priority. Neighborhood traffic calming circles are small in diameter, generally placed on low volume residential streets, and may be stop-controlled or multi-directional.

Modern roundabouts are distinguished from these other circulatory intersections by three basic principles:

- **Yield at Entry:** Traffic entering the circle yields to traffic already in the circle.
- **Traffic Deflection:** Pavement markings and raised islands direct traffic into a one-way counterclockwise flow.
- **Geometric Curvature:** The radius of the circular road and the angles of entry can be designed to slow the speed of vehicles.

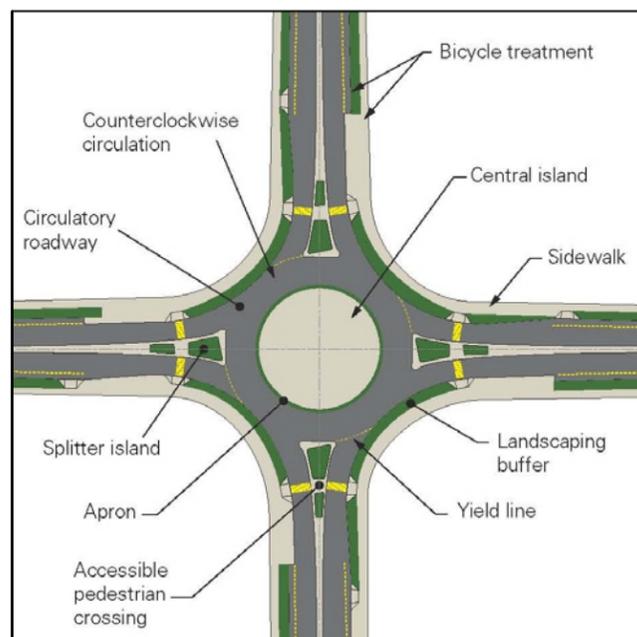


Figure 1. Key roundabout features and components.
Courtesy of Federal Highway Administration (FHWA)

Key features and components of a modern roundabout are highlighted in Figure 1 (Left) and Figure 2 (Below).

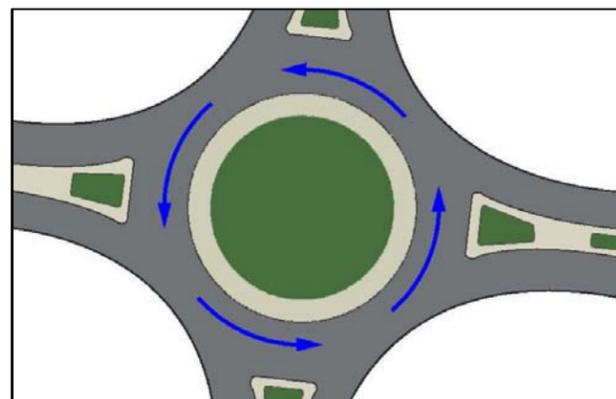


Figure 2. Continuous counterclockwise traffic flow in circulatory roadway.
Courtesy of Federal Highway Administration (FHWA)

Over the last few decades, thousands of roundabouts have been installed in Europe, Australia, and other parts of the world. Recently, they have gained support in the United States with states such as Maryland, Colorado, Florida, Kansas, Ohio, Indiana, Wisconsin, and New York, using roundabouts successfully. Drivers in those states also are becoming comfortable with their use and operation. In the cities and towns where roundabouts have been built, and even where the public has been hesitant about accepting them initially, roundabouts ultimately have been accepted because of the increased safety, traffic calming, and aesthetic benefits they provide.

WANT MORE INFORMATION?

Federal Highway Administration (FHWA)

www.fhwa.dot.gov

www.tfsrc.gov/safety/00068.htm

Insurance Institute for Highway Safety (IIHS)

www.highwaysafety.org

New York State Department of Transportation (NYSDOT)

<https://www.dot.ny.gov/main/roundabouts>

<https://www.dot.ny.gov/main/roundabouts/background>

Maryland Department of Transportation (MDOT)

<http://www.sha.maryland.gov/Pages/roundabouts.aspx>

Kansas Department of Transportation (KDOT)

http://www.ksdot.org/burtraffice/roundabouts/Roundabout_Guide/RoundaboutGuide.asp

Kansas State University

<http://www.k-state.edu/roundabouts>

Arizona Department of Transportation (ADOT)

<http://www.azdot.gov/about/transportation-safety/roundabouts>

Wisconsin Department of Transportation (WisDOT)

<http://dot.wi.gov/safety/motorist/roaddesign/roundabouts/index.htm>

Oregon Department of Transportation (ODOT)

http://www.oregon.gov/ODOT/HWY/ENGSERVICES/Pages/roundabout_home.aspx

Washington State Department of Transportation (WSDOT)

<http://www.wsdot.wa.gov/safety/roundabouts/>

Florida Department of Transportation (FDOT)

www.dot.state.fl.us/trafficoperations/operations/PDFs/FDOT%20-%20202%20Lane%20Roundabout.pdf

California Department of Transportation (CALTRANS)

<http://i80.dot.ca.gov/hq/oppd/roundabt>

NAVIGATING A MODERN ROUNDABOUT

MOTOR VEHICLES

- When approaching the roundabout, slow down and yield to pedestrians in the crosswalk.
- Approach the yield line, look to the left, and enter the roundabout when there is an adequate gap in the circulating traffic flow. Remember, traffic in the roundabout has the right-of-way.
- Keep your speed low and proceed counter-clockwise to your exit. Remember you now have the right-of-way and never stop in the roundabout.
- As you approach your exit, turn on your right turn signal and exit the roundabout, yielding to pedestrians in the crosswalk. Do not accelerate until after crossing the pedestrian crosswalk.
- Bicyclists are permitted to ride within the roundabout and shall be treated as another vehicle. Do not pass a bicycle in the roundabout.
- Drivers should behave in the same manner as they would on any other road if an emergency vehicle approaches, move as far right as possible to let the emergency vehicle pass. Do not enter the roundabout when an emergency vehicle approaches from another leg of the intersection. Allow vehicles in the roundabout to clear in front of the emergency vehicle.

TRUCKS AND EMERGENCY VEHICLES

- Large trucks and emergency vehicles drive on the circulatory roadway the same as other motor vehicles except they may use the provided truck apron to negotiate the tight turning radius of the roundabout. Generally, only the trailing wheels will track over the raised pavement of the truck apron.

PEDESTRIANS

- Stay on the designated walkways at all times and never cross the circular roadway to the central island.
- Cross the crosswalk one lane at a time, using the splitter island as a refuge before crossing the next lane.
- When crossing the street from curbside, look to your left for oncoming traffic. You have the right-of-way, but be careful, making sure drivers can see you and stop for you.
- When crossing the street from within the splitter island, look to your right for oncoming traffic.

BICYCLISTS

- Bicyclists can continue through the roundabout taking the travel lane like a motor vehicle or exiting and using a crosswalk as a pedestrian.
- Bicyclists using the circulatory roadway shall follow the same rules as a motorist. Ride at the speed of the circulatory roadway to discourage cars from passing you and use a hand signal when exiting.
- If you are unsure or uncomfortable using the roundabout, exit, dismount, and walk your bike as a pedestrian at the designated crosswalks.

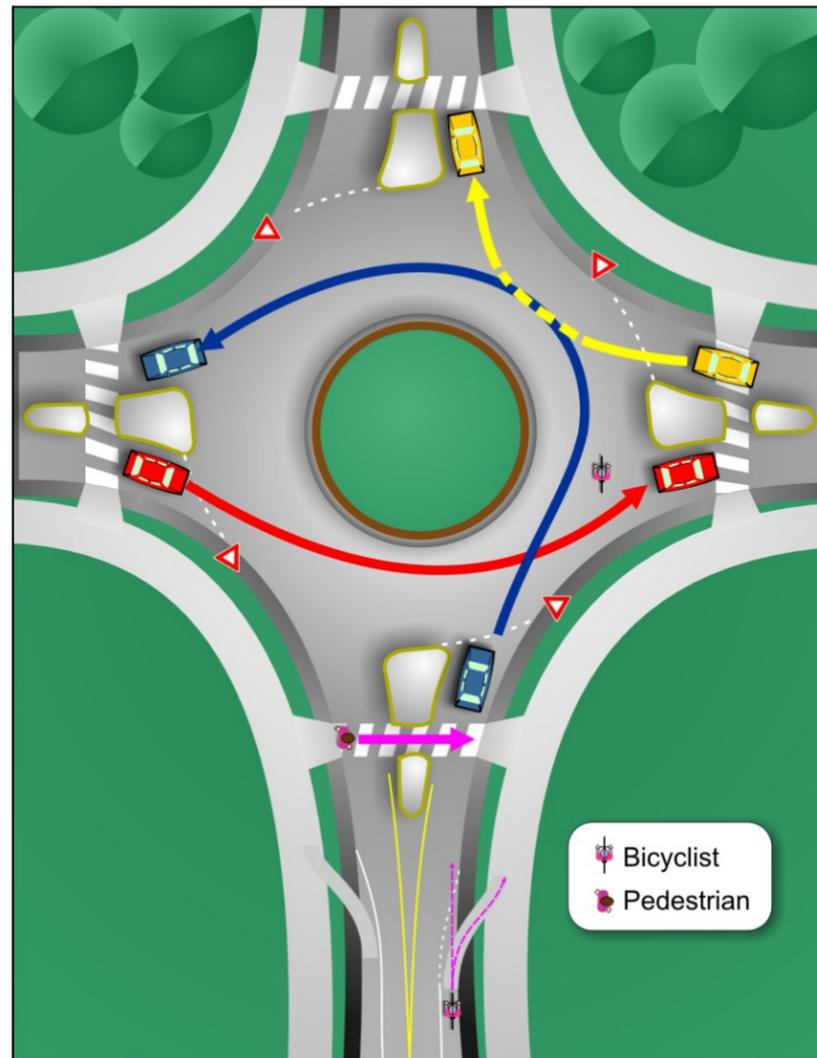


Figure 6. Schematic of Roundabout Usage

WHERE ARE MODERN ROUNDABOUTS IN THE UNITED STATES?

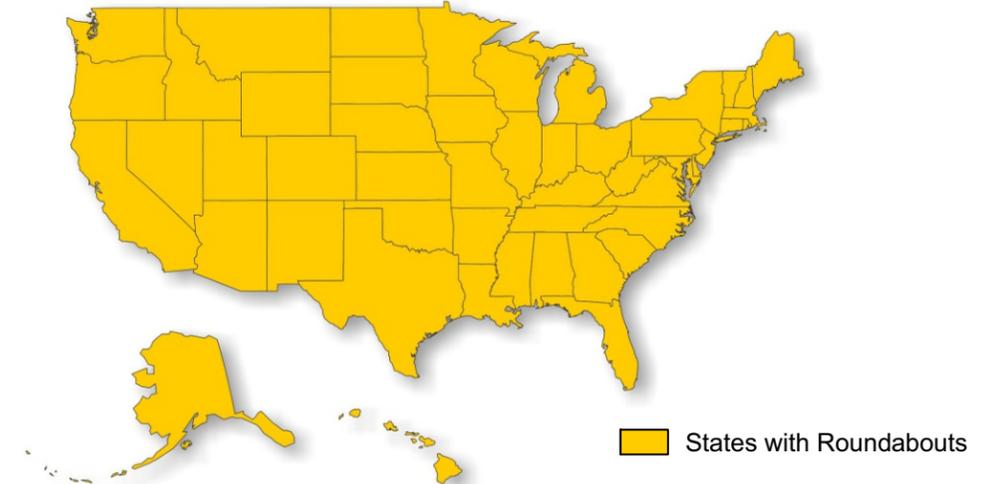


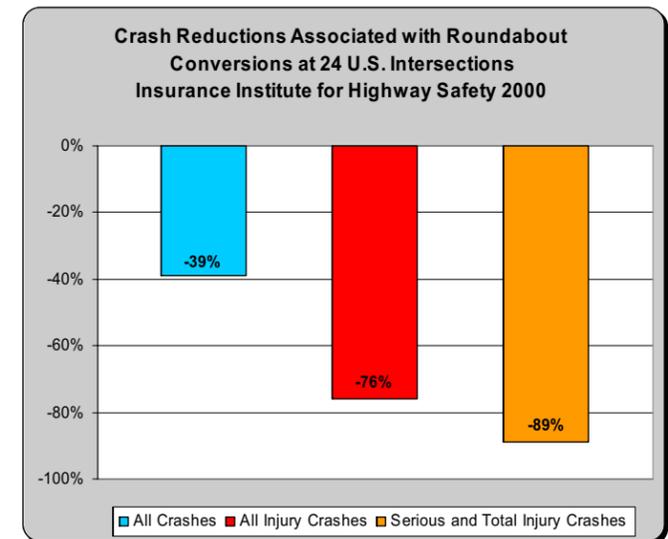
Figure 3. Map of United States with states containing roundabouts highlighted in yellow. Source: NE Roundabouts, RoundaboutsUSA, and Kittelson & Associates, Inc. and others.

ROUNDABOUT EFFECTIVENESS

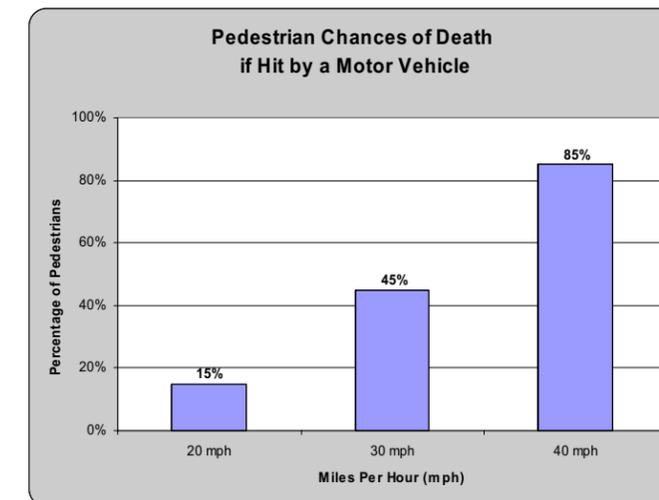
Recent studies in the United States show that roundabouts can dramatically improve safety and reduce delays at intersections. This parallels findings from studies performed in Europe and Australia.

A 2000 study by the Insurance Institute for Highway Safety evaluated changes in motor vehicle crashes following conversion of 24 intersections from stop sign and traffic signal control to modern roundabouts. The settings were located in 8 states and included a mix of urban, suburban, and rural environments. The study found that after converting to roundabouts:

- Total crashes declined by 39%
- All injury crashes declined by 76%
- Serious injury/fatal crashes declined by 89%



Source: Insurance Institute for Highway Safety (IIHS)



Source: Insurance Institute for Highway Safety (IIHS)

The study also found that roundabouts:

- Reduce pedestrian crashes by 30 – 40%
- Reduce bicycle crashes by 10%

The probability of a fatal pedestrian crash is small in the 15 – 25 mph traveling speed range of most roundabouts.

SAFETY AND OPERATIONAL PERFORMANCE

How do roundabouts reduce accidents so dramatically? While a standard signalized intersection has 32 potential *vehicular conflict points*, or spots where vehicles could collide, modern roundabouts reduce that number to 8. That is an impressive 75% reduction in conflict points. Fewer conflict points, combined with slower speeds, easy decision-making, and calmer traffic translate into fewer accidents. In addition, the collision angle between vehicles is more parallel with modern roundabouts, which reduces the severity of crashes (ie. No head-on or T-bone collisions).

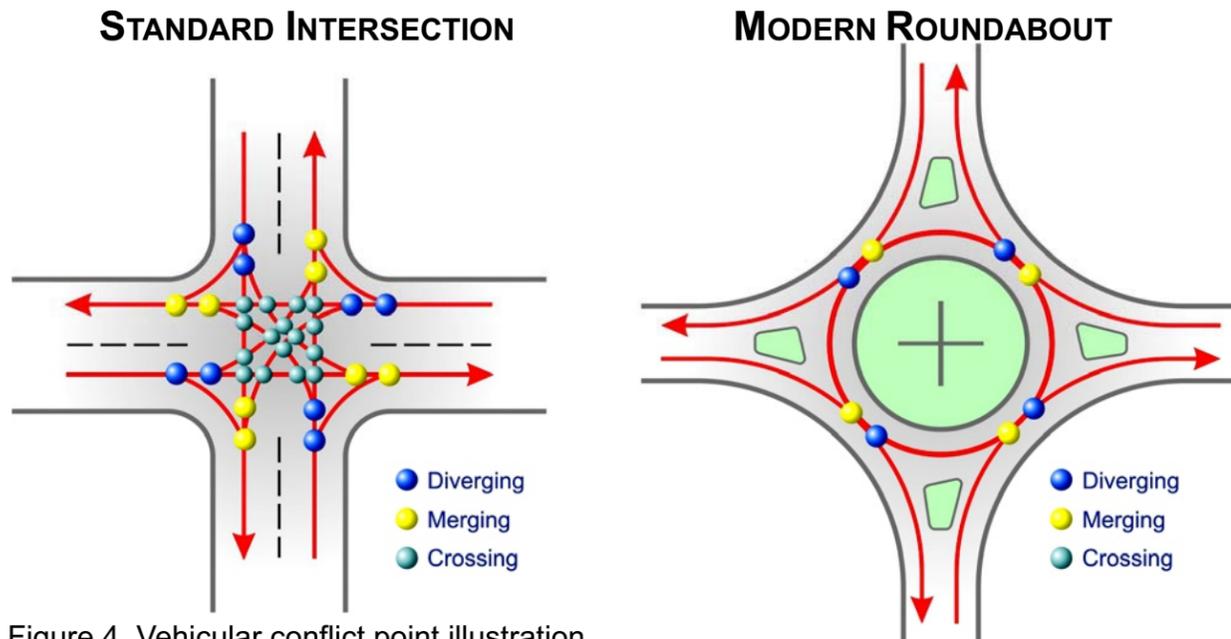


Figure 4. Vehicular conflict point illustration.

Modern roundabouts also reduce *pedestrian conflict points* from 24 at standard intersections to 8. The splitter islands provide refuge for pedestrians and with fewer lanes to cross and cars coming from only one direction, it is easier for pedestrians to determine gaps in traffic. There have been zero severe injury or fatal pedestrian or bike crashes at a U.S. modern roundabout.

Modern roundabouts are also extremely efficient. Traffic is always on the move, so driver delay is reduced by allowing motorists to yield rather than stop. Modern roundabouts also increase traffic capacity through the intersection by 30 – 50%.

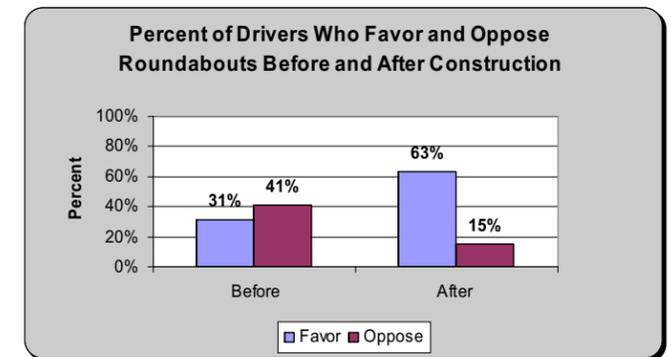


In addition to the safety benefits, modern roundabouts provide countless other benefits.

- The improved traffic flow reduces the need for storage lanes and provides a substantial reduction in pollution and fuel use.
- No signal equipment to repair, maintain, and operate saves electricity and maintenance costs.
- Benefits to the community include traffic calming and the aesthetic treatments that can be incorporated into the design of a roundabout. Many roundabouts serve as a gateway to the community, a development, or a neighborhood.

WHAT ARE PEOPLE SAYING ABOUT ROUNDABOUTS?

American motorists are often skeptical of roundabouts before they are introduced, but experience with roundabouts quickly wins them over. Many drivers simply prefer the traffic controls with which they are more familiar. After all, resistance to the unknown is a natural tendency. However, since properly designed roundabouts are as safe and efficient as proclaimed, studies show that twice as many drivers favor roundabouts after installation, compared with before.



Source: Insurance Institute for Highway Safety (IIHS)

Miscellaneous Quotes:

“When it was first installed, we anticipated it would be difficult... But, surprisingly, it’s gone very well.”
- Brattleboro, VT

“We have had a lot of people not very happy about the idea of roundabouts, but after they are constructed, those fears mostly go away.”

- Seattle, WA

“It slows them down... We used to get a lot of people coming down at high speeds, but now you have to stop to get through those circles.”

- Howard, MD

“When I first heard it was going in, I thought, ‘That’s crazy; that will never work’... Now, traffic keeps moving all the time, I’ve changed my mind 180 degrees.”

- Bellevue, WA

“At first, I was a little apprehensive-wondering how they would work to slow traffic... Overall, I’m very pleased with the way they’ve slowed traffic down. Traffic in general is traveling at a much slower rate in front of our school than it was prior to the roundabouts.”

- Linville Intermediate
Principal Chuck Templer
Howard, WI

“There is no backup of normal traffic at a roundabout compared to a signal or sign control. The roundabout protects emergency vehicles and personnel from the right angle crash.”

- Montpelier Fire Chief
Norm Lewis
Montpelier, VT

“I’m not an expert on traffic, but I was convinced it wasn’t going to work out... I guess sometimes you just have to trust the opinions of the traffic experts.”

- Citizen
Greenwich, NY

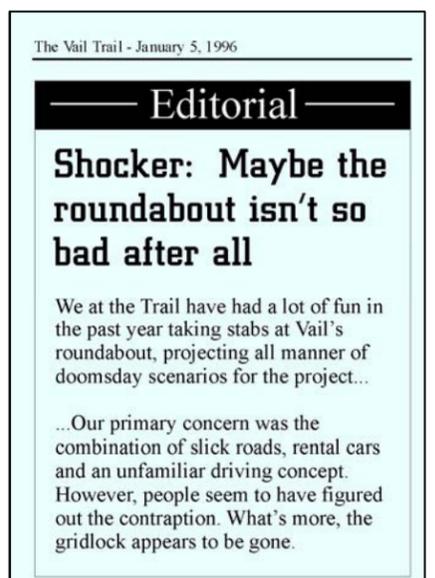


Figure 5. Editorial from *The Vail Trail* of Vail, Colorado, pertaining to two recently constructed roundabouts which were eventually voted best public works project for the next consecutive five years. Courtesy of The Vail Trail.