

UNSIGNALIZED INTERSECTION SAFETY STRATEGIES



Provide Roundabouts at Appropriate Locations

WHERE TO USE

Unsignalized intersections that are experiencing right-angle, rear-end, and turning crashes. Roundabouts are appropriate at most intersections, and at intersections with large traffic delays roundabouts are oftentimes a superior alternative to signalization. Roundabouts can also be very effective at intersections with complex geometry (e.g., more than four approach roads) and intersections with frequent left-turn movements.



Photo by: FHWA

DETAILS

The modern roundabout is a circular intersection with design features that promote safe and efficient traffic flow whereby vehicles travel counterclockwise around a raised center island, with entering traffic yielding the right-of-way to circulating traffic. Drivers approaching a roundabout must reduce speed, be prepared to stop for pedestrians and bicyclists, and look for potential conflicts with vehicles already in the circulatory roadway. Appropriate geometric curvature on the roundabout entry controls speeds. Once in the roundabout, vehicles maintain low speeds due to deflection of traffic around the center island as drivers proceed to the appropriate exit following the guidance provided by traffic signs and pavement markings. Modern roundabouts have key differences that distinguish them from older traffic circles and rotaries. Design guidance for roundabouts is provided in *Roundabouts: An Informational Guide* (www.tfhrc.gov/safety/00068.htm).

KEY TO SUCCESS

One key to success is designing the roundabout and its approaches in accordance with accepted geometric design and traffic control criteria. Designs that accommodate the needs of non-motorized users and include proper signing, pavement marking, and intersection lighting are keys to the success of a roundabout. Because public understanding of roundabouts is somewhat limited in many parts of the United States, educating the general public and local units of government about the effectiveness of roundabouts in reducing crashes is advisable.

ISSUES

A major impediment is the negative perception held by some drivers and elected officials. Drivers may be skeptical, or even opposed, to roundabouts when they are proposed. However, opinions quickly change when drivers become familiar with roundabouts. A study by the Insurance Institute for Highway Safety in communities where roundabouts replaced stop signs or signal-controlled intersections found 31% of drivers supported the roundabouts before construction, compared with 63% shortly after. Follow-up surveys conducted in these communities after roundabouts had been in place for more than one year found the level of public support increased to about 70% on average.



Roundabouts are not appropriate everywhere. Intersections that may not be good candidates include those with topographic or site constraints that limit the ability to provide appropriate geometry, those with highly unbalanced traffic flows, and isolated intersections in a network of traffic signals.

Roundabouts provide several advantages for pedestrians over traditional intersections. The splitter islands at the roundabout approaches provide a pedestrian refuge area, and pedestrians cross only one direction of traffic at a time. In addition, crossing distances are relatively short, and traffic speeds are lower than at traditional intersections. The observational studies performed for *NCHRP Report 572 – Roundabouts in the United States* showed that the overwhelming majority of roundabouts observed showed very few problems for crossing pedestrians and traversing bicyclists. However, two-lane legs are more difficult for pedestrians to cross than one-lane legs primarily because of the non-yielding behaviors of motorists. Accessibility of roundabouts for pedestrians with visual impairments is a very important issue. The U.S. Access Board is active in proposing guidelines for accessible rights-of-way, and particular attention to accessibility issues is needed when considering the design of pedestrian facilities at roundabouts.

TIME FRAME ●●●

Provision of a roundabout requires substantial project development. The need to acquire right-of-way will vary from site to site and depends upon the geometric design. These activities may require 4 years or longer to implement. Mini-roundabouts may be able to be built more expediently with signs and markings

COSTS ●●●●

Costs are variable, but construction of a roundabout to replace an existing intersection could run from several hundred thousand dollars to over \$1 million, based on the project location and constraints.

EFFECTIVENESS

PROVEN: Provision of modern roundabouts is a relatively new strategy in the United States, although roundabouts have been used overseas for many years. Recent research has estimated the effectiveness of installing a modern roundabout at previously unsignalized locations at a 38% reduction in total crashes, a 76% reduction in injury crashes, and a 90% reduction in fatal and incapacitating-injury crashes. *NCHRP Report 572* presents the results of the conversion of 36 two-way stop intersections to modern roundabouts, which resulted in an overall 44% percent reduction in total crashes and an 82% reduction in injury crashes.

COMPATIBILITY

Provision of a modern roundabout is typically an alternative to other intersection traffic control and intersection geometric improvements and is not typically used in conjunction with other strategies.

SUPPLEMENTAL INFORMATION

Although the precise number of roundabouts is unknown, estimates are that approximately 1000 have been built in the United States. By comparison, there are about 20,000 roundabouts in France, 15,000 in Australia, and 10,000 in the United Kingdom.

Although many states have established design policies and guidelines for roundabouts, they are still relatively new to many highway agencies, and their use is not yet a widespread intersection strategy in some areas. Several states have implemented formal roundabout preference policies including New York, Wisconsin, and Virginia.

For more details on this and other countermeasures: <http://safety.transportation.org>

For more information contact:

FHWA Office of Safety Design
E71, 1200 New Jersey Avenue SE
Washington, D.C. 20590
(202) 366-9064
<http://safety.fhwa.dot.gov>

FHWA Resource Center - Safety and Design Team
19900 Governor's Drive, Suite 301
Olympia Fields, IL 60461
(708) 283-3545
<http://www.fhwa.dot.gov/resourcecenter>

