Tech Brief Series **Tech Brief - 2019-1**

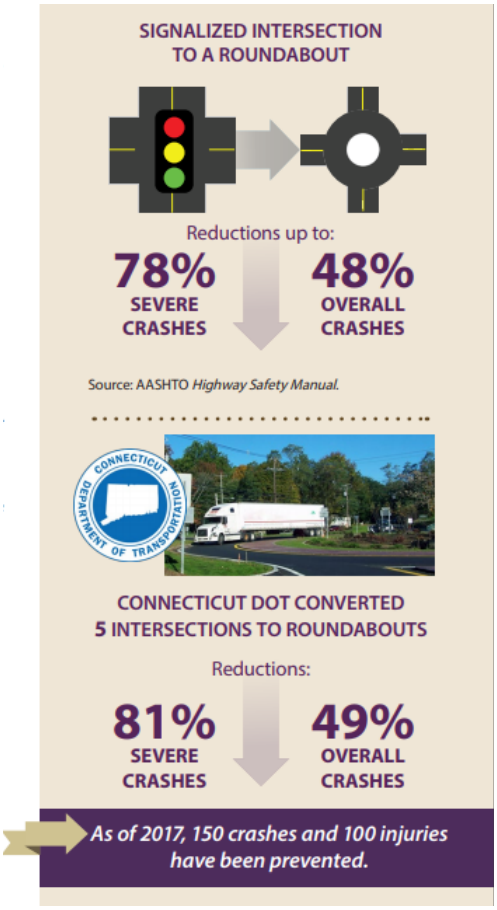
Roundabouts in Connecticut

The Federal Highway Administration (FHWA) encourages agencies to consider roundabouts during new construction and reconstruction projects, as well as for existing intersections that have been identified as needing safety or operational improvements, because roundabouts provide substantial safety and operational benefits compared to other intersection types

The modern roundabout is a type of circular intersection configuration with channelized approaches and a center island that results in lower speeds and fewer conflict points. At roundabouts, entering traffic yields to vehicles already circulating, leading to improved operational performance.

Roundabouts can be implemented in both urban and rural areas under a wide range of traffic conditions. They can replace signals, two-way stop controls, and all-way stop controls.

Roundabouts are an effective option for managing speeds, making it easier for drivers to make decisions and virtually eliminating angle and head-on collisions, which tend to be the most serious crashes. For these reasons, the roundabout is designated by FHWA as a Proven Safety Countermeasure.



Graphic: CTDOT

The table below provides a summary of the general characteristics of the three categories of roundabouts. The typical daily service volumes may serve as a general guide, but an operational analysis should be conducted to determine the capacity of a roundabout under site-specific conditions.

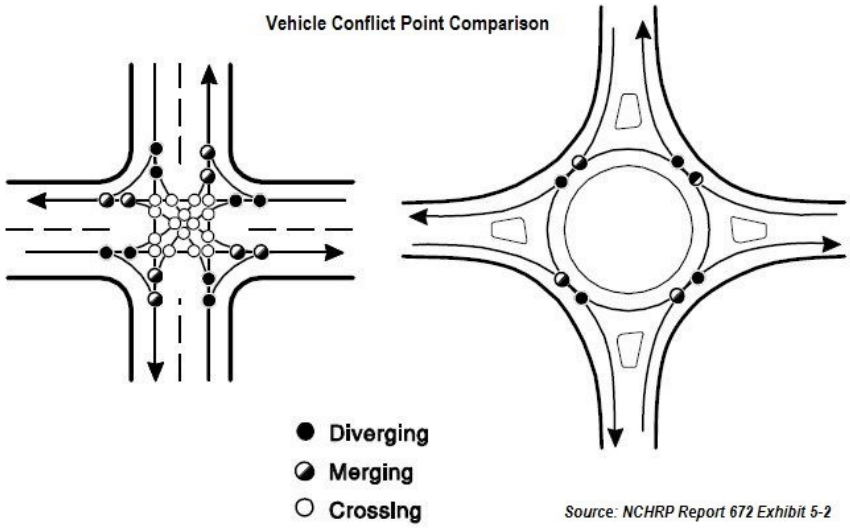
Design Element	Mini-Roundabout	Single-Lane Roundabout	Multilane Roundabout
Desirable maximum entry design speed	15 to 20 mph (25 to 30 km/h)	20 to 25 mph (30 to 40 km/h)	25 to 30 mph (40 to 50 km/h)
Maximum number of entering lanes per approach	1	1	2+
Typical inscribed circle diameter	45 to 90 ft (13 to 27 m)	90 to 180 ft (27 to 55 m)	150 to 300 ft (46 to 91 m)
Central island treatment	Fully traversable	Raised (may have traversable apron)	Raised (may have traversable apron)
Typical daily service volumes on 4-leg roundabout below which may be expected to operate without requiring a detailed capacity analysis (veh/day)*	Up to approximately 15,000	Up to approximately 25,000	Up to approximately 45,000 for two-lane roundabout

Exhibit 1-9, *Roundabouts: An Informational Guide, 2nd Edition*

Items to Consider When Implementing a Roundabout

Safety:

A traditional four-legged intersection has 32 conflict points which include eight merging, eight diverging and 16 crossing conflict points. Roundabouts have only eight conflict points. Most notably there are no crossing conflict pints at a roundabout, eliminating angle and left-turning collisions, which tend to be severe.



Due to the increased number of conflicting and interacting movements, multilane roundabouts often cannot achieve the same levels of safety improvement as their single-lane counterparts. However, the overall safety performance of multilane roundabouts is often better than comparable signalized intersections, particularly in terms of fatal and injury crashes. Consideration should be given to driver familiarity with single-lane roundabouts before considering implementation of a multilane roundabout.

Traffic Operations:

A detailed capacity analysis should be conducted using the appropriate roundabout analysis software in comparing intersection control alternatives.

Spatial Requirements:

Spatial requirements for roundabouts depend upon the size of the roundabout and other factors. Mini-roundabouts can often be accommodated within the pavement of an existing intersection. Larger roundabouts may require more space in the immediate vicinity of the intersection than comparable stop-controlled or signalized intersections due to the turning area requirements for large design vehicles.

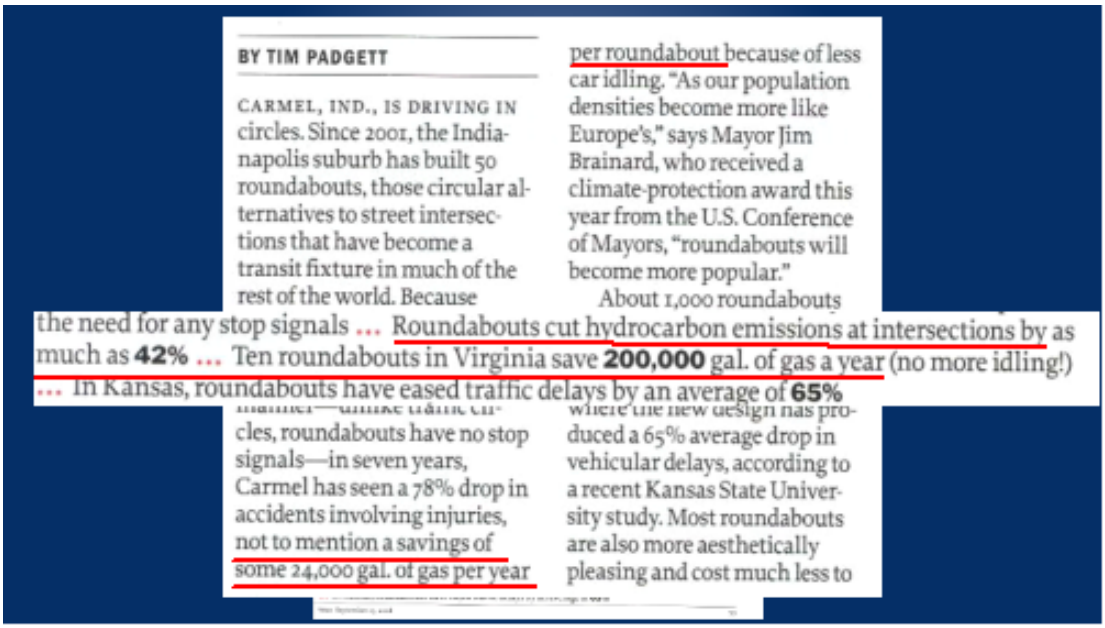
When replacing a signalized intersection with a roundabout, an approach with additional turning lanes may be replaced with a single-lane approach. This is sometimes referred to as the “wide nodes, narrow roads” concept. The right-of-way savings between intersections may facilitate on-street parking, wider sidewalks, planter strips, and/or bicycle lanes.

Access Management:

Roundabouts facilitate U-turns that may substitute for difficult mid-block left turns. Signalized and roundabout intersections have complex effects on traffic up- and down-stream of an intersection, so access management along a corridor should be studied when considering intersection control alternatives.

Environmental Factors:

Roundabouts can reduce noise, air quality impacts and fuel consumption significantly by reducing the number of acceleration/deceleration cycles and the time spent idling.



BY TIM PADGETT

CARMEL, IND., IS DRIVING IN circles. Since 2001, the Indianapolis suburb has built 50 roundabouts, those circular alternatives to street intersections that have become a transit fixture in much of the rest of the world. Because

per roundabout because of less car idling. "As our population densities become more like Europe's," says Mayor Jim Brainard, who received a climate-protection award this year from the U.S. Conference of Mayors, "roundabouts will become more popular."

About 1,000 roundabouts

the need for any stop signals ... Roundabouts cut hydrocarbon emissions at intersections by as much as **42%** ... Ten roundabouts in Virginia save **200,000** gal. of gas a year (no more idling!) ... In Kansas, roundabouts have eased traffic delays by an average of **65%**

cles, roundabouts have no stop signals—in seven years, Carmel has seen a 78% drop in accidents involving injuries, not to mention a savings of some 24,000 gal. of gas per year

where the new design has produced a 65% average drop in vehicular delays, according to a recent Kansas State University study. Most roundabouts are also more aesthetically pleasing and cost much less to

Gateway Treatments and Aesthetic Opportunities:

Installation of a roundabout provides an opportunity for aesthetic enhancement in a community or business district. Signs, flag poles, sculptural elements and landscaping may be featured in the center island. Landscaping in the center island not only provides a visual enhancement but also reduces vehicular speeds through the intersection, increasing safety.

Cost:

A new single-lane roundabout intersection in an unbuilt environment can have construction costs comparable to a traffic signal. Mini-roundabouts can be added in existing pavement areas and are often very affordable. However, as the size of the roundabout increases, particularly in a fully built-out commercial or residential area, the cost of roundabout construction can be higher than that of a traffic signal, depending on the footprint of the roundabout relative to that needed for the signal.

The ongoing operations and maintenance cost of a roundabout can be less than that for a signal. Although the initial construction cost may be more, a roundabout can have less operating and maintenance costs than a traffic signal, and the service life of a roundabout is significantly longer, approximately 25 years compared with 10 years for a typical signal. Additional consideration should be given to illumination at the intersection.

Roundabouts also provide substantial cost savings to society due to the reduction in crashes, particularly fatal and injury crashes, over their service life.

Route 162 at Oyster River and Beach Parking—West Haven, CT

Source: CTDOT

"5 Corners" (Route 74 at Route 286) —Ellington, CT

Source: CTDOT

References and Resources

- Roundabouts: An Informational Guide (2nd Edition), NCHRP Report 672: https://nacto.org/docs/usdg/nchrprpt672.pdf
- CTDOT Roundabouts Page: https://www.ct.gov/dot/cwp/view.asp?a=4109&q=467780&PM=1
- Insurance Institute of Highway Safety: https://www.iihs.org/iihs/topics/t/roundabouts/topicoverview
- Modern Roundabouts: A Livability Fact Sheet, AARP: https://www.aarp.org/content/dam/aarp/livable-communities/livable-documents/documents-2014/Livability%20Fact%20Sheets/AARPLivabilityFactSheet-Modern-Roundabouts-33116.pdf
- The City of Red Deer Roundabout Resources: http://www.roundabout.how/en/index.asp (The section on Driving in a Roundabout has useful videos. This is a Canadian source so the information on signage does not comply with U.S. standards. Consult the MUCTD: https://mutcd.fhwa.dot.gov/pdfs/2009r1r2/pdf_index.htm for signage and striping information).

CTI
Connecticut Transportation Institute
Technology Transfer Center
Celebrating 35 Years

For more Tech Briefs, Tailgate Talks, Safety Briefs or more information about the Connecticut Technology Transfer Center, visit us at: www.T2center.uconn.edu