

Research Makes the Case for Roundabouts

Roundabouts clearly provide safety and mobility benefits, yet some transportation agencies in the United States have been slow to adopt them. NCHRP research established foundational knowledge on roundabout safety, operation, and design that has driven a surge in their use nationwide.



Roundabouts, which help increase safety and reduce congestion, are becoming more common in the United States through the implementation of NCHRP Project 03-65.

Roundabouts in the United States: A Need for Data

In the 1950s, traffic circles fell out of favor in the United States because they allowed for high-speed merging and weaving of vehicles. A remedy for this unsafe and inefficient design was developed overseas: The United Kingdom developed the modern roundabout design that slows entering vehicles and requires them to yield to circulating traffic.

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This design is generally more efficient than traditional intersections, typically reducing congestion by keeping traffic flowing. It is safer as well, minimizing traffic conflict points and reducing the right-angle crashes that lead to more severe injuries and fatalities.

Because of these benefits, modern roundabouts are now widely used internationally. However, the United States has been slower to accept roundabouts because of questions about safety and operational capacity.

To help address such questions, NCHRP Project 03-65 was conducted, which resulted in *NCHRP Report 572: Roundabouts in the United States* (trb.org/news/blurb_detail.asp?id=7086). Researchers inspected several

representative roundabout installations to gather data and compiled a comprehensive inventory of roundabouts in the United States.

The resulting report includes methods for estimating the safety and operational capacity of roundabouts as well as updated design criteria. Technical guidance is spelled out in detail in the companion appendices, *NCHRP Web-Only Document 94* (trb.org/news/blurb_detail.asp?id=7274).

Paths to Practice

Incorporation into widely used tools

The results of NCHRP 03-65 have been incorporated into a number of widely used tools, including *NCHRP Report 672: Roundabouts: An Informational Guide—Second Edition* (trb.org/Publications/Blurbs/164470.aspx). This report is an update to an FHWA guide originally published in 2000, one based primarily on European and Australian guidelines.

“Virtually everything that came out of *NCHRP Report 572* worked its way into the roundabout guide, *NCHRP Report 672*,” says Lee Rodegerdts, the principal investigator who authored both *NCHRP Reports 572*

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and 672. “This is a go-to source nationally for information on roundabouts and is also being used outside of the United States.”

The roundabout capacity model and operational information developed in *NCHRP Report 572* was also implemented into TRB’s 2010 *Highway Capacity Manual* (HCM). “The HCM is widely used by transportation agencies across the United States and can be drawn upon to aid roundabout implementation nationwide,” says Rodegerdts, who is also a former HCM committee member and part of the team that updated the 2010 edition. “It’s a cornerstone document with a huge audience.”

(continued)

Implementation Strategies AT A GLANCE

- The Basis for National Guidance:** Results were incorporated into a number of widely used manuals and specifications such as *NCHRP Report 672*, TRB’s *Highway Capacity Manual*, and AASHTO’s “Green Book.”
- Facts Drive Acceptance:** Beyond demonstrating benefits, the research helped identify and dispel misconceptions that act as barriers to implementation.
- Identifying Additional Needs:** Follow-up projects will improve crash prediction and capacity models, and will address accessibility for the visually impaired. The results will further accelerate implementation.

NCHRP—Transportation research that works

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Results were also incorporated into AASHTO’s *A Policy on Geometric Design of Highways and Streets*, or “Green Book,” as well as several state DOT roundabout guides, noted Mark Doctor, FHWA liaison to NHCPR 03-65. “The breadth of its influence is a testament to the wealth of useful information this project produced,” Doctor says.

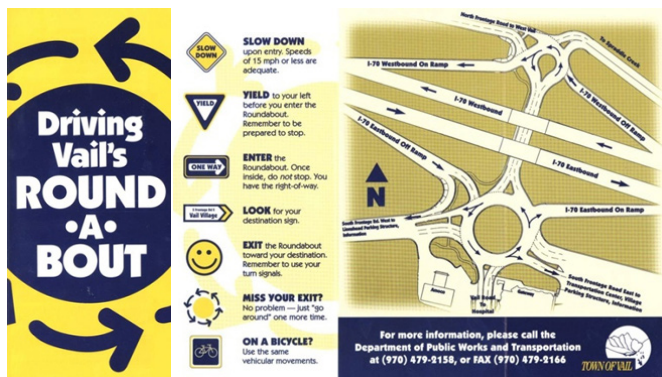
Rodegerdts adds, “With the help of FHWA, TRB, and other agencies, we were able to get our results into key documents used nationally and internationally. That was a critical part of implementation.”

Demonstrating safety, increasing acceptance

Part of the importance of *NCHRP Report 572* is how it continues to drive acceptance of roundabouts by clearly demonstrating their safety benefits. “This is the first large-scale national study to collect field data and make recommendations,” Rodegerdts says. “Our safety data are powerful and definitive.”

Doctor agrees. “Without a doubt, roundabouts are safer than traditional intersections,” he says.

Some of the reluctance to adopt roundabouts in the United States is predicated on public misconception. One common misconception is that a roundabout and a rotary are the same. Rotaries are higher speed facilities and can require changing lanes to exit, making them difficult for drivers to navigate during peak use. Other misconceptions about roundabouts are that they are always more expensive to build than signaled intersections and that they are difficult to learn to navigate. Tools to dispel such myths



Road authorities encourage acceptance of roundabouts by providing guidance to road users who are unfamiliar with them.

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and provide facts to the public are important for acceptance.

“This research is key for states that have challenges with implementation,” Doctor says, “whether in design, or planning, or convincing the public and elected officials that roundabouts are indeed the safer and more cost-effective choice.”

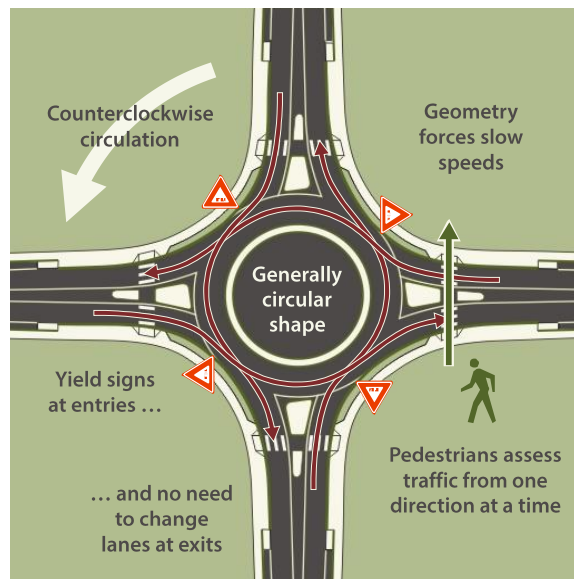
Continued research to accelerate implementation

NCHRP Report 572 has also been the impetus for continued research focused on encouraging implementation. “We’re now 10 years removed from the data collected in 2003 for NCHRP Project 03-65,” Rodegerdts says. “There were about 300 roundabouts in the United States back then, while now there are closer to 3,000.”

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With increasing use of roundabouts, there is also more data—data that can be used to develop more robust capacity and safety models. To that end, NCHRP Project 17-70 is underway to develop roundabout crash prediction models for AASHTO’s *Highway Safety Manual*. NCHRP Project 03-78B is addressing the accessibility of roundabouts to visually impaired pedestrians.

In addition, an FHWA-funded project (kittelson.com/projects/fhwa-topr-34-accelerating-roundabout-implementation-in-the-united-states) is focused directly on accelerating roundabout implementation in the United States by updating capacity and crash models with new data. This is an important project for the evolution of roundabout practice because some practitioners are concerned that current models based on *NCHRP Report 572* data do not reflect the operations of roundabouts at full capacity.



Modern roundabouts are designed for safety and ease of use.

“All of these projects are important descendants of NCHRP Project 03-65 that will help with implementation nationwide,” Rodegerdts says.

Implementation Success

With *NCHRP Report 572*’s broad and definitive influence, NCHRP 03-65 is a model for successful implementation. “The project has significantly improved roundabout design in the United States and made engineers more comfortable with selecting roundabouts as an alternative to other intersection controls,” says project panel member Richard Long, a professor at Western Michigan University with expertise in pedestrian safety. “It also brought to the forefront concerns about access for pedestrians, especially the visually impaired.”

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Doctor noted that one key to the project’s success was a focus on implementation from the beginning. “This was a practitioner-oriented project with very useful results that were bound to change practice,” Doctor says.

Long agrees. “There was a lot of hunger for practical information,” he says. “This led to a widely used report that put implementation at the forefront.”