



## TECHNICAL SUMMARY

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### TOTAL PROJECT COST:

\$74,989

### LRRB COST:

\$37,495



Signage is a standard method for alerting drivers to reduce speeds at roundabout approaches.



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# Choosing Effective Speed Reduction Strategies for Roundabouts

## What Was the Need?

Roundabouts can provide a safer alternative to traditional intersection control devices like traffic signals and stop signs. Roundabouts have been proven to reduce crash severity by requiring drivers to decrease speed during the approach to the intersection. But failure to slow down sufficiently could result in a crash.

Signs and markings are key treatments used to communicate to drivers that they must slow down as they approach the roundabout. When navigated appropriately, roundabouts can eliminate or reduce the severity of crashes, reduce delays and reduce fuel consumption.

## What Was Our Goal?

This project had two goals: to analyze existing research and conduct a survey of roundabout design and installation practitioners to determine best practices; and to develop a resource that engineers can use to identify appropriate speed reduction treatments for high-speed approaches to roundabouts.

## What Did We Do?

Investigators surveyed transportation engineers from Minnesota and other states, along with technical consultants, to learn their experiences managing roundabouts with high-speed approaches. The survey addressed geometric design parameters and traffic control methods, changes in maintenance practices, crash history and speed reduction measures that were considered or eventually enacted.

Previous research on the subject was studied, including the Federal Highway Administration report [Roundabouts: An Informational Guide](#) and [National Cooperative Highway Research Program Report 672: Roundabouts: An Informational Guide, Second Edition](#). Design manuals from four states were reviewed to provide a sample of the material available to practitioners seeking guidance on design of high-speed roundabout approaches.

Based on their research, investigators provided information on the effectiveness of various treatments and on their installation and maintenance costs. They also developed a methodology for conducting a speed study to assist engineers in determining the most effective treatment for a given intersection. Treatments for alerting drivers that a roundabout is ahead include traditional signs, pavement markings, illumination and other indicators, plus advanced devices like speed-activated, LED-enhanced warning signs.

## What Did We Learn?

Each roundabout presents unique challenges. Local road engineers need to evaluate the characteristics of the intersection being considered (such as geometric design and adjoining land use) and the costs of installation and maintenance before recommending a specific treatment or combination of treatments.

*Using survey results and prior research, this project developed a new resource to enable Minnesota local road engineers to select appropriate speed reduction measures for roundabouts. Further research is needed to determine the relative effectiveness of different measures alone and in combination.*

*“Although roundabouts are becoming common, single-vehicle crashes from drowsy, inattentive or unfamiliar drivers are still a concern, particularly in rural areas. This project provides an overview of existing speed reduction treatments that have been used in both roundabout and nonroundabout contexts, and a framework to properly evaluate the effectiveness of new treatments.”*

—Joe Gustafson,  
Traffic Engineer,  
Washington County

*“Rather than try to identify the right combination of treatments, the research was designed to give engineers a variety of options to consider for a given location.”*

—Susan Chrysler,  
Senior Research Scientist,  
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Reductions in speed associated with speed control treatments will decrease the likelihood of crashes as drivers approach and enter roundabouts.

Other findings include the following:

- Speed reduction techniques found effective for horizontal curves, urban-rural transition zones and isolated rural intersections should be effective for rural roundabouts with high-speed approaches.
- In rural locations, speed reduction treatments that have been used at railroad crossings, T-intersections and work zones may also be applicable to roundabouts.
- Some unique treatments used internationally hold promise, but further study is needed before these treatments can be recommended for use in the United States.

### What's Next?

This study was the first phase of research. The findings provide the methodology to select, install and evaluate treatments at different locations. Further research is needed to:

- Analyze the effectiveness of speed reduction treatments at different locations.
- Determine the impact of different combinations of treatments.
- Establish the comparative benefits of two or more treatments that fall within the same general cost and maintenance grouping.
- Analyze the impact of roundabout infrastructure (such as gateway treatments and illumination), various pavement markings and the long-term effects of specific signing treatments.

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*This Technical Summary pertains to the LRRB-produced Report 2017-14, “Strategies for Effective Roundabout Approach Speed Reduction,” published May 2017. The full report can be accessed at [mndot.gov/research/reports/2017/201714.pdf](http://mndot.gov/research/reports/2017/201714.pdf).*