When the Winnipeg Sun ran a page-three article in 2013 stating that the city, in Manitoba, Canada, planned to institute a series of roundabouts, reader reaction was immediate and vociferous.

“If you want to drive just like they do in London, move there!” one reader wrote.

Another reader was concerned that snowy conditions would create huge pile-ups as vehicles slipped while navigating the circles. “Those circles are in cities with warmer climates, what moron decided to initiate this farce!” the reader wrote online.

The newspaper article turned out to be an April Fools’ Day prank, but it illustrates common attitudes toward this relatively recent development in highway safety — at least before people experience them.

The U.S. has seen a dramatic increase in the use of roundabouts since 2000, and the use of decorative concrete is a primary design feature in them.

Modern roundabouts are engineered to accommodate high volumes of traffic, minimize delay and maximize traffic safety — and they do.

According to the Insurance Institute for Highway Safety, studies have found reductions in injury crashes of 72-80 percent and reductions in all crashes of 35-47 percent at U.S. intersections converted to roundabouts from traffic signals or stop signs.

One study of 19 rural roundabouts converted from intersections with speed limits of 40 mph or higher, that originally had stop signs on the minor approaches, found a 62-percent reduction in all crashes and an 85-percent reduction in injury crashes.1

Not Your Grandpa’s Traffic Circle
Modern roundabouts differ from old-style traffic circles or rotaries in both design and function. Older traffic circles have bigger inner radiiuses of 300 to 600 feet. That’s a problem because they don’t force drivers to slow down, as modern roundabouts do. They often have landscape or water features that can distract drivers.

Another major difference is that in some traffic circles, right-of-way priority is given to vehicles entering the circles, while modern roundabouts give that priority to vehicles already in circulation.

Because of these features, older traffic circles are prone to congestion and other problems absent from modern roundabouts. Confusion between the two may play a part in public attitudes concerning roundabouts, attitudes that usually change as drivers become familiar with them.2

Anatomy of a Roundabout
Modern roundabouts are composed of a circulating roadway surrounding a central...
island with radiuses of 100-150 feet. The relatively small radius helps slow traffic. Island design increasingly features decorative concrete flatwork as an aesthetically pleasing and structurally sound element. The island’s outer edge in particular, known as the truck apron, features decorative concrete to distinguish it as a correctional buffer between the road and the island.

The truck apron is so named because, while it separates most vehicles from the central island, it provides extra turning room for the back-ends of large trucks as they maneuver through the roundabout. In addition to being decorative, the truck apron must be built to withstand heavy truck traffic.

Colored, or colored and textured “splitter” concrete islands increase safety by using contrasting colors that alert drivers to slow down as they approach the roundabouts. They also help direct traffic flow. Decorative concrete also directs pedestrian traffic across splitter islands and adjacent walkways.
systems, the U.S. 23 and Lee Road interchange corridor handles approximately 8,000 vehicles per hour.

Traditional signal alternatives were found to have inadequate capacity, resulting in excessive delays and potentially dangerous backups on freeway ramps, according to Mark Johnson, P.E. of MTJ Roundabout Engineering, the project’s design engineer.

A double roundabout configuration at the southbound ramp terminals accommodates six entries and exits with minimal circulating flow, increasing intersection entry capacity and reducing crash potential. Such complexity renders the visual cues supplied by decorative concrete even more important. The decorative concrete elements help increase driver awareness by making center and splitter islands more visible and by focusing driver attention on the system’s navigational cues.

From basic colored concrete, to etched finishes, to stamped surfaces, the combination of colors, finishes and textures allow for nearly unlimited design options.

Decorative Concrete Design in Roundabouts

Red stamped concrete in running bond or herringbone patterns have been popular designs for roundabout truck aprons and walkways for many years. Alternative colors, such as browns and tans, and new patterns and finishes like flagstone are also taking their places alongside popular red stamped brick.

One of decorative concrete’s biggest trends has recently found its way into roundabout design. Washed or etched “sand-scape” finishes enhance safety by creating a higher coefficient of friction that increases slip-resistance compared to other decorative finishes.

Color in etched surfaces appears more natural than in stamped surfaces because of the exposure of sand or other aggregate in the mix design. Engineers and architects may also appreciate the fact that the etched surfaces cost only slightly more than colored concrete alone, and significantly less than stamped concrete.

The combination of safety, aesthetics and cost has increased the use of etched surfaces in all types of municipal applications and pedestrian traffic areas, including roundabouts.

Many recent roundabout designs combine decorative concrete styles. A project by Michigan’s Washtenaw County Road Commission used a brown flagstone and red brick pattern on the four roundabouts at the U.S. 23 and Lee Road interchange.

The combination creates a traffic flow that has been proven to keep traffic moving even with the proximity of a heavily traveled highway and a popular outlet mall.

One of the country’s most complex roundabout systems, the U.S. 23 and Lee Road interchange corridor handles approximately 8,000 vehicles per hour.

A vehicle navigates the circulation path of a two-lane roundabout in South Bend, Ind. While most roundabouts are designed with matching truck aprons and splitter islands, this one uses turf on its splitter islands. Photo courtesy of DLZ Architects.

This close-up of the decorative concrete truck apron on a roundabout near the University of Notre Dame, in Indiana, shows the popular red stamped brick design. Such aprons are usually 10-15 feet wide and serve as an extra emergency vehicle lane, most commonly for large trucks needing extra turning room. Photo courtesy of DLZ Architects.
Low-Cost Alternatives
Attempts to lower installation costs have led some designers to try brick pavers and stamped asphalt as alternatives to decorative concrete.

Brick pavers without a concrete base can’t withstand high traffic volumes, while paver installations with concrete bases tend to cost more than most decorative concrete installations.

Stamped asphalt is not much cheaper than stamped concrete but must be coated to achieve its color, which wears away with any traffic volume.

More People Means More Traffic
Between births, deaths and immigration, the U.S. population is growing by one person every 16 seconds according the U.S. Census Bureau, and has nearly doubled from 179 million in 1960 to more than 320 million in 2015.

This expanding population has and will continue to place extreme demands on the U.S. road system. Modern roundabouts are one method of handling the ever-increasing volume of traffic. As the number of roundabouts grows — and a quick Internet search shows that nearly every state in the U.S. is studying how to incorporate them — decorative concrete will continue to play an important part in roundabout design. The role of the decorative concrete industry is to continue to provide a durable end-product that engineers and architects can trust and will be proud to feature in their projects — projects that reduce accidents and injuries on American roads.

Notes
1 “Roundabouts,” iihs.org, February 2014.