



KS LTAP Newsletter

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Crashes at Multilane Roundabouts and How to Reduce Them **By Mehrdad Givechi, PE, PTOE**

An increasing number of communities in Kansas are opting to install a roundabout as a traffic-control device in an intersection, for reasons ranging from safety to walkability. Roundabouts have proven safer and more efficient than other types of circular intersections because of their unique features and characteristics. They are considered one of the Federal Highway Administration's Proven Safety Countermeasures (PSC), which were launched in 2008 as part of the first round of FHWA's Every Day Counts (EDC) initiative.

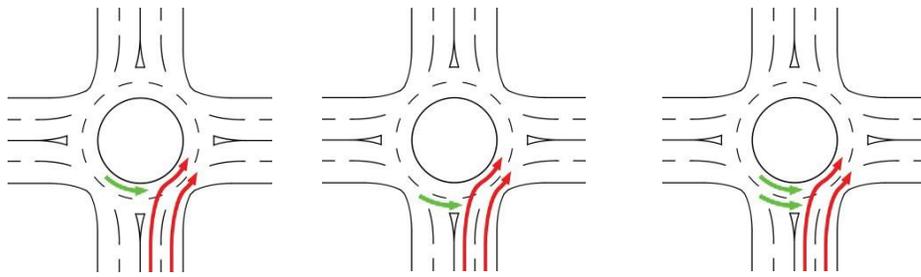
Although many roundabouts have some common fundamental features, they come in a wide variety of shapes and sizes depending on the particular site. For instance, a roundabout does not have to be perfectly circular. It can be in the shape of an oval, teardrop, peanut, or dog bone. It can have as few as three legs and as many as six legs.

A roundabout can be very small and simple or very large and complex, with multiple lanes and crosswalks. This article will examine safety issues with multiple-lane roundabouts, and some ideas for how to prevent crashes at these locations.

Why crashes are higher at multi-lane roundabouts

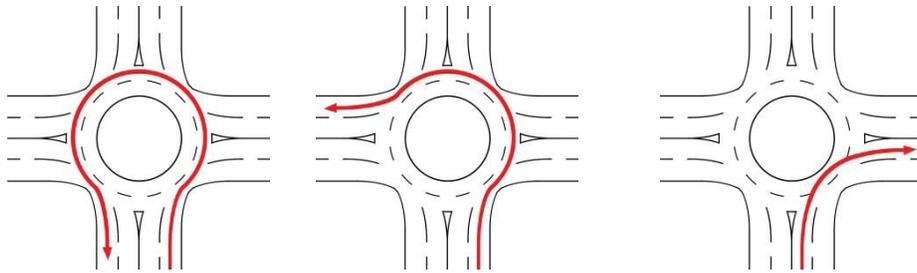
Single-lane roundabouts are far easier to navigate than their multilane counterparts. They have a smaller footprint, fewer conflict points, lower operating speeds, and fewer crash rates. Studies show that the primary reason multilane roundabouts experience higher crash rates is driver error at roundabouts with two entry and exit lanes at each approach (known as 2x2 roundabouts). These errors lead to three types of violations: yield violations, turn violations, and lane change violations. The two most severe property-damage-only (PDO) crashes are caused by failure to yield and left turns from the outer lane, as illustrated below:

According to a 2012 FHWA Guidance Memorandum promoting implementation of PSCs, the conversion of a two-way, stop-controlled intersection to a roundabout results in 44% fewer crashes and 82% fewer severe crashes. Similarly, when a signalized intersection is converted to a roundabout, the overall number of crashes drops by 48% and severe crashes fall by 78%.

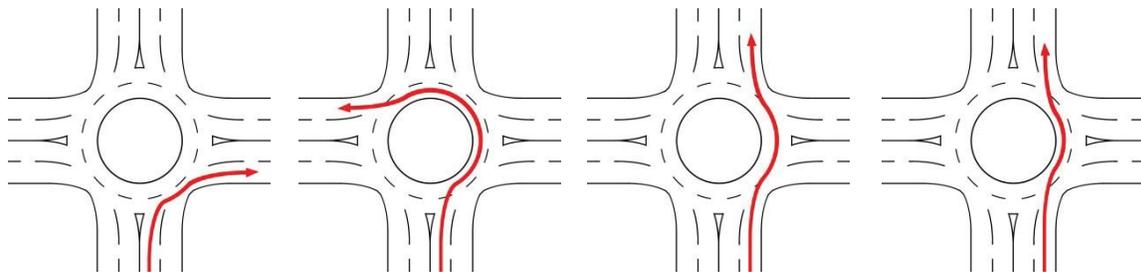


LEGEND
 Vehicle with Right-Of-Way 
 Vehicle failing to Yield 

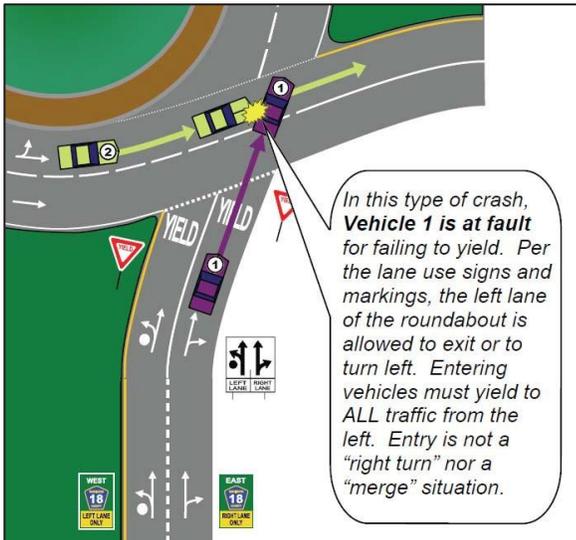
Types of Yield Violations



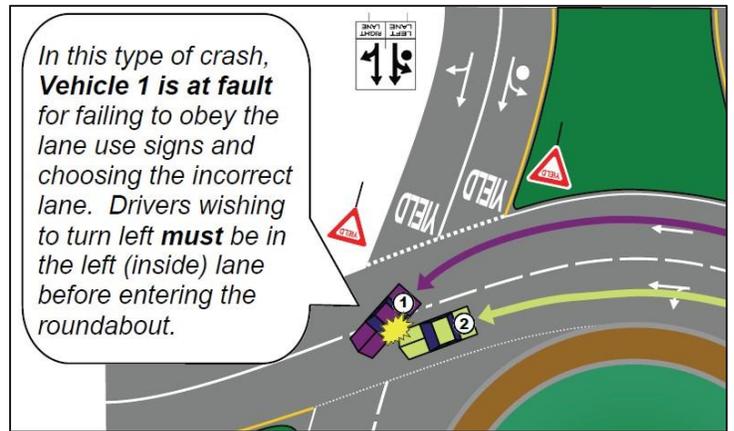
Types of Turn Violations (Improper Lane Use)



Types of Lane Change Violations (Improper Lane Change)



Example of "Fail to Yield" Crash
Crash



Example of "Left Turn from Outer Lane"

Simple ways to reduce violations and crashes at multi-lane roundabouts

There are several low-cost mitigation measures that can reduce the number of crashes at multilane roundabouts. They include:

- Improving pavement marking and signage to better guide the motorist and enhance driver expectancy
- Making geometric improvements to alleviate unnecessary movements and reduce the number of conflict points, such as conversion of a 2x2 roundabout to partial 2x2
- Educating the public, including public-private partnerships between law enforcement agencies, driver's education instructors, transportation engineering groups, and insurance companies

Examples

A number of agencies nationwide have implemented one or more of these mitigation measures and have seen significant reductions in traffic violations, thereby reducing crashes, at a number of multilane roundabouts. Examples include:

Portland / 66th Street Roundabout in Richfield, MN

Changes in pavement marking and signage resulted in significant reduction (45%) in turn lane violations, moderate reduction (20%) in lane change violations, and no improvements to yield violations.

Cleveland, Ohio

A combination of pavement marking and signing changes, coupled with lane reconfiguration using delineators, reduced overall crashes by 42% and injury crashes by 80%.



Intersection of Quigley Road and W. 14th Street at the I-71 on/off ramps, Cleveland, OH
(Before Triage)



Intersection of Quigley Road and W. 14th Street at the I-71 on/off ramps, Cleveland, OH
(After Triage)

Suggested Resources on This Topic:

- FHWA's Office of Safety
https://safety.fhwa.dot.gov/provencountermeasures/pc_memo.cfm
- FHWA's Center for Accelerating Innovations (CAI), Every Day Counts (EDC)
<https://www.fhwa.dot.gov/innovation/everydaycounts/>
- TRB Standing Committee on Roundabouts: <http://trbroundabouts.com/>
- To become a friend of the TRB Committee go to:
www.mytrb.org/Committees/SelfNominationAsFriend.aspx
- To join the Roundabout Listserv e-mail Geno@ksu.edu or Danita@ksu.edu