Some Common Design and Operational Issues

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Crosswalk directed into Circulating Roadway
Vertical Curve within Roundabout

Lack of Deflection = high speed right turns
High speed entry combined with low speed exit catches drivers unawares so they hit the exit curb

10 Hits,
Very low volume
Less than 6 months
Approach – Almost Straight

Mini-Roundabout
Lack of Deflection
Solution – Force Vehicles into Curbside Lane

FHWA Recommendation of Uniform Circulating Width
Only Works when all entry lanes are the same number
Uniform Circulating Width - Clearwater Eastern End

T-bone crashes caused by illegal left turns.

Narrow two Circulating lanes to one

Illegal left turns are eliminated
T-bone crashes eliminated
A Recent Example of following the FHWA Guide that will lead to crashes in the future if drivers make illegal left turns.

Single lane entry above leads into two circulating lanes shown right. At least four roundabouts that have followed the FHWA Guidelines have had problems with illegal left turns.

Two Lanes Merge into one within a roundabout from both left and right create a free-for-all that forces drivers to merge while traveling a double reverse curve.
Note how drivers use a roundabout. The traveled paths are not all that we expect and that the FWA Guidelines for uniform circulating widths are not consistent with driver behavior.

The proposed MUTCD Roundabout Markings show how to design a roundabout with uneven entry lanes.
Be wary of accepting all that is written as absolute. It is better to read, understand the basic principles then THINK about the relevance of the information and how to apply it to your situation.

Second problem at Clearwater was an unusual traffic pattern where a very high percentage of drivers turned right leaving the outside lane empty. Drivers then entered the roundabout into the empty lane but failed to yield to drivers in the inside lane who were about to exit. Instead of enforcing the Yield Rule, the exit was moved slightly.
Clearwater after.
The topmost exit was straightened to bring exiting drivers closer to drivers about to enter the roundabout.

New Exit Condition
Unfortunately the straighter exit has increased vehicle speeds and as a consequence the Yield rate by drivers has dropped considerably at this pedestrian crossing.

Exterior Curbing is Essential to Stop Vehicles Cutting Across Grass.
Why the hole?

Lack of Prominent Feature makes roundabout hard to see and navigate
Plain Central Islands are Harder to See

Roundabout Lacks Vertical Feature
This roundabout is easy to see because it has a very large tree.

Large Tower = Easy to See
Not all Roundabouts should be Round

Kinks Can Destroy the easy flow
See how kinks, even in the pavement markings, degrade the overall appearance of the roundabout.

Kinks in the curb line
How Pedestrians Use Roundabouts

At this roundabout people have been videotaped running along the road into the roundabout around the truck apron and back along the exit road.

Pedestrian Crossing Through Center
People worry about school children at roundabouts but this crossing guard finds it an easy job, note hand in pocket.
Pedestrians Crossing without a Crosswalk across a two lane roundabout carrying up to 50,000 vehicles per day

Pedestrian Crossing Location

20-feet from yield line to pedestrian crossing not 25 as per FHWA Guidelines
Importance of Determining Design Vehicle then Designing for It
Flush Truck Aprons are Not Good

Painted Truck Aprons Are Not Good
Conversion of a Huge Intersection Into a Walkable Intersection – Crosswalks were 68 feet long

Reduced to 13 feet wide pedestrian crossings
Modified crosswalk markings more suitable for visually impaired people and wheelchairs users.

Fastest/Natural Paths are so easy to manipulate that they are a useless measure of vehicle speeds through a roundabout.
Manipulation of Fastest Paths

By moving the inflection point between curves, R1, R2 and R3 can be decreased or increased at will without making any changes to the roundabout geometry.

Fastest paths that meet the requirements but the design speed through the roundabout is approximately 50 mph. How do you think it will perform?
Use Speed curves to design roundabouts so you can truly limit vehicle speeds

Roundabouts should be designed using speed curves because these design speeds cannot be manipulated like Fastest or natural paths because the speed curves are fixed radii.

23 mph versus 25 mph Design Speed

Good drivers can pass through a 23 mph designed roundabout at 27 mph and more than 30 mph through a roundabout with 25 mph design speed. I prefer to limit all of my roundabouts to 23 mph or less to truly limit vehicle speeds and reduce the lowest crash rates.
Flaring Roundabout designed in Australia had a flare on the approach from two to three lanes.

Anyone who correctly designs a roundabout will automatically flare approaches and departures. This is called GOOD DESIGN. It is not a RODEL thing.
A Substitute for the English Mini Roundabout that will slow vehicles and reduce vehicle crashes that the mini does not.

Up lighting of trees instead of highway style lighting for some roundabouts.
WISH LIST FOR THE FUTURE

Less Signs

Variable lighting

Guidance From Access Board