

Some Common Design and Operational Issues

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Crosswalk directed into Circulating Roadway

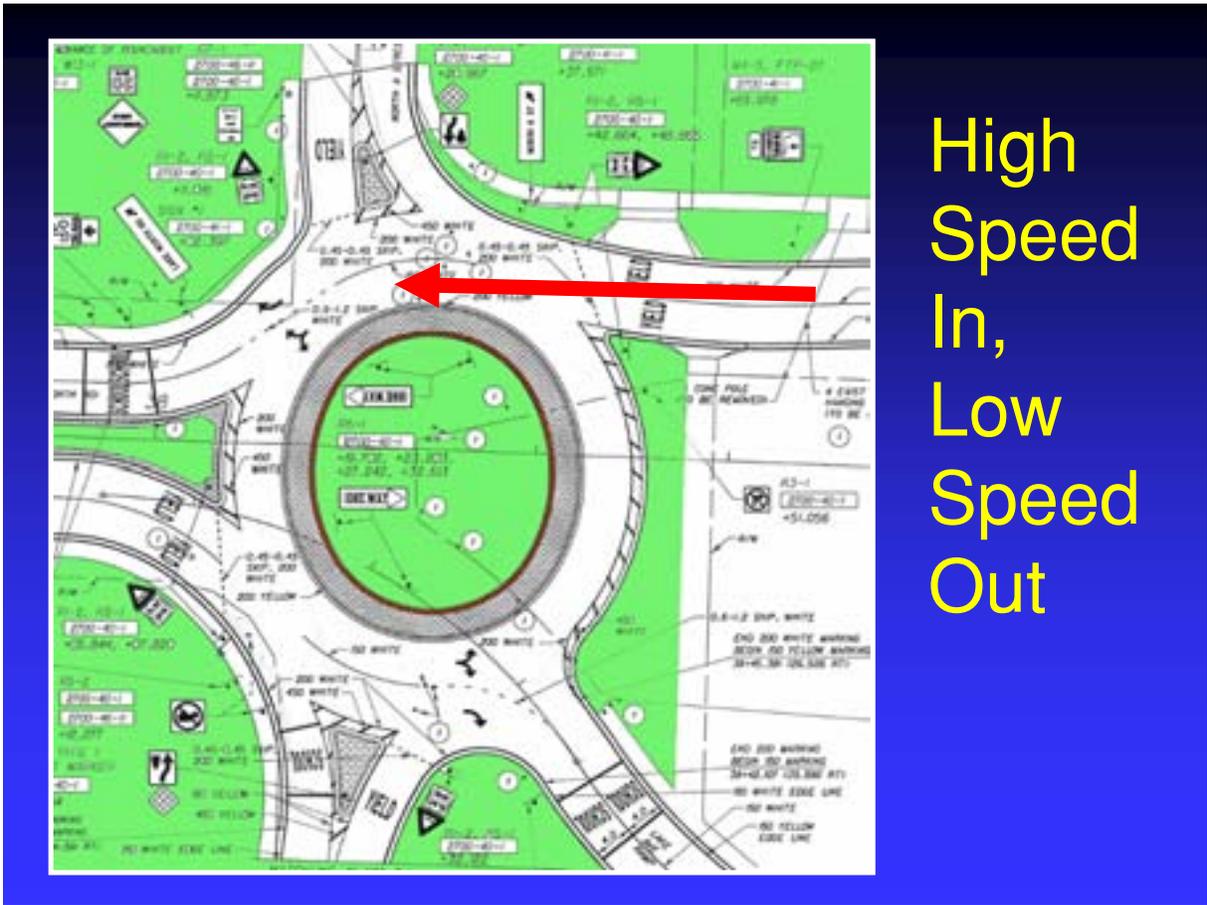


Vertical Curve within Roundabout



Lack of Deflection = high speed right turns





High speed entry combined with low speed exit catches drivers unawares so they hit the exit curb



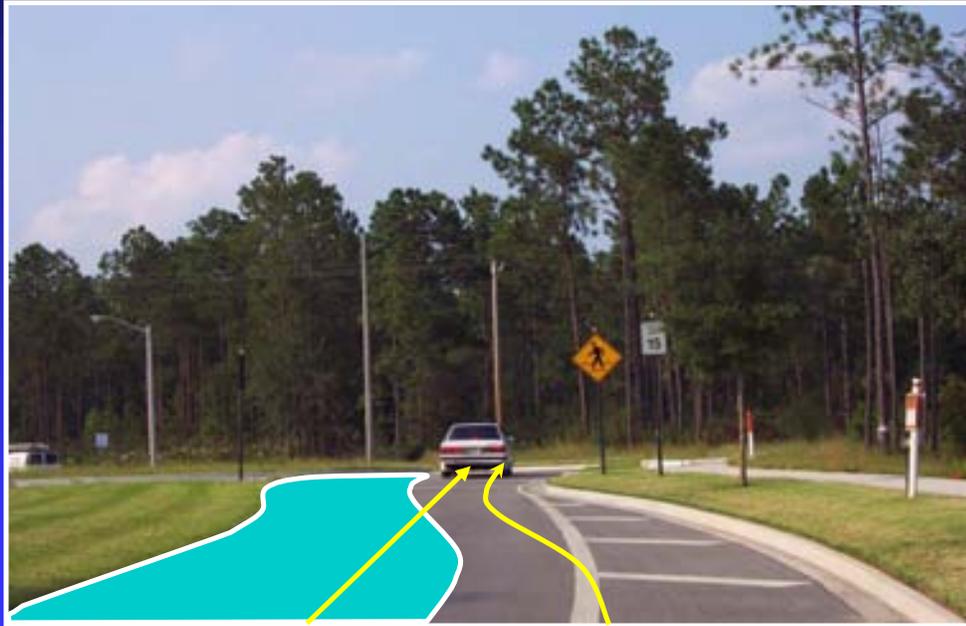
Approach – Almost Straight



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

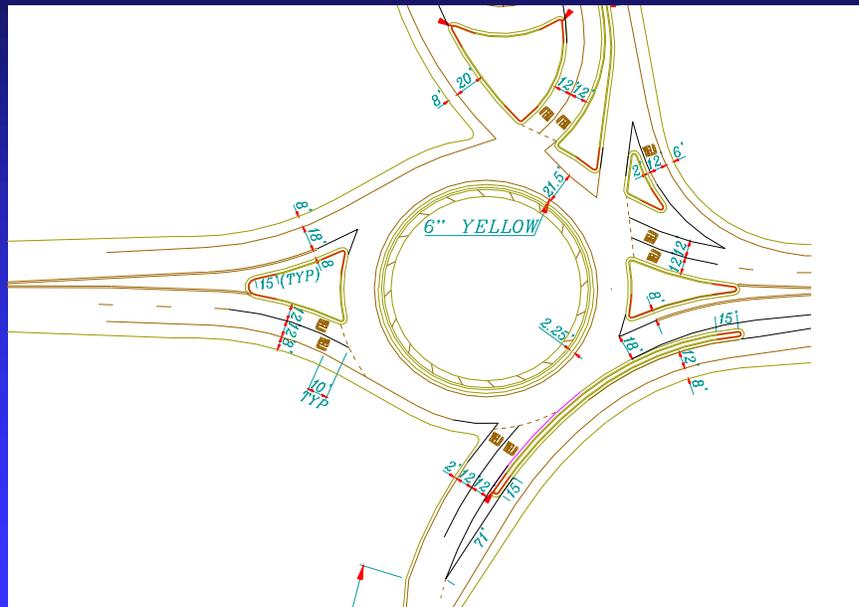


A Recent Example of following the FHWA Guide that will lead to crashes in the future if drivers make illegal left turns

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.

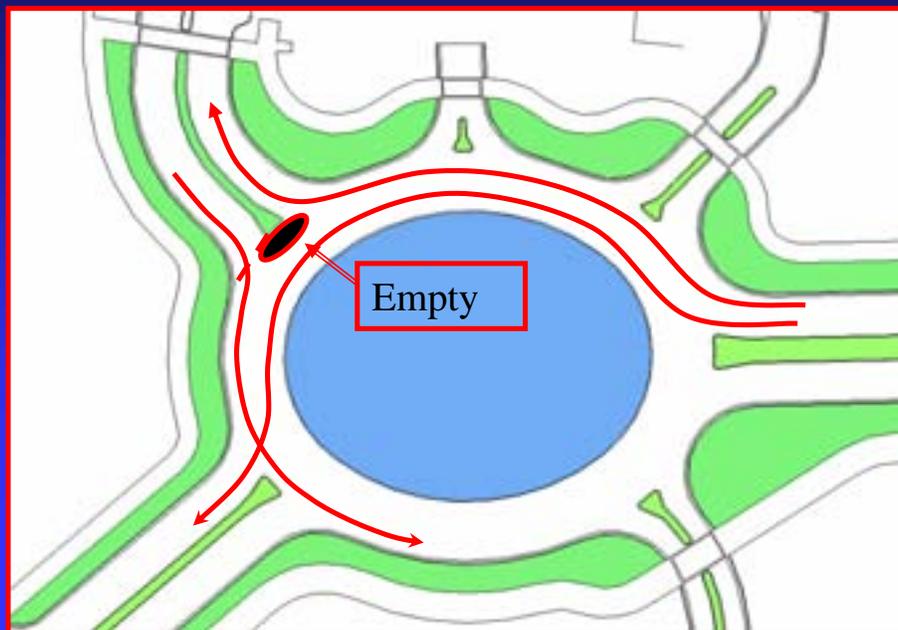


The proposed MUTCD Roundabout Markings show how to design a roundabout with uneven entry lanes



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



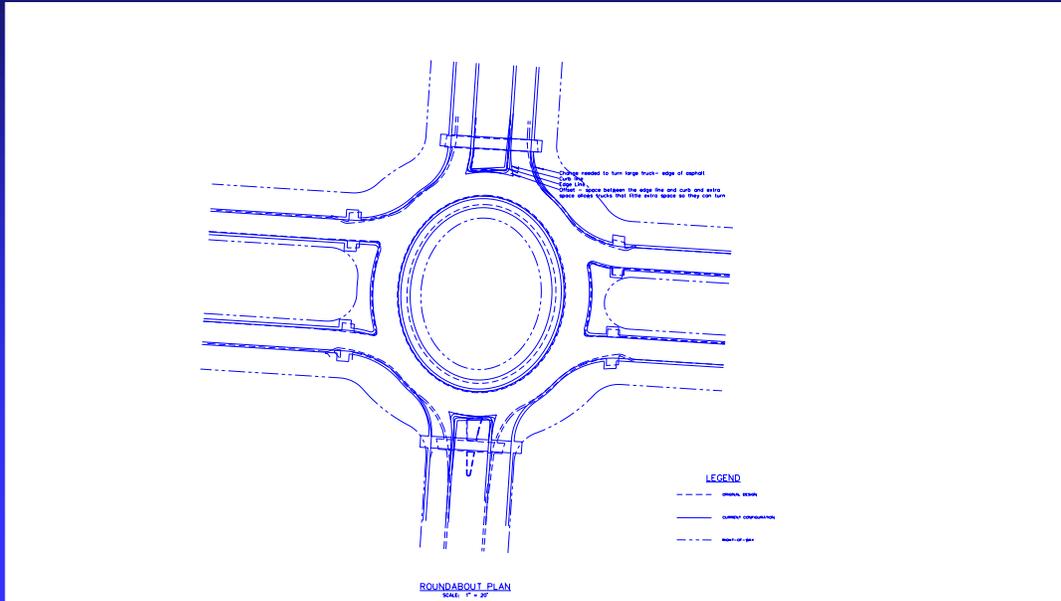
This roundabout is easy to see because it has a very large tree



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



Pedestrian Using Truck Apron as a Sidewalk



People worry about school children at roundabouts but this crossing guard finds it an easy job, note hand in pocket.

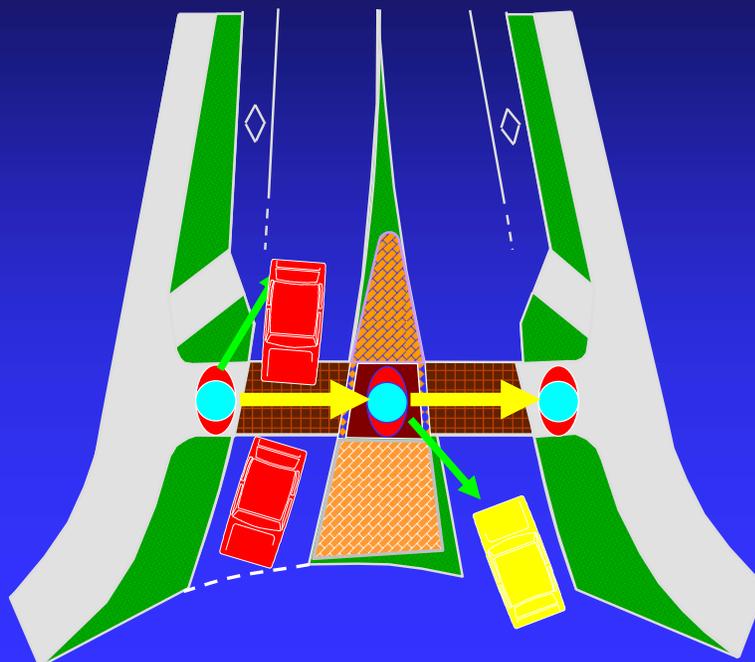


Pedestrians Crossing without a Crosswalk across a two lane roundabout carrying up to 50,000 vehicles per day



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



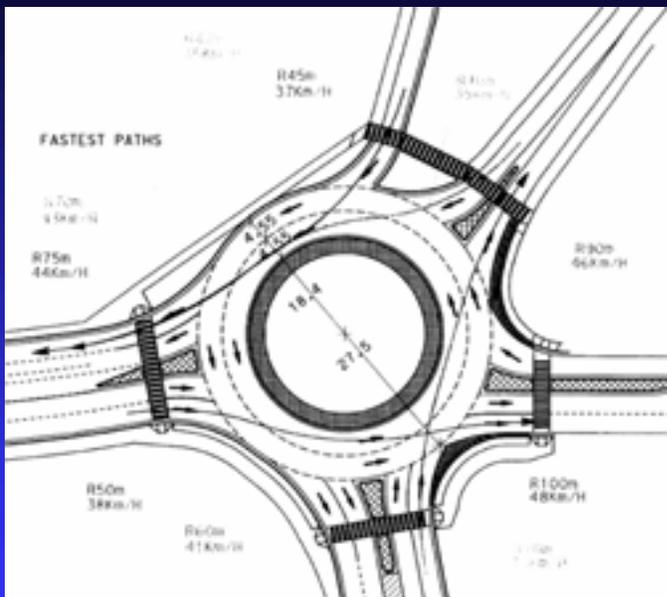
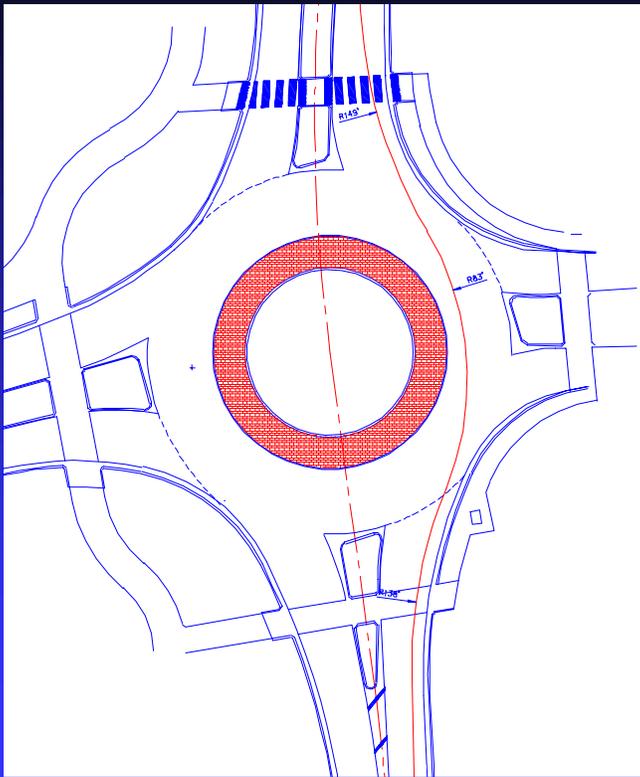
Modified crosswalk markings more suitable for visually impaired people and wheelchairs users.



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

Manipulation of Fastest Paths

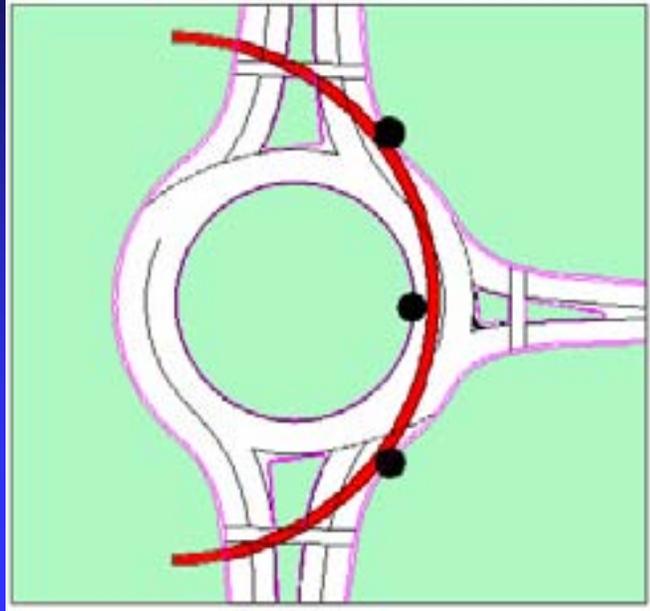
By moving the inflection point between curves, R1, R2 and R3 can be decreased or increased at will without making any changes to the roundabout geometry



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

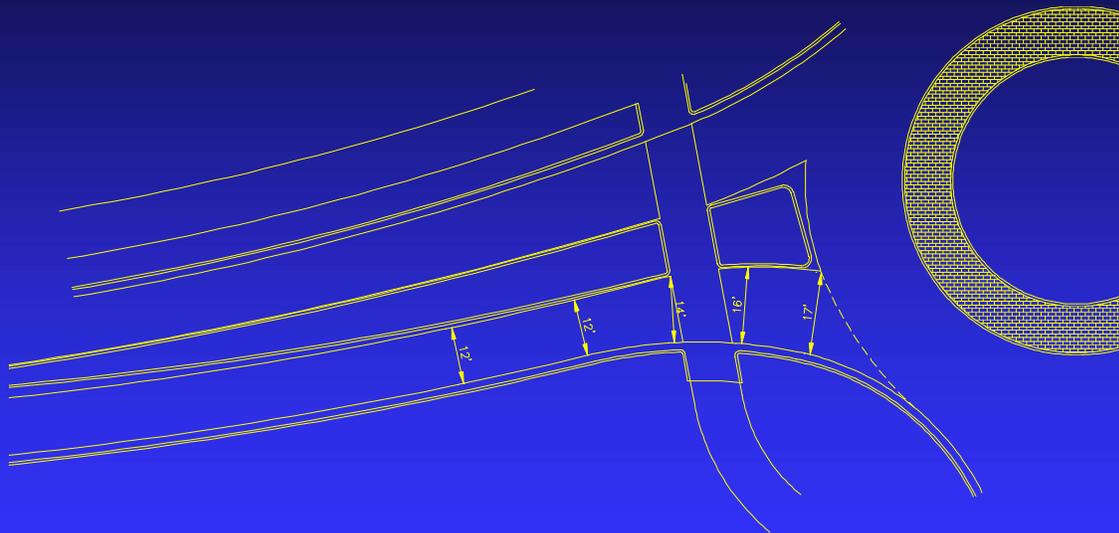


Good drivers can pass through a 23 mph designed roundabout at 27 mph and more than 30 mph through a roundabout with 25 mph design speed. I prefer to limit all of my roundabouts to 23 mph or less to truly limit vehicle speeds and reduce the lowest crash rates



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