Roundabouts in Florida

Part 1 – Lesson’s Learned
Part 2 – Critical Features
Part 1 Topics

- How is Florida doing
  - FDOT, Off-Sytem and Nationally
    Presented by Paul Hiers

- Successes and Challenges
  - District One Rural Roundabouts
    Presented by Walt Breuggeman
  - District Five SR 44 Roundabout
    Presented by ????
Part 2 Topics

• Central Office Review
  • Process and Common Errors
  • Design Requirements on SHS

• When Things Go Wrong

• Critical Features
  • Signing
  • Landscaping
  • Lighting
  • Aprons and Splitter Islands
  • Design Vehicle
  • Path Overlap

• Driver Mistakes
A Little History

• 1996 One of two States with a Roundabout Design Guide
  • PPM stated roundabouts are the preferred intersection control on SHS

• 2007 Roundabout Guide Sunsetted and Adopted FHWA Guide
  • PPM stated that roundabouts shall be considered.

• 2012 Formally adopted NCHRP 672
  • PPM stated that roundabouts must be evaluated.

• 2014 Provided tools for Evaluation
  • PPM dropped “preferred”
  • Given “equal consideration”
How is FDOT doing?

Roundabouts on SHS

2012 – 7

2014 – 13 after 18 years of “preferred”

2015 – 21

2016 – 29 projected
How is FDOT doing?

2015

- 8,483 Signals on SHS
  - An increase of 9 from 2014
- 21 Roundabouts on SHS
  - An increase of 8 from 2014

(according to RCI)

<table>
<thead>
<tr>
<th>District</th>
<th>Constructed</th>
<th>Planned</th>
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Why should we want more?

**Vehicles**
- 35% reduction in total crashes
- 75% reduction in injury crashes
- 90% reduction in fatal crashes

**Pedestrians and Cyclists**
- 54% reduction in total crashes
Why are we not building more?

- Initial Investment
- Resistance from Public or Businesses
- Project Schedule (R/W, Utilities)
- Not safe for Pedestrians and Cyclists
- ADA concerns (2-Lane)
How is Florida doing

• Approximately 300 “roundabouts” on Off-system Roads

• The Villages in Sumter/Marion Counties has 30 two-lane modern roundabouts.

• Downtown Ft. Pierce:
How is the US doing?

<table>
<thead>
<tr>
<th>Country</th>
<th>Roundabouts Per 1,000 intersections, 2014</th>
<th>Road fatalities Per 100,000 inhabitants, 2013</th>
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<tr>
<td>France</td>
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<td>5.1</td>
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<tr>
<td>Australia</td>
<td>15.4</td>
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<td>10.4</td>
<td>3.7</td>
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<td>Britain</td>
<td>7.9</td>
<td>2.9</td>
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<tr>
<td>Germany</td>
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<td>4.3</td>
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<td>United States</td>
<td>0.9</td>
<td>10.6</td>
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</table>

Sources: 2014 Nokia Here maps; WHO

- **FRANCE** – 300 NEW ROUNDBOUTS EACH YEAR
- **US** – 8,200 INTERSECTION RELATED FATALITIES EACH YEAR
Rural Roundabouts

SR 33 at Deen Still Road

SR 17 at Hunt Brothers Road
Rural Roundabouts

- Programmed due to High Number of Fatalities
- Prior to current Roundabout checklist found in Intersection Design Guide
- SR 17 / Hunt Brothers – 2 fatalities and 23 injury crashes from 2005 to 2014
Rural Roundabouts

- Significant crash history dating back several years
- Neither intersection met signal warrants
- Signal may reduce some crashes, but would likely create additional rear end collisions
- For Deen Still, County implemented rumble strips, stop ahead signage, and a flashing beacon on top of the stop sign
- Additional fatality crashes after implementation of minor improvements
SR 33 at Deen Still Road - Aerial

Google Earth
01/21/2015
Roundabout Screening

- Does the intersection have any geometric or visibility limitations that would complicate construction?
- Does major roadway AADT exceed 90% of total intersection AADT?
- Does the intersection have pedestrians that would have difficulty crossing the road?
- Is the intersection located within a coordinated signal network?
- Is there downstream conditions that could cause queues to back up into the intersection?
- Would the roundabout create impacts to 4(f) or environmentally sensitive sites?
SR 33 at Deen Still Road – 150’ I.D.

- Side streets under stop control
- Traffic signal not warranted
- 21.7% truck traffic
- Significantly higher speeds
- No realistic detour available
- It is in the Green Swamp
- Circle to be concrete
- Concrete circle does present a constructability issue
- Had adequate R/W for temporary pavement / MOT
SR 33 at Deen Still Road – 150’ I.D.

- Less than a mile from Van Fleet Trail
- Constructing sidewalk
- Posted speed limit not changed
- Geometrically designed to lower speeds
SR 33 at Deen Still Road

LOOKING EAST

LOOKING NORTH
SR 17 at Hunt Brothers Rd - 115’ I.D.

- Flashing Beacon Signal
- 3% truck traffic
- 55 mph posted on SR 17
- Lowered approach speed limit to 45 mph
- Circle to be asphalt
- No sidewalk due to right of way constraints and lack of pedestrian usage
- Part of bike trail
- Detour allowed for quicker construction
SR 17 at Hunt Brothers Pre-Construction
SR 17 at Hunt Brothers Construction
SR 17 at Hunt Brothers
SR 17 at Hunt Brothers
SR 17 at Hunt Brothers Pilot Project – Median Alert
Truck Movements

• AutoTurn is conservative
• Right turn movements are many times the tightest movement
• A 115’ inscribed diameter roundabout can be designed adequately to accommodate a WB-62FL truck
• Most drivers appear to be adapting
Stakeholder’s Support

• Business owner expressed concern
SR 44 at Grand
A Tragic Loss of Life
## SR 44 at Grand Crash Summary

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<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>Jan-June 2015</th>
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</table>

- **Crash Statistics**
  - 63% of crashes resulted in injury/fatality
  - 97% during dry conditions
  - 70% daytime / 30% nighttime
SR 44 at Grand
Safety Alternatives Comparison

Traffic Signal
- Expected Crash Reductions
  - 13% Total
  - 41% Injury
- Reduce angle crashes
- May increase rear-end
- Higher speeds:
  - more severe crashes

Roundabout
- Expected Crash Reductions
  - 71% Total
  - 87% Injury
- Fewer conflict points
- Slower speeds:
  - increase reaction time
  - reduce severe crashes
SR 44 at Grand Monetized Safety Benefits

Roundabout vs Existing Stop Control
• $8 million in crash reduction benefits

Roundabout vs Signal
• $4.4 million in crash reduction benefit
Questions

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