The Case for Roundabouts

TRB National Roundabout Conference

May 23, 2005

Brian O’Neill
Television coverage:
Traffic signal report card
Delays at red lights getting longer

Wall Street Journal, June 13, 2000

Stopped at a Light?
Why Not Read This, You May Have Time

As Red Signals Grow Longer, Northern Virginia Tries
An Experimental Speedup

By ANNA WILDE MATHEWS
Staff Reporter of THE WALL STREET JOURNAL
FAIRFAX COUNTY, Va. — At the corner of Fairfax County Parkway and Fair Lakes Parkway, drivers see red.
Major intersection problems

- Traffic congestion and delays
- Vehicle emissions
Major intersection problems

- Wide streets
- Long crossing distances
Major intersection problems

- Crashes and injuries
- Traffic signals encourage speeding
Intersection crashes
U.S. 2003

More than 2.5 million crashes occurred at intersections
8,659 fatal crashes
These represent 41 percent of all crashes, 46 percent of all injury crashes, and 23 percent of all fatal crashes
Roundabouts can help address these problems
Rural
Suburban
Urban
Simple
Complex
Benefits of modern roundabouts

- Traffic flow: reduce delay, decrease fuel consumption and air pollution
- Safety: significantly reduce injury crashes
- Maintenance: eliminate maintenance and electricity costs associated with traffic signals (approximately $3,000 per year)
- Aesthetics: central island provides opportunity for landscaping
Available research suggests that roundabouts can provide a relatively high degree of safety for pedestrians compared with stop sign and traffic signal control.
Pedestrians and roundabouts

- For single-lane roundabouts, the number of pedestrian crashes is about 3-4 times less than for comparable signalized intersections.
- For multi-lane roundabouts, the number of pedestrian crashes is about the same as for comparable signalized intersections.
- The severity of pedestrian crashes is lower for roundabouts than for other forms of traffic control.
Advantages for pedestrians

- Traffic speeds within roundabouts are very low – typically 15-20 MPH
- Refuge islands provide for short crossing distances
- Roundabouts are simple intersections, which eliminate left-turns, right-turns, and associated conflicts common at conventional intersections
Number of roundabouts constructed by transportation departments in 9 states
CA, CO, FL, KS, MD, NV, NY, OR, WA
Estimated number of roundabouts

- France: 20,000
- Australia: 15,000
- UK: 10,000
- U.S.: 5,000
Impediments to construction of roundabouts

- Relatively new in the United States, so there has been some reluctance to apply them
- Questions about relevance of international research and design practices to U.S. experience
- Opposition among some local residents and elected officials
Purposes of IIHS roundabout research

- Estimate crash reductions associated with roundabouts compared to stop signs and traffic signals
- Evaluate impact of roundabout conversions on traffic flow and public opinion
Percent reductions in crashes associated with roundabouts at 23 U.S. intersections

2001

- All crashes
- All injury crashes
- Serious and fatal injury crashes
Initial evaluation of public opinion and traffic flow

2002

- 3 intersections converted from stop signs to roundabouts in Kansas, Maryland, and Nevada
- Phone surveys and field observations before and after roundabout construction
- Roundabouts reduced traffic congestion, vehicle delays, and proportion of vehicles that stopped
- Significant increase in public support for roundabouts after construction
Follow-up evaluation of public opinion and traffic flow

2004

- 3 intersections converted to roundabouts from traffic signals and stop signs
- Study sites in New Hampshire, New York, and Washington
- Roundabouts completed in 2004
Intersection with stop sign converted to roundabout

Nashua, NH
Intersection with traffic signal converted to roundabout

Greenwich, NY
Intersection with 4-way stop sign converted to roundabout

Bellingham, WA
IIHS study to identify benefits of roundabouts

- Identified 10 intersections in Northern Virginia where
  - new traffic signals were installed within past 5 years or
  - intersections with traffic signals were substantially modified by widening or other changes
Recently modified intersection
Route 123 at Lee Chapel Road in Fairfax Station, Virginia
New traffic signal
Roberts Road at New Guinea Road in Burke, Virginia
Expected effects of roundabouts on traffic flow compared with signal lights

Northern Virginia

- Average 62% to 74% reduction in vehicle delays
- Vehicle delays reduced by about 325,000 hours annually
- Fuel consumption and emissions reduced by about 235,000 gallons annually
Expected effects of roundabouts on crashes and injuries compared with signal lights

Northern Virginia

- Could have prevented an estimated 62 crashes, including 41 injury crashes, between 1999 and 2003 at 5 intersections

- Estimates based on N.Y. Department of Transportation study (2004) that found 37% fewer crashes and 75% fewer injury crashes from conversion to roundabouts
How can we accelerate construction of roundabouts?
Land development

Critical opportunity to construct roundabouts
Advantages of constructing roundabouts as part of land development

- Developer pays construction cost
- Cost of roundabout is less than traffic signal
- Landscaping opportunities
- Avoids expense and controversy of conversion to roundabouts later, after conventional intersections have been built
Roundabout constructed as part of land development
Nokesville, Virginia
Roundabout constructed as part of land development

Reno, Nevada
Continued involvement of TRB

- Regional conferences
- Domestic scanning tours
- Technical publications and special reports
- Visibility on Annual Meeting program
Increased involvement of professional organizations

- AASHTO
- ITE
- ASCE
- NACE
- APA
Increased Federal role

- Instructional courses in roundabout design
- Financial incentives for building roundabouts
- Encourage use of CMAQ and highway safety funds for roundabouts
- FHWA regional and state offices should actively promote roundabouts
Engage environmental advocates

- Air quality
- Fuel conservation
- Fewer traffic lanes, less road widening = more trees
- Landscaping opportunities
- Less electricity consumed by traffic signals
For more information:

www.iihs.org