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
Short video on roundabouts
Rural
Suburban
Number of roundabouts constructed by transportation departments in 9 states
CA, CO, FL, KS, MD, NV, NY, OR, WA
Estimated number of roundabouts

- France: Approximately 20,000
- Australia: Approximately 15,000
- UK: Approximately 10,000
- U.S.: Approximately 2,000
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
Safety evaluation

- 23 intersections converted to roundabouts between 1992 and 1997
- 14 were single lane; 9 were multi-lane
- Study sites located in 8 states: CA, CO, FL, KS, ME, MD, SC, and VT
- The empirical Bayes approach was employed to account for regression to the mean while normalizing the differences in traffic volume between the before and after periods
Percent reductions in crashes associated with roundabouts at 23 U.S. intersections

2001
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
Public opinion surveys

- Surveys conducted in each community approximately 6 weeks before, 6 weeks after, and 1 year after construction
- Random digit dialing methods used to survey 300 drivers per city and time period
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
Percent reductions in delay

-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0

average vehicle delay  v/c ratio  proportion of vehicles that stopped

Greenwich  Nashua  Bellingham

IIHS
Percent of residents who favor roundabouts
Before and after installation

New York
New Hampshire
Washington
Percent of residents who favor roundabouts one year after construction

By gender and age
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
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
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
Roundabouts require fewer traffic lanes than traditional intersections to accommodate the same amount of traffic.
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
For more information:

www.iihs.org
Q & A: Roundabouts
IIHS website

Q&A: ROUNDABOUTS
as of February 2006

1. Introduction
2. What is a roundabout?
3. How do roundabouts differ from older traffic circles and rotaries?
4. How do roundabouts affect safety?
5. How do roundabouts affect traffic flow?
6. Are there other benefits?
7. Can roundabouts accommodate larger vehicles?
8. How do roundabouts affect older drivers?
9. Are roundabouts safe for pedestrians?
10. Do roundabouts require more space than traditional intersections?
11. Do drivers favor roundabouts?
12. What are the impediments to building roundabouts?
13. How common are roundabouts in the United States?
14. What are appropriate locations for roundabouts?
15. What types of intersections may not be good candidates for roundabouts?

1. Introduction  Traffic congestion and motor vehicle crashes are widespread problems, especially in urban areas. Roundabouts, used in place of stop signs and traffic signals, are a type of circular intersection that can significantly improve traffic flow and safety. Where roundabouts have been installed, motor vehicle crashes have declined by about 40 percent, and those involving injuries have been reduced by about 80 percent. Crash reductions are accompanied by significant improvements in traffic flow, thus reducing vehicle delays, fuel consumption, and air pollution.