ROUNDABOUT TOPICS--FINDINGS AND TRENDS FROM VERMONT AND BEYOND

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TRENDS

• U.S. LOST HIGHWAY SAFETY LEAD TO U.K., U.S. NOW NINTH (7 AHEAD HEAVILY INVESTED IN ROUNDABOUTS)

• VEHICLE MILES OF TRAVEL GROWTH SLOWS--U.S. VMT, 2004, UP 1.1%

• VMT GROWTH STALLS IN NEW ENGLAND--90s HISTORIC LOW OF 16%, FLAT LINE AFTER 1999

• FUTURE: TOWARD “EUROPE,” INTEGRATED, CAR MODAL SHARE DOWN AND OTHERS UP
TRENDS


- INCREASING ENGINEERING COMMUNITY CONCERN OVER INJURY NEGLIGENCE SUITS FOR INSTALLING STOP LIGHTS WITH THEIR MULTIPLE RATES OF DISABLING INJURIES
FIRSTS IN NORTHEAST ROUNDABOUTS

- Town center roundabout plan: 1995, Manchester, VT
- 2-Lane and interstate interchange: 1999, Brattleboro, VT, “Keene-Turn”
- 1st federal Scenic Byway funded design, Smuggler’s Notch Scenic Road/Stowe Mtn. Resort gateway, 1995
ROUNDABOUTS IN THE U.S., A PREDICTION: The roundabout impact on the U.S urban built environment will be far greater than that of the interstate highway--and the impact will be totally positive.
Plan for Parking, Road Corridor Improvements and Pathways
Manchester Parking and Pedestrian Improvements Plan
Manchester, VT
FIRSTS IN NORTHEAST ROUNDABOUTS

• First Governor’s dedication:
  • 1999, VT Gov. Howard Dean, Brattleboro (1st in U.S.?)

• First Micro-NECTA Core Area Full Feasibility Assessment: Keene, NH
  • Michael “Mr. Roundabout” Wallwork, Jacksonville, 1993;
First U.S. law, 2002, directs VT transportation agency to “pursue... construction of roundabouts at intersections determined to pose safety hazards for motorists.”

“Roundabout Corridor”--2005, Malta, NY, five roundabouts, including Northway, I 87, interchange, NYDOT
VERMONT ROUNDABOUTS SAFETY PERFORMANCE

- 24 "ROUNDABOUT YEARS" -- NO DISABLING INJURIES
- FIVE MINOR INJURIES -- 4 CAR OCCUPANTS, ONE PEDESTRIAN
- INJURY RATE (PER MILLION ENTERING VEHICLES) (/MEV): 0.045
- 2-LANE MEV INJURY RATE: 0.023
- 1-LANE MEV INJURY RATE: 0.059
VERMONT ROUNDABOUTS SAFETY PERFORMANCE

- Comparative injuries rates /MEV

  VT Roundabouts: 0.045
  US 7/VT 103 (TWSC): 0.270
  VT 62 (West 3 Signals): 0.490

(Note: TWSC and signals are high speed intersections)
MONTPELIER’S KECK CIRCLE

- 1995, 3-Leg, 10,050 VPD, 106 ft. ICD
- 260 peds per day; Design: Wallwork
- Peak hour stop delay: 6.3 sec. before, 2.7 sec. after; block away signal delay drops 40 to 27 sec. from shift of traffic on rectangle grid
- MEV injuries rate:
  Before: 0.17
  After: 0.058 -66%
2 Injury crashes (9/95 through 12/04): (1) 83-year-old pedestrian, bumps and bruises; (2) Two vehicle, one complaint of back soreness, headache

• 100% City funded

• 2 Property Damage Only (PDO) Crashes
MANCHESTER’S GRAND UNION

- 4-leg; opened, September, 1997; 90 ft. ICD
- VT 7A; 10,800 VPD (estimated)
- Wallwork design, Grand Union Co.
- 1 crash late 1997, 2 minor injuries from air bag, MEV crash rate 10/97 through 12/04: 0.075
MANCHESTER’S GRAND UNION

- Commercial product “Bomanite,” concrete veneer with custom color and pattern, used on all splitter islands and apron, stood up well since 1997
BRATTLEBORO’S “KEENE TURN”

- 4 leg, 1999, I-91/US 5/VT 9, 172 ICD
- 28,000 VPD, sidewalked
- Replaced signal with left turn protection
- MEV injury rate:
  Before       1.076
  After        0.058  -95%
  (Before data 5 years, after 4.25 years)
BRATTLEBORO’S “KEENE TURN”

- Heavy truck volume (tractor trailers), 900 daily, 3.2% of VPD; medium trucks, 1,120 daily, 4.0% of VPD
- Identified significant design flaws remain in place--higher PDO rate results
- Design--VT Agency of Transportation
- Stop delay a.m. peak: Before, 44 sec.; after, 12 sec.
WILLISTON’S “MAPLE TREE PLACE”

- 4-leg, 2001, about 90 ft. ICD
- Private shopping complex street, 6,000 VPD (estimated); at future point, town highway
- Design: local firm
VERMONT EXPERIENCE


- No state agency initiated roundabouts to date

- 3 of 4 roundabouts private or city funded
MOTOR FUEL USE REDUCTION

• Base research, Sweden, Andras Varhelyi, annual reduction of 18,000 gallons, 23,000 vpd; car following methodology, signal converted to roundabout (2001)

• VAOT evaluation of a.m. and p.m. peak, Keene Turn: 28,000 vpd from video tape; before and after hours of idle delay. By converting to fuel use and extrapolated to full daily average--30,845 gallons annually
aaSIDRA software enables easy calculation of fuel use reduction in stop light conversions.

- Assuming 20,000 gallons per intersection for 200 intersections in Vermont (300 signalized intersections), potential savings equal one percent of motor fuel consumption, over half percent total State petroleum consumption.
MOTOR FUEL USE REDUCTION

• Motor fuel reduction per entering vehicle per year:
  Swedish Study       0.75 gal.
  Brattleboro Analysis 1.10 gal.

• Motor fuel reduction converts to pollutants, GHGs (aaSidra calculates)
U.S. ROUNDABOUT MARKET POTENTIAL

- Extrapolation of 2002 France 20,000 roundabout population to U.S.: 93,000
- Extrapolation of 2002 roundabout building rate to U.S.: 4,600
- Value ($1 million per roundabout)
  - 93,000 roundabouts: $93 billion
  - 4,600 roundabouts: 4.6 billion (about 15% of the federal highway program)
Vermont in-place French population equivalent, 200, and annual production, 10 yearly. Vermont has 300 stop lights. Numbers are realistic for Vermont.

Apply “French ratios” to any state or area:
Roundabouts in place—337 per million population; production—18 yearly per million population
TRANSPORTATION LAND USE EQUATION

• Conclusion: roundabouts reduce sprawl.

• In the same functional manner a new highway at urban fringe changes land use by inducing sprawl, i.e., lower densities over time--the roundabout placement at existing intersections over time operates in the exactly opposite direction, i.e., higher densities of development over time.
THE URBAN IMPACT OF THE ROUNDABOUT--CAR ‘ATTRITION’

Urbanologist Jane Jacobs

“Erosion of cities by automobiles entails...events that...hardly need describing...Attrition of automobiles by cities is today almost always by happenstance...Nevertheless it does occur”

*The Death and Life of Great American Cities*, 1961
THE URBAN IMPACT OF THE ROUNDBOOTH--CAR “ATTRITION”

The roundabout constitutes a powerful new technology to apply as a tool of car attrition in urban North America.
1000 Friends of Oregon study found 4 factors key good pedestrian environment and walking mode use: (1) intersection crossing ease; (2) sidewalks present; (3) sidewalk connectivity; and (4) topography.

By scoring each factor 0 to 3, a score of at least 9 of 12 needed to indicate a positive environment for pedestrians.

For any busy intersection, roundabout needed for strong “crossing ease” score.
“No amount of painted white lines, crosswalks, traffic lights, button operated signals, ever quite manage to change the fact that a car weighs a ton or more, and will run over any pedestrian unless the driver brakes... The people who cross a road will only feel comfortable and safe if the road crossing is a physical obstruction, which physically guarantees that the cars must slow down and give way to pedestrians.”
ROUNDABOUT KEYS PEDESTRIAN MODE

A roundabout by providing a “physical obstruction” we call deflection and a pedestrian refuge at mid-traffic stream moves a substantial distance toward meeting the criterion stated in “Pattern Language”
“THE ROUNDABOUT IS THE PERSONAL COMPUTER OF TRANSPORTATION BUILT WITH STONE AGE MATERIALS”
• 2003 Highway deaths (FARS), 42,600; injuries, 2,889,000 (313,000 incapacitating)

• Intersection/intersection related crashes:
  – 8,700 fatality, 23% of all
  – 894,000 injury,
  – 1,664,000 property damage only
  – 2,700 signal (31%)--includes about 900 red-light-run fatalities; 3,200 stop sign (36%)
Signal percentage of all intersection/intersection related crashes:
- 23%, 2700 fatalities
- 51%, 451,000 injury
- 47%, 789,000 property damage only
ROUNDABOUTS AND NATIONAL HIGHWAY SAFETY

Suggested objective of full roundabout deployment:
Reduce intersection fatalities 25%, about 2,000; injuries 25%, about 200,000
TONY REDINGTON

TRANSPORTATION POLICY AND
NORTHEAST AREA ROUNDABOUT COALITION--VT
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www.NEARoundabouts.org (built and operated by Bob White, founder of NEARC)

Excellent roundabouts “link” website at
Roundabouts.ca:
http://roundabouts.ca/links.htm

Webcam of first Ontario roundabout:
http://roundabouts.ca/livecam.htm