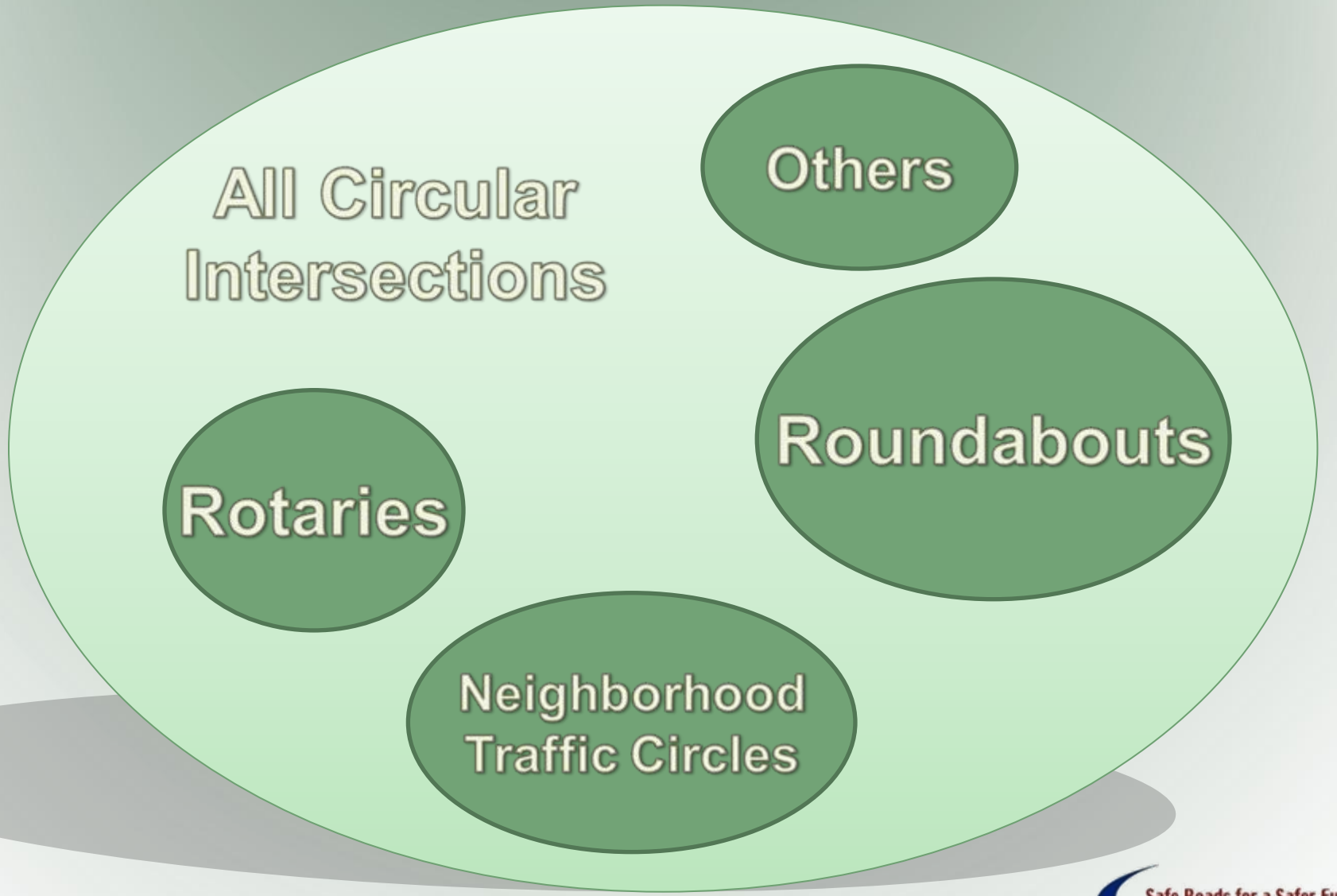
U.S.Department of Transportation
Federal Highway Administration

Safe Roads for a Safer Future
Investment in roadway safety saves lives

Safety Aspects of Roundabouts

Terminology



What isn't a Modern Roundabout?

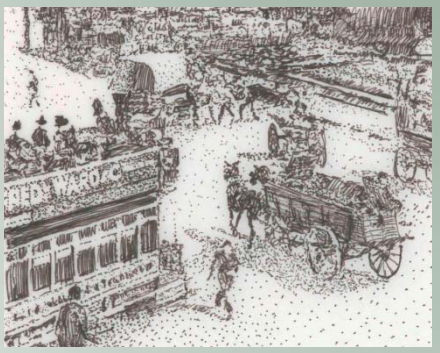
What is a Modern Roundabout?

- A compact circular intersection in which traffic flows counter-clockwise around a center island
- Entering traffic yields
- Approaches are channelized to deflect traffic into a proper entry path
- Designed to slow the speed of vehicles

What is a Modern Roundabout?

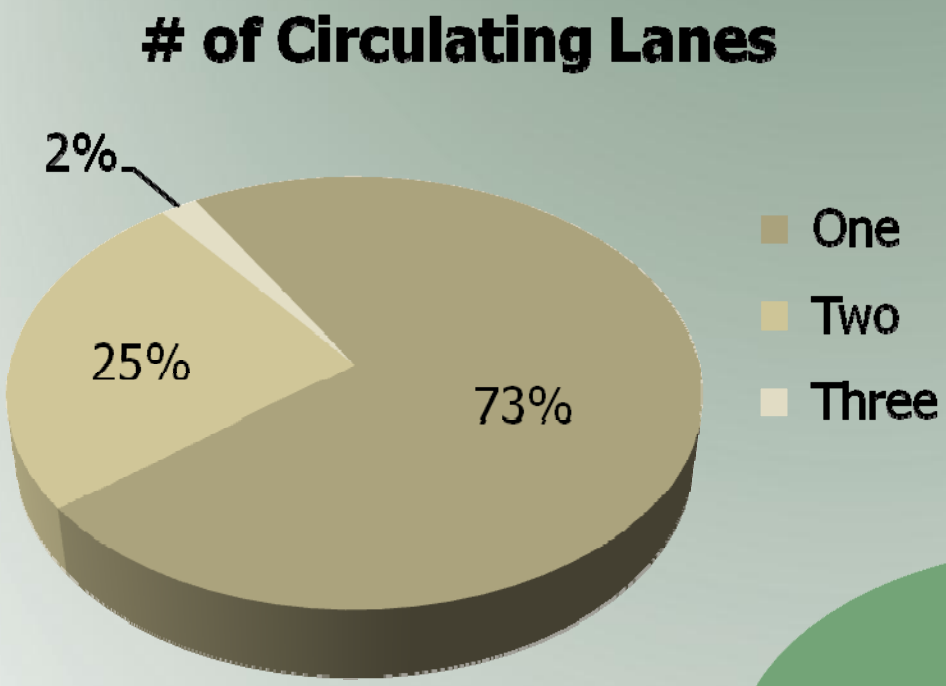
Roundabout History

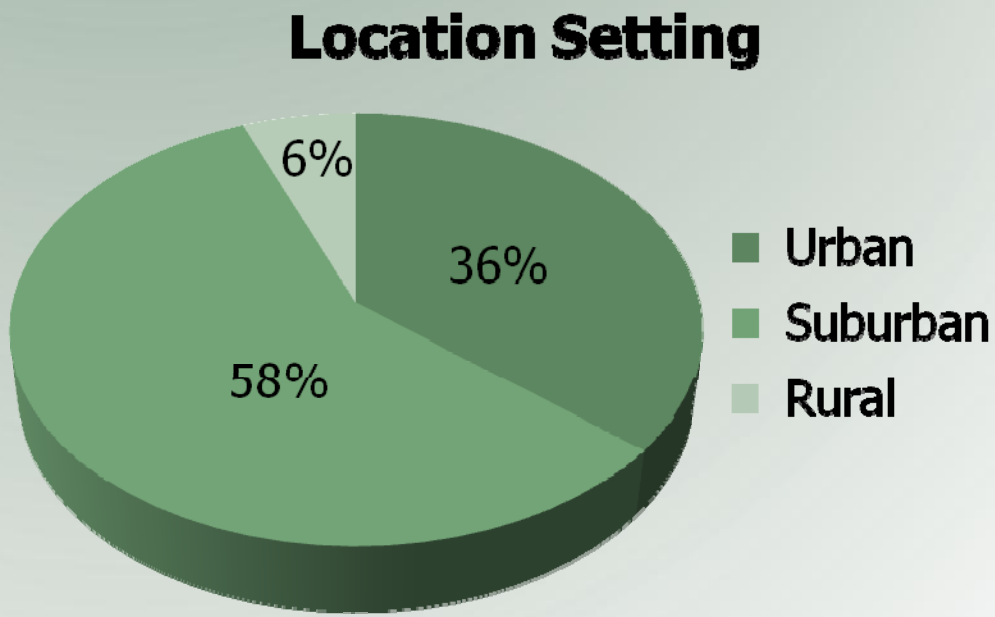
1900's | 1910's | 1920's | 1930's | 1940's | 1950's | 1960's | 1970's | 1980's | 1990's



- Rotaries and Traffic Circles Emerge
  - Columbus Circle in NYC credited as the first
- Circular intersections out of favor
- Great Britain tries variants of circular intersections
  - Adopted mandatory "yield at entry" rule
- **Modern** roundabouts widely used in Europe and Australia
- Modern roundabouts start to be built in the US

Roundabouts in the U.S.





Source: NCHRP Report 572: Roundabouts in the United States

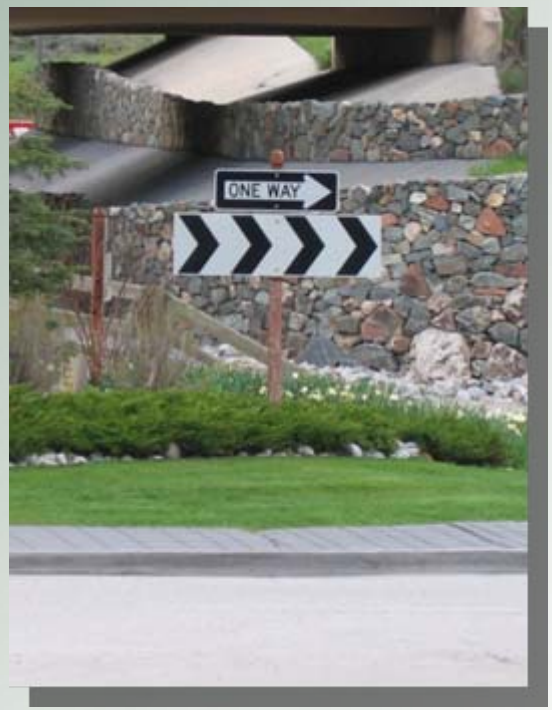
Key Features

Yield Control

Vehicles yield upon entry in a modern roundabout.

Circulatory Roadway

No traffic control in the circulatory roadway.
Movement is counter-clockwise.



Central Island

Central island deflects vehicles from a straight-line path.

Splitter Island

Splitter islands separate, deflect, and slow traffic.

Landscaping

Landscaping is needed as a visual element to drivers

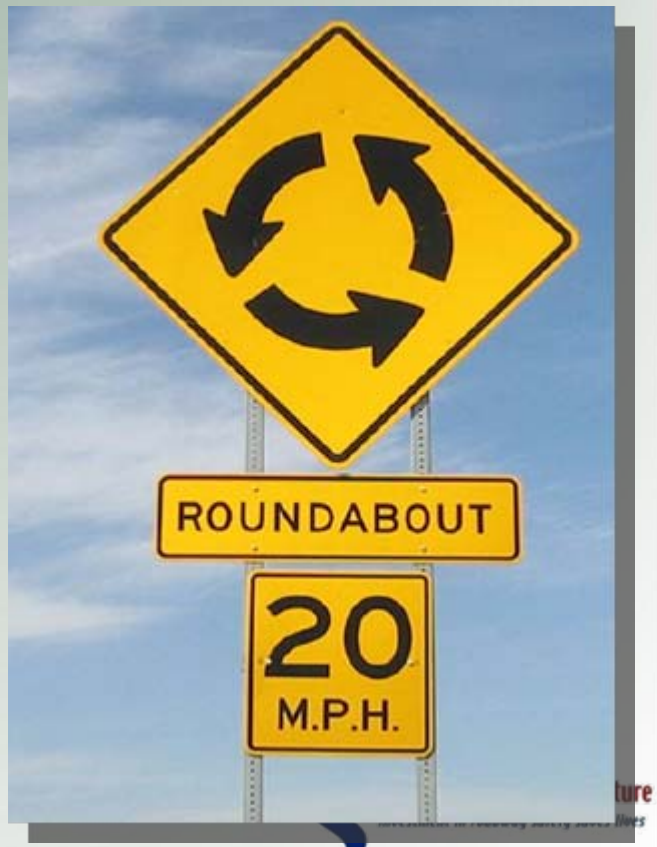
Pedestrian Access

Pedestrian crossings must conform to ADA standards.

Truck Apron

Where trucks are common, a properly designed apron may be necessary.

Signing and Marking



Proper signing help drivers navigate the roundabout.

Signing and Marking

Proper signing help drivers navigate the roundabout.

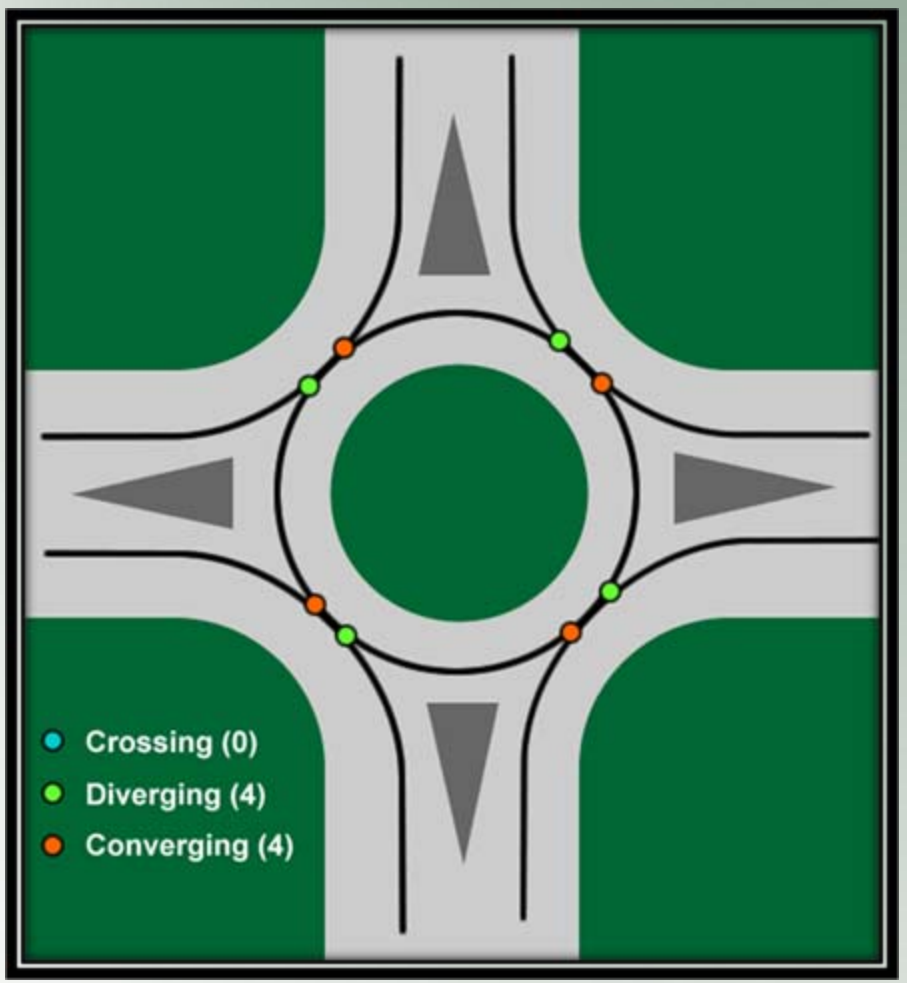
Signing and Marking

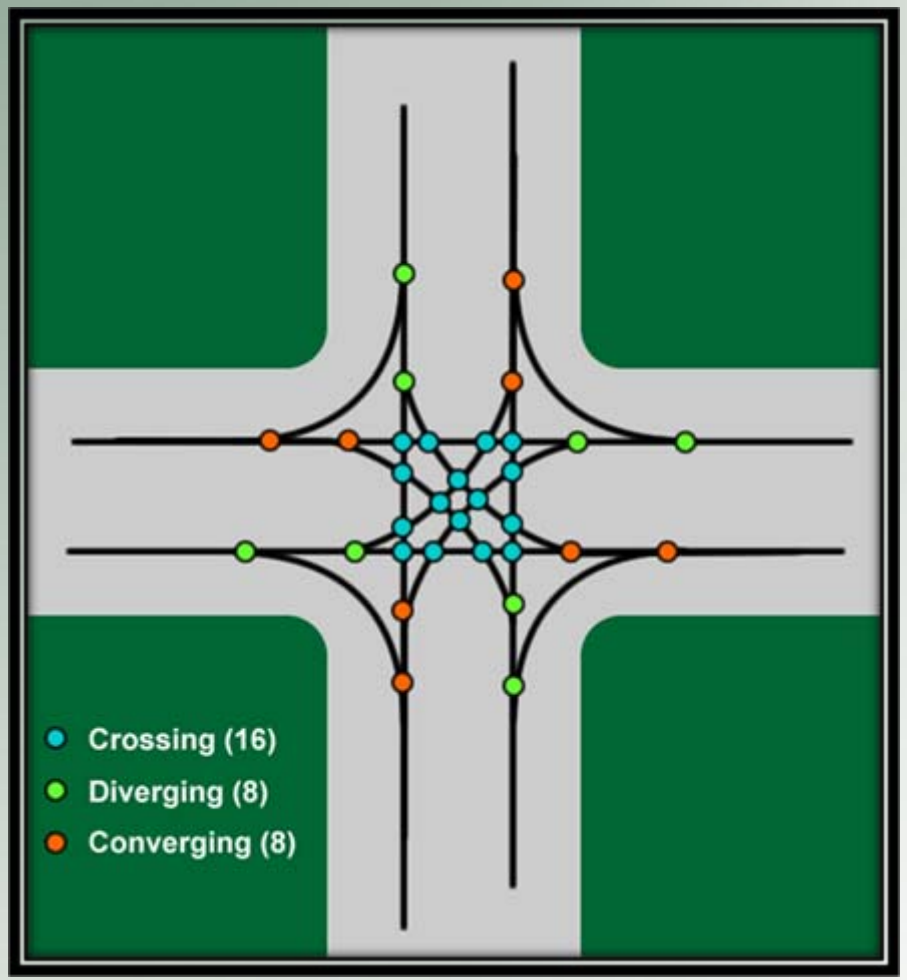
Proper pavement markings help drivers navigate the roundabout.

Why a Roundabout?

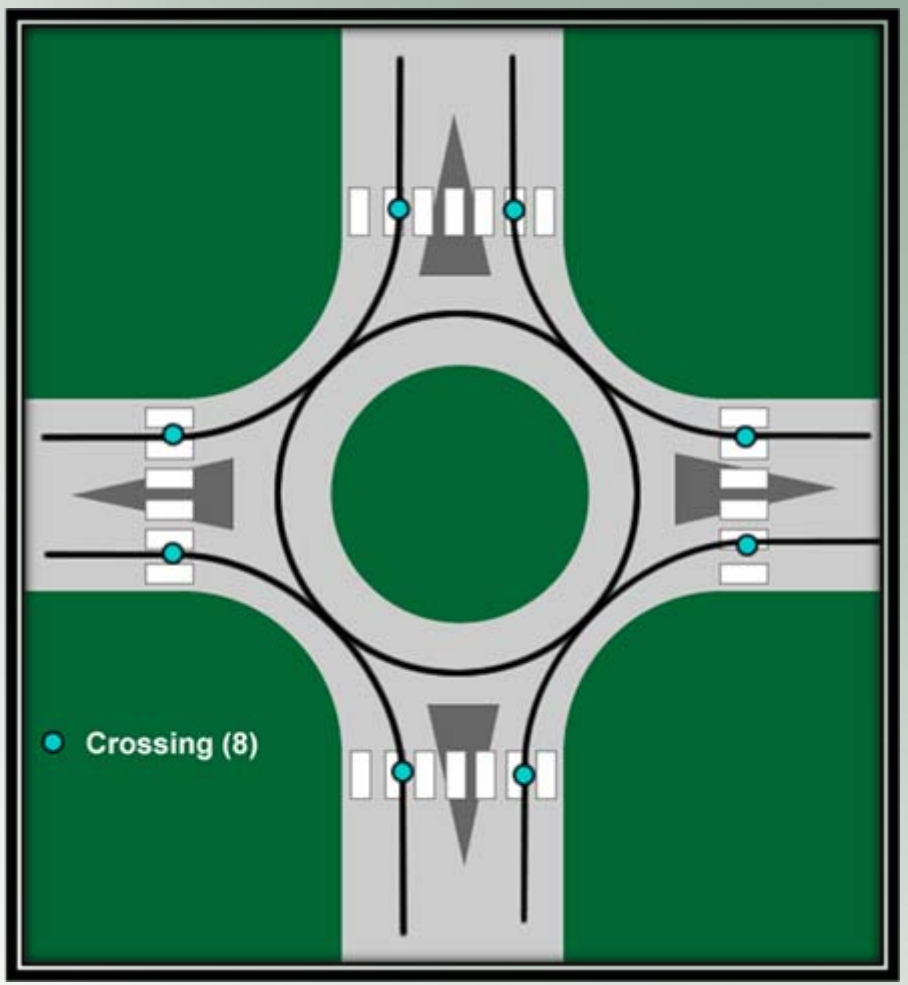
- Improve safety
- Reduce congestion and pollution
- Save money
- Complement other common community values

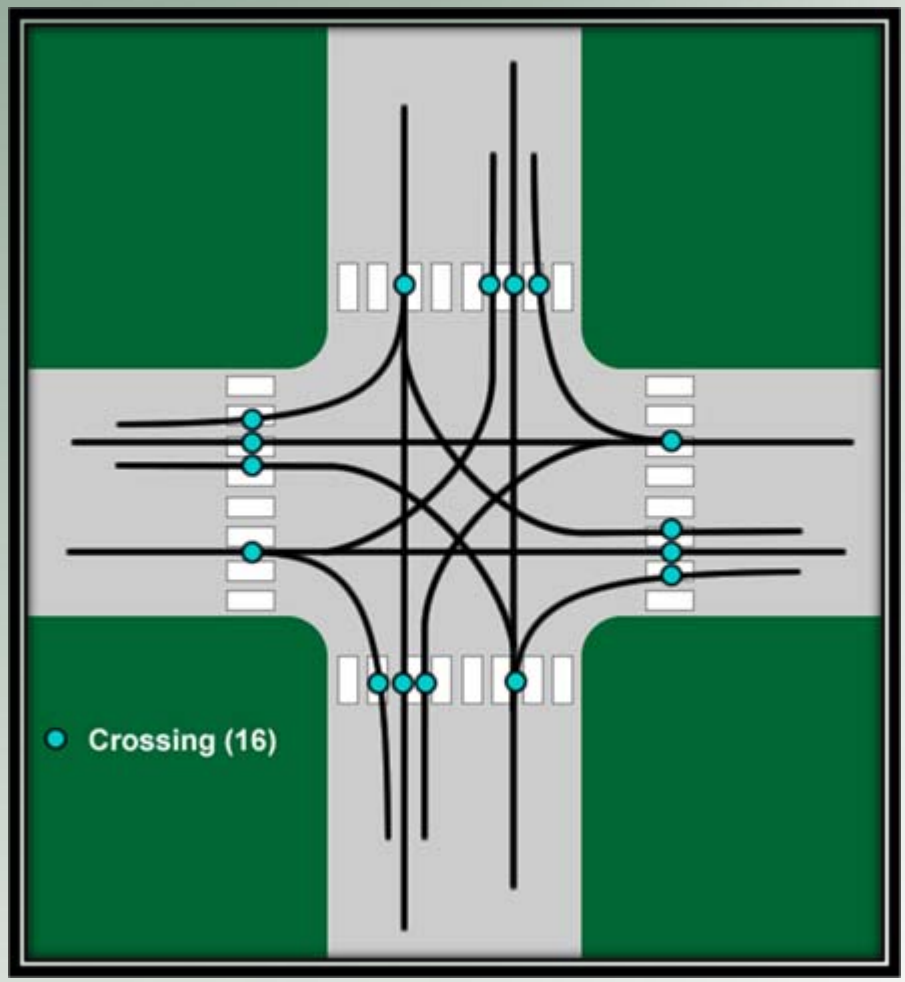
Vehicle Conflict Points





Vehicle-Pedestrian Conflict Points

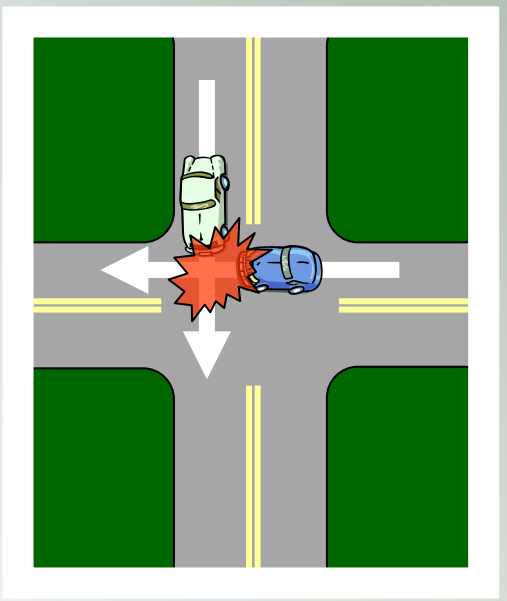




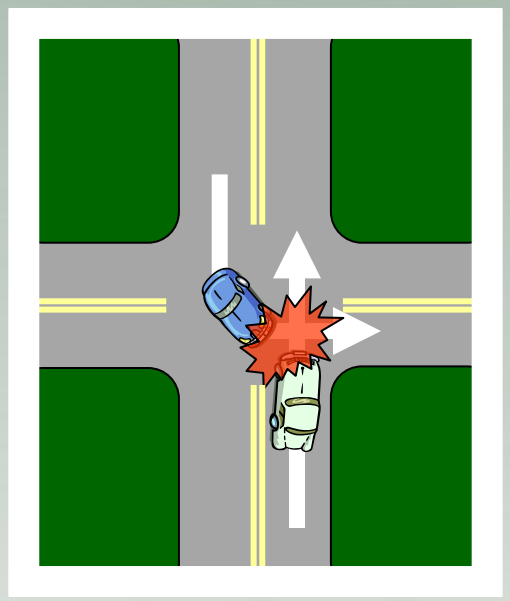
Type of Crashes

Typical 4-leg intersection

Angle

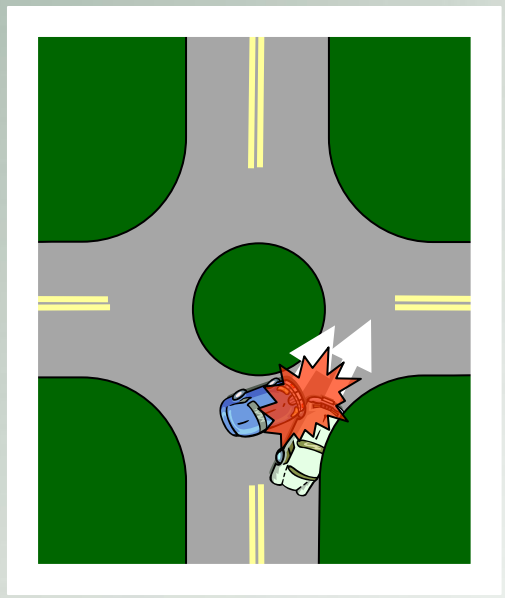


Left turn



Roundabout

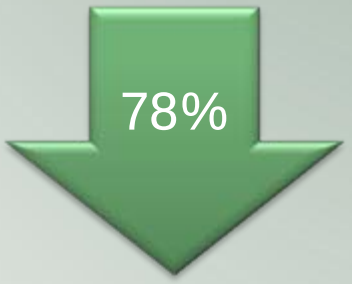
Sideswipe



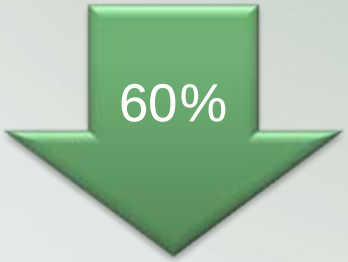
Study Results

Convert signalized intersection to roundabout

All crashes



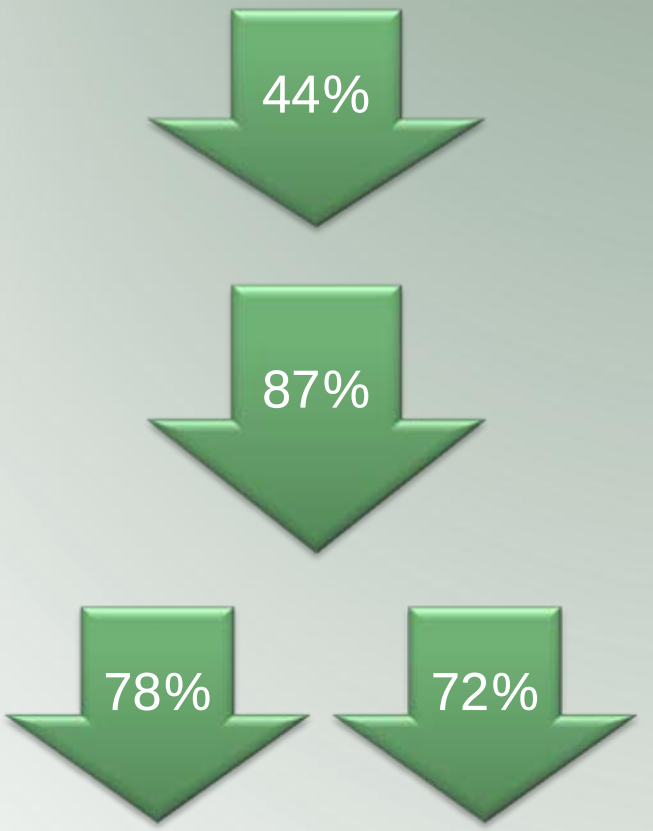
Fatal/injury crashes



Fatal/injury crashes in urban area

Study Results

Convert two-way stop intersection to roundabout



All crashes

Fatal/injury crashes in rural area

Fatal/injury crashes in urban area

Older Drivers and Safety

- Narrowing of visual field
- Restricting of the area of visual attention
- Decreased motion sensitivity
- Decline in selective attention
- Decline in divided attention
- Decline in perception-reaction time (PRT)
- Loss of flexibility

Older Drivers and Safety

Conventional Intersection	Roundabout
High speeds	Low speeds
Little response time	Situation changes slowly/More PRT
High energy crashes	Low energy crashes
Unforgiving environment	Forgiving environment
High severity crashes	Low severity crashes
Complexity	Easier to judge gaps
Wide visual scans	Narrow visual scans

Reduce Congestion and Pollution

Efficient during peak and off-peak

- Stops
- Idling
- Delay

Save Money

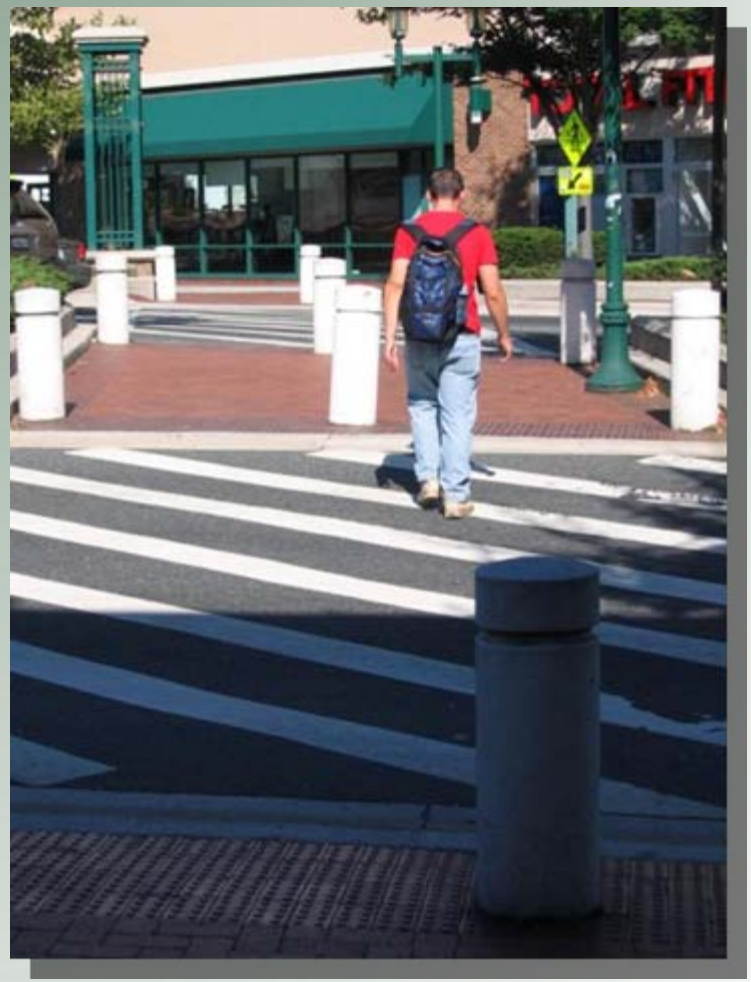
- No signal equipment to install, power, and maintain
- May require less right-of-way
- Less pavement may be needed

Complement Community Values

- Quieter
- Functional
- Aesthetically pleasing

Special Considerations

- Pedestrians
- Bicyclists
- Visually-impaired



Multi-Lane Roundabouts

Mini-Roundabouts

- Smaller design for urban areas
- Speed zones < 35 mph
- Central island is often painted
- Relatively inexpensive

Rural Roundabouts

- Higher approach speeds
- Properly designed splitter island is critical

Right-of-Way Requirements

Where to Consider Roundabouts

- Intersections with high crash rates/high severity rates
- Intersections with complex geometry, skewed approaches, >4 approaches
- Rural intersections with high-speed approaches
- Freeway interchange ramp terminals
- Closely spaced intersections
- Replacement of all-way stops
- Replacement of signalized intersections
- At intersections with high left turn volumes
- Replacement of 2-way stops with high side-street delay
- Intersections with high U-turn movements
- Transitions from higher-speed to lower-speed areas
- Where aesthetics are important
- Where accommodating older drivers is an objective

Roundabouts in Corridors

Roundabouts in Interchanges

- Fewer queue backups
- Less bridge width possible

Roundabouts and Rail Crossings

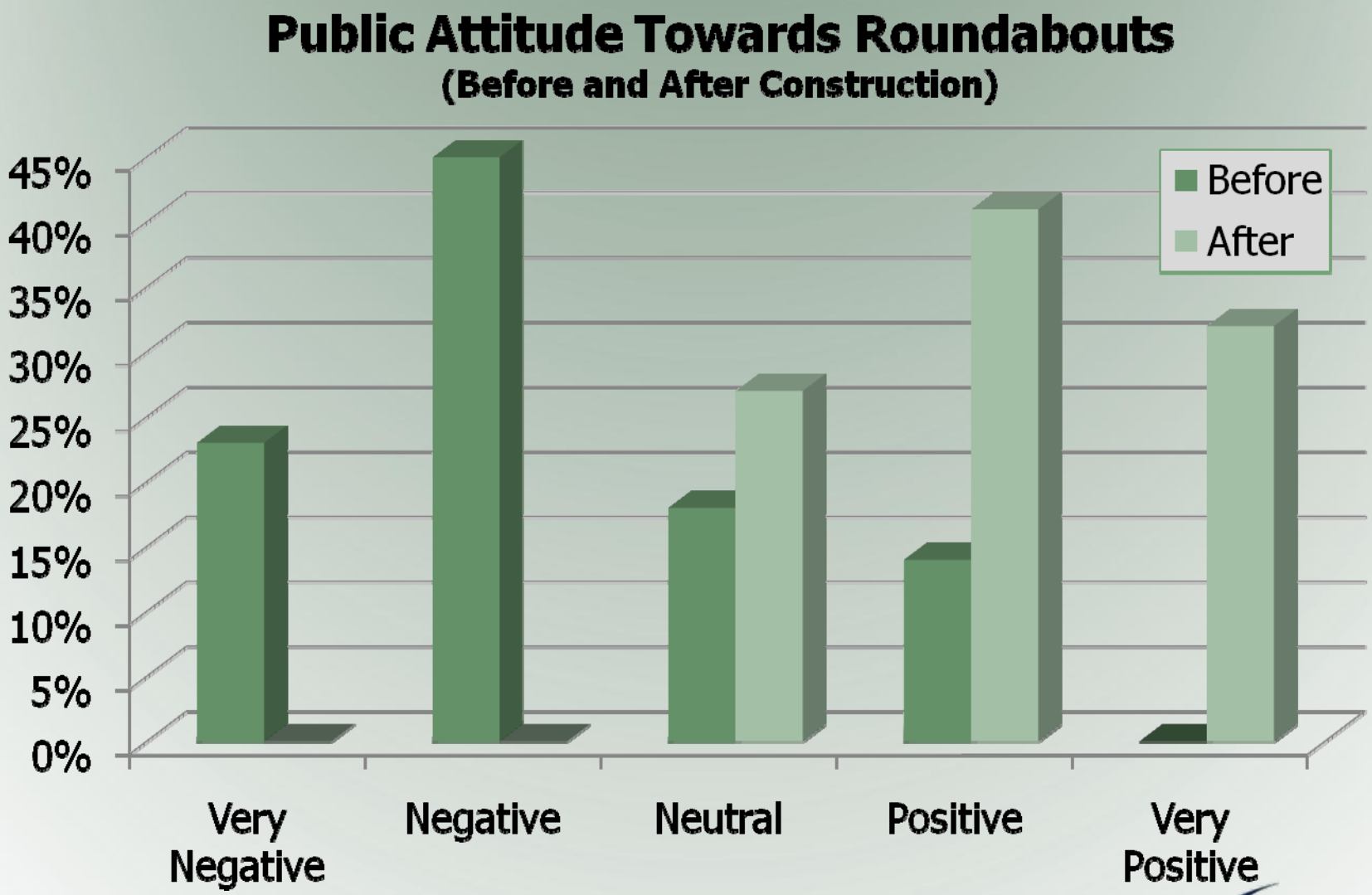
Roundabouts and Schools

Roundabouts and Driveways

Issues to Review

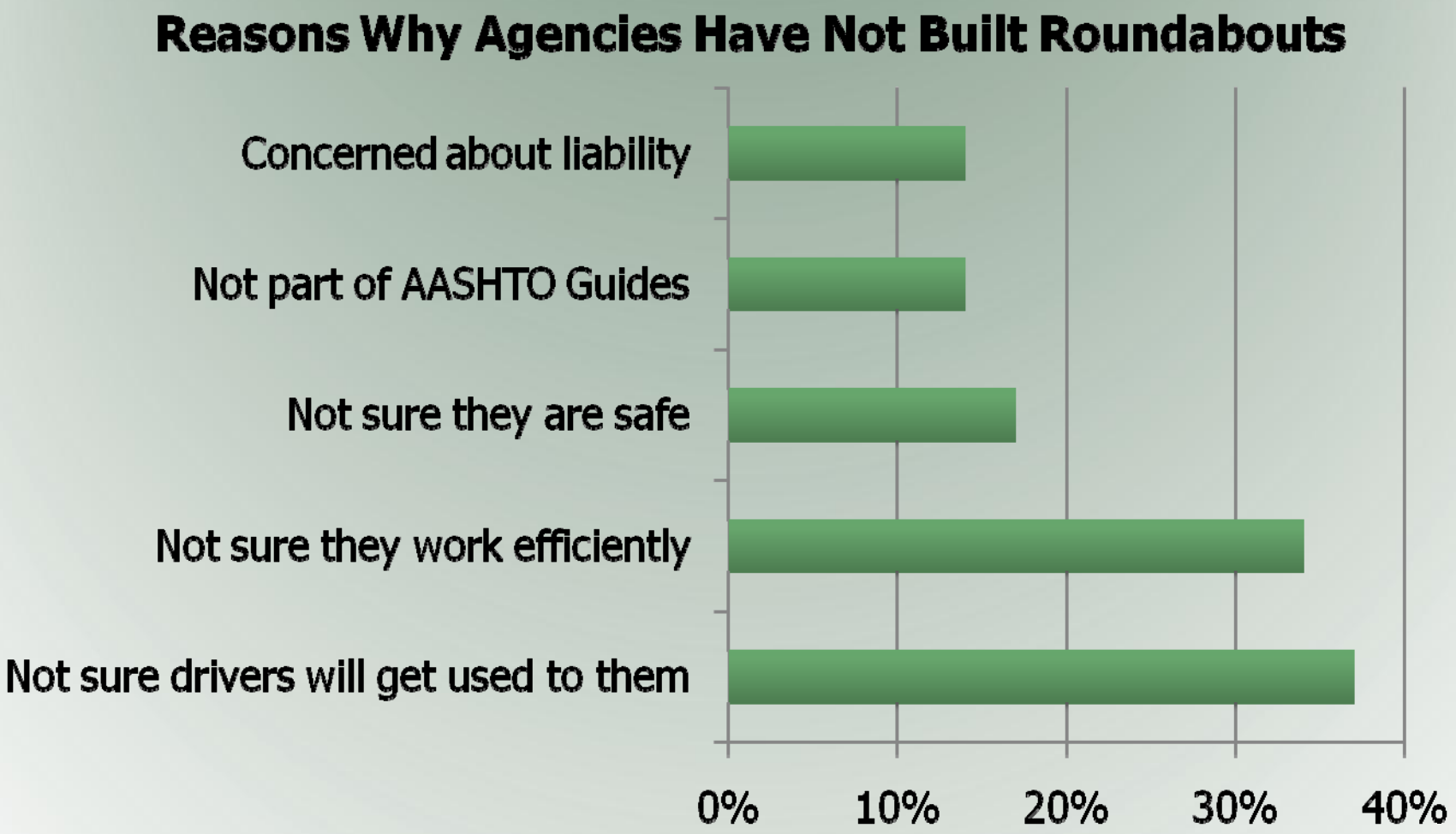
- Context
- Space feasibility
- Physical or geometric complications
- Proximity of railroad grade crossings, drawbridges
- Traffic congestion
- Presence of oversize vehicles
- Presence of pedestrians and bicyclists

Roundabout Resistance



Source: NCHRP Synthesis 264

Roundabout Resistance

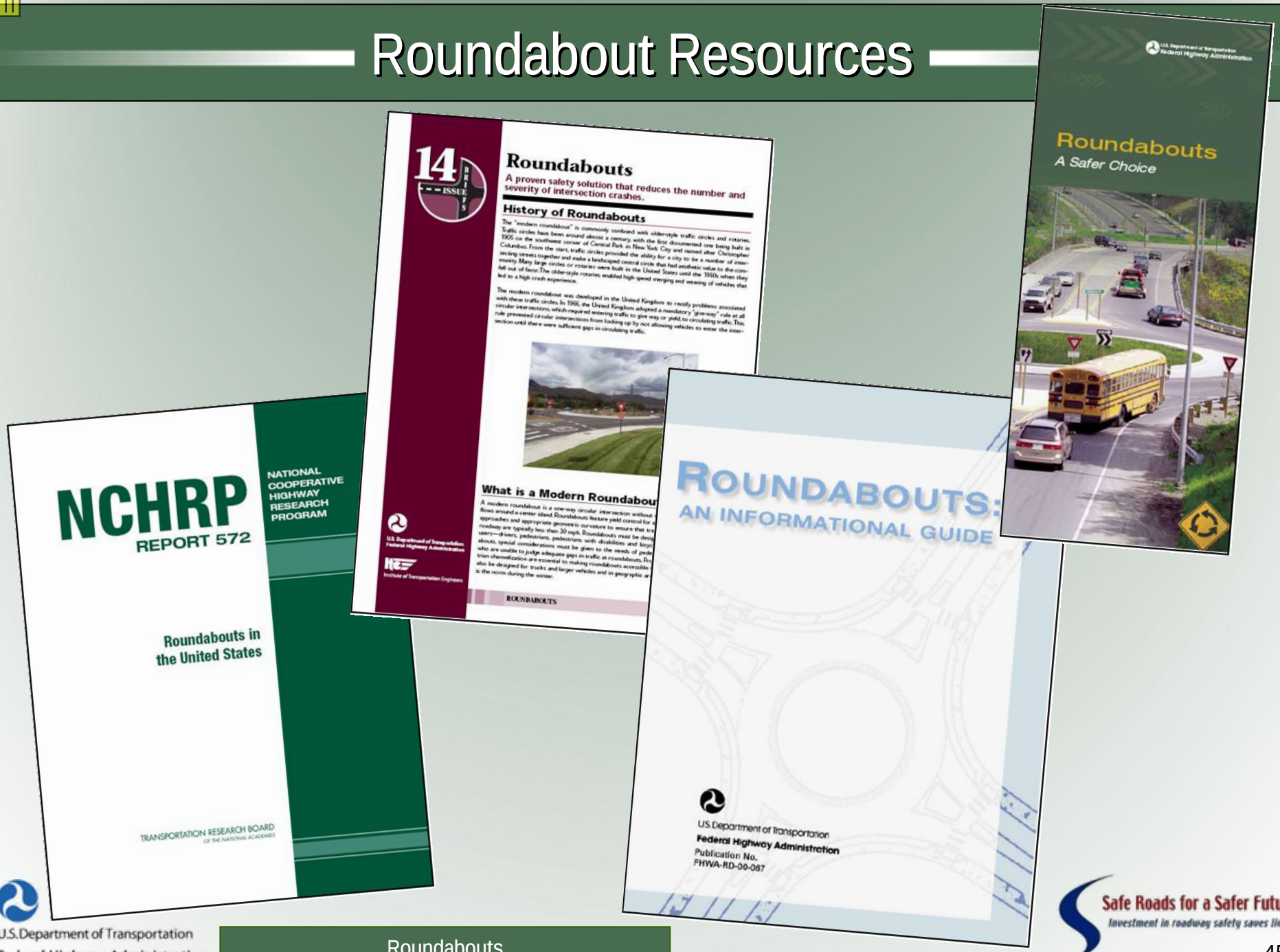


Source: NCHRP Synthesis 264

Keys to Success

- Proper design
- Public involvement
- Stakeholder support

Roundabout Resources



For More Information

- FHWA Office of Safety
  - http://safety.fhwa.dot.gov/
- Institute of Transportation Engineers
  - http://www.ite.org/
- U.S. Access Board
  - http://www.access-board.org/
- National Cooperative Highway Research Program
  - http://www.trb.org/