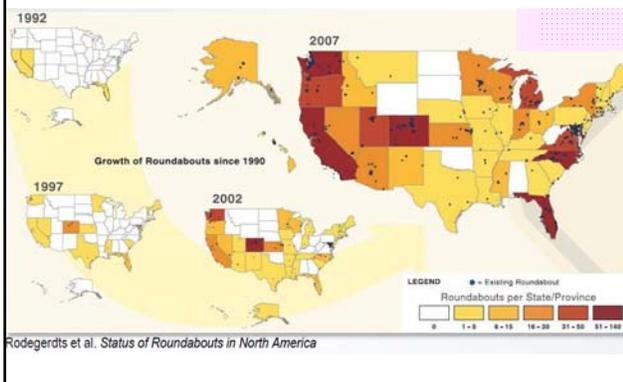


Hillary Isebrands, PE – FHWA Resource Center  
Scott Ritchie, Roundabouts and Traffic Engineering

Please REVIEW this as a DRAFT

- NEED to ADD Background and Photos Throughout

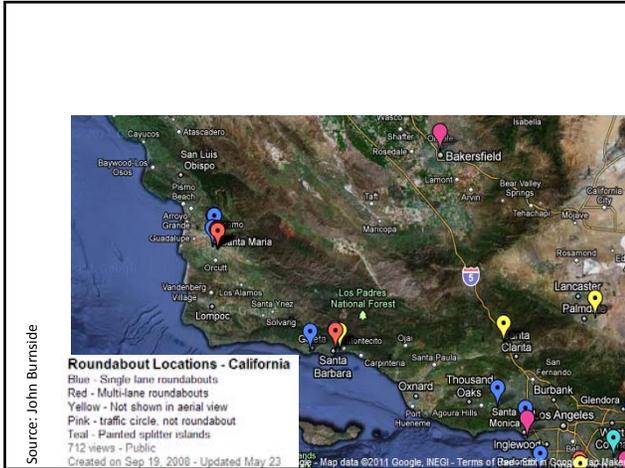
### Snap Shot of Roundabouts in the US



~ 200  
Roundabouts  
in California

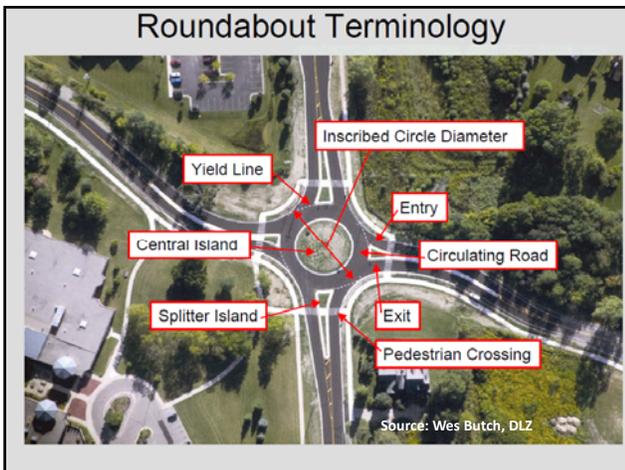


Source: John Burnside



Where do we find Roundabouts in the US?

- Urban, suburban and rural locations
- All types of climates (snow belts included)
- Low speed (20-35mph) roadways
- High speed (40 – 65 mph) roadways
- Roadways with high truck volumes
- Near schools
- Near railroad tracks



What is a Modern Roundabout?

- FHWA Roundabouts: A Safer Choice Video

## FHWA Guidance Memorandum on Consideration and Implementation of Proven Safety Countermeasures

Guidance Memorandum on Consideration and Implementation of Proven Safety Countermeasures  
 Subject: ACTION: Consideration and Implementation of Proven Safety Countermeasures  
 Date: July 10, 2008  
 From: Jeffrey A. Lindley, Associate Administrator for Safety

List of guidance documents included herein:

- [Road Safety Audits](#)
- [Rumble Strips and Rumble Stripes](#)
- [Median Barriers](#)
- [Safety Edge](#)
- [Roundabouts](#)
- [Left and Right Turn Lanes at Stop-Controlled Intersections](#)
- [Yellow Change Intervals](#)
- [Medians and Pedestrian Refuge Areas in Urban and Suburban Areas](#)
- [Walkways](#)

### 5. Roundabouts (Rev. 7/01/09)

#### Guidance Statement/Application:

Roundabouts are the preferred safety alternative for a wide range of intersections. Although they may not be appropriate in all circumstances, they should be considered as an alternative for all proposed new intersections on Federally-funded highway projects, particularly those with major road volumes less than 90 percent of the total entering volume. Roundabouts should also be considered for all existing intersections that have been identified as needing major safety or operational improvements. This would include freeway interchange ramp terminals and rural intersections.

## FHWA Roundabout Guidance

### 5. Roundabouts (Rev. 7/01/09)

#### Guidance Statement/Application:

Roundabouts are the preferred safety alternative for a wide range of intersections. Although they may not be appropriate in all circumstances, they should be considered as an alternative for all proposed new intersections on Federally-funded highway projects, particularly those with major road volumes less than 90 percent of the total entering volume. Roundabouts should also be considered for all existing intersections that have been identified as needing major safety or operational improvements. This would include freeway interchange ramp terminals and rural intersections.

## Benefits of Roundabouts

- SAFETY
  - Reduction in speed for ALL vehicles (15-25 mph)
  - Less severe crashes (significantly reduced angle crashes caused by running a stop sign or a red light)
- OPERATIONS
  - Reduction in delays (less time at the intersection 24 hours a day)
  - Suitable for traffic volumes upwards of 50,000 vehicles/day
- ENVIRONMENT
  - Potential reduction in emissions (starts and stops)
  - Less pavement more green space (Opportunities for landscaping in the center island i.e. community gateway)
  - Wide nodes and narrow roads (keep corridors narrow and no turn lanes)

## Reduction of Speeds on Rural Highways

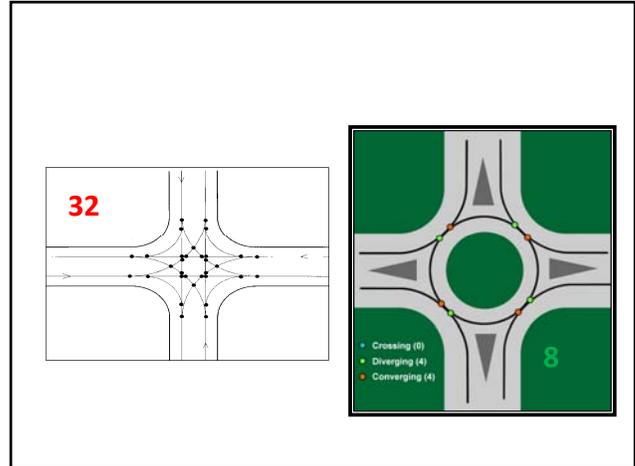


Photo Courtesy: Neal Hawkins

### Agricultural Equipment and Semi-trucks



Photo Courtesy Black Hawk County, Iowa and Hillary Isebrands



### Safety Statistics - Conversion of a Stop or Signal Controlled Intersection to a Roundabout

Intersection Type	Number of Intersections	Setting	Crash Reduction Factor (all crashes)	Crash Reduction Factor (injury crashes)
All	55	Urban/ Suburban/Rural	35%	76%
Signalized	9	Urban/Suburban	48%	78%
Two-way Stop Control	36	Urban/ Suburban/Rural	44%	82%
	9	Rural	72%	87%
All Way Stop	10	Urban/ Suburban/Rural	- 3%	- 28%

Source: NCHRP 572 (2007)

### Rural, High-speed Approaches to Roundabouts Before and After Safety Study

- 19 intersections
- WA, OR, KS, WI, MN, MD

Measure of Effectiveness	Before	After	Percent Change
Total crashes	511	212	-0.59
Injury crashes	299	44	-0.85
Years of data	98.2	98.2	No change
Mean total crashes/year	5.11	2.38	-0.53
Mean injury crashes/year	3.02	0.53	-0.83
Mean crashes/intersection	26.9	11.15	-0.59
Average injury crashes/intersection	15.74	2.32	-0.85
Mean crashes/MEV	1.68	0.61	-0.64
Injury crashes/MEV	0.97	0.13	-0.87

Source: Isebrands TRR 2096, 2009; Dissertation

Rural, High-speed Approaches to Roundabouts  
Before and After Safety Study

Table 5: Change in Crash Types

	Before	After	Change
Angle	353	42	-
Turning movement	27	6	-
Head on	19	0	-
Fixed Object	19	68	+
Sideswipe	14	28	+
Rear end	61	44	-
Run off the road	4	7	+
Other	10	16	+
Unknown	4	1	-
Single vehicle	24	80	+
Night	83	71	-
Trucks	28	28	No change
Alcohol related	21	26	+

Source: Isebrands TRR 2096, 2009; Dissertation

Rural, High-speed Approaches to Roundabouts  
Before and After Safety Study

Table 6: Injury Crashes by Crash Type<sup>1</sup>

	Before	After	Change
Angle/turning	205	6	-
Rear end	28	15	-
Head on	8	0	-
Sideswipe	9	5	-
Fixed object	6	6	No change
Run off the road/Loss of control	2	7	+
Other	5	3	-
Incomplete Crash Records	24	3	-

<sup>1</sup> This table excludes fatal crashes.

Source: Isebrands TRR 2096, 2009; Dissertation

Rural, High-speed Approaches to Roundabouts  
Before and After Safety Study

Table 7: Before and after crash comparison

Control Before	Sites	Lanes	Crashes recorded in after period		Index of Effectiveness and Point Estimate of the Percentage Reduction in Crashes	
			All	Injury	All	Injury
All	19	All	212	44	0.335 67%	0.126 87%
Two-way stop (4 legs)	17	All	197	42	0.322 68%	0.122 88%
	16	1	149	35	0.256 74%	0.107 89%
	1	2	48	7	1.41 41%	0.405 60%
One-way stop (3 legs)	2	1	14	2	0.739 26%	0.276 72%

Source: Isebrands TRR 2096, 2009; Dissertation

Conversion of a Stop or Signal Controlled Intersection to a Roundabout

Intersection Type	Number of Intersections	Setting	Crash Reduction Factor (all crashes)	Crash Reduction Factor (injury crashes)
All	55	Urban/Suburban/Rural	35%	76%
Signalized	9	Urban/Suburban	48%	78%
Two-way Stop Control	36	Urban/Suburban/Rural	44%	82%
	9	Rural	72%	87%
Two-way Stop Control	17	Rural (1 lane)	74%	89%
All Way Stop	10	Urban/Suburban/Rural	- 3%	- 28%

Source: NCHRP 572 (2007) and Isebrands TRR 2096, 2009; Dissertation

### Roundabouts with High Speed Approaches in the US

- Approach speeds are 40mph to 65mph
- Located across the United States
  - Implemented by State DOTs, County and Local Governments
- A majority are either a single lane roundabout or 1-2 lane hybrid roundabout

### Definitions....

1. High-speed

40+

2. Rural



Image Source: Icebrands and Google Earth

### Rural Roundabouts – A few locations

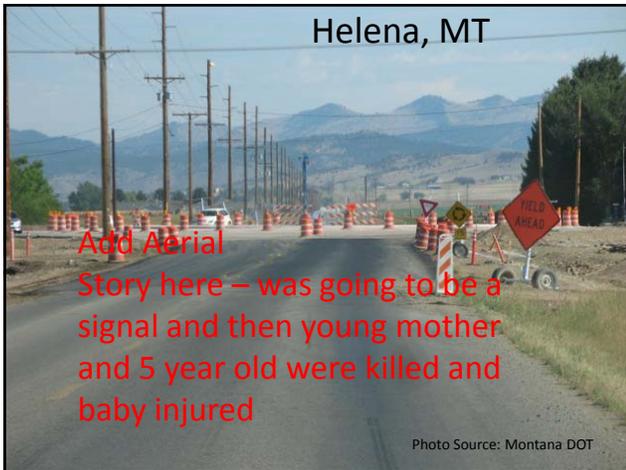
- Palmdale, CA
- Skaget, WA
- Helena, MT
- Duvall, WA
- Lothian, MD (20 miles South of Annapolis)
- Eagle, CO
- Avon, CO (Near entry to Beaver Creek Ski Resort)
- Chippewa Falls, WI
- Verboort, OR
- Waterloo, IA
- Paola, KS (40 miles SW of Kansas City)

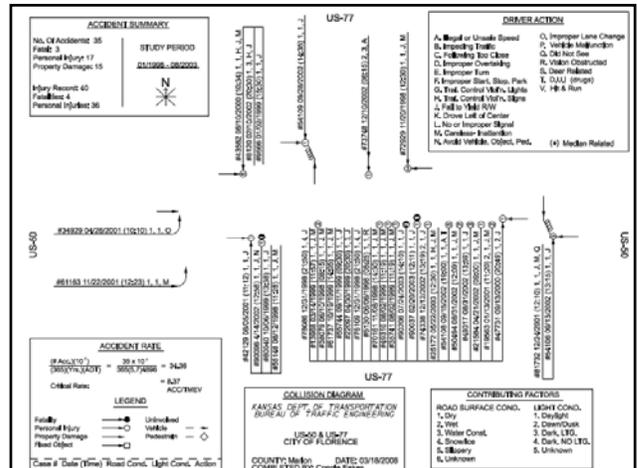
Palmdale, CA

Video and  
photo

Photo Source: CalTrans







## Intersection has long been a deadly site



### Two teens die in U.S.-50/77 collision

Two teenage girls are dead after a County emergency also came to the scene.

Alison Cady, 16, and Lyndsay Sherbert, 15, were killed instantly when a tractor-trailer collided into the passenger side of their car. They were crossing U.S.-50/77 intersection north of Florence. The accident took place just after 2 p.m.

According to Marion County Under-sheriff Randy Brazil, Sherbert was driving a 1998 Ford Taurus, with Cady as the passenger. Sherbert stopped at the stop sign, then proceeded across the intersection.

The car was struck by a 1993 Volvo semi owned by Rolling West Trucking of Centerville, Iowa, with Alvin Wardell of Centerville driving the truck. He was not injured.

Cady was the daughter of Jeff and Theresa Cady of Marion. Funeral services were held Monday morning at Holy Family Parish, St. Julia Neponseuse Church, Pilora.

Sherbert was the daughter of Duane Sherbert of Marion and Lyndsay Sherbert of Marion and Lyndsay Sherbert of Marion.




Source: Kansas DOT/Marion County Record



