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WHEN ROADWAY DESIGN OPTIONS ARE WIDE OPEN, WHY NOT GO AHEAD AND BUILD A

ROUNDABOUT?

TOO MANY NEW DEVELOPMENTS LIKE THIS AREN'T BEING DESIGNED TO REAP THE BENEFITS OF ROUNDABOUTS.

When traffic engineers plan the roads that eventually will accommodate traffic in new developments like this, the plans usually involve intersections with stop signs or signal lights. But the barren site of a future intersection might be an opportunity to consider another option for traffic management, the modern roundabout. These have been built by the tens of thousands worldwide. The main benefits have

been to improve traffic flow and reduce injury crashes by as much as 75 percent compared with intersections controlled by stop lights or signs (see *Status Report*, May 13, 2000; on the web at www.iihs.org). But only about 1,000 roundabouts have been built in the United States.

"Transportation engineers, like everybody else, generally go with what they're used to, and what they're used to on U.S. roads is constructing standard four-way intersections equipped with stop signs or signal lights. Doing this means missing the benefits of roundabouts, so we'd like to encourage officials to consider roundabouts earlier and more often in the roadway planning process," says Richard Retting, the Institute's senior transportation engineer and author of two new studies that suggest how to overcome traditional impediments to building roundabouts.

One impediment is logistical: It can be costly and disruptive to tear up an existing intersection and replace it with a roundabout. The easiest way around this is to construct the roundabout to begin with, before an intersection with a traffic light or stop sign is installed. Another roundabout opportunity is when an intersection with a signal light is scheduled for major modification.

Institute researchers studied 10 intersections where roundabouts could have been constructed but weren't. Instead local officials either outfitted the new intersections with traffic signals or retained the signal lights at intersections that were undergoing major modifications. The researchers measured traffic volumes, monitored the number of crashes that occurred, and estimated vehicle delays and fuel consumption at the intersections with the signals. Results were

compared with estimates of what could have been expected with roundabouts instead.

A key finding is that vehicle delays at the 10 intersections would have been reduced by 62-74 percent, saving 325,000 hours of motorists' time annually. Fuel consumption would have gone down by about 235,000 gallons per year, and there would have been commensurate reductions in vehicle emissions.

The safety benefits also are considerable. Previous research indicates that roundabouts reduce crashes by 37 percent overall — injury crashes by 75 percent — compared with intersections that have signals. Applying these risk reductions to 5 of the 10 intersections for which crash data were available, researchers estimated there would have been 62 fewer crashes over 5 years. There would have been 41 fewer injury crashes.

"If only 10 percent of the 250,000 intersections with signals in the United States were modified as roundabouts, the national safety and fuel saving benefits would be enormous," Retting points out, "and you can reap these benefits without as many logistical challenges if you 'think roundabout' from the very beginning of a *(continues on p.4)*

FLORIDA COMMUNITY GETS IT RIGHT

When the first roundabout (above) was constructed in Clearwater, Florida, the community's traffic operations manager wasn't a fan. "I'm an old signals and sign man. I never would have believed this would have worked, but it has convinced me that roundabouts do a remarkable job of accommodating all different kinds of users including cars, pedestrians, and bicycles," says Paul Bertels. He recalls that the multiple signal lights that had controlled traffic at this location regularly brought vehicles to a halt and caused massive backups, but now the traffic keeps moving.

Bertels wasn't the only skeptic when this roundabout opened in December 1999. Opposition began before construction and continued for a while afterward. But once engineers tweaked the design and motorists got used to the new traffic pattern, the complaints abated. In fact, Clearwater residents came to like the first roundabout so much that they requested another (below). They even collected $3,000 toward its construction and then held a party to celebrate when it opened (right).

Since then 3 more roundabouts have been constructed in Clearwater, and 7 more are being designed. All 10 of them were proposed by local residents.

photos courtesy Ken Sides

(continued from p.3) roadway project, for example when new housing or shopping developments create the need for roadway construction. Then it can be less expensive to construct a roundabout than to install traffic lights. Plus the developers may be required to fund the roundabout construction as a condition of zoning approval.

Initial opinion may be an impediment: Study after study, including the Institute's most recent one in northern Virginia, indicates the benefits of roundabouts in reducing both crashes and traffic congestion. Yet roundabouts frequently run into opposition, especially before they're constructed.

Institute researchers conducted telephone surveys of residents in three communities in New Hampshire, New York, and Washington State where intersections with stop signs or traffic lights were being replaced with roundabouts in 2004. The opinion surveys were conducted before the roundabouts were built and twice more, about six weeks after construction and then about a year later.

Fifty-four percent of the survey participants initially said they opposed roundabouts. One-third said they were strongly opposed. These proportions changed considerably right after construction, as motorists began getting used to the roundabouts. Then only 36 percent said they were opposed, and the proportion in favor increased from 36 to 50 percent.

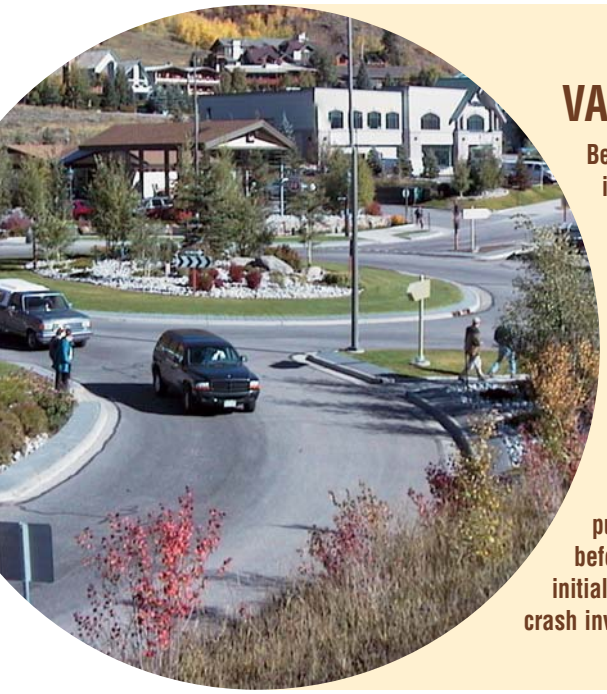
"It might not sound like much of a victory to find out that half of the respondents expressed their approval for roundabouts. But the first follow-up surveys were conducted soon after motorists began navigating this new form of traffic control. Roundabouts weren't yet routine," Retting explains. Opinion surveys conducted more recently show growing approval. More respondents now say they like the roundabouts, while fewer say they disapprove.

Previous before-and-after surveys have revealed similar turnarounds in public opinion (see *Status Report*, July 28, 2001; on the web at www.iihs.org). This is because many motorists find out, through their own experience, that vehicles generally flow more smoothly through roundabouts than through intersections controlled by traffic signals. Delays are reduced. In many cases there's no need to stop at a roundabout, just slow down.

Message for transportation officials: "What these two studies teach us is simple. Just build them. Go ahead and construct a roundabout where it's appropriate, and do it, if possible, when a roadway is first engineered," Retting advises. Especially in suburban areas where population growth and housing development are escalating and new roads are planned, officials would do well to consider roundabouts.

"Don't let initial opposition get in the way," Retting adds. "Many U.S. motorists aren't familiar with roundabouts yet, so they're wary of them. But once the roundabouts are built, the traffic flow and safety benefits turn people around, even people who weren't enthusiastic from the get-go."

For a copy of "Continued reliance on traffic signals: a case study in missed opportunities to improve traffic flow and safety at urban intersections" by C. Bergh et. al and "Traffic flow and public opinion: newly installed roundabouts in New Hampshire, New York, and Washington" by R.A. Retting et al., write: Publications, Insurance Institute for Highway Safety, 1005 North Glebe Road, Arlington VA 22201, or email publications@iihs.org.



VAIL, COLORADO: TOWN WITHOUT SIGNAL LIGHTS

Before the first roundabout was constructed in Vail, Colorado, ski season traffic was leaving visitors and local residents alike wanting to ditch their cars and just ski into town. Now traffic at every exit from an interstate highway entering Vail is governed by a roundabout. The result is that traffic backups have largely disappeared.

But the process wasn't easy. The first proposals for roundabouts were resisted. Warren Miller, a local filmmaker, protested in the newspaper for six months. Still two roundabouts were built in 1995, and the opposition diminished as motorists got used to the new traffic patterns and noticed that vehicles were moving more smoothly. The newspaper published letters from Miller, who admitted he had been wrong. With public support, two more roundabouts opened in 1997. Now Vail is known as a town without signal lights.

Besides enduring fewer backups, motorists benefit in terms of safety. Greg Hall, director of public works and transportation, says crashes were reduced by about 20 percent from 3 years before the first roundabout to 3 years after. Injury crashes have gone down 85 percent. And despite initial concerns that bicyclists and others wouldn't adapt to the roundabouts, there has been only 1 crash involving a bicycle in the 10 years since Vail opened its first roundabout.

Risks are higher for teenage drivers with teen passengers, and new research points to behaviors that are increasing the risks

When teenagers drive with peers in their vehicles, they drive faster than other motorists and leave less distance between themselves and the vehicles in front of them. They more frequently engage in other risky behaviors like speeding. These are the findings of a recent study by researchers at the National Institutes of Health and Westat.

In light traffic with longer distances between vehicles, drivers of all ages increased their speeds — and teenagers increased them more than older drivers. Exceeding the speed limit by more than 15 mph was significantly more likely when male passengers were traveling with a teenager at the wheel. About 1 of every 4 teenage drivers with males in their vehicles drove this fast compared with about 1 in 20 teenage drivers who were traveling alone or with a female passenger.

With a teenage passenger who was male, drivers of both genders maintained higher speeds than when driving alone. But when the passengers were female, the drivers' speeds were slightly slower than when driving alone.

Teenage drivers of both genders maintained shorter headways, or distances to the vehicles in front of them, compared with other drivers. Headways didn't vary much according to whether the teen driver was male or female, but headways did become shorter with male passengers in the vehicles. When the passenger was female, the headways were longer than when driving alone or when the passenger was a male. The longest headways were maintained by female drivers with female passengers.

"Crash rates are much higher when teenagers travel together, and this new study sheds light on some of the reasons," says Institute senior vice president for research Susan Ferguson. Evidence from an Institute study indicates that when teen passengers ride with teen drivers their crash rates, including fatal crash rates, go up (see *Status Report*, Dec. 4, 1999; on the web at www.iihs.org). This is especially true when the passengers are males. The more passengers the greater the risks.

In 2004 a little more than half of all crash deaths involving 16-year-old drivers occurred when they had teen passengers in their vehicles.

Lead author of the new study, Bruce Simons-Morton, notes that "peers in vehicles, especially males, not only can distract teen drivers but also may encourage them to take more risks than they ordinarily would — risks like driving faster and closer to the cars in front of them."

Simons-Morton says these findings support the idea of establishing passenger restrictions as part of states' graduated licensing systems. Seventeen states still don't include such restrictions.

The researchers collected the data for the study at 13 sites on roads near 10 different public schools in the Washington, D.C., metropolitan area. Teams of 3 observers worked together during after-school hours. One observer estimated the ages and genders of the drivers and passengers leaving school parking lots and recorded the types and colors of their vehicles. The other two observers captured the vehicles on videotape, one from across the street and the other from a nearby road.

More than 3,000 passing vehicles were observed. A total of 471 were driven by teenagers, 245 boys and 226 girls. No passengers were in 232 of the 471 vehicles, and the rest had 1 or more passengers.

"Observed effects of teenage passengers on the risky driving behavior of teenage drivers" by B. Simons-Morton et al. is published in *Accident Analysis & Prevention* 37 (2005).

When used as directed, big passenger vans are more likely to roll over

They account for a small share of crash deaths, but passenger vans can be risky

Fifteen-passenger vans are intended to transport up to, well, 15 people. But there's a safety downside — as the occupants pile in, the risk of rolling over goes up. Most rollovers involve one vehicle, and single-vehicle rollover crash risk actually is lower for lone drivers of 15-passenger vans than for drivers traveling alone in SUVs. But a government analysis indicates that adding more people to either kind of vehicle raises the risk of rolling over by about 9 to 12 percent per person — and vans hold more people.

"So the fact of high occupancy is the problem. The purpose of the vans also is the source of their risk," says Susan Ferguson, the Institute's senior vice president for research.

A 2001 report conducted for the National Highway Traffic Safety Administration (NHTSA) associates the increased rollover risk of 15-passenger vans with their centers of gravity. A high center of gravity means a higher risk of rolling over, and a 15-passenger van's center of gravity rises about 4 inches as the vehicle is fully loaded. This compares with 1.4 inches for a fully loaded 7-passenger van and 0.9 inch for a minivan. NHTSA says the 4-inch difference translates into a 40 percent increase in the propensity to roll over.

Another NHTSA report compares the odds of rollover when a vehicle is fully loaded versus a driver only. This ratio is 1.2 for cars, 1.5 for pickups, about 2 for SUVs and minivans, and 5 for 15-passenger vans. Given these comparisons, it's not surprising that a greater proportion of deaths in single-vehicle crashes of vans occurs in rollovers. During 2000-04 the proportion of all occupant deaths in single-vehicle crashes that occurred in rollovers was 83 percent for the vans compared with 76 percent for SUVs, 60 percent for pickups, 58 percent for minivans, and 45 percent for cars.

To reduce the risk of rolling over, most new 15-passenger vans are being equipped with electronic stability control (ESC) — important because NHTSA tests show that drivers of big vans with ESC are less likely to lose control of their vehicles in the kinds of high-speed maneuvers that can result in rollovers. Studies of the real-world experience of vehicles with and without ESC also demonstrate the benefits of this technology in reducing single-vehicle rollovers (see *Status Report*, Jan. 3, 2005; on the web at www.iihs.org).

Last year NHTSA began publishing the results of handling tests conducted to rate the stability of some passenger vehicles (see *Status Report*, March 6, 2004; on the web at www.iihs.org). Now Congress has told the agency to begin conducting the same tests to rate 15-passenger van stability.

Maintenance is another issue, and tire pressure might be affecting van stability. According to a NHTSA study released earlier this year, more than half of all 15-passenger vans have at least one substantially underinflated tire. This compares with about 30 percent for cars, SUVs, and pickups. About 1 in 4 vans has an overinflated tire.

And what about the van drivers? Some of them might not operate such big vehicles on a regular basis. They might be unfamiliar with the way 15-passenger vans handle and the extra risks when fully loaded. Yet the drivers don't have to undergo any special training. Commercial licenses are required to drive vans with room for 16 or more people but not for

Seven of the 12 people in this van were ejected when it ran off the road and rolled over at least twice near Henrietta, Texas, in 2001. Four of the van's occupants were killed and the other eight were seriously injured.

vans designed for 15. States may impose their own restrictions if vans are used commercially, but no special license is needed for mom or dad, for example, to transport a sports team or church group.

Extending commercial licensing requirements to 15-passenger van drivers might sound like a good idea, but there are unknowns. If the result were that fewer groups traveled by van because of a shortage of licensed drivers, the occupants might spread out into multiple vehicles. The safety consequences of putting more vehicles on the road to transport the same number of people are unknown.

This is worth thinking about because, despite their stability problems and high proportion of deaths in rollover crashes, 15-passenger vans don't have alarmingly high overall death rates. Driver deaths per million registered vans during 2000-04 numbered 57. This compares with an average of 108 for all passenger vehicles (cars, pickups, SUVs, and vans).

The death rate for all occupants, not just drivers, was higher in the vans than in the other kinds of passenger vehicles — 231 per million versus an average of 156 — but this is largely attributable to the the vans' higher occupancy. When big vans crash, more people risk dying.

The usual safety measures like buckling up can reduce these deaths. Fifteen-passenger vans have belt systems at every seat, but only about 20 percent of people killed in van crashes during 2000-04 were using their belts. More than half of the fatally injured occupants without belts were ejected from the vehicles.

"The perspective we need to keep is that 15-passenger vans aren't menaces on the road. They aren't accounting for a big proportion of motor vehicle deaths. But when they're loaded they do pose a risk to their occupants. This problem should lessen in newer vans equipped with ESC, but still we need to pay attention to who's driving the vans, how they're maintained, and whether their occupants are doing what all vehicle occupants should do, like buckle up," Ferguson concludes.

Flawed analysis of red light camera program draws Institute critique

Editor's note: On October 4, 2005, The Washington Post published a review of the District of Columbia's red light camera program by reporters Del Quentin Wilber and Derek Willis. The gist was that the cameras haven't reduced crashes. Institute researchers reviewed the reporters' analyses, finding fundamental flaws, and communicated the following critique to The Post on October 7.

The most obvious flaw is in the data that were used, which appear to show an almost 50 percent citywide increase in all crashes from 1999 to 2000. Such an increase is out of line with other years in the dataset and cannot be explained by any obvious factors such as an increase in traffic. Inquiring about this, the Institute learned from the D.C. Police Department's Inspector Patrick Burke that a change in the way crash statistics were reported and recorded was instigated between 1999 and 2000. Burke said he informed the reporters of this and cautioned them not to use the data for before-and-after comparisons. Yet the reporters used the invalid dataset.

Wilber and Willis reported that "broadside crashes, also known as right-angle or T-bone collisions, rose 30 percent" at camera intersections from 1998 to 2004. This should have raised an instant red flag because (1) it is illogical on its face, and (2) the finding is so far out of line with numerous findings published in peer-reviewed scientific journals. There is absolutely no reason to believe that cameras cause right-angle crashes to increase; the worst that could be expected is that cameras would fail to reduce crashes. Not even the most vociferous opponents of red light cameras claim they increase right-angle impacts.

Wilber and Willis should have been more skeptical. They should have dug deeper into the data. Scientists do this routinely, especially when they come up with findings that are out of line with other scientific research. Before reaching apparently contradictory findings, good researchers go back to the datasets they are using to try to understand why the apparent findings are different from prior research. When reporters conduct their own analyses, they should apply the same rigor.

Wilber and Willis should have first reviewed existing research, which among other findings indicates that cameras reduce red light running and crashes at all intersections in a community,

not just those with cameras; this is referred to as a spillover effect. Yet in their analysis Wilber and Willis compared crashes at D.C. intersections with and without cameras to assess the effectiveness of the cameras. Thus, the analysis lacks the very first requirement for estimating effects — a reasonable expectation of what would have happened without the cameras.

Lives are at stake, and *The Post* needs to take more care before reporting inaccuracies that could mean more traffic deaths.

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