

# CIRCLE OF INFLUENCE

## HOW FRANCE HAS USED ROUNDABOUTS TO CUT CASUALTIES

The burgeoning growth of roundabouts in France is testament to their emerging popularity across the globe. A key reason behind the steady rise of the roundabout is the positive impact it has on road safety



Over the past 20 years the number of roundabouts in France has mushroomed from just 500 to more than 30,000. French officials have embraced modern roundabouts for their inherent safety when compared with other forms of junction, and are monitoring accident statistics closely in order to cut their numbers further.

France first began introducing modern roundabout designs on its highway network in the late 1970s, following a modification of the country's Highway Code and publication of technical guidelines. It is an indication of their preponderance today that in the city of Nantes there are now two roundabouts for every 1,000 inhabitants.

### MATTER OF PRIORITIES

The introduction of roundabouts was not without its problems. French police were brought out of retirement to show the population how to navigate this long forgotten traffic device. There was also a decade-long struggle between two opposing views regarding who should have priority on a roundabout, with the French government at one point allowing every French region to make its own choice – which proved to be a recipe for misunderstanding and traffic accidents. Eventually “The Society for Priority to the Right” was victorious and the program for the development of roundabouts in France really began to gather pace.

Drivers had to be taught how to use roundabouts when they were more widely introduced across France

Official estimates suggest that France adds on average more than 1,000 roundabouts to its road network each year. Safety has been the driving force behind this growth – detailed accident statistics gathered by the French traffic police show that modern small, single-lane roundabouts are far safer than other forms of traffic junction.

Traffic junction expert Bernard Guichet, from the French Transport Ministry, says that though the number of roundabouts in the country is increasing, the total number of accidents at roundabouts has fallen. In 1990, there were around 15 accidents each year per 100 roundabouts; today there are fewer than five accidents per 100 roundabouts each year.

In part, this lower incidence of roundabout accidents can be attributed to an overall improvement in traffic safety in France, but Guichet believes two other factors have played a part: driver experience and roundabout design.

He claims that safety has risen as French drivers have become increasingly familiar with using roundabouts. “Today there is no rural part of France or any cities where there are no roundabouts,” he explains.

“On daily trips most drivers will navigate several roundabouts during their journey, so this type of intersection does not surprise them any more.”

Interestingly, the incidence of roundabout accidents involving elderly drivers (aged 66



**Small, single-lane roundabouts are proving to be extremely successful on French roads**

years or more) is no better than at signal controlled junctions, but 30% lower than at other intersections.

### BETTER BY DESIGN

Improvements in roundabout design have also played their part in cutting accidents. When technical guidelines were published, some 15 years ago, roundabout design in France improved rapidly both in terms of safety and cost.

“It is important to design roundabouts to be simple for the driver to understand,” stresses Guichet. “We found that very large roundabouts with multiple lanes cause many problems and are not good for safety. This is very important because at the international level, some countries (including the USA) have traffic engineers who are seeking to build roundabouts that are too complicated.”

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## STATISTICS AND WORLD STUDIES



In France, research has shown that motorized two-wheelers are involved in 41.2% of all accidents at roundabouts

Every day French traffic police gather accident statistics for the Bulletin d'Analyse d'Accident Corporel de la circulation (BAAC). Each accident is categorized under four distinct headings: general characteristics; place; vehicles; and people.

Details gathered include time and date, light and atmospheric conditions, location, type of intersection, vehicles involved, impact point, age and gender of people involved, nature of injury and validity of driving license.

This data provides valuable information relating to the type

and nature of all accidents, including those occurring at roundabouts.

Bernard Guichet's analysis of the BAAC traffic accident statistics relating to roundabouts provides some startling results. Though only 20% of roundabout crashes take place at out of town locations, for example, those same locations account for some 40% of fatalities.

While the incidence of accidents involving pedestrians at modern roundabouts is far lower than for other junction types, the proportion of pedestrians fatally injured is slightly higher at 3.4%, compared with 3.1% for intersections as a whole.

The number of accidents involving cyclists at roundabouts is also far lower than for other types of intersections, and the

proportion of fatal injuries is only 1.8%, compared with 4.7% at other intersections.

One possible area of concern relates to the proportion of accidents involving motorbikes, motor scooters and other motorized two-wheeled vehicles, which account for 41.2% of all accidents at roundabouts. Though the total number of such accidents is far less than at other intersections, it does suggest that there is potential to increase safety at roundabouts for bikers.

Guichet says it is striking that some 25% of personal injuries sustained at France's modern roundabouts involve only one vehicle. The equivalent figure for other intersections is only 1.5%. These figures reflect the fact that roundabouts help to separate vehicles, which helps to minimize the severity of injuries.

France's burgeoning roundabout population comprises comparatively small, single lane designs, which are economical to build, use minimal land and support good traffic flows. These roundabouts slow vehicles down and turn them so that any collisions are restricted to glancing blows between vehicles traveling in broadly the same direction. Regular deaths and serious injuries are replaced by shunts and bumps.

They are not to be confused with traditional big, high-speed traffic circles, which were built years ago in Paris, London, and Washington, D.C. Designed to support the dangerous combination of high-speed entry and multilane weaving, most such traffic circles suffer high crash rates.

This reiterates how crucial design is for the end user. Just ask any driver whether he would prefer to tackle a regular, single lane roundabout or to drive around the Arc de Triomphe – the answer is obvious.

### WHY SMALLER IS BETTER

Guichet says that the economic and safety arguments in favor of small, single-lane roundabouts will continue to support their establishment throughout France. He is also observing a growing trend to introduce mini-roundabouts at small intersections.

"It is a testament to the safety of these designs," he adds, "that 80% of roundabouts in France have never seen an accident. In fact, there are now over 30,000 roundabouts in France and over the past 14 years there have been only 20,000 accidents."

Guichet says that France has played a leading role in measuring the safety benefits of modern roundabouts, while his counterparts in the UK have focused more on the capacity benefits.

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→ "The scale of France's roundabout program is staggering: 30,000 built in 30 years. They have transformed the French roadscape and driving culture. The benefits are so obvious to French engineers that the number continues to rise at the rate of 1,000 per year. Finance Ministries would normally demand a program measured in hundreds of million dollars was evaluated. But the benefits from this remarkable, sustained program are all one way. Fewer crashes, even fewer injuries – and deaths are rare.

In the light of this work, it is perhaps surprising that neither the UK nor France has undertaken any recent in-depth cost benefit analysis of modern roundabouts compared with other intersections.

Modern roundabouts have been shown to be highly effective in cutting accident rates and reducing the severity of accidents. They have also been shown to improve traffic flow and raise capacity – therefore having a positive impact on congestion. It may simply be that the arguments in favor of their introduction are sufficiently compelling that transport departments do not feel the need to finance further research to establish the extent of their benefits. ■

In this article, roundabout guru Bernard Guichet contrasts how French engineers focus on safety and English engineers focus on capacity. This tells you all you need know. If you understand the rules of modern roundabout design, you'll find neat solutions for almost every traffic situation – from rural roads to busy cities.

France started its roundabout program more than half a century after its mass motorization. Developing countries today need vaccines to stop the epidemic of rising road deaths. A program introducing the humble roundabout on a large scale, as France has done, is one of them."

*John Dawson, chairman, iRAP*



Where accidents have taken place involving only one vehicle, some 60% occurred at night. Around 50% of single vehicle accidents involved young drivers with less than five years experience at the wheel, while 28% involved drivers who had been drinking.

Interestingly, across the whole of France the highest incidence of accidents at roundabouts occurs at around 1800hrs on a Friday.

### SAFER INTERSECTIONS

A series of studies around the world have confirmed that modern roundabouts provide the safest available form of intersection control.

In its report "Roundabouts: An Informational Guide", the US Federal Highway Administration said that, "experience in the

United States shows a reduction in crashes after building a roundabout of about 37% for all crashes and 51% for injury crashes."

If only small to moderate single lane roundabouts are considered, then the fall in the number of crashes is even greater, typically adding up to 51% for all crashes, and 73% for injury crashes.

Similar results have been recorded elsewhere in the world. In Australia, for instance, the number of collisions at intersections where modern roundabouts have been constructed has fallen by up to 61% for all crashes and up to 87% for injury crashes.

The number of injury crashes at French intersections fell on average by between 57 to 78% following the construction of

modern roundabouts, while the equivalent figure for the UK was 25-39%. In Germany the total number of crashes at intersections fitted with modern roundabouts fell by 36%, while the Netherlands experienced a 47% drop in all crashes.

In probably the most comprehensive US study to date, the Insurance Institute for Highway Safety studied 24 intersections, which in the past decade have been converted from stop control and signals to modern roundabouts. These 24 intersections were a mix of urban, suburban and rural environments. Overall, the study found reductions of 39% for all crash severities combined, 76% for all injury crashes and around a 90% reduction in fatal and incapacity injury crashes.



The safety benefits of roundabouts have been studied across the world – with impressive results

**WRITTEN BY**  
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