ROUNDABOUTS IN FRANCE
Safety and New Uses

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Every year, more than 1000 new roundabouts in FRANCE
More roundabouts, but less accidents per roundabout

Evolution 1993 - 2003
From 1993 to 2003, in France,
- total number of traffic accidents fell by 36%
- number of traffic accidents per roundabout fell by 58%
FATAL ACCIDENTS

Number of dead persons in roundabout

2,7 dead persons per cent accidents
Year 2003
112 pedestrians for 1406 accidents

Year 2003
2 killed pedestrians for 1406 accidents
## Roundabouts and elderly drivers

Part of elderly drivers in accidents

<table>
<thead>
<tr>
<th>age</th>
<th>Roundabouts</th>
<th>Other intersections</th>
</tr>
</thead>
<tbody>
<tr>
<td>66-75 years</td>
<td>5.46%</td>
<td>7.74%</td>
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<tr>
<td>&gt; 75 years</td>
<td>4.14%</td>
<td>5.71%</td>
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<tr>
<td>For a total of drivers</td>
<td>1209</td>
<td>14337</td>
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</tbody>
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Ref. 1999-2003 – Bretagne + Pays de la Loire
New guidelines has been published in 1998 and 1999

http://catalogue.setra.equipement.gouv.fr/2_prod/telechargement.shtml
software

Girabase
Calculation of Roundabout Capacity

This product is an English language adaptation of a French product

Sales Office http://www.certu.fr
New use of roundabouts and studies:
- intersection with tram
- near railway level crossing
- with traffic signals
For 10 years, modern tram has made a broad rise in large French cities.
They are modern roundabouts with yield to the entries.

Advantages of roundabouts for tramway intersections:
- better safety
- possibility of U-turn
- easier management of traffic lights
When a tram arrive, traffic is stopped by red lights and priority is given to the tram.

Flashing red signal are used on the ring to stop cars.

This specific signal is used for trams.
4 detections order the signals

LD : (80 - 140m) = red for cars and “green” for tram
CD : (5 - 10m) = confirmation and safety
RAZa : (5m after) = red for tram
RAZb : (after roundabout) = black for car
Roundabouts close to railway level crossing

More and more of roundabouts, therefore more often close to level crossings
The French National Railway Company is anxious

Road Directory and Railway Company manage a working group
to plan a guideline with solutions

Two various problems are studied …
First problem: the queue of the level crossing goes up in the roundabout.

Not a safety problem = less important

In a short time, roundabout is cleared.
Second problem: the queue of the roundabout goes up on the level crossing.

A train can arrive at 160 km/h - risk of fatal accident.
Solutions are either preventive, or curative, static or dynamic

Various complementary signals are tested to avoid the stop on railways
A slip road can give a possibility of release to vehicles stopped on the rails.
Other curatives solutions used traffic signal

At entry of roundabout

Or in the ring of (large) roundabout
We propose a formula to calculate the time of release of the level crossing

\[ t(s) = 7 + \pi \frac{(Rg-La/2)}{20} + dPN/4,05 + lPN/2,78 \]

To validate the various parameters, the reaction times were timed on a lot of roundabouts.

Publication of a guideline in 2005
A subject of research: roundabouts with permanent traffic signals

Advantages compared with traffic signals:
- general safety
- U-turn and important left turn
- reduction speed

Advantages compared with roundabouts:
- safety for pedestrians with 2 or 3 lanes
- better capacity than limits for roundabouts
- queue management

Guideline for area of utilization, design, planning, road signs …

Publication in 2006
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