The Safety of Roundabouts in Belgium

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Roundabouts and Traffic Lights: Evolution

Number of traffic lights and roundabouts in Wallonia

- Traffic lights in National Roads
- Roundabouts in National Roads

Graph showing the number of traffic lights and roundabouts in Wallonia from 1990 to 2002.
Evaluation of roundabouts

3 Evaluations

1) Before - After

2) Accidents Frequency

3) Comparisons: Roundabouts - Traffic lights; Belgium (Wallonia) - France
Assessment of the changing into roundabouts

- Heavy improvement: 25%
- Improvement: 28%
- No significant results: 20%
- Deterioration: 27%
**Before - After**

![Graph showing yearly average number of injury accidents](image)

- Yearly average number of injury accidents
- "Before" and "After" categories

National Roundabout Conference 2005 DRAFT
Before - After


Before

736 accidents
544 years

After

411 accidents
520 years

reduction of 42 %
Before - After

Open country : - 50 %
Semi-urban : - 46 %
Urban : - 15 %

But on the same period,

- 15 % of accidents in other crossroads
Before - After : Comparison

France : - 60 % of accidents (100 R., Haute-Garonne)
       - 66 % of accidents (SETRA, CETE de l'Ouest, ...)
       - 88 % (55 R., Loire Atlantique 1979-2000)

Denmark : - 53 % (urban), -84 % (open country)

The Netherlands : - 71 % (181 roundabouts)

Australia : - 71 % (13 roundabouts)

USA : - 76 % (24 roundabouts, Maine)
       - 88 % (8 roundabouts, Maryland)
Injury accidents frequency in roundabouts

- Open country
- Semi-urban
- Urban
Roundabouts: Acci. Frequency

151 Roundabouts (1992-2000) - 736 years

for an AADT = 10 000

<table>
<thead>
<tr>
<th>Area</th>
<th>Accidents</th>
<th>Serious Acci.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open country</td>
<td>0.527</td>
<td>0.169</td>
</tr>
<tr>
<td>Semi-urban</td>
<td>0.488</td>
<td>0.115</td>
</tr>
<tr>
<td>Urban</td>
<td>0.502</td>
<td>0.082</td>
</tr>
</tbody>
</table>

~ 0.5 simple to double
Traffic lights : Acci. Frequency

Injury accidents frequency in traffic lights

Yearly average number of injury accidents

Average daily coming in traffic

- Open country
- Semi-urban
- Urban
- Linear (Urban)
- Linear (Semi-urban)
- Linear (Open country)
Traffic lights : Acci. Frequency

122 Traffic lights (1992-2000) - 1098 years

for an AADT = 10 000

<table>
<thead>
<tr>
<th>Category</th>
<th>Accidents</th>
<th>Serious Acci.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open country</td>
<td>1,139</td>
<td>0,280</td>
</tr>
<tr>
<td>Semi-urban</td>
<td>0,743</td>
<td>0,146</td>
</tr>
<tr>
<td>Urban</td>
<td>0,609</td>
<td>0,098</td>
</tr>
</tbody>
</table>

simple to double  
simple to threefold
## Comparison: Traffic lights - Roundabouts

**Traffic lights / Roundabouts**

<table>
<thead>
<tr>
<th></th>
<th>Accidents</th>
<th>Serious Acci.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open country</td>
<td>+ 116 %</td>
<td>+ 66 %</td>
</tr>
<tr>
<td>Semi-urban</td>
<td>+ 52 %</td>
<td>+ 24 %</td>
</tr>
<tr>
<td>Urban</td>
<td>+ 21 %</td>
<td>+ 25 %</td>
</tr>
</tbody>
</table>
Comparison: Traffic lights - Roundabouts

Traffic lights / Roundabouts

<table>
<thead>
<tr>
<th>Country</th>
<th>Accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>+ 100 %</td>
</tr>
<tr>
<td>Norway</td>
<td>+ 60 à + 100 %</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>+ 30 %</td>
</tr>
<tr>
<td>Australia</td>
<td>+ 100 %</td>
</tr>
</tbody>
</table>
Roundabouts: France - Belgium

Injury Accidents / year

Belgium (Wallonia)  France

~ 0.5  ~ 0.25

for an AADT = 10 000
Roundabouts: Belgium - France

**Explanations:**

- general over-proportioned
- direct way of turn-to-right
- frequent entries of two lanes
- two-lanes rings
- few reductions of the profile in upstream of the roundabout
Types of accidents in roundabouts

Open country

> rain - no influence

> 59 % - collisions against an obstacle

> two-wheels veh. are implicated in 13 % of acci.

> alcohol ... 21 % of accidents

> Recommendations
Types of accidents in roundabouts

**Built-up area**

> rain - no influence

> 39 % - lateral collisions

> 31 % - collisions against an obstacle

> two-wheels veh. are implicated in 26 % of acci.

> Recommendations
Types of accidents in traffic lights

**Open country**
- rain - great influence
- 49% lateral collision
- 24% frontal collision
- 20% from behind collision
- turn-to-left - 56% of acci.
- red light crossing - 29% of acci.

**Built-up area**
- idem excepted pedestrians = 12% of acci.
Principal planning elements

> prefer a simple installation
> rule out any aggressive obstacle
> a good view when approaching the roundabout
> avoid too big planning elements
> not hesitate to make the central island rather small in urban environment
Choice of types of crossroads

Motorways and Express ways

> uneven crossroads
> semi-crossroads (way in, way out)
> sometimes roundabouts on express ways
Choice of types of crossroads

Ordinary Roads: Open Country

Basic crossroad = simple crossroads (stop, yield, priority of right)

When turn-to-left more important > a turning left way

When side-traffic rather important or safety problems > roundabout
Choice of types of crossroads

Urban ou Semi-urban Environment

Several kinds of crossroads are often compatible. Defining the installation aims and their priorities in act will help to choose the most appropriate type of crossroads.
Choice of types of crossroads

Basic crossroad = simple carrefour (stop, yield)

Roundabout :
- safety problem, speed moderation
- complicated crossroads (numerous islands)

Traffic lights :
- manage and control the traffic in regulated zone
- priority of public transport
- control the queues
- pedestrians crossing too difficult