Is the cyclist still safe at the roundabout?

A comparative study using big data

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Traffic has changed a lot in recent years
Cyclist safety is under pressure*

- 14% of all traffic accidents are with an (e)-bicycle
- 35% of all victims is an (e)-cyclist
- 57% of the (e)-bicycle accidents fall at an intersection versus 31% of all other accidents
- First half year of 2022 counts the highest number of (e)-bicycle casualties since 2014

* STAR-accident based on police data, 2018 up to 2021.

Is the cyclist still safe at the intersection?

See public STAR website on: www.star-traffic-accidents.eu/en-GB/Map
Comparative research with Big Data

- Floating Car Data (HERE)
  - Traffic flow, number of vehicle measurements
  - Split by driving direction
- GIS map (HERE)
  - Functional Road Class
  - Speed limit
  - Intersection types
- Accidents (STAR*)
  - Total number of accident victims
  - Victim of accidents with (e) bicycle

* Police registration (2018 up to 2021); note: major under-registration of mainly single-sided bicycle accidents
VCRN: algorithm to combine geographical data in clusters

### All intersection in the Netherlands (N = 575,970)

<table>
<thead>
<tr>
<th>Type</th>
<th>Main intersection</th>
<th>Between intersection</th>
<th>Minor intersection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal intersection</td>
<td>12.541</td>
<td>94.027</td>
<td>457.912</td>
</tr>
<tr>
<td>Roundabout max. 50 km/u limit</td>
<td>1.736</td>
<td>1.170</td>
<td>610</td>
</tr>
<tr>
<td>Roundabout &gt; 50 km/u limit</td>
<td>1.532</td>
<td>454</td>
<td>83</td>
</tr>
<tr>
<td>Traffic light</td>
<td>3.499</td>
<td>2.304</td>
<td>102</td>
</tr>
</tbody>
</table>

VIA Clustered Rand Network (VCRN)
Risk figures various intersection types

* Small number and not logical situation

△ roundabouts with max. 50 km/h are with priority for cyclists as a guideline
Points to consider in research

- Influence of errors in Big Data and automatic match?
  - Coverage of data match* >97.8%
  - Data errors in accidents and traffic flow occur in all situations
  - Errors in GIS data occur in relatively small numbers in comparison with the high total numbers

- Effect of 'FCD traffic flow' as traffic volume on a comparative study?

- Effect of cycling intensities on the safety of roundabouts?

* Only accidents with an exact location can be matched
Traffic flow (FCD) versus Traffic volume (model)

3 Types of roundabouts Brabant with Traffic flow, FCD (HERE)

3 Types of roundabouts Brabant with motor vehicle volume, Traffic model (Dat.mobility)

* Roundabouts in province Noord-Brabant; N= 821
Effect of cycling intensities

* Roundabouts in province Noord-Brabant; N= 821
Conclusions & recommendations

- Up-to-date Big Data are very useful, especially in times of rapid change
- VCRN and Big Data are suitable as
  - New signalling function for monitoring
  - Instrument to anticipate on events that make changes traffic
- It's time for a ‘expiration date’ on research results due to recent changes in traffic?
- The discussion about the safety of cyclists on roundabouts is important and must be conducted