Workshop Roundabouts
Australia

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Why built roundabouts?

- High capacity
- Safe
Typical capacity per type of roundabout

- single lane roundabout: 25,000 veh/24h
- two-lane roundabout, single lane exits: 30,000 veh/24h
- two-lane roundabout, two-lane exits: 40,000 veh/24h
- turbo roundabout: 60,000 veh/24h
Capacity 2

Monogram capacity of single-lane roundabout

- Red line: maximum capacity
- Yellow line: average waiting time < 20 sec

<table>
<thead>
<tr>
<th>Volume roundabout (veh/h)</th>
<th>Volume access (veh/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>200</td>
<td>800</td>
</tr>
<tr>
<td>400</td>
<td>1200</td>
</tr>
<tr>
<td>800</td>
<td>1600</td>
</tr>
</tbody>
</table>

- not sufficient
- sufficient

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Capacity 3

Waiting time main road

![Graph showing average waiting time for different types of junctions. The x-axis represents the total volume of junction (veh/h) and the y-axis represents the average waiting time (sec). The graph compares:
- Pink line: roundabout
- Red line: junction with traffic lights (1+1 lanes)
- Yellow line: junction with traffic lights (2+1 lanes)]
Capacity 4

Multi-lane roundabout

volume acces minor road (veh/h)

volume acces mayor road (veh/h)

turbo roundabout
single lane roundabout
Safety 1

- Main safety advantages of roundabouts
  - actual speed is low
  - the number of conflicts is reduced
  - no crossing conflicts
  - predictable behavior (keeping lanes)

32 conflicts
9 conflicts
8 conflicts

▲ diverging  ■ merging  ● crossing
### Risk figures

<table>
<thead>
<tr>
<th>Type of junction Inside build up area</th>
<th>Accidents with injuries per million motor vehicle kilometers</th>
<th>Victims per accident with injuries</th>
<th>Fatalities per victim</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 legs with traffic lights</td>
<td>0,13</td>
<td>1,21</td>
<td>0,04</td>
</tr>
<tr>
<td>4 legs with traffic lights</td>
<td>0,15</td>
<td>1,19</td>
<td>0,05</td>
</tr>
<tr>
<td>3 legs without traffic lights</td>
<td>0,09</td>
<td>1,92</td>
<td>0,07</td>
</tr>
<tr>
<td>4 legs without traffic lights</td>
<td>0,08</td>
<td>1,56</td>
<td>0,06</td>
</tr>
<tr>
<td>roundabout (without traffic lights)</td>
<td>0,06</td>
<td>1,18</td>
<td>0,04</td>
</tr>
</tbody>
</table>
Safety 3

Important aspects:

- Inform road user in time
- Entrances should connect radial
- Narrow entrance and exit lanes
- Small entrance and exit radius
- Wide bend out
- Raise central island
Safety 4

Example
Bicycle friendly roundabout design 1

- Safe: Low speed
- Speed hump
Bicycle friendly roundabout design 2

- Safe: Blind spot

4.50m
Bicycle friendly roundabout design 3

- Priority: Single lane roundabout

Outside build-up area
Priority to cars

Inside build-up area
Priority to bicycles
Bicycle friendly roundabout design 4

- Priority: Turbo roundabout

- Give way to CARS

- Give way to BICYCLES
Typical accident type

- On turbo roundabouts with give way to BICYCLES:
- Bad visibility due to other cars
Bicycle crossing 1

- With give way to **Bicycles**:
  - Smooth flow
  - On going coloured surface
Bicycle crossing 2

- With give way to **CARS**:  
  - Zig zag  
  - No coloured surface
Spatial need turbo roundabout

- Reconstruction junction with traffic lights → turbo roundabout
Royal HaskoningDHV and roundabouts

Roundabouts - Application and design

A practical manual
Roundabout types:

Multi lane roundabout:

Single lane roundabout:
Roundabout types: single lane with priority
Roundabout types: single lane without priority
Roundabout types: single lane with signage
Roundabout types

Basis turborotonde (drietaks)

Eirotonde (drietaks)

Knierotonde (drietaks)

Basis turborotonde (vierkants)

Eirotonde (vierkants)

Knierotonde (vierkants)
Roundabout types

Gesloten knieronde (drietalaks)
Spiraalkroon (drietalaks)
Rotorkroon (drietalaks)
Sterkroon (altijd drietalaks)
Kniestond (drietalaks)
Spiraalrotonde (vieretalaks)
Rotorkroon (vieretalaks)
Examples: Amersfoort 1
Examples: Amersfoort 2
Examples: Amersfoort 3
Examples: Bussum 1
Examples: Bussum 2
Examples: Maarsbergen 1
Examples: Maarsbergen 2
Examples: Maarsbergen 3
Examples: Utrecht 2
Examples: Utrecht 3
Examples: Eindhoven by night
Examples: Eindhoven by day
Examples: Leeuwarden
Examples: Den Bosch
Examples: Hilversum
Examples: Hilversum Mediapark
Examples: Multilane without priority
Examples: Poland
Examples: Swindon England - magic
Questions