

Modern design principles of interurban roads: Safer intersection solution (4. Part) - Roundabouts

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Overview about the presentation

- Types of roundabouts
- Traffic dimensioning of roundabouts
- Road safety aspects of roundabouts
- Effects on pedestrian and cycle traffic
- Example for multilane roundabout

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1. Types of roundabouts

Roundabouts are the most safety intersection type. Pre-conditions are a correct planning and building construction including the road marking and signage.



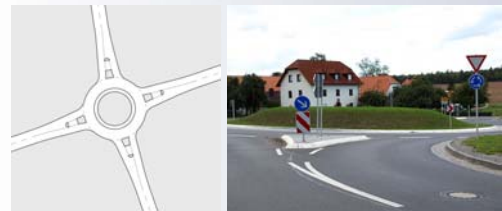
Example for a
2-Lane-Roundabout

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1. Types of roundabouts

Small Roundabout:
Single-Lane-Circle (35 – 45 m diameter)



Source: Merkblatt Kreisverkehr – Germany FGSV 2006

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1. Types of roundabouts

Mini Roundabout:
Single-Lane-Circle (13 – 22 m diameter)



Source: Merkblatt Kreisverkehr – Germany FGSV 2006

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1. Types of roundabouts

Roundabout:
Two-Lane-Traffic ability (40 – 60 m diameter)



Source: Merkblatt Kreisverkehr – Germany FGSV 2006

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1. Types of roundabouts

Large Roundabout:
Multi-Lane-Circle (more than 60 m diameter)



Source: Merkblatt Kreisverkehr – Germany FGSV 2006

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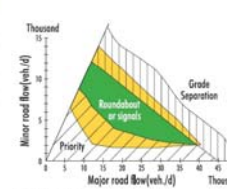
2. Traffic dimensioning of roundabouts

Table 1-1 Capacity based on intersection type

INTERSECTION TYPE	CAPACITY (pcph)
Right-hand priority	1,000 – 1,500
Fixed-priority	5,000 – 12,000
Single-lane roundabout	20,000 – 28,000
Multi-lane roundabout	35,000 – 7*
Signalized intersection	20,000 – 80,000*

* Variable between countries.
 * Depending on the lane assignment.

Figure 1-1 Type of intersection based on traffic flows



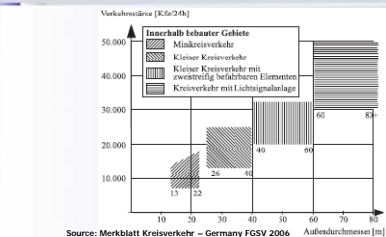
Source: IHT, 1987

Choice of the intersection type according to capacity

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2. Traffic dimensioning of roundabouts



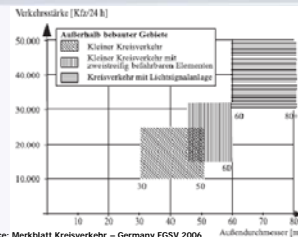
Source: Merkblatt Kreisverkehr – Germany FGSV 2006

Choice of the roundabout type according to capacity inside inhabited areas

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2. Traffic dimensioning of roundabouts



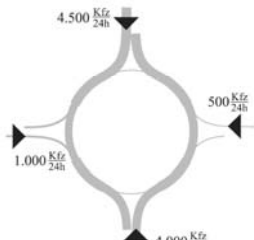
Source: Merkblatt Kreisverkehr – Germany FGSV 2006

Choice of the roundabout type according to capacity outside inhabited areas

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2. Traffic dimensioning of roundabouts



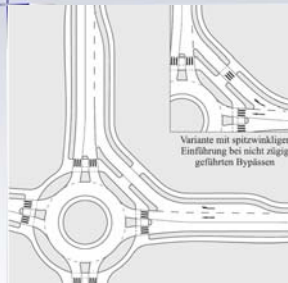
Example for acceptable limit of unbalanced distribution of traffic intensity

Source: Merkblatt Kreisverkehr – Germany FGSV 2006

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2. Traffic dimensioning of roundabouts



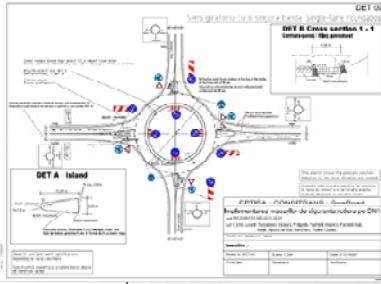
Example for roundabout with bypass to increase the capacity for one direction

Source: Merkblatt Kreisverkehr – Germany FGSV 2006

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2. Traffic dimensioning of roundabouts



Example for roundabout for normal capacity in Romania

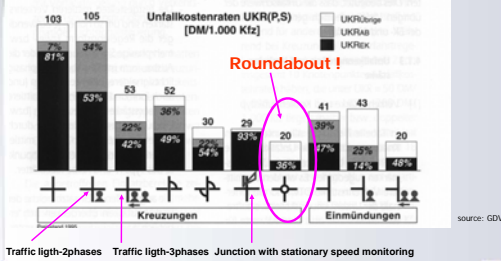
3. Road safety aspects of roundabouts

Rule No. 1: The circle traffic has the right of way!



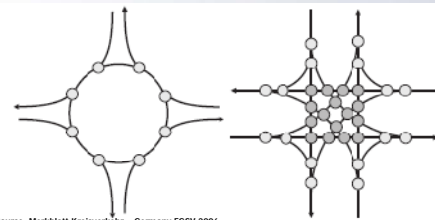
3. Road safety aspects of roundabouts

Safe junctions – comparison of junction-geometries on interurban roads - German statistics about the „accident – cost – rates“



source: GDV

3. Road safety aspects of roundabouts



Source: Merkblatt Kreisverkehr – Germany FGSV 2006

Conflicts on a roundabout (8) in comparison to an intersection (32)

3. Road safety aspects of roundabouts

Roundabout has a low number of conflict points:

- > in particular no multiple conflicts
- > in particular no crossing conflicts
- > in particular no left-turning conflicts

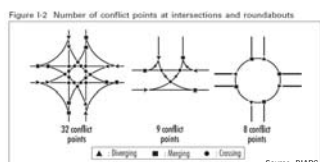


Figure 1-2 Number of conflict points at intersections and roundabouts

Source: PIARC

3. Road safety aspects of roundabouts

Roundabout is good readily identifiable:



Source: Kreislichtlinie Kanton Zürich

3. Road safety aspects of roundabouts

Roundabout is good understandable:



- only easy decision making for drivers
- good visibility conditions for road users

Source: Merkblatt Kreisverkehr – Germany FGSV 2006

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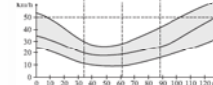


3. Road safety aspects of roundabouts

Roundabout reduce the accident severity:



- low level of speed of vehicles
- low difference of speed level between all road users



Typical run of speed in area of a roundabout (Source: Merkblatt Kreisverkehr – Germany FGSV 2006)

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3. Road safety aspects of roundabouts

Roundabout reduce the accident severity:



- low level of speed of vehicles, because the deflection of straight ahead traffic is double width of lane at min.

Deviation of straight ahead traffic due to roundabout island (Source: Merkblatt Kreisverkehr – Germany FGSV 2006)

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3. Road safety aspects of roundabouts

Roundabout reduce the accident severity:

	Typ	Minikreisverkehr	Kleiner Kreisverkehr	Kleiner Kreisverkehr mit zweistreifigen Zufahrten
innerhalb bebauter Gebiete	Eckausrundung Zufahrt R _z	8-10	10-14	12-16
	Eckausrundung Ausfahrt R _a	8-10	12-16	12-16
außerhalb bebauter Gebiete	Eckausrundung Zufahrt R _z	-	14-16	14-16
	Eckausrundung Ausfahrt R _a	-	16-18	16-18

- proposed radii for in- and outgoing traffic

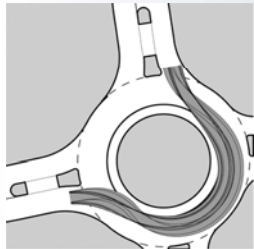
Source: Merkblatt Kreisverkehr – Germany FGSV 2006

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3. Road safety aspects of roundabouts

Roundabout reduce the accident severity:



- Check of traffic ability by help of dynamic minimum turning curve

Check of traffic ability (Source: Merkblatt Kreisverkehr – Germany FGSV 2006)

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3. Road safety aspects of roundabouts

Roundabout reduce the accident severity:



- Safekeeping of traffic ability by pave areas (for example cobble) outside of carriageway

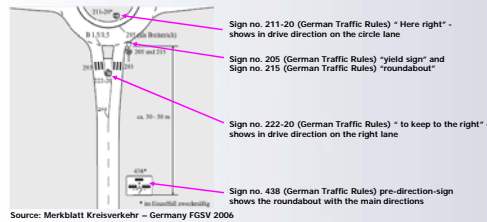
Safekeeping of traffic ability (Source: Merkblatt Kreisverkehr – Germany FGSV 2006)

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3. Road safety aspects of roundabouts

Signage for roundabouts inside inhabited areas:

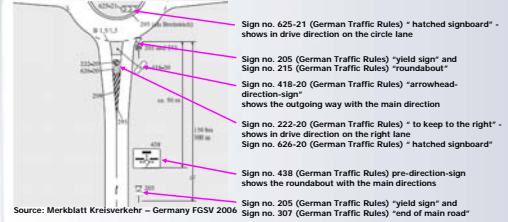


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3. Road safety aspects of roundabouts

Signage for roundabouts outside inhabited areas:



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4. Effects on pedestrian and cycle traffic

Pedestrian and cycle way inside inhabited areas:



Example for give-way-line for pedestrians and separate cycle way

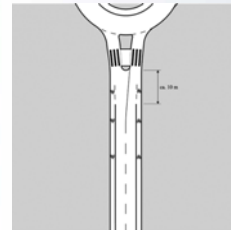
Source: Merkblatt Kreisverkehr - Germany FGSV 2006

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4. Effects on pedestrian and cycle traffic

Cycle way inside inhabited areas:



Example for cycle way on access road to roundabout

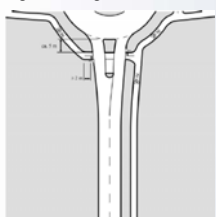
Source: Merkblatt Kreisverkehr - Germany FGSV 2006

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4. Effects on pedestrian and cycle traffic

Cycle way outside inhabited areas:



Example for cycle way in 2-way-line without right of way

Source: Merkblatt Kreisverkehr - Germany FGSV 2006

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4. Effects on pedestrian and cycle traffic

Roundabout with bypass



Example for pedestrian and cycle way with right of way for all directions and for bypass

Example for pedestrian and cycle way with right of way for all directions, not for bypass

Source: Merkblatt Kreisverkehr - Germany FGSV 2006

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Multilane roundabout

Source: PIARC

Example for a multilane roundabout

See the yield sign on access lanes!

Usually are roundabouts with a diameter more than 30 m less safe!



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Multilane roundabout

Berlin – Germany

The so called „Great Star“,
it works safe with additional traffic signals



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Thank you for your attention!

Any Questions?



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