Turbo-Roundabout
- an Experience from Germany

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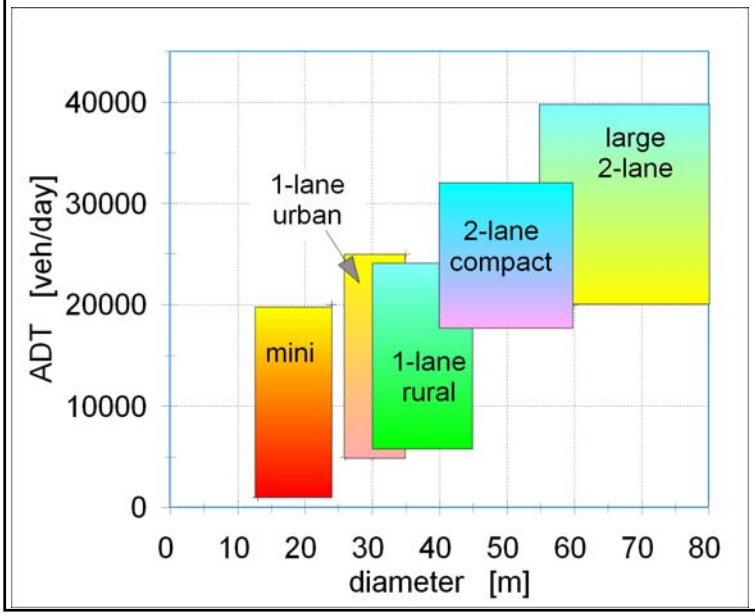
Lehrstuhl
für Verkehrswesen

Typology of roundabouts



Types
according to

- ADT ↑
- size →

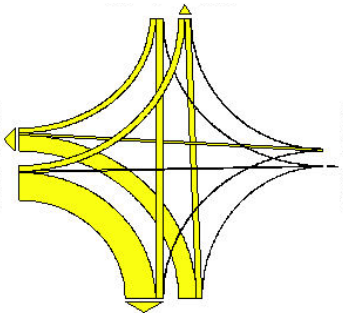
Starting Point

- Germany: Restrictive view on larger roundabouts
  (larger than single-lane)
- Large total capacities require balanced distribution
  of traffic volumes over the approaches and exits
- What to do, if traffic is concentrated
  on specific movements?

Starting Point

- What to do if traffic is concentrated
  on specific movements?

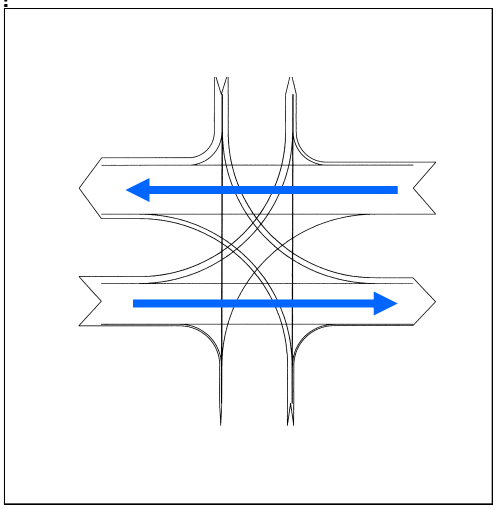
  large right turn movements : Bypass



Starting Point

- What to do if traffic is concentrated on specific movements?

large through movements :



Roundabout in Baden-Baden

Baden-Baden

State:
Baden-Württemberg

80 000 Inhabitants

Spa (hot springs)

Black Forest

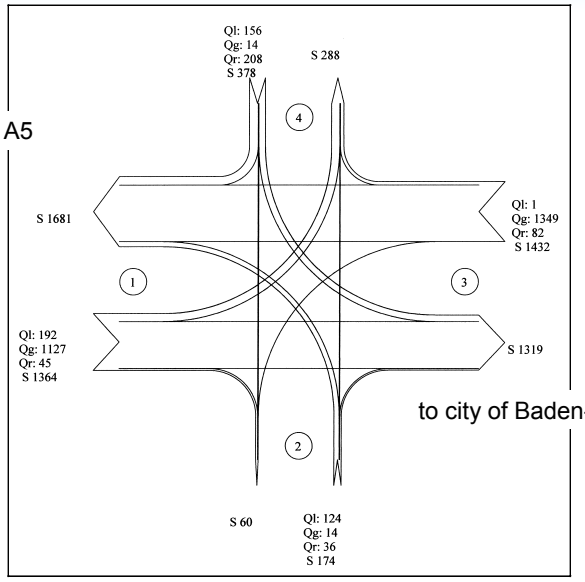
Starting Point : local situation in Baden-Baden

to city of Baden-Baden ⇒

to motorway A5

Starting Point : traffic volumes

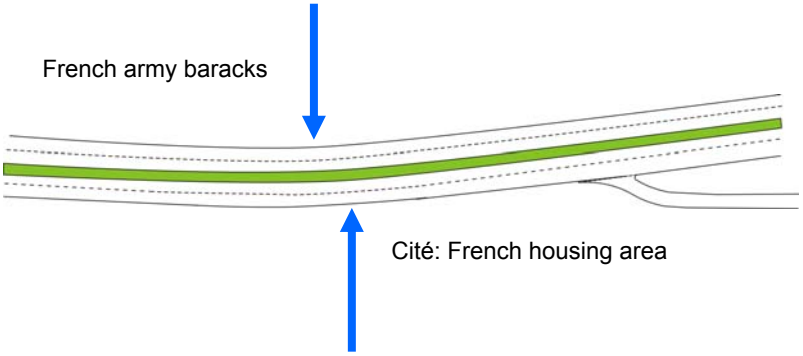
to motorway A5



ADT:
31000 veh/d

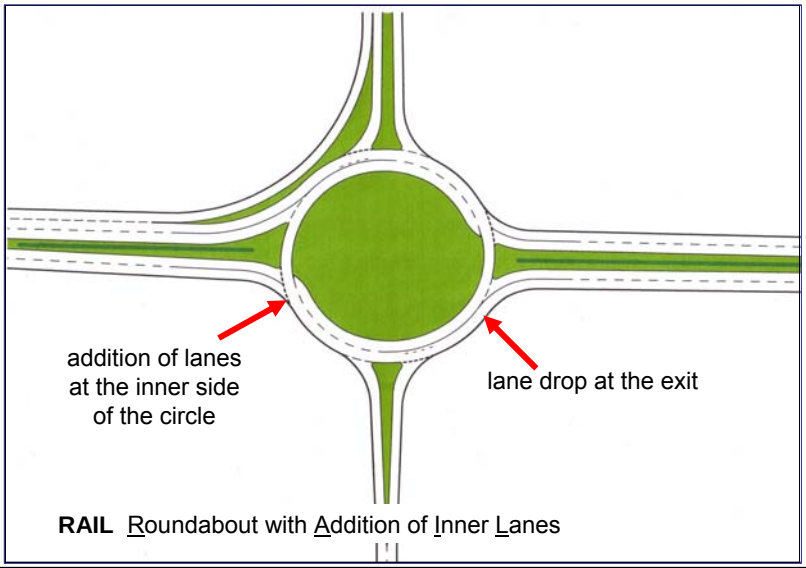
to city of Baden-Baden

Problem : new interchange



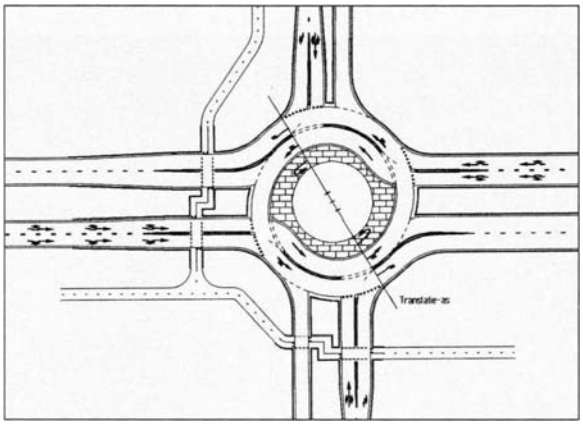
Architects: best solution:
Roundabout

Solution : Turbo-roundabout



RAIL Roundabout with Addition of Inner Lanes

Turbo-roundabout : Netherlands



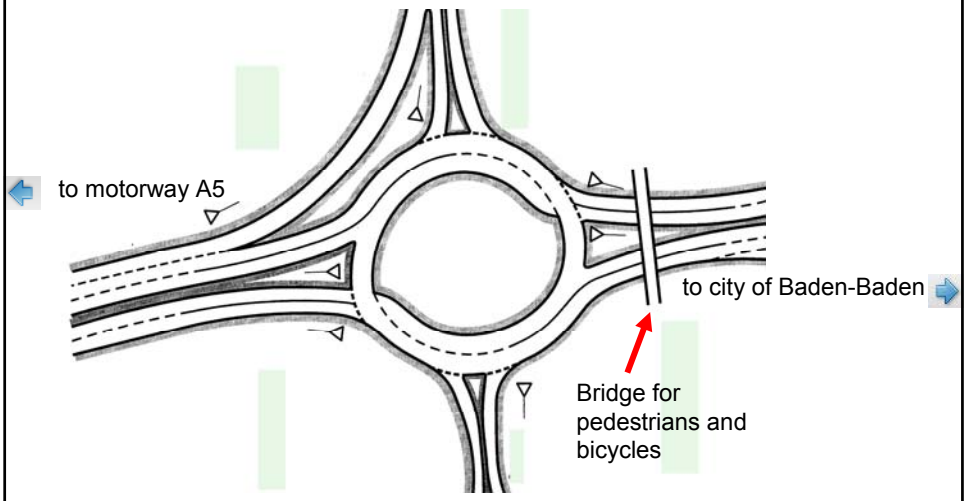
invented by
Bertus Fortuijn

source: homepage of Bertus Fortuijn

Turbo-roundabout : Netherlands

kerbs as dividers
between lanes

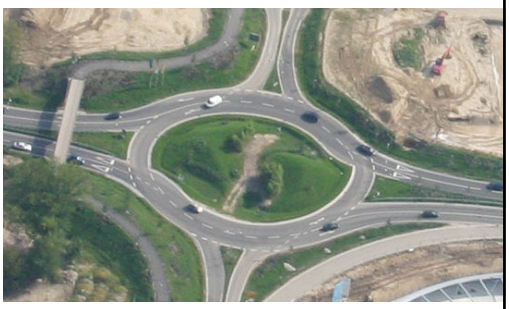
Turbo-roundabout Baden-Baden



Turbo-roundabout Baden-Baden

Baden-Baden
opened May 2006
≈ 30 000 veh/d

Turbo-Roundabout Baden-Baden



- no kerbs within the circle
- no pedestrians or cyclists (are on a bridge)

Turbo-Roundabout Baden-Baden

- no kerbs within the circle
- no pedestrians or cyclists (are on a bridge)

Turbo-Roundabout Baden-Baden

- no kerbs within the circle
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Turbo-Roundabout Baden-Baden

Utilisation of lanes

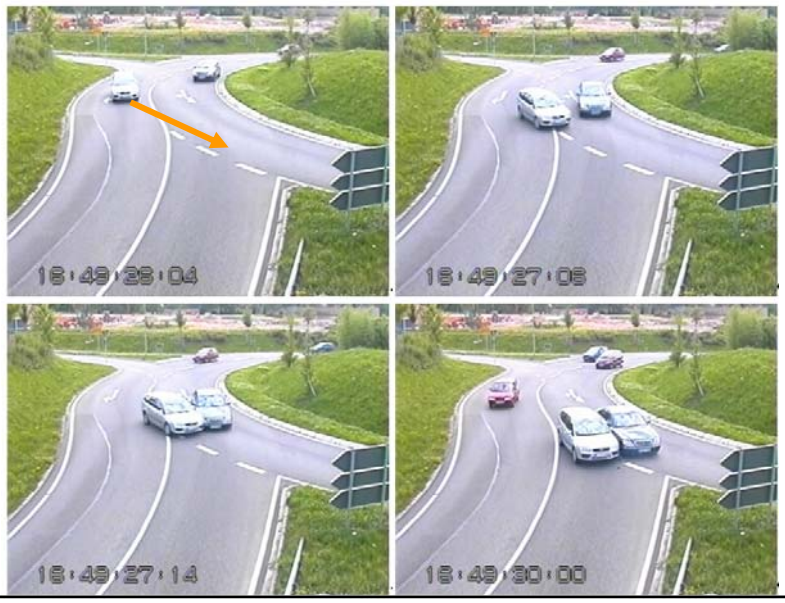
	B 500 from West to East (coming from freeway A 5 heading to city centre) →		B 500 from East to West (from city centre heading to freeway A 5) ←	
	left lane	right lane	left lane	right lane
Entry	24 %	76 %	39 %	61 %
Exit	23 %	77 %	40 %	60 %

24%

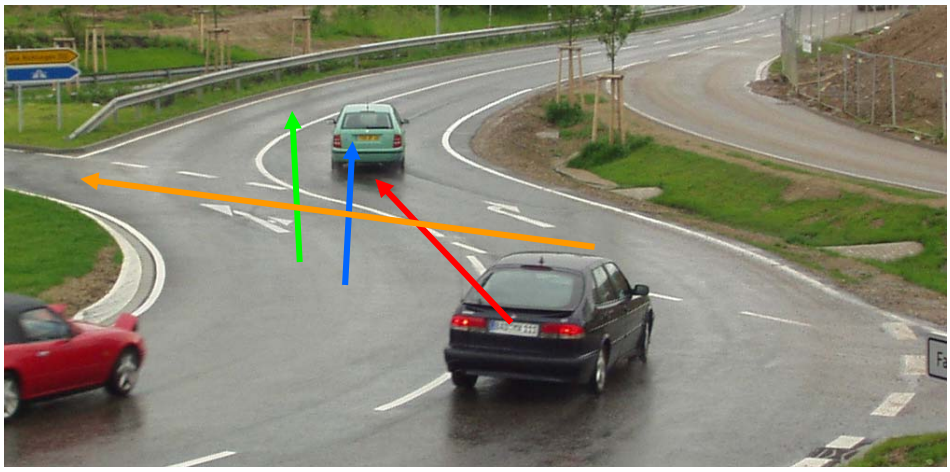
76%

Illegal crossing of lane markings

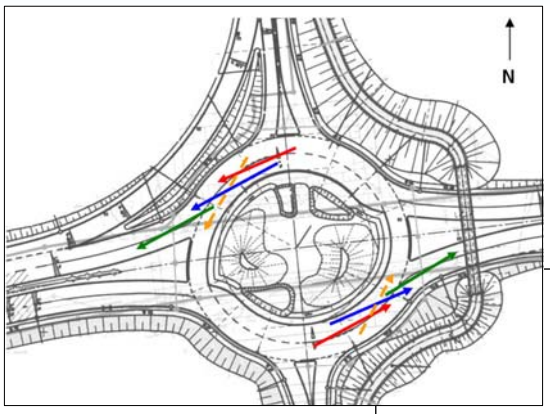
Illegal crossing of lane markings

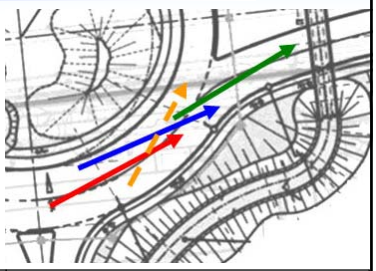


Illegal crossing of lane markings



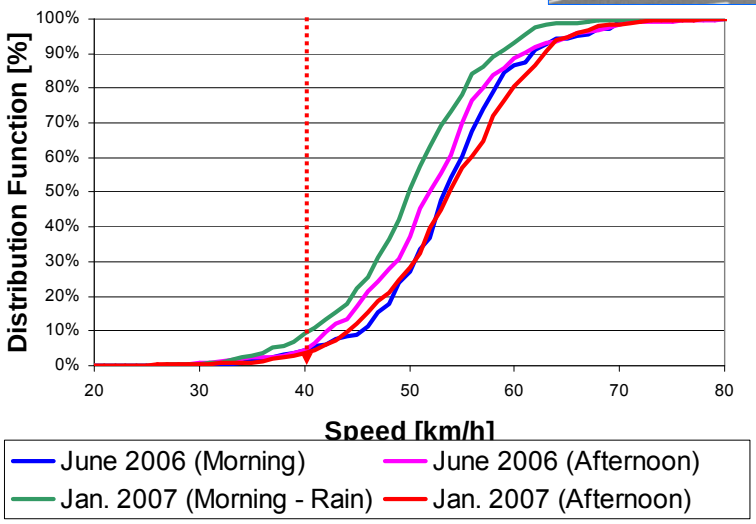
Illegal crossing of lane markings





	violators [%]	
	Eastbound traffic →	Westbound traffic ←
red →	8 - 12	6 - 18
green →	1 - 7	1 - 20
blue →	1 - 5	3
yellow →	0 - 3	0

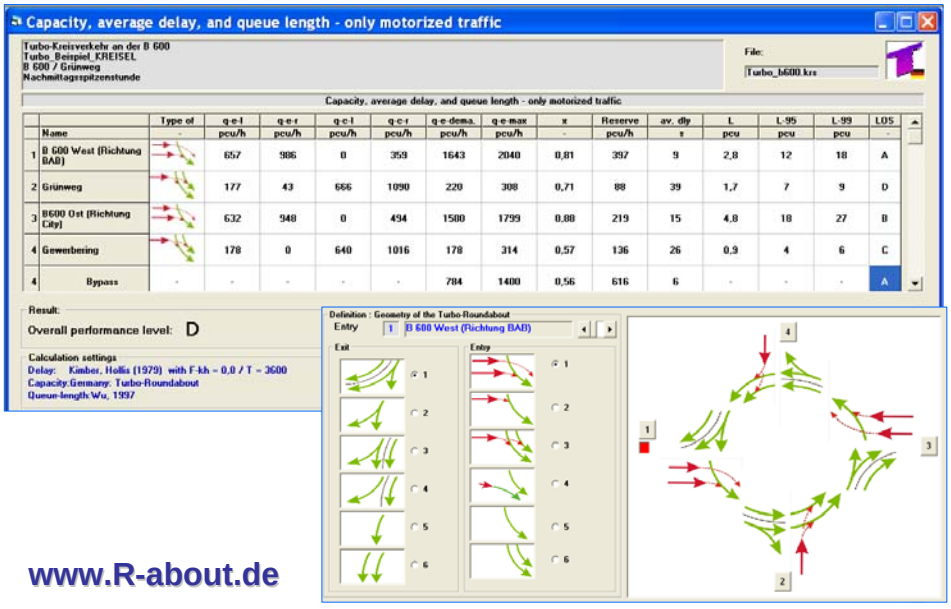
Speeds on the western approach



Critical gaps and follow-up times

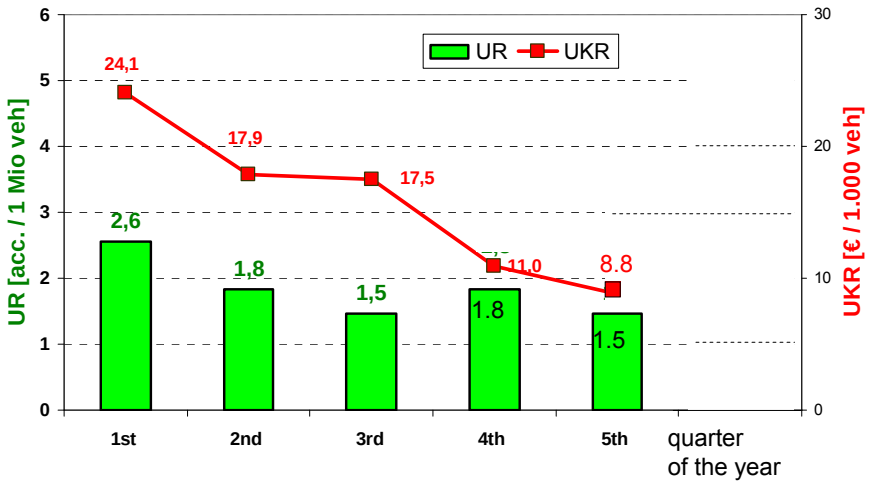
	critical gap t_c		follow-up time t_t	
	absolute [s]	sample size [veh]	absolute [s]	sample size [veh]
two-lane entry	**4.5**	62	**2.4**	4667
single-lane entry	**4.7**	180	**2.8**	23

Calculation of capacity and quality of service



www.R-about.de

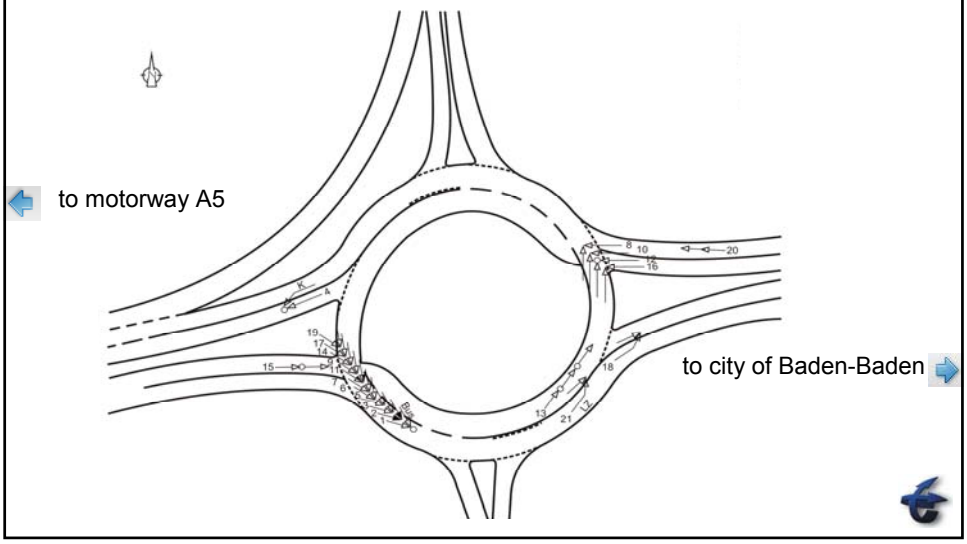
Accident rates (UR) + accident cost rates (UKR)



Accident rates (UR) + accident cost rates (UKR)

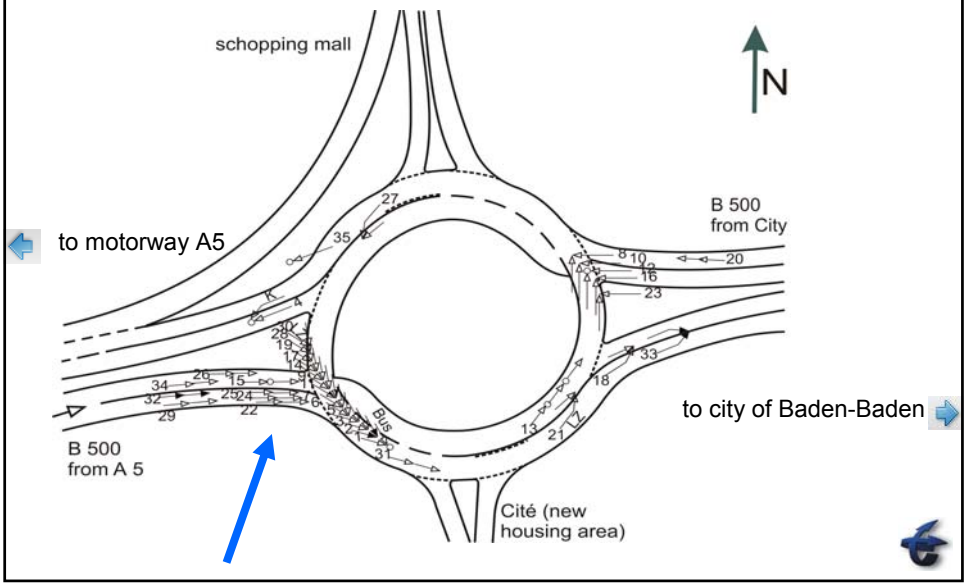
	UR [acc. / 10^6 veh]	UKR [EURO / 1.000 veh]
Turbo-R. Baden-Baden	**1,9**	**17,60**
Roundabout with presceening + lane marking (urban)	0,63 – 1,46	6,58 – 13,92
Roundabout with presceening + lane marking (rural)	3,29 – 4,43	17,08 – 36,26
Signalized intersection (3 stages)	1,2	39

Accidents (1st year)

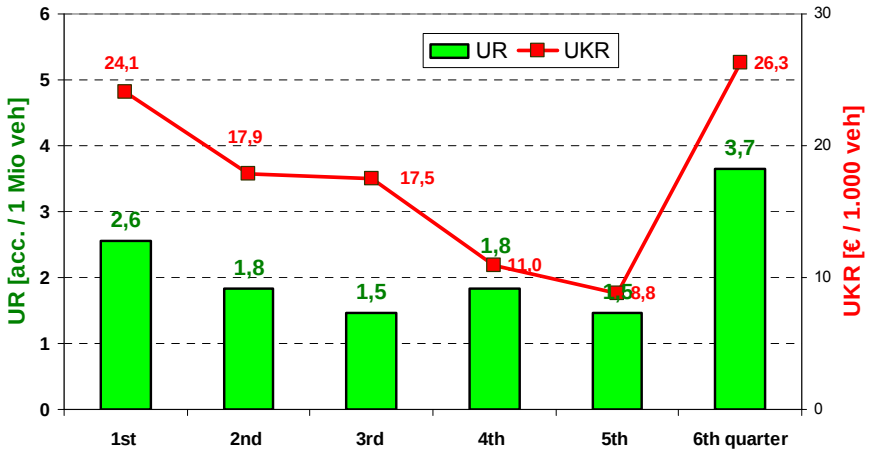


Safety improvement : Increasing the sight distance

Accidents (1.5 years)



Accident rates (UR) + accident cost rates (UKR)



Accident rates (UR) + accident cost rates (UKR)

	UR [acc. / 10^6 veh]	UKR [EURO / 1.000 veh]
Turbo-R. Baden-Baden	**2.1**	**17,60**
Roundabout with presceening + lane marking (urban)	0,63 – 1,46	6,58 – 13,92
Roundabout with presceening + lane marking (rural)	3,29 – 4,43	17,08 – 36,26
Signalized intersection (3 stages)	1,2	39

Conclusions

- **Turbo-roundabout works**
- **is capable to treat large volumes of through-traffic under lower demand on the side approaches**
- **no cyclists should be allowed**
- **pedestrians ? (better not)**
- **no severe accidents**
- **safety needs carefull consideration (damage-only accidents)**
- **problem: too low crossing volumes**
- **just one case! more experience needed**
- **However: Enthusiastic planning activities !**

Thank you for your attention