Informal document **GRSG-118-08**
(118th GRSG, 15–17 July 2020
Agenda item 5)

Analysis of Dooring accidents and a proposal for a corresponding Driver Assistance System

Structure

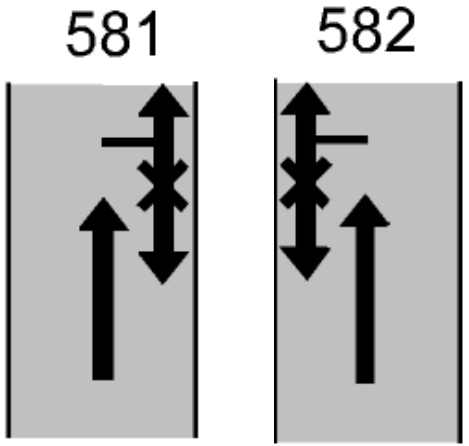
- **Accidentology**
  - **National statistic**
  - **In-Depth (GIDAS)**
  - **Derivation of cyclist stopping distance**
- **Proposal for Driver Assistance System**

Accident Analysis – National statistic

Average Dooring accidents per year extrapolated for Germany (2007-2016)

	Accidents	Killed	Seriously injured	Slightly injured
Total	2209	1	283	1967
Daylight	1907	1	250	1692
Dark / twilight	303	0	33	275

Main accident types

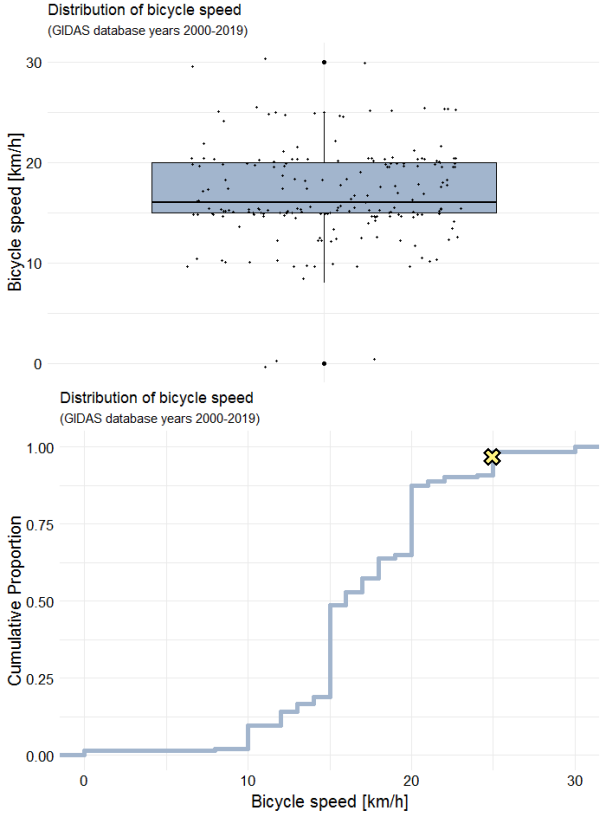


Accident Analysis – In-Depth (GIDAS)

Results from GIDAS analysis for years 2000-2019

- In 95% of all accidents the involved vehicle type is passenger car
- 80% of Dooring accidents occur in daylight situations
- Around 80% of Dooring accidents occur on the vehicles driver side

Accident Analysis – In-Depth (GIDAS)

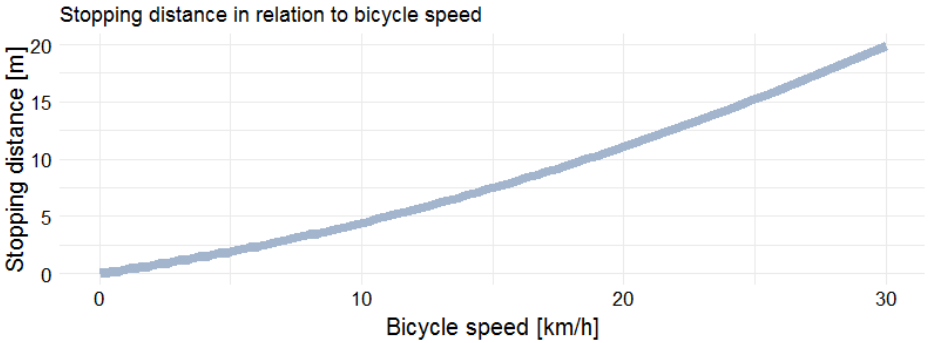


- Average bicycle speed is around 16 km/h
- 50% of all cyclist have an initial velocity prior to the crash between 15 and 20 km/h
- Around 95% of all cyclists have an initial velocity prior to the crash <= 25 km/h

Derivation of cyclist stopping distance

Assumptions:

- Bicycle speed $v_{bicycle}$ = 25 km/h
- Bicycle deceleration $a_{bicycle}$ = 3.5 m/s² according to DIN EN ISO 4210-2
- Reaction time $t_{reaction}$ = 1.2 s



Calculations:

- Braking distance to standstill:

$$s_{braking} = 0.5 \times \frac{v_{bicycle}^2}{a_{bicycle}} = 6.9 \text{ m}$$

- Thinking distance:

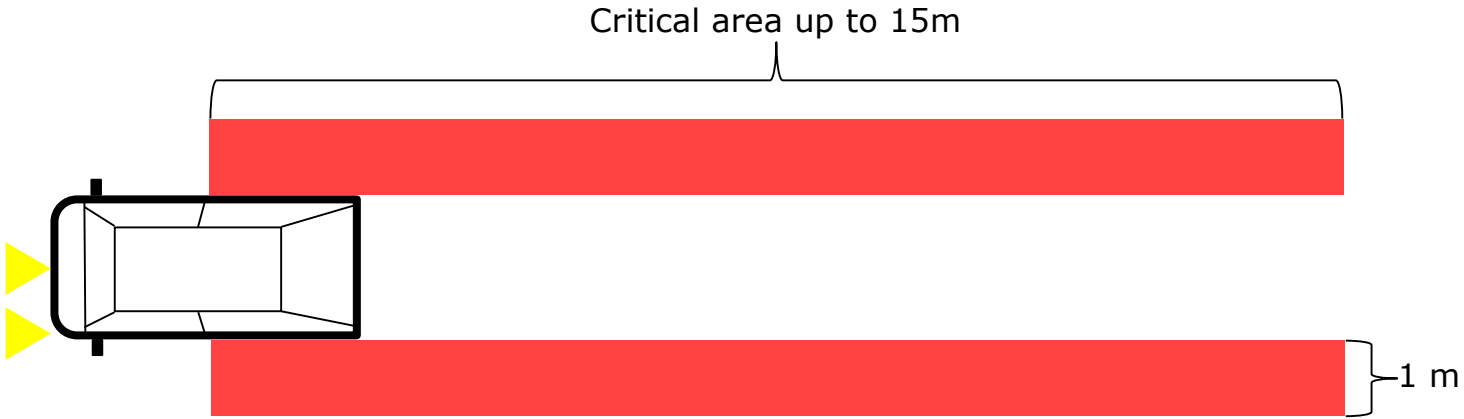
$$s_{reaction} = t_{reaction} \times v_{bicycle} = 8.3 \text{ m}$$

- Stopping distance:

$$s_{stop} = s_{reaction} + s_{braking} = \underline{\mathbf{15.2\ m}}$$

- **Cyclist needs 15.2 m to reach standstill from an initial velocity of 25 km/h**

Proposal for Driver Assistance System



Proposal:

- Speed adaptive critical area up to 15m with intensive warning of exiting car occupants or temporary blockade of the door
- Adressing lateral distance up to 1m
- Working under daylight as well as lowlight conditions
- Working on driver as well as front seat passenger side