



Injury Risk of Lower Leg outside of 30° Tangent-Area

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Agenda

- ▶ Aim of the study
- ▶ Accident data filter
- ▶ Definition AISUSKNIE
- ▶ Car to pedestrian frontal accidents (415)
- ▶ Definition BTA
- ▶ Accidents AISUSKNIE2+
- ▶ Accidents with market launch after 2006 (all AISUSKNIE)

Pedestrian Accidents with Leg Injuries

- Aim of the study -

- ▶ Open Item: Comparison of the injury risk inside/outside 30° COB

5. Review of Open Items from the 5th Meeting (all) (Document TF-BTA-5-02, agenda item 7)

The action items agreed in the previous session were individually reviewed (TF-BTA-5-02, agenda item 7) and were all considered closed:

BAST: Double-check whether it is possible to do a case by case assessment for the widening of the test area (see agenda item 5).

Mr. Zander explained that BAST did not carried out a case-by-case analysis since this was considered to be too time consuming and might have slowed down the progress of this group. However, he announced to show some details from accident data that should be able to explain issues with the widening.

Pedestrian Accidents with Leg Injuries

- Accident data filter -

- ▶ Pedestrian accidents 2002 – 2013 from GIDAS Database

M1 to pedestrians (Passenger cars <u>with</u> SUV, van, mini-bus, pickup)	1831
First registration of passenger car > 2000	758
w/o multiple collisions	687
Frontal	415
AISUSKNIE2+	71

Pedestrian Accidents with Leg Injuries - Definition AISUSKNIE -

- ▶ AISKNIEUS describes injury severity in body regions knee and lower leg
- ▶ AISKNIEUS is evaluated from AIS values of individual injuries in the lower leg area (variable SITZ with values 716-720, 733-734)
- ▶ Extraction of relevant injuries from GIDAS:

716 - Patella, knee

717 - Lower leg

718 - Fibula

719 - Tibia

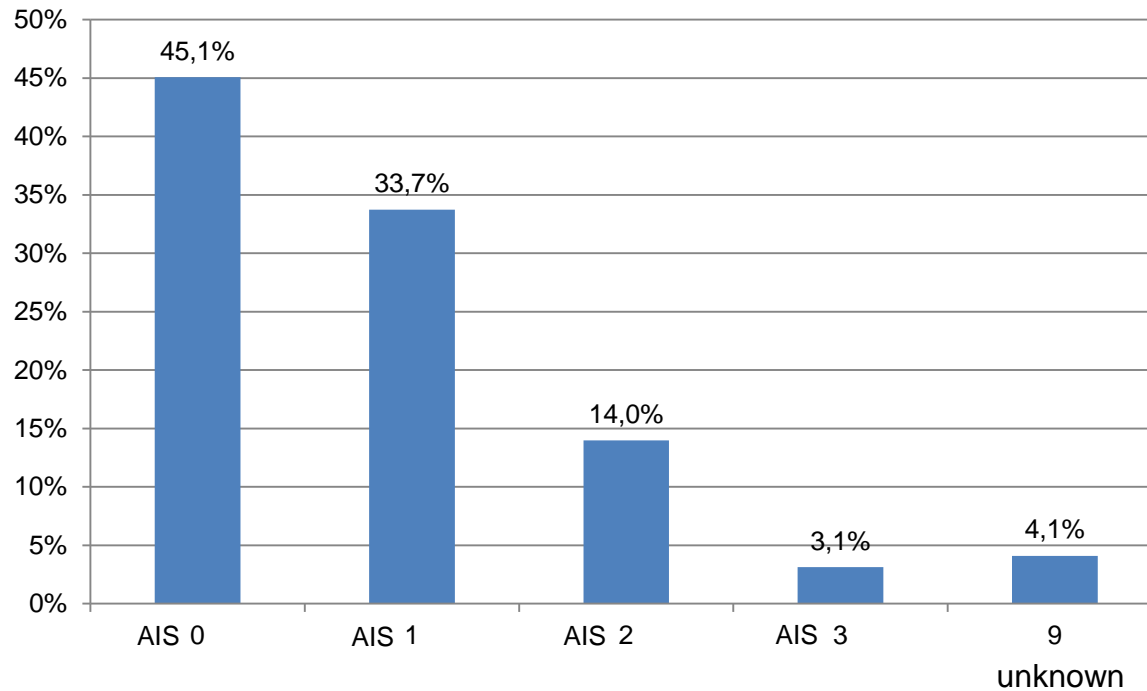
720 - Head of tibia

733 - Collateral ligaments

734 - Cruciate ligaments

Pedestrian Accidents with Leg Injuries - Car To Pedestrian Frontal Accidents (415) -

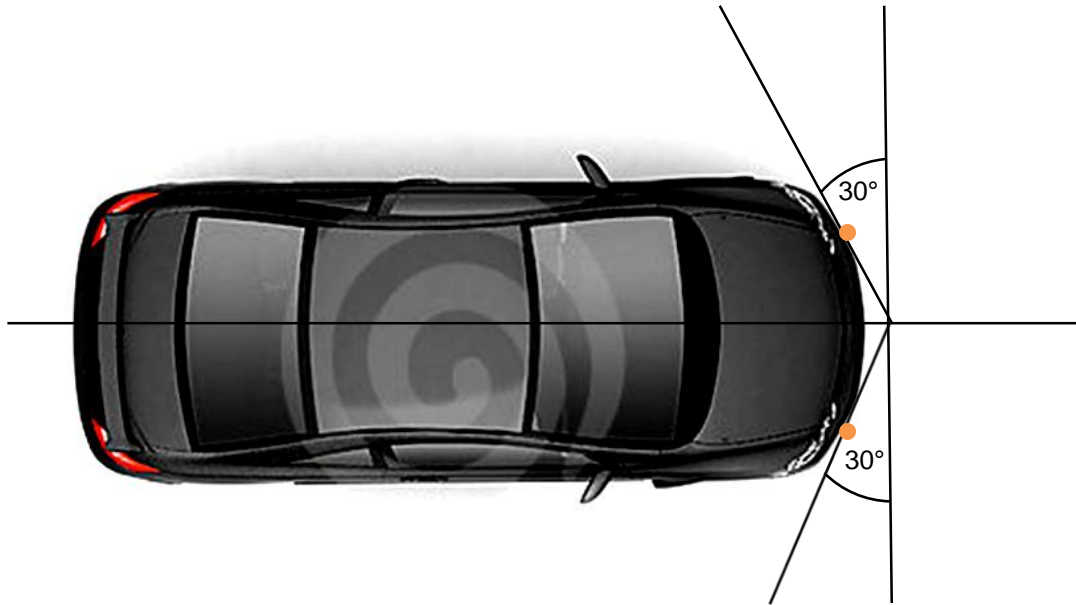
- ▶ **2002-2013:** 415 frontal pedestrian accidents (total)
- ▶ Distribution of AISUSKNIE
 - ▶ Maximum severity of AISUSKNIE = 3



- ▶ **The large majority of cases ($\approx 79\%$) show no injury or slight injuries**

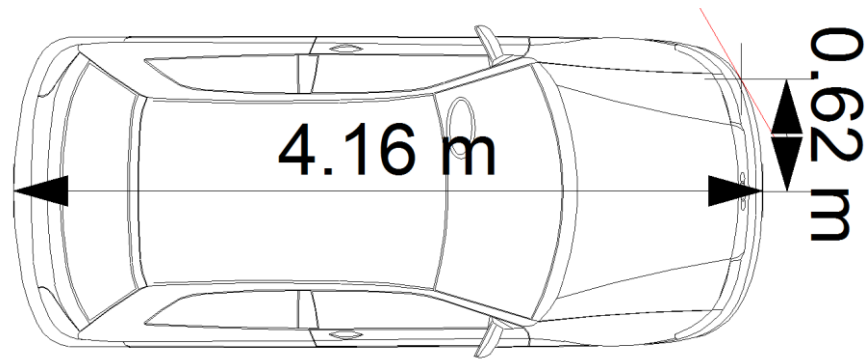
Pedestrian Accidents with Leg Injuries - Identification of the bumper test area -

- ▶ 30° tangent at front end of the car

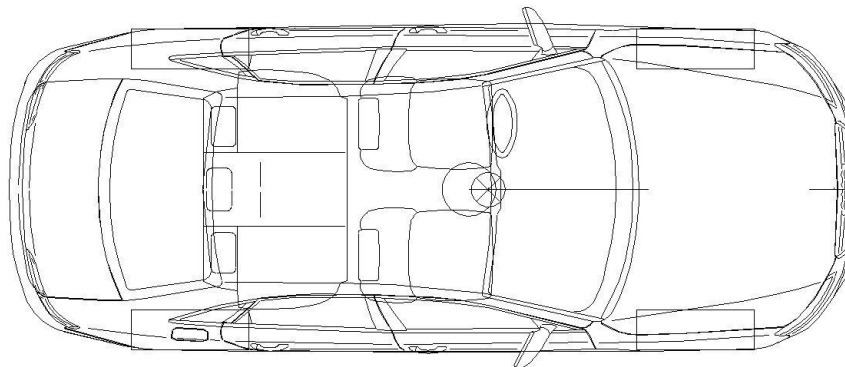


Pedestrian Accidents with Leg Injuries - Identification of the bumper test area -

- ▶ Source: Geometric models available for the accident reconstruction software
 - ▶ High degree of detail, accuracy of determination ± 10 mm
- ▶ Example AUDI A3

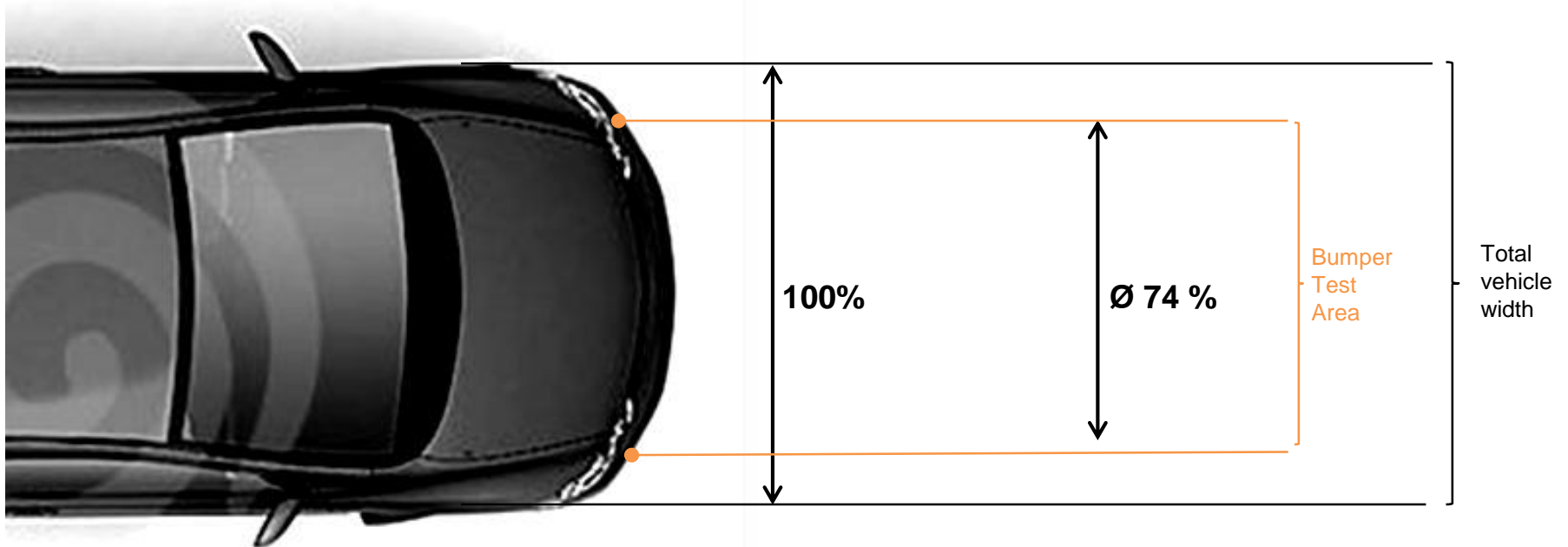


- ▶ Example AUDI A4



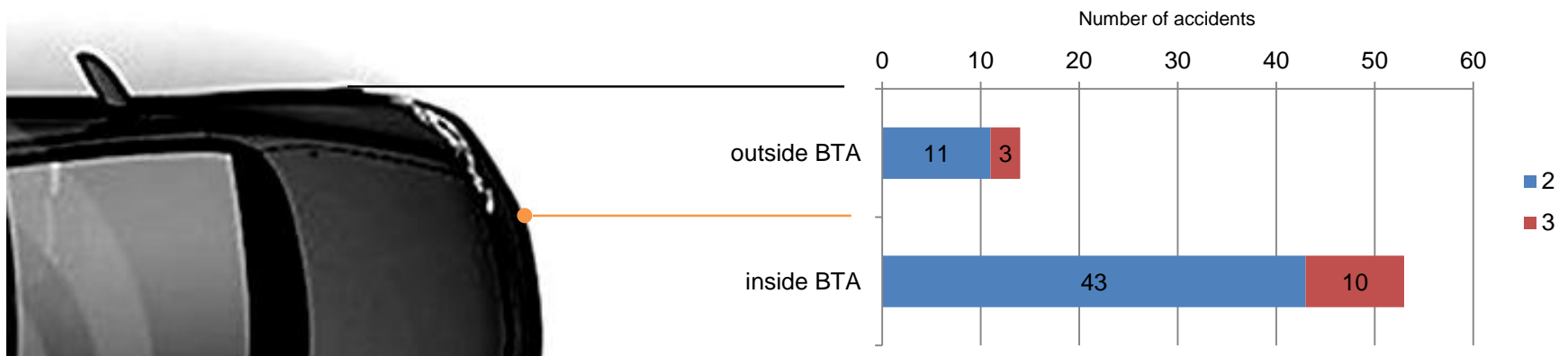
Pedestrian Accidents with Leg Injuries - Dimensions of the BTA -

- ▶ Average size of the BTA: 74% of vehicle width



Pedestrian Accidents with Leg Injuries - Accidents with AISUSKNIE 2+

- ▶ Absolute distribution of all accidents



- ▶ A trend to lower frequency of severe accidents in the outer area can be seen in relation to the test area

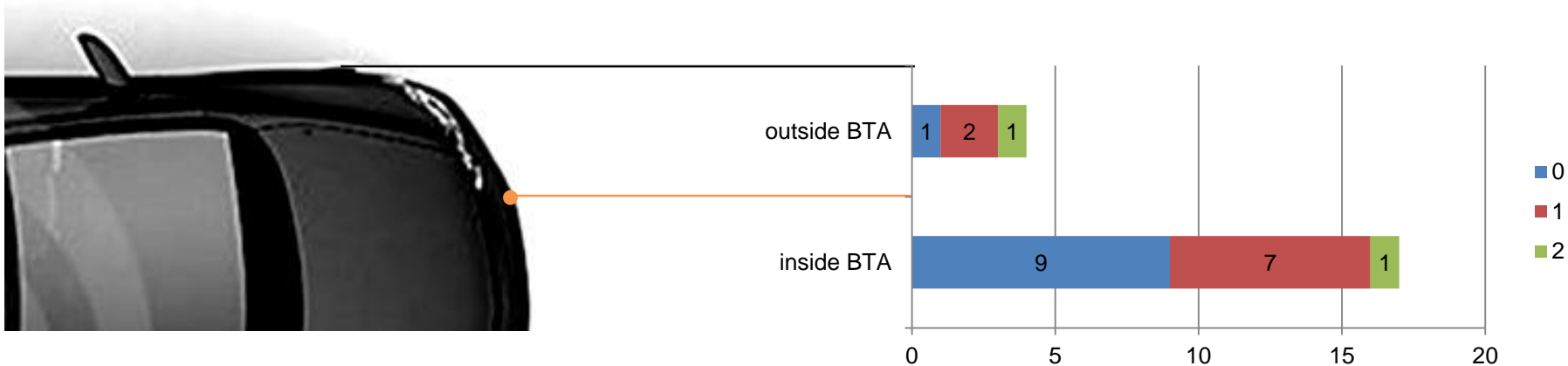
Pedestrian Accidents with Leg Injuries - Accidents with market launch after 2006 -

- ▶ Legislation concerning pedestrian protection: 10/2005
- ▶ Accidents Data filter

Pedestrian accidents 2002 – 2013 from GIDAS	
M1 to pedestrians (Passenger cars <u>with</u> SUV, van, mini-bus, pickup)	1831
First registration of passenger car > 2000	758
w/o multiple collisions	687
Frontal	415
Market launch > 2006	26

Pedestrian Accidents with Leg Injuries Accidents with market launch after 2006

- ▶ Contact point outside BTA: 4 accidents
- ▶ Contact point inside BTA: 17 accidents



- ▶ No severe injuries (AISKNIEUS) can be found in GIDAS outside the currently defined bumper test area for modern cars with a market launch after 2006