



FAT-Bast-Joint Project :

„Pedestrian safety in context with the low noise level of vehicles with alternative propulsion “

**QRTV, UN ECE, WP 29
Berlin, Germany
27-29. October 2010**

Introduction

- At low speed, EVs and HEVs usually have a **lower noise level** than conventional ICE.
- Therefore in some situations there could be a **higher risk of car-pedestrian-crashes**, especially for visually impaired and blind people, but also for people with sensory defensiveness and children.
- Due to **demographic projection**, amount of parties concerned is rising.
- About 1500 EVs and 28.900 HEVs on german roads → trend is rising
- **Further research is needed** to classify the problem and find reasonable solutions



Demographic structure in Germany

Visually impaired people:

- 347.226 visually impaired & blind (by law)
- ca. 645.000 visually impaired & blind and 1,2 Mio. partially sighted people (estimation by experts)

Elderly people:

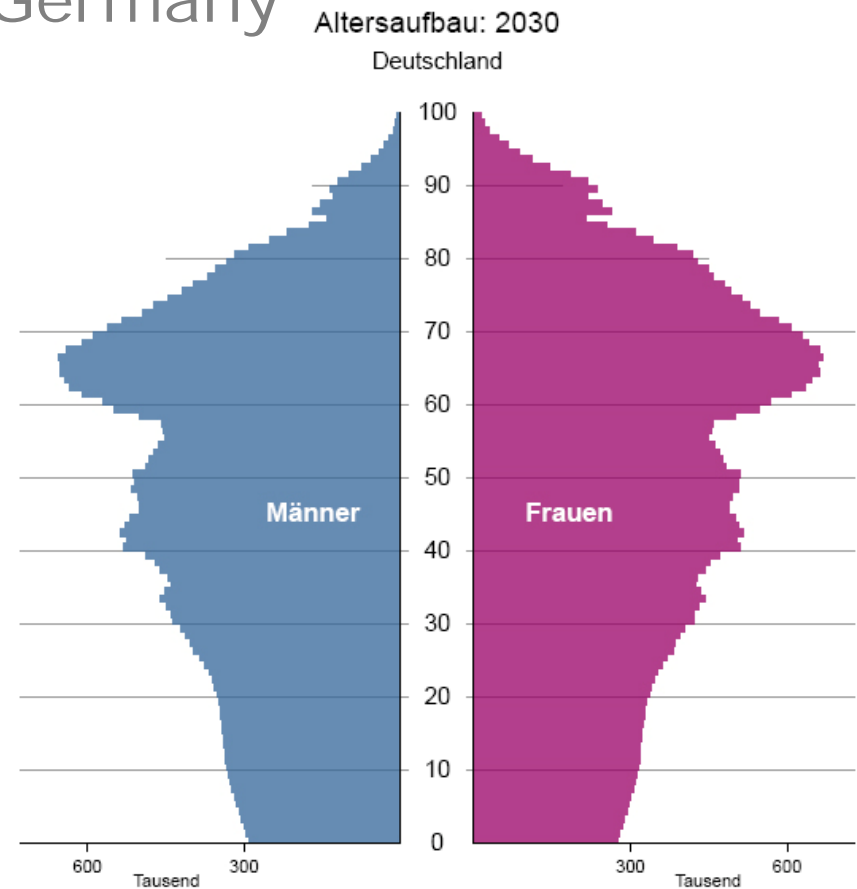
- 15.6 Mio. people with + 65 years

Deaf people:

- 260.495 deaf & hard-of-hearing (by law)

Children :

- 11,6 Mio. children (0-15 years)
-
- 460.782 visually impaired & blind
 - 22,1 Mio. people with + 65 years



Quelle: Statistisches Bundesamt 2008

Project topics

- **Baseline analyses to describe the situation**
 - Where do these problems of vehicle perception occur already today?
 - Accidents with pedestrian/ bicycles
 - Typical accidents with visually impaired and deaf people
- **How are vehicle perceived in general?**
 - How and what information do various groups of people select?
- **Estimation for possible future situation** (as far as possible)
 - Target Population (vehicles, VRU)
- **Provide a range of possible solutions** which are discussed in relation to the theoretical and practical background
- **Selected solutions will be discussed with vulnerable road users**, especially visually impaired people

Procedure – accident data

- **International literature research:**
 - **USA** (DOT HS 811 204, NHTSA, 2009): 8400 HEV and 559.700 ICE → Pedestrian-accidents 77 (HEV) and 3580 (ICE) & 48 (HEV) und 1860 (ICE) Bicycle-accidents (2000-2007)
 - This study found that pedestrian and bicyclist crashes involving both HEVs and ICE vehicles commonly occurred on roadways, in zones with low speed limits, during daytime, and in clear weather, with higher incidence rates for HEVs when compared to ICE vehicles
 - The HEV was two times more likely to be involved in a pedestrian crash in these situations than an ICE vehicle was.
 - **Germany:** GIDAS (data available)
 - **Netherlands** (Report 680300009, Rivm, 2010): 17 accidents with pedestrian out of 230 accidents with EVs and HEVs (2008)
 - **Japan:** no reported data with EVs and HEVs
- **Research in progress!**

Procedure – catalogue of measures

- **Infrastructural measures**
 - Warning at pedestrian crossing
 - Road surface
 - Traffic lights
- **Vehicle based measures**
 - sound
- **Vehicle/driver and vehicle/pedestrian – communication & other way around**
 - Sensor- and Radar technology
 - RFID – Radio Frequency Identification Device
 - vFSS – Advanced Forward Looking Safety System
- **Additional measures**
 - (Training/ Education)



Procedure – evaluation of the catalogue

- **Literature-based evaluation**
- **Focus group-Interviews**
 - Discussion with stakeholders on specific measures
 - Parties concerned:
 - Visually impaired/blind
 - Elderly people with sensory defensiveness
 - Children
 - People without sensory defensiveness (control group)
 - each 10-15 people
- **Additional individual interviews**
 - persons tanking part in current demonstration projects.
 - etc.

Results

- **Description of the current accident situation**
- **Prediction of future accident situations and -causes**
- **Perception model**
(Estimation of the acoustic portion of the pedestrian-crossing decision)
- **Model-based evaluation**
- **Catalogue of measures with functional description**
- **Evaluation of the measures**
(Interviews)



Quelle: Daimler AG



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