

## **VC-COMPAT Mid-Term Workshop**

### **Cost Benefit Car-To-Truck Leg**

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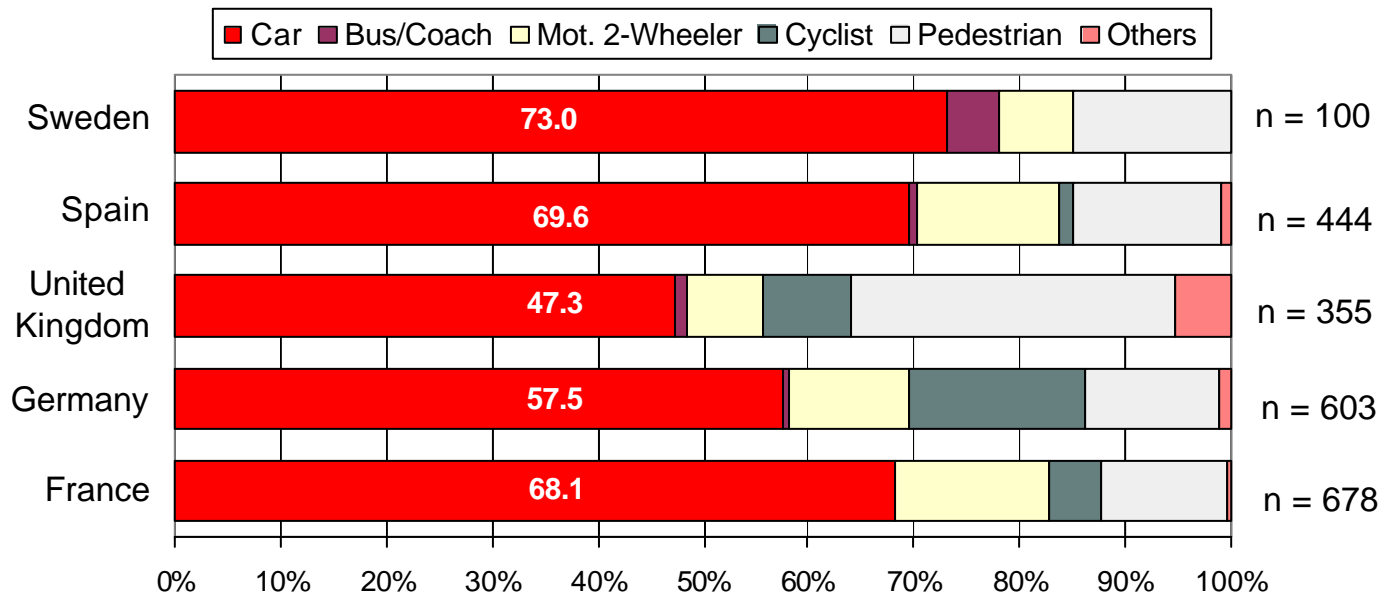
## Car-To-Truck Leg

### Task performed by GDV so far :

- Task 2.6  
Update of national statistics w.r.t. front, side and rear underrun of trucks
- Task 2.7  
Collection of existing in-depth accident cases
- Task 2.8  
Prediction of benefit of having front and rear underrun protection

### Task 2.6

## Fatalities Among Collision Opponents (Year 2001)



## Task 2.7/2.8

# Conclusions From In-Depth Analysis Of Front And Rear Underrun Car-to-Truck Accidents

## General

- In general, front-front collisions involve higher closing speeds than front-rear collisions (car front-to-truck rear)
- Deformation degree of car increases with higher closing speed
- Tendency for offset collisions (partial overlap) is stronger for frontal impacts (contrary driving direction) than for rear impacts (same driving direction of the colliding vehicles)

## Task 2.7/2.8

# Conclusions From In-Depth Analysis Of Front And Rear Underrun Car-to-Truck Accidents

## Front Underrun

- Car-to-truck frontal collisions occur most frequently at an impact angle between  $0^\circ \pm 15^\circ$ .
- In most cases, car-to-truck frontal collisions involve less than 50 % of truck front (about 75 % of passenger car, respectively)
- From in-depth analyses, a test procedure can be suggested with an overlap of less than 75 % of the car front



## Task 2.7/2.8

# Conclusions From In-Depth Analysis Of Front And Rear Underrun Car-to-Truck Accidents

## Rear Underrun

- Although compliant with current regulations (static load requirements), many underrun devices collapse or tear-off when cars impact truck ends
- Lower overlaps result in deeper underrun of car (small number of in-depth cases)
- Underrun reaching to car's A- and B-pillar possible for closing speeds of 30 km/h
- Further accident analysis suggested w.r.t. collisions with overlaps of over 75 % of car front
- Consider dynamic test procedures with inclusion of such scenarios



## Task 2.7/2.8

## Estimated Benefit Potential of Improved RUPS and Energy Absorbing FUPS

Preventible fatalities and serious injuries per year (estimated) *		
	Absolute Numbers	Percentage (in relevant accidents)
<b>e.a. FUPS vs. rigid FUPS</b>		
fatalities	190 ... 204	10 %...11 %
seriously injured	1,497	30 %
<b>improved rigid RUPS vs. conventional RUPS</b>		
fatalities	144	36 %
seriously injured	1,757	52 %
<b>e.a. RUPS vs. improved RUPS</b>		
fatalities	84	21 %
seriously injured	507	15 %

\* from three studies by GDV, TNO, TRL  
100% equipment rate w/ FUPS and RUPS assumed

## Ongoing Task:

### Task 2.9

#### Estimation of costs of effective front and rear underrun protection

- Costs for energy-absorbing FUPS
- Costs for improved rigid RUPS
- Costs for energy-absorbing RUPS

**Thank you for your attention!**