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# **Estimation of Cost Reduction due to Introduction of FlexPLI within GTR9**

**5<sup>th</sup> Meeting of Informal Group GTR9 Phase 2  
Bergisch Gladbach, December 6<sup>th</sup> - 7<sup>th</sup>, 2012**

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**Bundesanstalt für Straßenwesen**

**Bundesanstalt für Straßenwesen**

**(Federal Highway Research Institute)**

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# National accident statistics (GER)



**Vehicle to pedestrian casualties (2009 – 2011):**

**Only passenger car (1x) to pedestrian (1x) accidents [2 road users]**

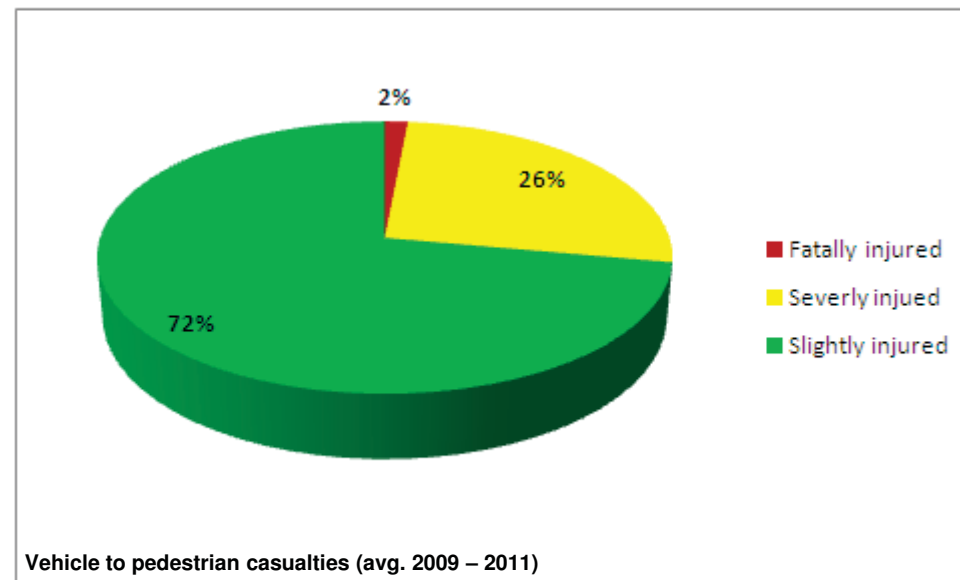
**65843 accidents**

**Averaged accident severity p.a.:**

**323 fatally injured**

**5774 severly injured**

**15785 slightly injured**



# In Depth Accident Data (GIDAS)



Dataset (GIDAS from 1999-2011) and starting position:

- Only accidents with one pedestrian and one passenger car involved
- 1925 accidents; 1760 complete (wrt. injuries, impact location, etc.)
- Pedestrian laterally impacted, i.e. impact location @ 8-10 / 2-4 o' clock
- Injury causing vehicle parts: vehicle front, w/o BLE !

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**Assumption: reduction of lower extremity related AIS 1-3 injuries by 1 when vehicle designed with pedestrian friendly bumper (AIS-1 shifting)**

e.g.: open tibia fracture <sup>AIS-1</sup> → closed tibia fracture

closed tibia fracture <sup>AIS-1</sup> → bruises

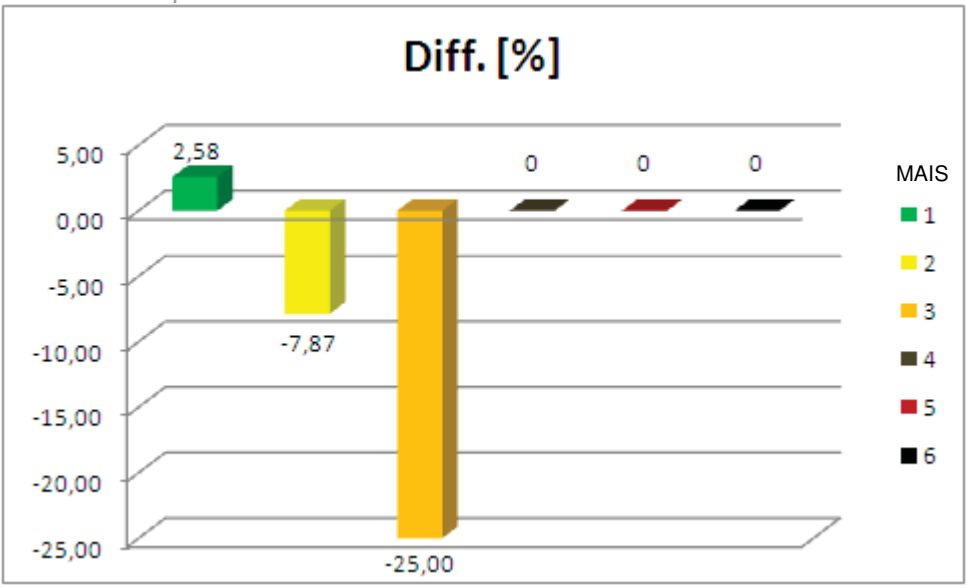
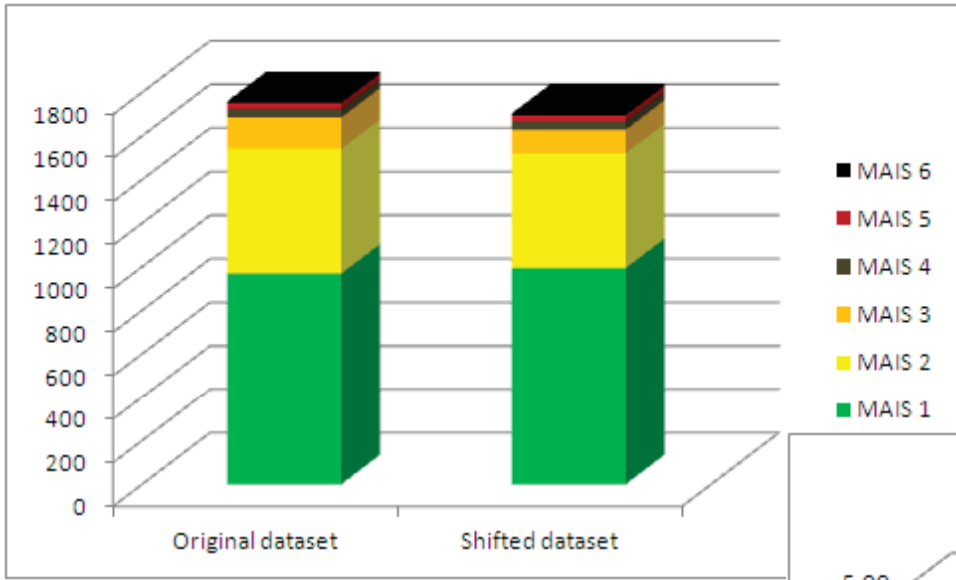
- Considered lower extremities: all injury types of tibia, fibula, knee, ligaments, subtalar joint

→ 498 vehicle to pedestrian accidents affected

# In Depth Accident Data (GIDAS)



**MAIS injury distribution of all complete pedestrian casualties (1760 casualties original vs. 1704 casualties shifted [some AIS1 shifted to AIS0]):**



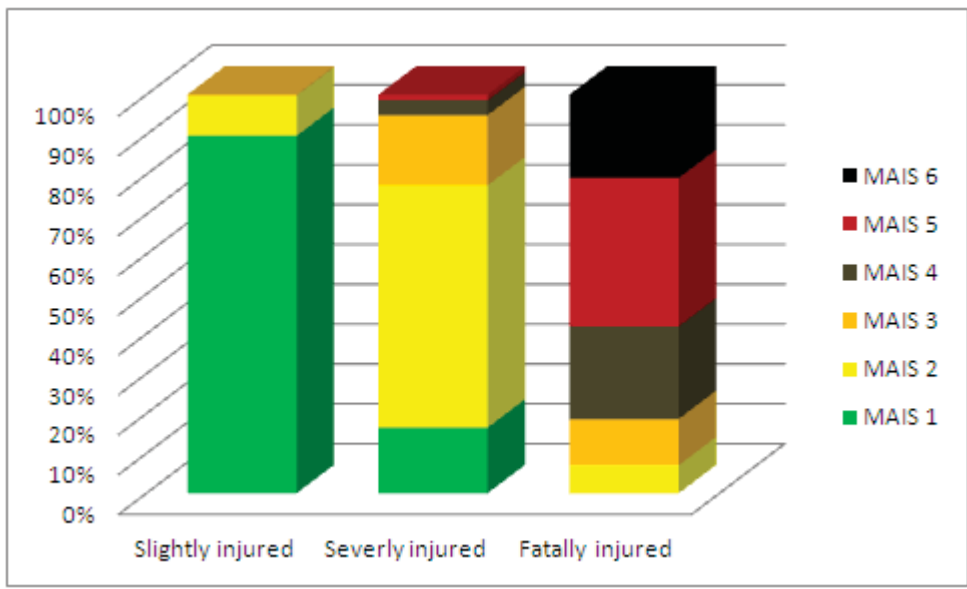
**MAIS shifting due to pedestrian friendly vehicle bumper design:**



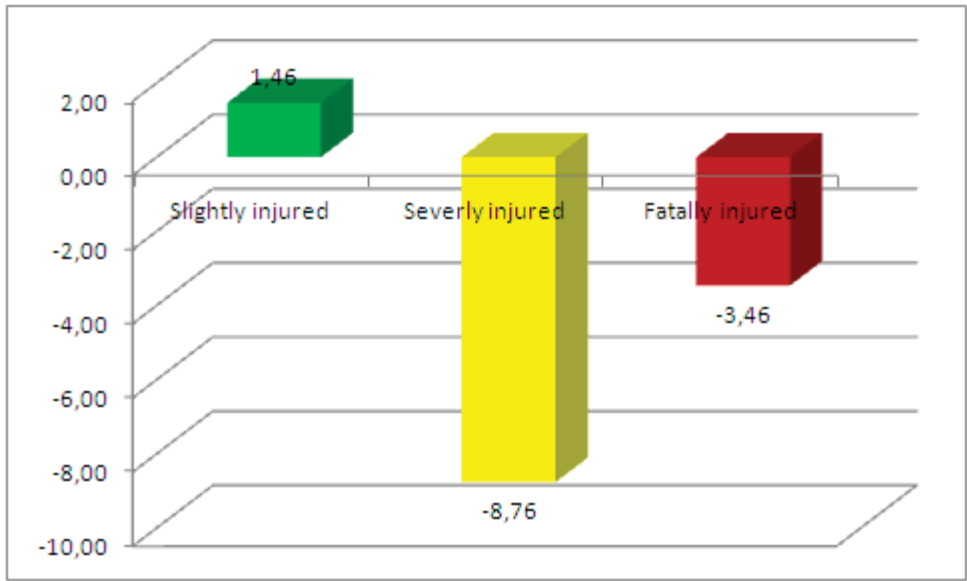
# Accident Data (GIDAS + GER)



**MAIS injury distribution of fatally, severely and slightly injured pedestrians in GIDAS ( $\Sigma$  casualties: 1759)**



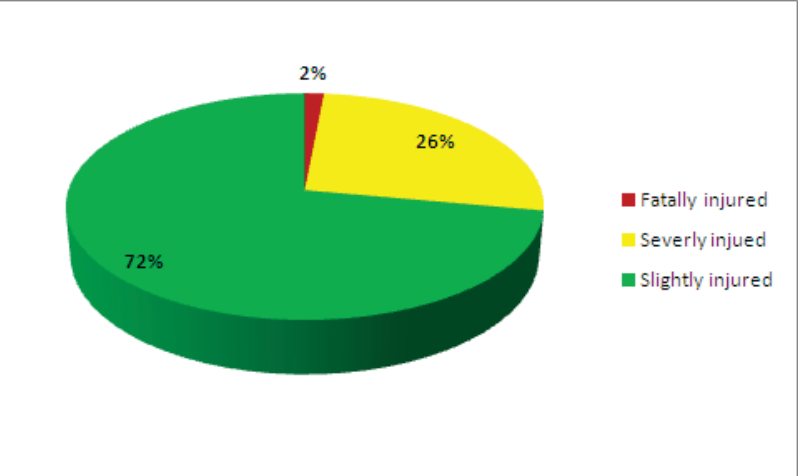
**Shifting of fatally, severely and slightly injured pedestrians from national accident statistics after AIS-1 shifting**



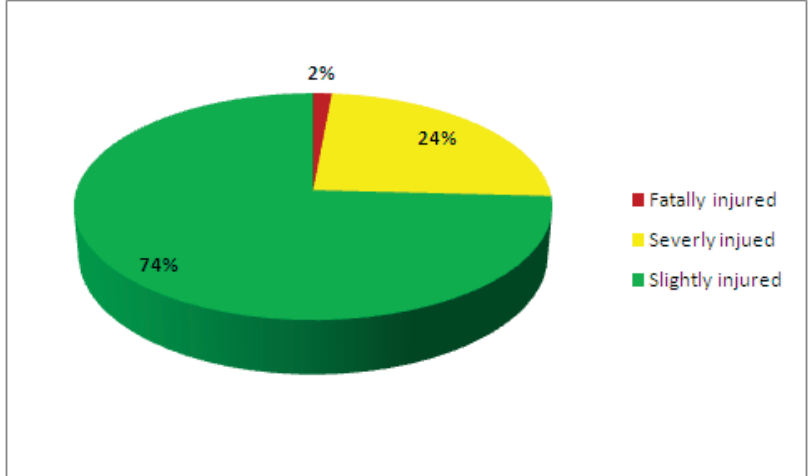
# National accident data [GER]



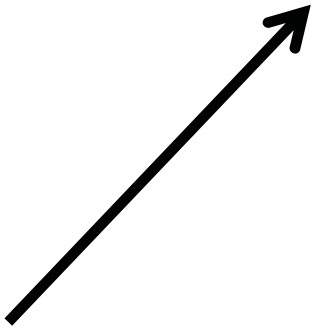
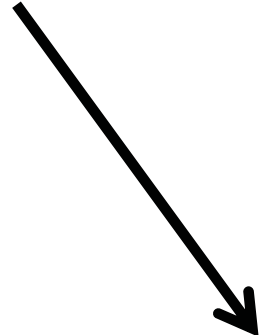
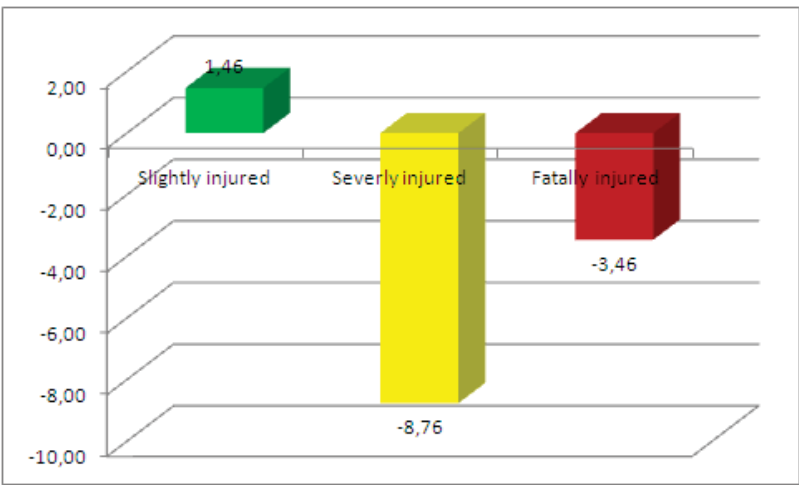
Shifting of fatally, severely and slightly injured pedestrians from national accident statistics:



Original national dataset



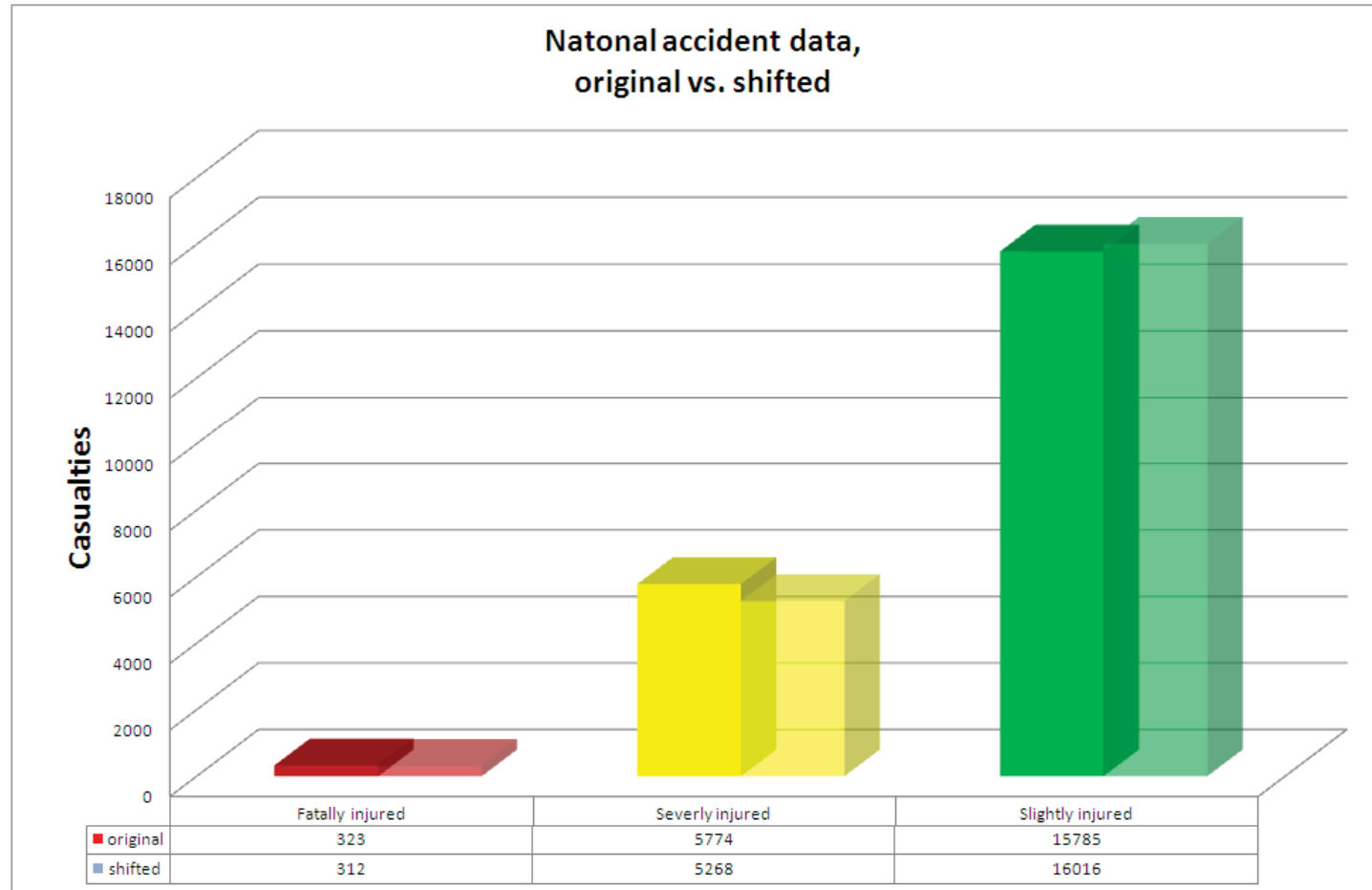
National dataset, shifted



# National accident data [GER]



Shifting of fatally, severely and slightly injured pedestrians from national accident statistics:

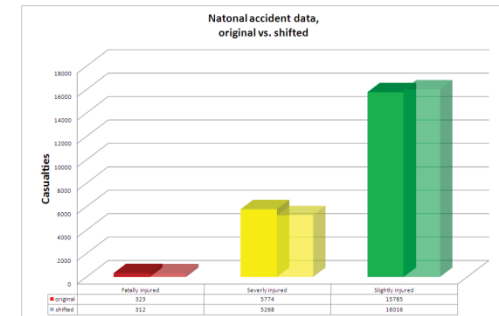


# National accident data [GER]



## Estimation of cost reduction:

	original	shifted	Diff. [abs]	costs per case [€]	Reduction [€]
Fatally injured	323	312	11	1018065	11.364.027
Severly injured	5774	5268	506	105477	53.355.492
Slightly injured	15785	16016	-231	4305	-994.170
Σ					63.725.349



**Estimation of maximum annual cost reduction in Germany due to vehicles designed with pedestrian friendly bumper (AIS-1 shifting):**

**63.725.349 EURO**

**Estimation of annual cost reduction in Germany under consideration of 70% injury risk covered by FlexPLI:**

**63.725.349 EURO \* 0,7 = 44.607.744 EURO**





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# Thank you !