

# Discussion of Injuries in Pole Side Impact Crashes

## NHTSA's Motivation for Upgrading the Side Impact Test Procedures & Benefit Analysis

Presented by  
Susan Meyerson

2<sup>nd</sup> Meeting of the Pole Side Impact GTR  
Brussels, Belgium  
March 3-4, 2011

# Reference for Motivation

---

NHTSA Side Impact Research: Motivation For Upgraded Test Procedures, R. Samaha and D. Elliott, 18ESV492\*

\*Document Number RD-03: located on the UNECE website for the Pole Side Impact GTR Informal Working Group

# Situation in the U.S. at the Time of the Study

- ★ A significant percentage of the passenger fleet consists of Light Trucks and Vans (LTVs)

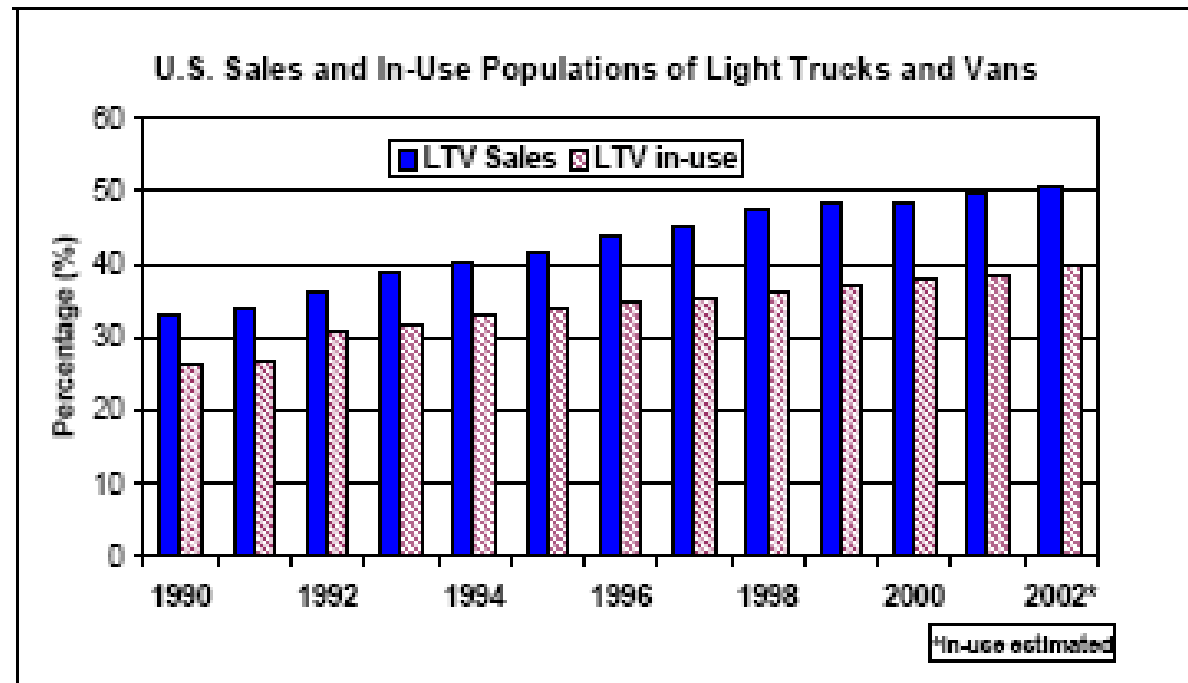


Figure 1. Data Source: Automotive news Market Data Books.

# Situation in the U.S. at the Time of the Study

- ★ Penetration of Side Impact airbags in fleet was increasing due to FMVSS 214 and the optional perpendicular pole test in FMVSS 201.

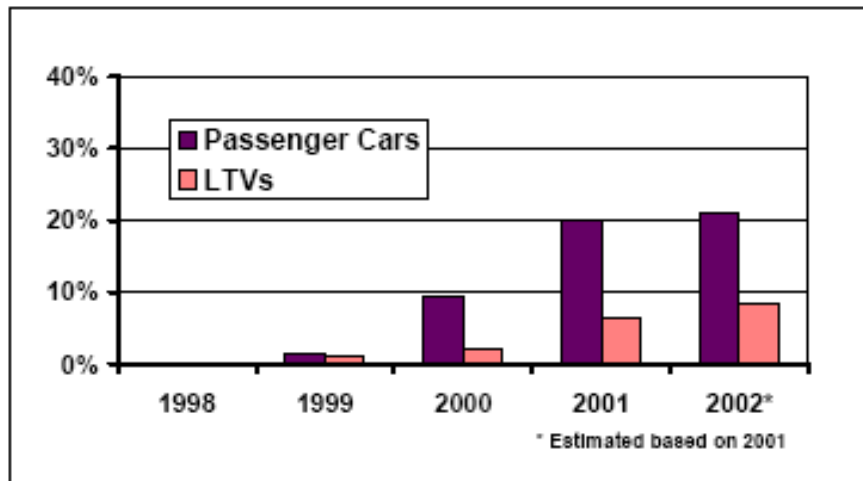


Figure 2. Driver head air bag installations in new vehicles (combo and curtain systems).<sup>1</sup>

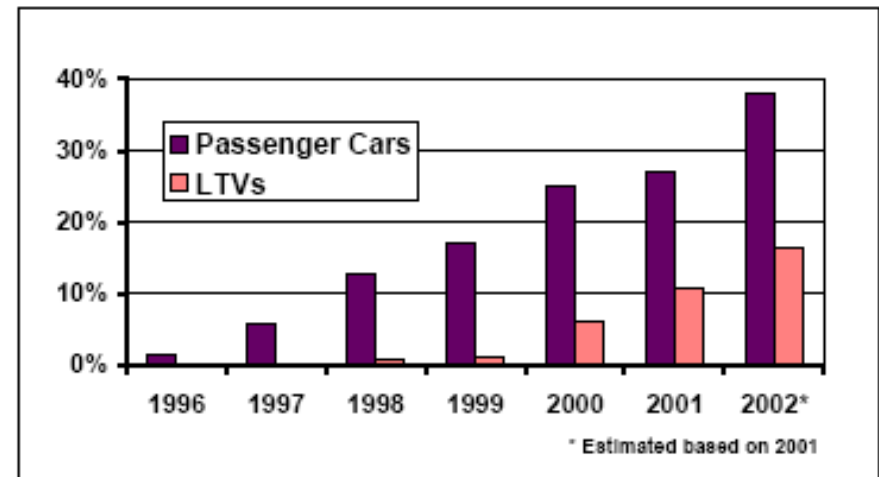


Figure 3. Driver thorax air bag installations in new vehicles (includes combo air bags).

# Methodology of Study

---

- ★ Data collected from
  - US National Automotive Sampling System/Crashworthiness Data System (NASS/CDS)
  - US Fatality Analysis Reporting System (FARS)
  - US General Estimate System (GES) (1990-2001)
- ★ Belted Occupants in side struck vehicles of 1995 or later (3-point belts)

# Injuries in Nearside Crashes

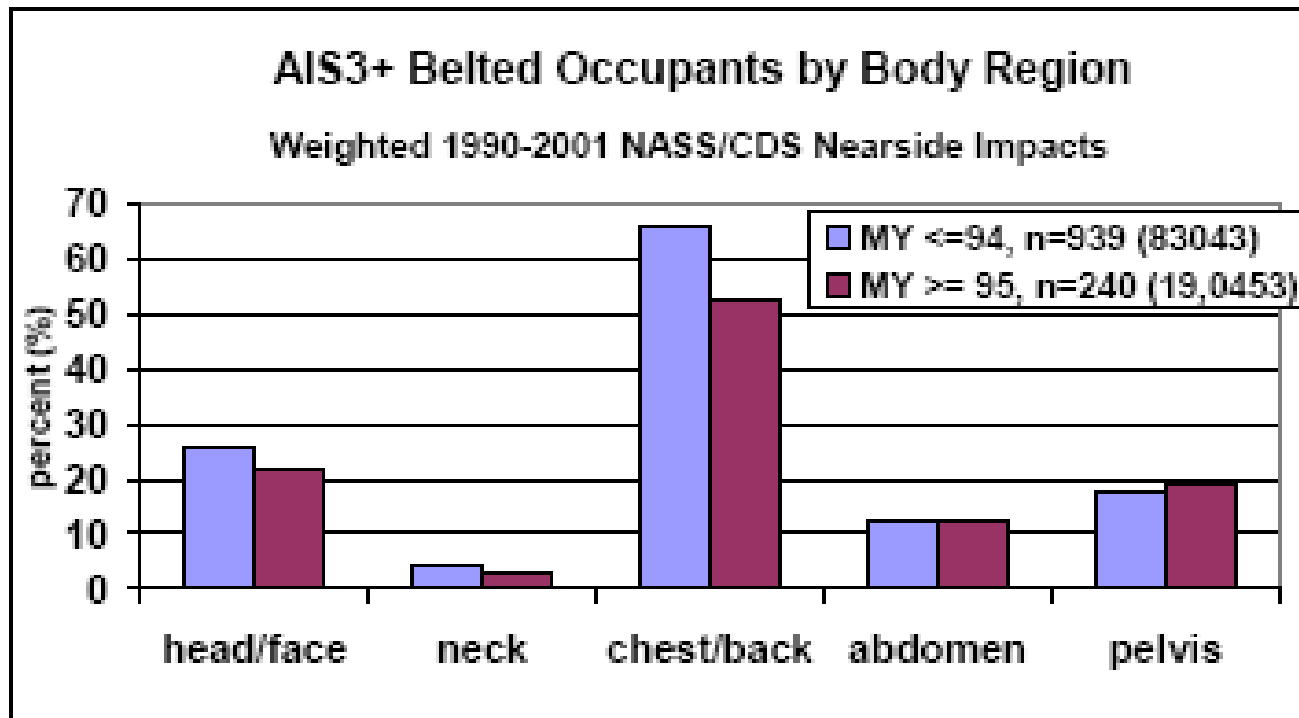
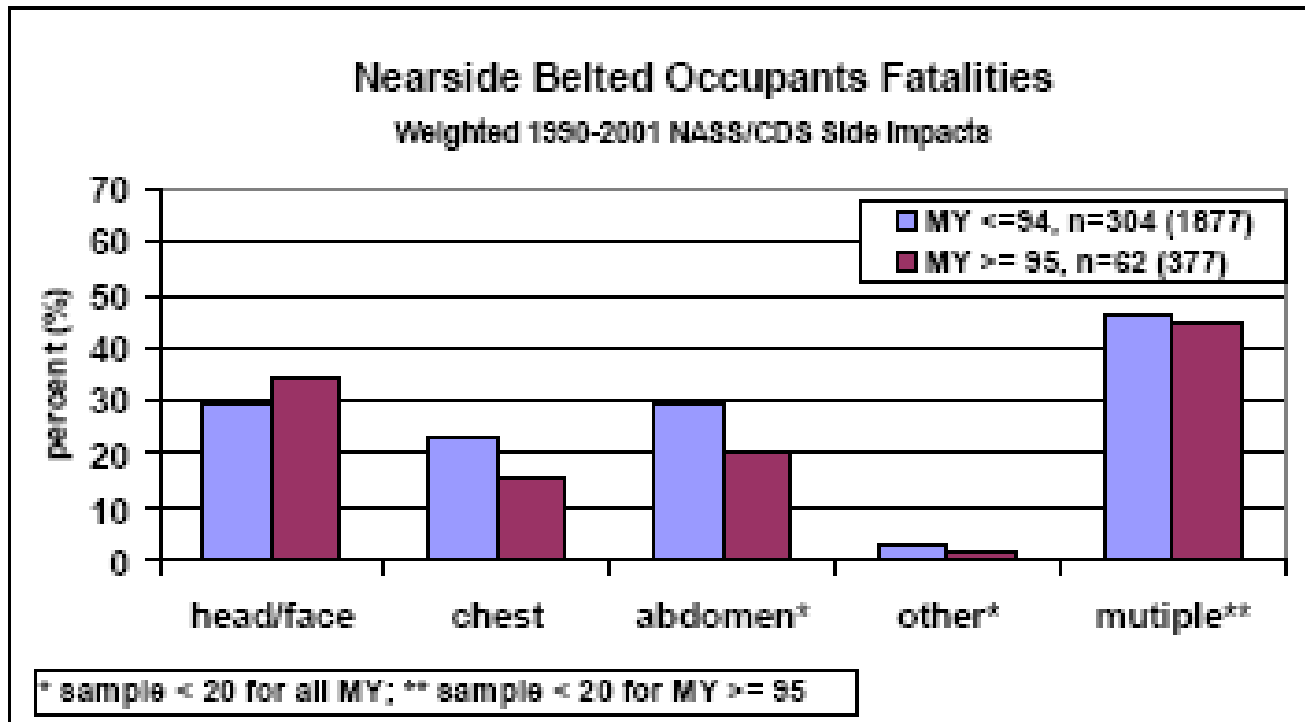


Figure 8. Belted occupants by seriously injured body region in nearside crashes.

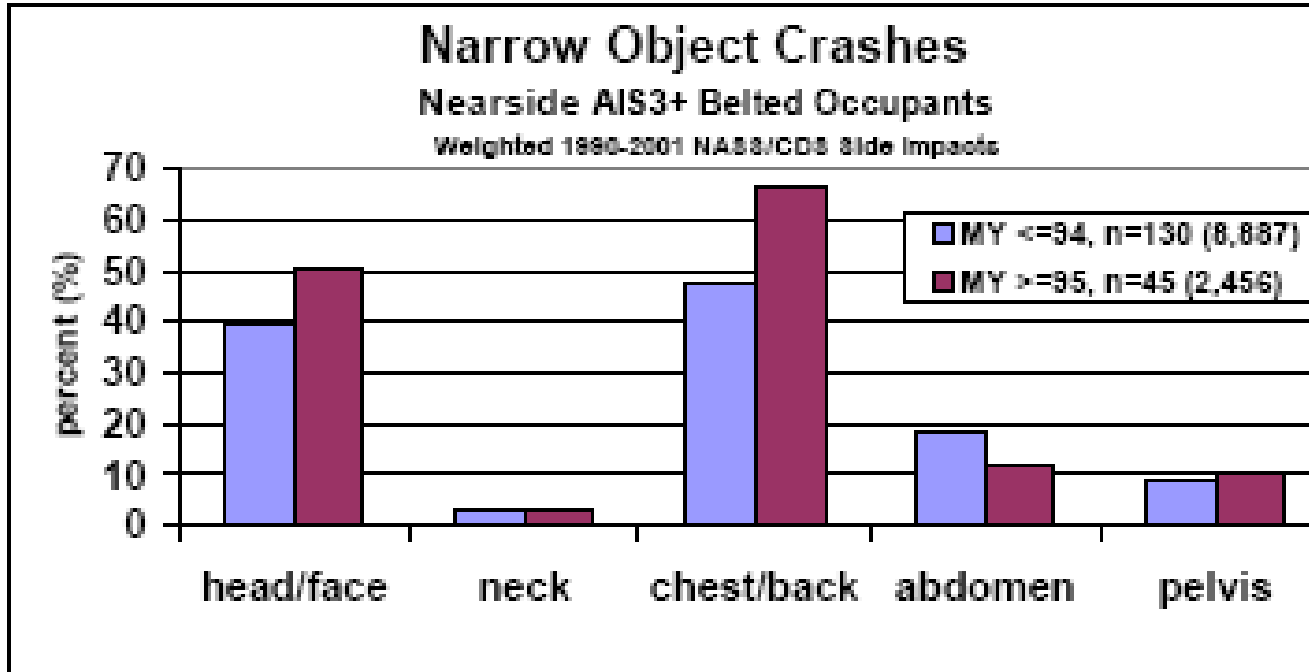
# Fatalities in Nearside Crashes



- Occupants categorized by maximum serious injury (MAIS) in a single body regions or multiple body regions.

Figure 9. NASS/CDS fatalities in occupants with an injury in a given body region.

# Injuries in Narrow Object Crashes

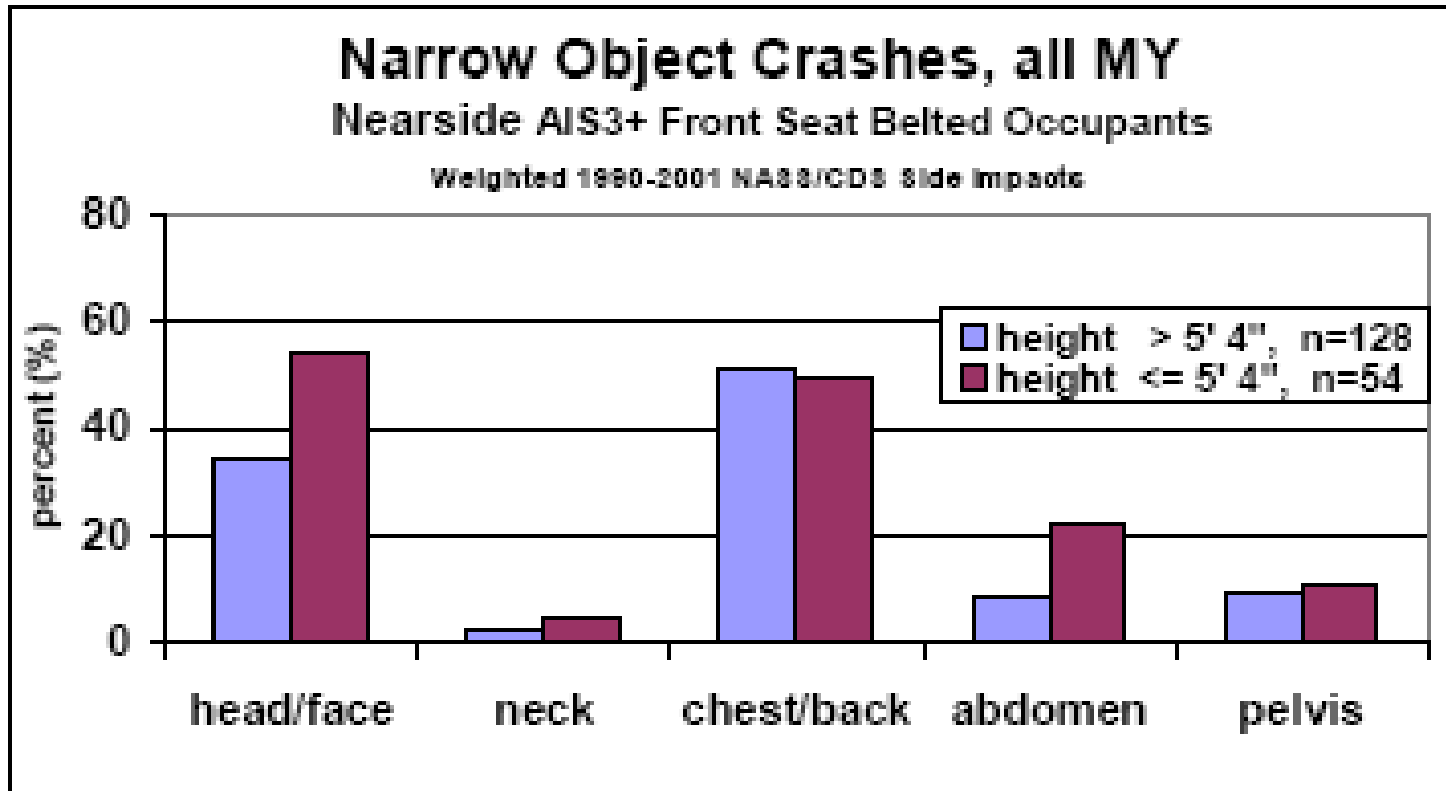


- Side Impacts with Rigid Narrow Objects account for 21% of nearside fatalities.

**Figure 18.** Narrow Object crashes: NASS/CDS seriously injured occupants.



# Occupant Stature in Nearside Rigid Narrow Object Crashes



# Benefit Analysis Discussion from PSI-01-16

---

- ★ At the 1<sup>st</sup> meeting there were questions on the lack of pelvic and abdominal injuries and fatalities represented in the benefit calculations.
- ★ Reason: Benefits calculations were based on the Maximum AIS injury/fatality sustained by the occupant

# 2000 – 2004 Annualized NASS CDS Data\* Used by Injured Body Region

Body Region	Vehicle-to-Pole/tree		Vehicle-to-vehicle		Total, %
	Injury**	Fatal	Injury**	Fatal	
Head	266	298	903	651	<b>25.8%</b>
Chest	419	46	2,809	733	48.9%
Abdomen	0	0	128	146	3.3%
Pelvis	0	0	288	67	4.3%
Others	315	28	763	342	17.7%
<b>Total</b>	<b>1,000</b>	<b>372</b>	<b>4,891</b>	<b>1,939</b>	<b>100.0%</b>

\*delta-V of 12 -25 mph,

\*\*MAIS 3 -5 serious injuries.



# Conclusions

---

- ★ In narrow object crashes
  - Most of the serious injuries are to the head and chest, but there are also serious injuries to the abdomen and pelvis
  - The maximum injury sustained is to either the head or chest.