Informal document No. **GRSP-47-31**
(47th GRSP, 17 - 21 May 2010,
agenda item 5)

US Side Impact Protection Rule

Federal Motor Vehicle Safety Standard No. 214

National Highway Traffic Safety Administration

47th Session of GRSP, May 2010

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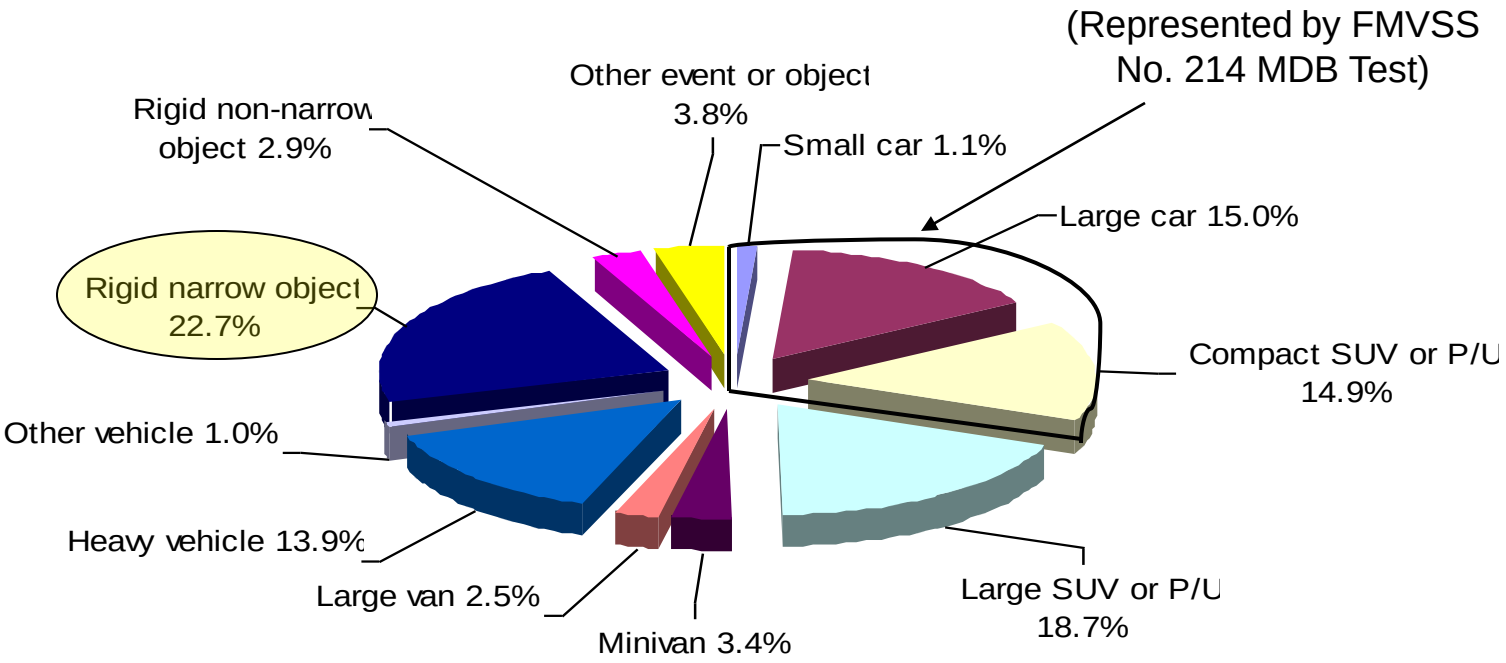
Near-side Fatalities by Crash Partner

2005 FARS, Nonrollover Occupant Fatalities
MY 1995+ Struck Vehicle



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Rigid narrow object countermeasures apply to all configurations

Real World Crash Injury Data
(Basis for US Rulemaking)

2001 FARS
1997-2001 NASS

	Injury Occurrence	
	Serious	Fatal
Head	13%	40%
Chest	59%	38%

- **Short stature occupants (<5'4")**
  - 35% serious/fatal injured occupants; 93% are female
  - Increased risk of head injury

Major Provisions of Rulemaking

- Add 75 degree oblique pole tests
  - 20 mph
  - Front outboard occupants
- Upgrades 50th percentile male dummy
  - EuroSID-2 with Rib Extensions (ES-2re)
  - Pole and existing moving barrier tests
- Adds 5th percentile female dummy
  - SID-IIsD
  - Pole and existing moving barrier tests

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Why 75° Oblique Angle vs. 90° FMVSS No 201

- Only 11% of seriously injured occupant represented by 90 degree angle from a reviews of NASS data.
- Oblique angle to assure more robust sensor performance
  - Early testing showed vehicles with head protection did not pick up the impact with the oblique pole and deploy the bags
- Oblique angle to assure better head protection and larger air bags (curtains)
  - Early testing showed vehicles equipped with a combo head and chest bag did not adequately protect occupants head in oblique condition.
- Vehicles certified to the upgraded side impact requirements exempt from pole test specified in FMVSS No. 201.

  - NHTSA SIDE IMPACT RESEARCH: MOTIVATION FOR UPGRADED TEST PROCEDURES, R. Samaha and D. Elliott, 18ESV492

Pole Test – 2004/05 Toyota Sienna

SID-IIsD - Driver
HIC = 2019
Th Defl = 37
Abd Def = 57.9
Iw Spine = 55
Pelvis F = 4670

ES-2re - Driver
HIC = 667
Th Defl = 47
Abd Force = 1751
Iw Spine = 60
Pelvis F = 2127

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Major Comments & Responses

- **General support from manufacturer and consumer groups**
- **Alliance: 5th dummy not needed**
  - **Response: Considerable basis for benefits; incorporated SID-IIsD**
- **Manufacturers: use voluntary agreement**
  - **Phase 1 (9/1/07): 50% either FMVSS No. 201 pole or IIHS MDB;**
  - **Phase 2 (9/1/09): 100% IIHS MDB**
  - **Response: IIHS/Alliance voluntary agreement benefits only about 50% of Rule**
- **Consumer groups wanted more requirements**
  - **Rear seat pole test**
    - Response: Manufacturers will likely install curtains in response to: 214 final rule, IIHS ratings & ejection mitigation; Curtains will provide head protection to front and rear seat occupants in side impacts.
  - **More stringent injury criteria (HIC of 800, deflections < 35 mm)**
    - Response: Adopted injury criteria is consistent with existing pole test requirements; and deflections were adjusted for age

Incremental Costs

- **New systems**
  - Wide head/torso combo bag w/ 2 sensors ~ $126/vehicle
  - Wide window curtain + torso bag w/ 2 sensors ~ $243/vehicle
  - Wide window curtain + torso bag w/ 4 sensors ~ $280/vehicle
- **Vehicles with Side Air Bags**
  - In 2005, over 40% have head and/or torso inflatable protection systems
  - In 2011, manufacturers project 89% head and 73% torso air bags
  - Added sensors and/or wider bags required to meet requirements
- **Average incremental cost ~ $25-66/vehicle, with MY 2011 fleet**

*Target Population**
(NASS CDS, 12 –25 mph)

- Fatalities: 2,311
- AIS 3-5 Injuries: 5,891

*** Excludes Rollover Crashes**

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Incremental Benefits*
(Lives & Injuries Saved)

- About 80% of benefits are from head injuries

	Fatalities saved	AIS 3-5 injuries prevented
Combination head/torso air bag w/ 2 sensors	266	352
Window curtain + torso air bag w/ 2 sensors	311	361
Window curtain + torso air bag w/ 4 sensors	311	371

*Benefit estimates are based on 100% ESC

*Based on projected air bag sales in MY 2011

Cost Effectiveness Estimates

Costs (2004 dollars)	Benefits	Cost per ELS
$429M – 1.1B	266-311 fatalities 352-371 injuries	$1.6* – 4.6 M†

* - 3% discount; head/torso combo bag
† - 7% discount; window curtains + torso bag w/ 4 sensors

The most likely scenario is window curtains and separate thorax bags with 2 sensors, the cost per equivalent life saved is $1.8 to $2.3 million.

References

- Federal Register Notices (http://www.gpoaccess.gov/fr/index.html)
  - Notice of Proposed Rulemaking: 69 FR 27993
  - Final Rule: 72 FR 51957
  - Response to Comments on Final Rule: 73 FR 32483
- NHTSA Side Impact Research: Motivation For Upgraded Test Procedures, R. Samaha and D. Elliott, 18ESV492
- FMVSS 214 Pole Tests w/ SID-IIsD and ES2-re (http://www-nrd.nhtsa.dot.gov/database/aspx/vehdb/querytesttable.aspx)
  - Test #s: 5436, 5317, 5443, 5408, 5457, 5472, 5444, 4859, 5458, 5407, 5438, 5300, 5459, 5405, 5421, 5439, 5417,5296,5437,5406,5470, 5416

Thank You

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