



New HPM and HRMD Standards

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New HPM and HRMD Standards

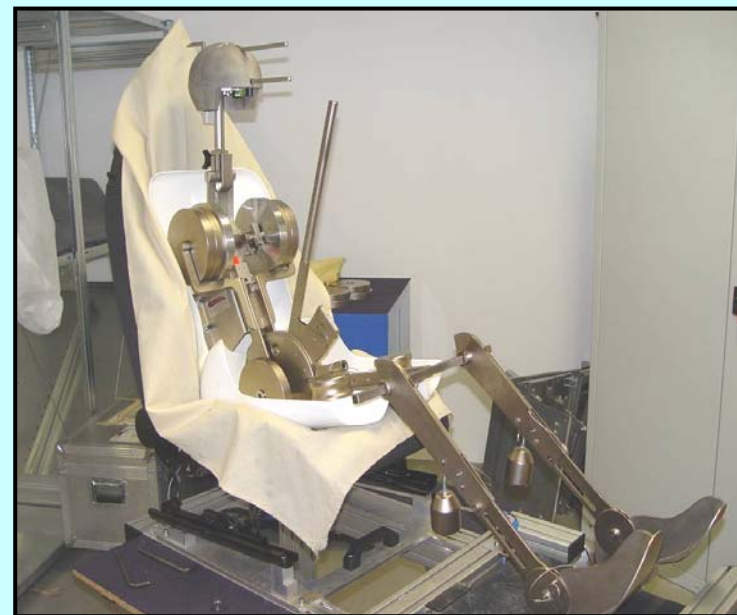
1. Initial Situation



The backset and H-Pt. affect whiplash test results for IIHS, Thatcham, EuroNCAP and FMVSS202a by:

1. the seat
2. the equipment (HPM and HRMD)
3. the procedure
4. the measuring technicians

Interim status presented to
IIHS, D. Zuby and
Thatcham, M. Avery
November 2008



New HPM and HRMD Standards

1. Initial Situation



HPM

1. Several suppliers for HPM's, unknown copies are existing
2. Actual standards for measuring devices are not fulfilled

HRMD

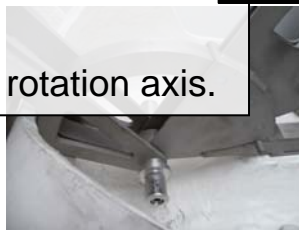
1. developed in the 90's as extension for the HPM to measure backset
2. One supplier, RONA
3. Two versions and copies are existing
4. Actual standards for measuring devices are not fulfilled



HPM weight difference up to 3 kg!

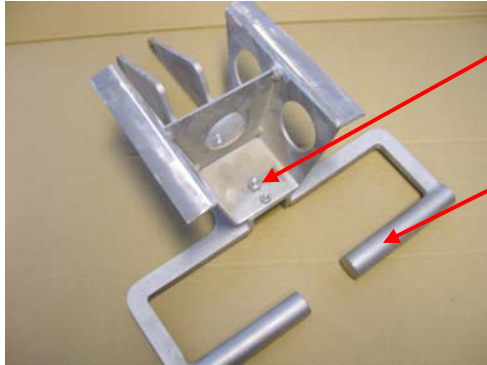
Differences in shape (> 9 mm) and position (> 4 mm) of the cushion and back!

H-Pt. markings are not in line with the rotation axis.



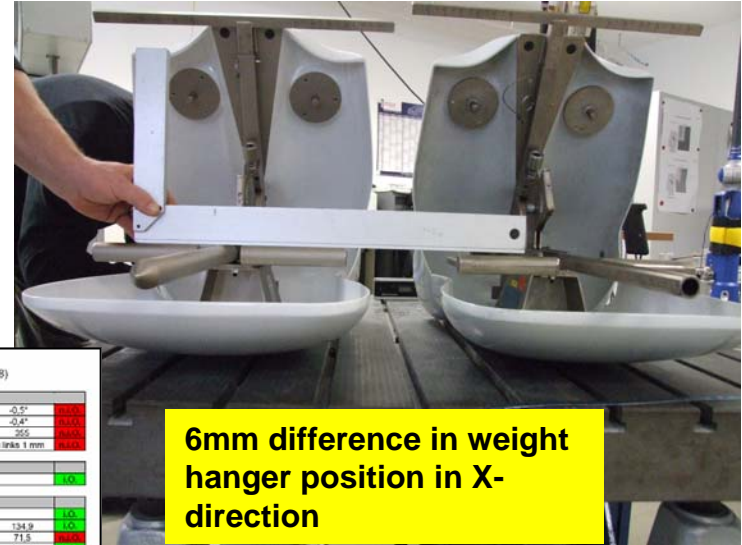
New HPM and HRMD Standards

2. Deviations and Variations



Contact surfaces of HRMD differs more than 9 mm!

several mm in every direction and of angle more than 0,5°



6mm difference in weight hanger position in X-direction

Messung (Toleranzen gem. DILEMMA, SAE Referenz J826 MAR2008)			
Weight Hangers			
Winkelwert um $\pm 0,5^\circ$	0,3°	-0,5°	0,2/0,2
Winkelwert um $\pm 0,5^\circ$	0,3°	-0,4°	0,2/0,2
Z-Lage (H) 250,0 mm ± 1 , Achse $\pm 0,5$ mm	25,4	25,5	0,0/0,0
X-Lage, Achse $\pm 0,5$ mm		Versatz rechts zu links 1 mm	0,0/0,0
Torsionwert			
Torsionwert an h. Flügel (γ_{50}) $\pm 0,5^\circ$	69,9°		0,0/0,0
Gesäßschale			
H-Pr-abstand (10x) 375,1 mm ± 1	370,4		0,0/0,0
Abstand H-Pr nach hinten (2x) 134 mm	134,2	134,9	0,0/0,0
Abstand Vorderkante 72,6 mm ± 1	71,2	71,5	0,0/0,0
größte Breite ± 102 mm ± 20 mm	204,5	204,3	0,0/0,0
größte Breite ± 12 mm ± 1		406,6	0,0/0,0
Abstand H-Pr nach unten (3x) 97,6 mm ± 1	97,6	99,8	0,0/0,0
Rückenschale			
größte Breite (10x) 388 mm ± 1	195,2	189,5	0,0/0,0
		305,7	0,0/0,0
Lage Oberkante 641 mm ± 2	641		0,0/0,0
Versatz Rückenschale in X-Lage max. ± 1 mm		1	0,0/0,0
HRMD			
Kopfabstandstrehe Skalierwert 60 mm $\pm 0,5$	63		0,0/0,0
Kopffüßbreite 786,6 mm $\pm 0,5$	795		0,0/0,0



New HPM compared with older version: No vertical mounting of back shell!



Black back shell is smaller over all compared to the white version

New HPM and HRMD Standards

2. Deviations and Variations



Thatcham defined the calibration device GLORIA to reduce variation.

„A first step in the right direction! But more improvement is necessary.“ (ADAC, Mr. Sandner)

But:

There are only four GLORIA's existing without any documentation.

The GLORIA calibration allows too much variation, for example a cushion height difference in Y direction. Supplied „GLORIA-ready“ HPM's failed in GLORIA calibration!

AA calibrates HPM's, but the modifications are unknown which results in unknown consequences for running programs.

=> less improvement!

After a deeper look into it, we found out there is more potential to reduce variation.



New HPM and HRMD Standards

3. Activities



OEM's and seat manufacturers want to reduce the measuring variations of the H-point and backset results to get clear information about the actual seat quality/safety. To achieve improvement, the following is necessary:

1. Calibration

A proper calibration device and procedure to ensure quality over time for HPM and HRMD.

2. Precise Equipment

HPM and HRMD need a rework to reduce tolerances in shape, dimensions and positions.

*In addition came the new **SAE J826 Rev MAR2008** which demands several tighter tolerances and has new measures listed.*

SAE International		SURFACE VEHICLE STANDARD		SAE J826 MAR2008	
Issued	1992-11	Revised	2008-03		
				Superseding	J826 JUL1995

(R) Devices for Use in Defining and Measuring Vehicle Seating Accommodation

RATIONALE

This revision incorporates an inspection procedure for checking calibration of the H-point machine (Appendix C). It also adds specifications for the mounting surface of the head restraint measuring device.

Other changes include:

- 10 year phase-out period for the HPM
- Revision of HPM weight specification from 157 to 169.6 lb to reflect current HPM build
- New ambient humidity specification
- Narrower range of ambient test temperatures
- Clarification of muscle cloth specification
- Extensive revision of short couple method and addition of long couple method to Appendix A
- Terminology consistent with SAE J1100
- Editorial clarifications

SAE J4002 (HPM-II) and SAE J826 (HPM) shall co-exist for a transition period of at least 10 years, preferably no longer, from the first publication date of SAE J4002 (August 2005). Following this transition period SAE J826 will be withdrawn. During the transition period, it remains up to the vehicle designers to decide which HPM to use. Regulatory bodies and other parties that need to know shall be informed regarding which HPM was used.

New HPM and HRMD Standards

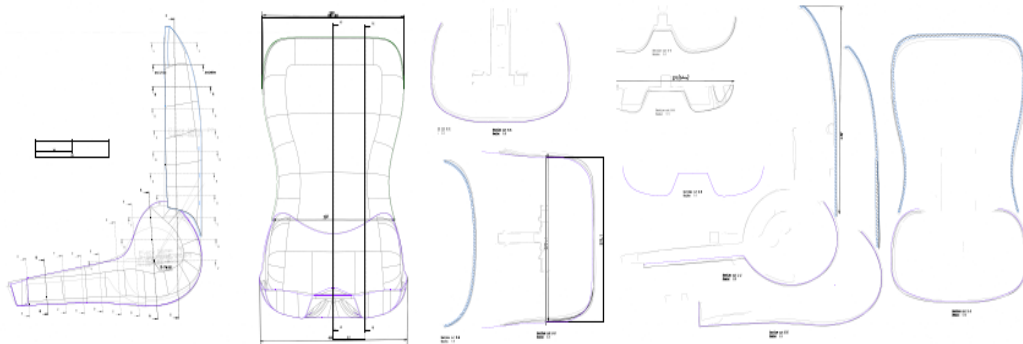
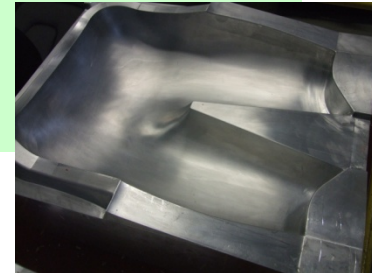
3. Activities



2. Precise Equipment

HPM:

- ✓ CAD
- ✓ Moulds
- ✓ Parts
- ✓ Rework of metal parts to fulfil DILEMMA specifications
- ✓ New reference HPM mounted and ready for measuring
- ✓ Additional clones ready



Not a new HPM, but modified to fulfil specifications with reduced tolerances!

New HPM and HRMD Standards

4. Benefits



Precise Equipment

HPM and HRMD need a rework to reduce tolerances in shape, dimensions and positions.




HPM and HRMD that fulfil DILEMMA/HCD and SAE J826


A photograph of a red HPM (Human Performance Machine) and HRMD (Human Response Measurement Device) equipment. The HPM is a red, reclining seat with a control panel. The HRMD is a vertical metal frame with a spherical sensor head. Both images have a small "LEAR" logo in the bottom left corner.

Calibration

A proper calibration device and procedure to ensure quality over time.



DILEMMA/HCD Standard

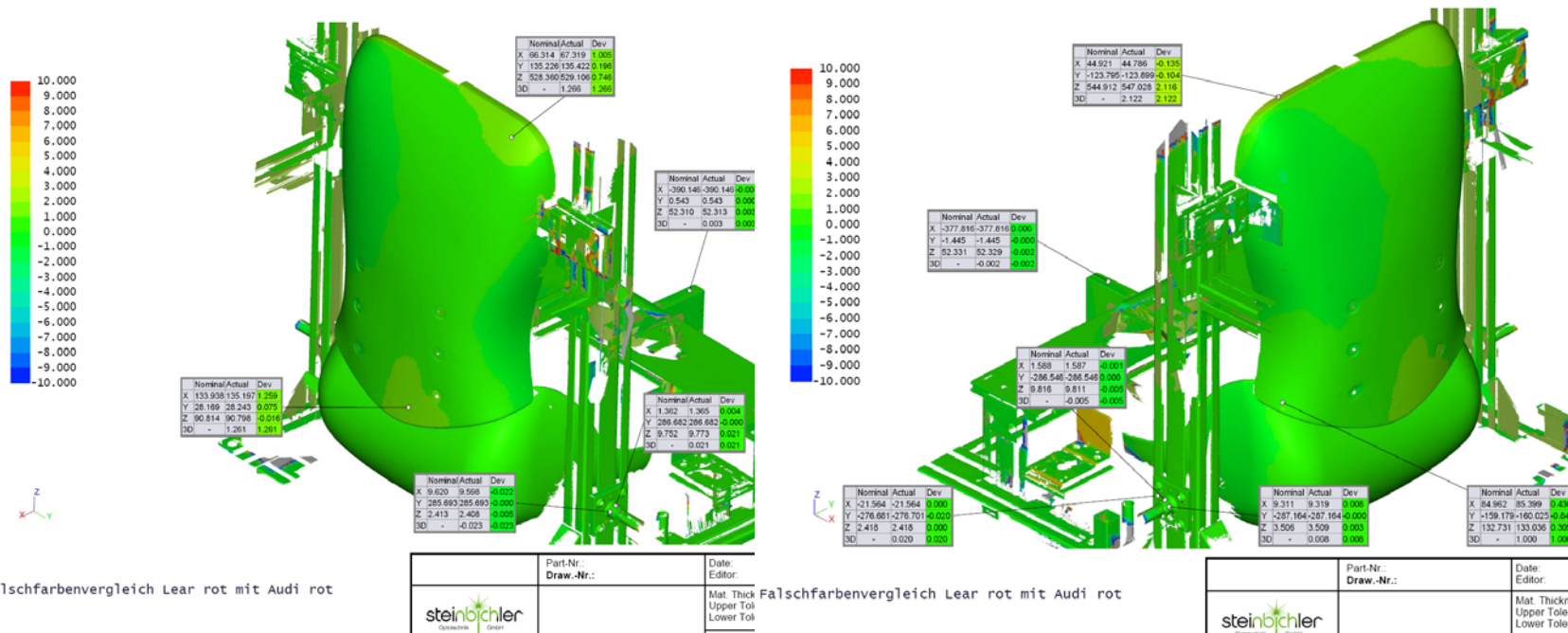
A photograph of a HRMD (Human Response Measurement Device) calibration equipment, showing a vertical metal frame with a spherical sensor head. The image has a small "LEAR" logo in the bottom right corner.

New HPM and HRMD Standards

4. Benefits



Two new HPM's calibrated with new shells:



Falschfarbenvergleich Lear rot mit Audi rot

Part-Nr.:	Date:
Draw-Nr.:	Editor:
Mat. Thick Upper Tol:	
Lower Tol:	

Falschfarbenvergleich Lear rot mit Audi rot

Part-Nr.:	Date:
Draw-Nr.:	Editor:
Mat. Thick Upper Tolera:	
Lower Tolera:	

Before: maximum deviation > 9 mm over all and > 6 mm for the shells only!

With three different HPM's of old design up to 40 mm variation in backset

After: max. deviation < 1.5 mm over all and < 1mm for the shells only!

With three different red HPM's 4 mm variation in backset

New HPM and HRMD Standards

5. Feedback



VDA (German Automotive Industry):
„We will release this as a VDA standard soon.“

ADAC: *„We want a red HPM.“*

Thatcham: *„The DILEMMA calibration could be the GLORIA II.“*

GO-Design: *„Every big seat manufacturer wants reworked HPM's and they are impressed about the quality. 17 HPM's changed until end of 2009“*

AZT Allianz: *„We want this calibration and the new shells.“*

Audi: *„We are impressed about the tight tolerances.“*

VW/Audi/Seat/Skoda: *„This will be our new group standard.“*
Audi: complete changed; VW: changed until end of 2009

LEAR: *„European plants almost complete changed.“*

Faurecia: *„We compared two red HPM's and measured only 0,5 mm diff., changed until end of 2009“*