WS-1-1

NHTSA International Dummy Meeting

Washington DC

November 5, 2009

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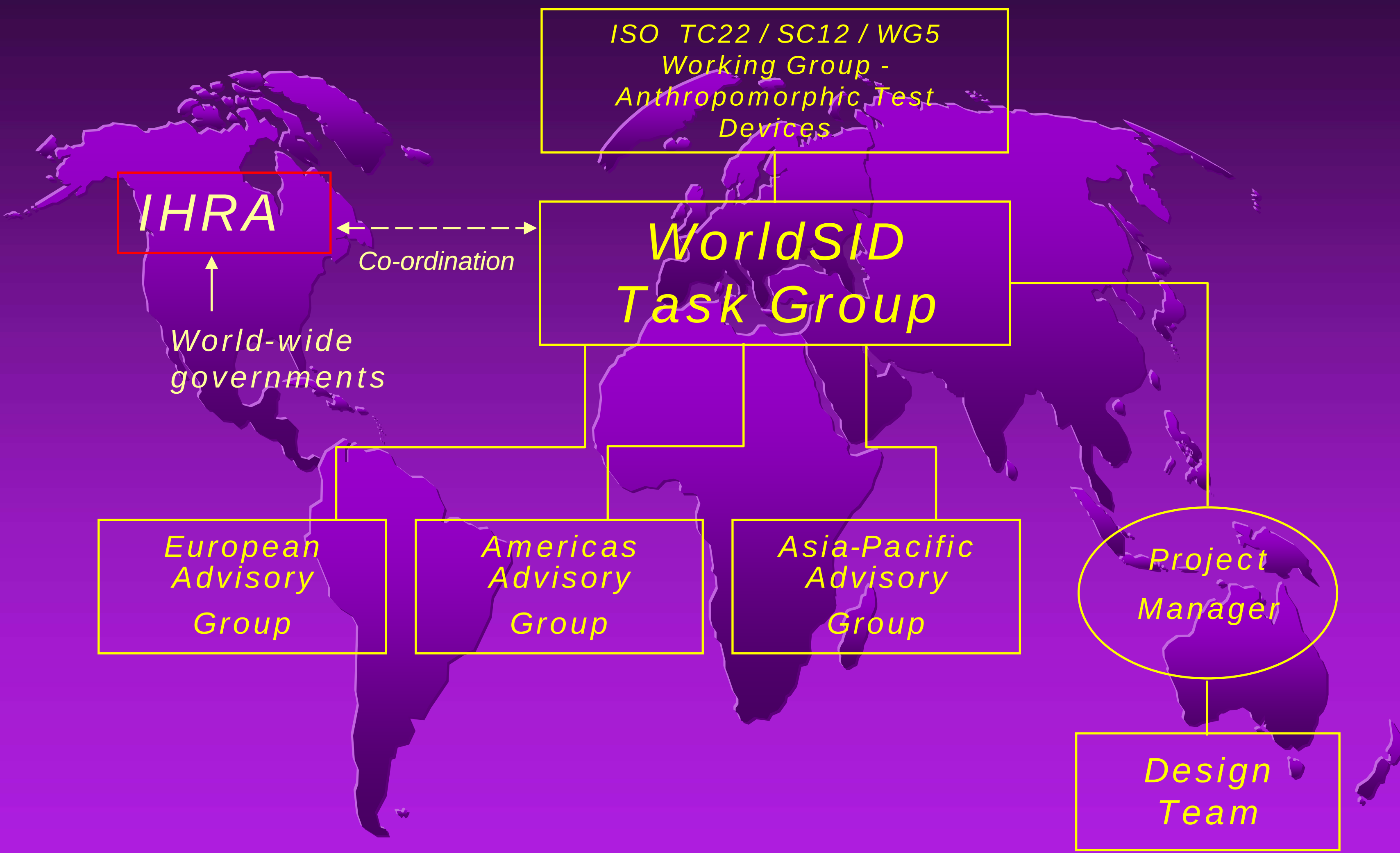
A New Advanced Side Impact Dummy

Project Organisation



Design Targets

- 50th percentile, adult male dummy anthropometry

Standing height:	1753 mm
Seated height:	911 mm
Mass:	77,3 kg

- Biofidelity to be rated “good“ to “excellent“ on ISO side impact dummy rating scale
- Symmetrical behaviour (left / right)
- Impact performance ± 30°

WorldSID Development - History / Schedule

- Jun. 1997 — Resolution by ISO/TC22/SC12/WG5 – establishing a task group, chaired by Tri-Chair Committee
- Sep. 1999 — Final set of specifications/design targets
- Jun. 2000 — Prototype design signed-off
- Sep. 2000 — First assembly
- Dec. 2000 — Prototype demonstration
- Oct. 2002 — Pre-production version - design freeze
- Nov. 2002 — Manufacture of 11 pre-production dummies
- Dec. 2002 — End of prototype prelim. evaluation (> 400 tests)
- Apr. - July2003 — Delivery of 11 pre-production dummies
Start of WorldSID world wide evaluation --
- Feb. 2004 — Production version - design freeze
- Mar. 2004 — Release of production version
- Aug. 2008 — NHTSA WorldSID biofidelity evaluation
- May 2009 — Introduction of multi-point sensing

ISO - WorldSID 50th Evaluation

- WorldSID Biofidelity rating according to ISO TR9790
- WorldSID Testing conducted by OSRP, Transport Canada, and NHTSA
- WorldSID Task Group and NHTSA conducted similar sled tests
  - Data is similar between the two organizations
  - Calculated ISO biofidelity rating using ISO data and NHTSA data

ISO - WorldSID 50th Evaluation

Biofidelity Rating according to ISO TR9790

- Comparison of ES-2re vs WorldSID

unacceptable *marginal* *fair* *good*
excellent

0 | 2.6 | 4.4 | 6.5 | 8.6 | 10

Body Region	ES-2re	WorldSID Ford (OSRP)	WorldSID NHTSA/VRTC
Head	5	10	10
Neck	4.2	5.3	5.5
Shoulder	4.5	10	8.3
Thorax	4.0	8.2	7.5
Abdomen	4.1	9.3	7.3
Pelvis	3.2	5.1	4.8
Overall	**4.2**	**8.0**	**7.2**

"GOOD"

Collaborators:

WorldSID Contributors

AAM	Honda	Porsche
AAMA	INRETS	PSA
ACEA	ISO	Renault
Autoliv	JAMA	SIBER*
Audi	JARI	TNO
BAST	JMLIT	Toyota
BMW	LAB	Transport Canada
CEESAR	Lear	TRC
DaimlerChrysler	MIRA	TRL
DOTRS	NHTSA	TRW
FIAT	Nissan	Volvo
Ford	OSRP	VRTC
GM	PDB	VW

*EC Sponsored

The Benefits of Collaboration

- The collaboration of industry & governmental organizations worldwide has made it possible to:
  - Conduct extensive testing & evaluation;
  - Prepare drawings and user manual
- Collaboration continues through ISO to facilitate the development of pertinent risk curves for each body injury measure; and
- Develop a practical seating procedure that can be used in the world market.

The Benefits of Collaboration

International collaboration encourages industry involvement and increases funding opportunities.

For example:

- Proposal under consideration by ACEA to fund the development of injury risk curves for the WS 5th;
- Toyota contribution to arm biofidelity research;

WorldSID Development of Injury Risk Curves

1. In depth literature review of PMHS data
2. Defined the criteria for the selection of appropriate PMHS data for the construction of the injury risk curves
3. Scaled the PMHS data to account for the differences of anthropometry between the PMHS and the 50th percentile dummy

WorldSID Development of Injury Risk Curves cont'd

4. Adjusted the scaled data to account for the influence of age on the injuries;
5. Collated all WorldSID 50th test results;
6. Constructed the injury risk curves by pairing the scaled WorldSID data adjusted to the PMHS injuries, using the methods commonly used in the literature

Published in the Stapp Car Crash Journal (2009)

Guidelines for selection of IRC construction method(s)

1. Description of commonly used methods and their underlying assumptions;
2. Definition of dataset characteristics; For example, boundary conditions, censoring, injury mechanisms
3. Design of decision tree to match dataset characteristics with most appropriate method(s);
4. Application to biomechanical dataset to evaluate and validate the process.
5. Reality check

Further Activities

ISO:

- Development of methodology for the selection of injury risk curves for WorldSID 50th Male;
- Revision of ISO TR9790
- Evaluation of WS 5th
- Preparation of ISO documentation for WS 5th

Other Activities

TRANSPORT CANADA:

- Evaluation of multipoint sensing (RibEye) in WorldSID 50th and SIDIIs;
- Evaluation of advanced on board data acquisition to use with RibEye;
- Biofidelity evaluation of updated WorldSID 5th Female;
- Evaluation of updated WorldSID 5th Female in full scale reconstruction of a pole crash.

WS 50th Activities by Transport Canada

Evaluation of multipoint sensing (RibEye)

- Completed 5 triplicate FMVSS 214 pole tests comparing WS 50th / WS 50th Rib Eye / ES2 RE in the driver position;
- Completed 5 paired car-to-car tests comparing WS 50th / WS 50th Rib Eye
- Complete 1 paired FMVSS 214 of WS 50th RibEye in a vehicle with and without seat mounted airbag.

WS 5th Activities by Transport Canada

- Completed the partial biofidelity evaluation of updated WorldSID 5th Female;
- Completed the evaluation of updated WorldSID 5th Female in full scale reconstruction of a pole crash;
- Completed 1 triplicate FMVSS 214 comparison of WS 5th/ SIDIIs/ SIDIIs RibEye
- May complete 3 paired IIHS barrier tests SIDIIs RibEye/ WS 5th

WorldSID

Thank you !

www.worldsid.org