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# Update on the WorldSID injury risk curves

on behalf of ISO/WG6 and ACEA-TFD

GRSP WorldSID Informal Group  
26th of October, 2011  
Seoul

# WorldSID 50th injury risk curves

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➤ **During the last GRSP meeting, it was indicated that:**

- the injury risk curves as a function of commonly used measurements dedicated to the WorldSID 50th based on the methodology developed in the TR12350 were available
- A set of injury risk curves dedicated to the WorldSID 50th among those available should be **recommended**, including the recommendation of :
  - the AIS level
  - the dummy measurement more appropriate to predict the risk of injury

# WorldSID **50th** injury risk curves

## ➤ Currently under discussion:

➤ During the September ISO/WG6 webex meeting, **a set of injury risk curves was selected**

➤ Following the guidelines to build the injury risk curves (ex: recommandation of the survival analysis)

➤ Among those built with commonly used measurements and with several AIS levels (built in ISO/WG6)

➤ Based on statistical results and engineering judgment

➤ *Shoulder injury risk AIS2+ as function of shoulder force (no AIS3 test)*

➤ *Thoracic skeletal risk AIS3+ as a function of the maximum thoracic and abdomen rib deflection*

➤ *Abdomen risk AIS2+ as a function of the maximum abdomen rib deflection (only 1 AIS3 test)*

➤ *Pelvis risk AIS2+ and 3+ as a function of the maximum pubic force*

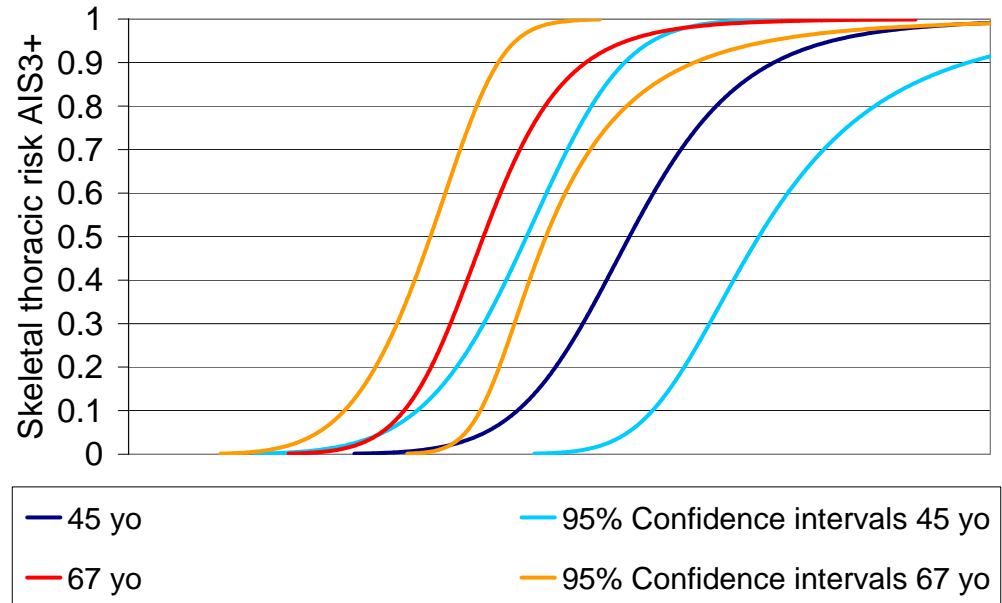
**Preliminary**

# WorldSID 50th injury risk curves

## ➤ Currently under discussion:

- The injury risk curves were proposed to be **released**
  - at **45** year old (target age of the occupant to protect)
  - and at **67** year old (age closer to those of the PMHS → more information available → confidence in the curves is more important)

- The injury risk curves were proposed to be released with a **quality index**
  - The quality index is better at 67 yo than at 45 yo



- Another ISO/WG6 webex meeting (25th of October) was set up to **collect the comments and suggestions**

# WorldSID **50th** injury risk curves

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## ➤ Next steps:

- Reach the **consensus** on the set of injury risk curves (target date: ISO/WG6 face to face meeting is November)
- **Update the TR12350** accordingly
- Vote within ISO on the **publication** of the TR12350

# WorldSID **5th** injury risk curves

1st step: SCALED TEST CONFIGURATIONS

- The **scaling of the conditions** of the tests used to build the injury risk curves was the **main current task** since the last GRSP meeting
- **Progress** has been made during the three last **webex meetings**
  - Experts from car industry, universities, international institutions... participated
  - **Consensus is close** on the scaled test configurations
  - A document describing the scaled test configurations as agreed during the ISO/WG6 webex meetings will be made available for **final agreement**

↓  
November 2011

# WorldSID **5th** injury risk curves

2nd step: TESTING

- The list of the test configurations used to build the injury risk curves was presented during ISO/WG6 webex meeting
- Most of the test configurations will be reproduced by VRTC/NHTSA and TRL
- Testing to be performed by ACEA, OSRP, MCW... might also be used (TBD when the test matrix from these labs is finalized)



Start: November 2011  
End: December 2012?

# WorldSID 5th injury risk curves

## TR12350 SHOULDER IMPACTOR TESTS

2nd step: TESTING

Impactor	Number of PMHS	Impactor speed (m/s)	Laboratory performing the test
Bolte shoulder impactor tests (lateral)	14	4.5	VRTC
	4	6	VRTC
Bolte shoulder impactor tests (15° forward)	4	4.5	VRTC
Bolte shoulder impactor tests (30° forward)	4	4.5	VRTC
	2	7.5	VRTC
INRETS shoulder impactor tests (lateral)	12	1.5	TRL
	5	3.5	TRL
	2	6	TRL
INRETS shoulder impactor tests (oblique rearward)	7	1.5	TRL
INRETS shoulder impactor tests (oblique forward)	8	1.5	TRL
WSU	12	4.5	TRL
ISO/TR9790 shoulder impactor test 1 (APR)	3	4.5	VRTC, TRL



# WorldSID 5th injury risk curves

## TR12350 THORAX IMPACTOR TESTS

2nd step: TESTING

Impactor	Number of PMHS	Impactor speed (m/s)	Laboratory performing the test
ISO/TR9790 thorax impactor test 1 (HSRI)	19	0.9	TRL
	4	4.3	VRTC, TRL
	1	6.1	TRL
Shaw thorax impactor tests (lateral)	4	2.5	VRTC
Shaw thorax impactor tests (30° forward)	4	2.5	VRTC
WSU/GM thorax impactor tests (30° forward)	1	6	TRL
	1	8.7	TRL (if impact speed is achievable)
UMTRI thorax impactor tests (lateral, without pad)	1	2	TRL
UMTRI thorax impactor tests (lateral, with 0.5 cm thick pad)	5	2	TRL (if padding available)
	2	8.5	TRL (if impact speed is achievable)
UMTRI thorax impactor tests (lateral, with 10 cm thick pad)	1	2	TRL
	2	8.5	TRL (if impact speed is achievable)

# WorldSID 5th injury risk curves

## TR12350 ABDOMEN AND PELVIS IMPACTOR TESTS

2nd step: TESTING

ABDO IMP

PELVIS IMP

Impactor	Number of PMHS	Impactor speed (m/s)	Laboratory performing the test
WSU/GM abdomen impactor tests (30° forward)	1	10	
OSU abdomen impactor tests	2	6	
	3	9.5	
	2	11	
WSU/GM pelvis impactor tests (lateral)	6	5	TRL
	3	7	TRL
	5	10	TRL (if impact speed is achievable)
UMTRI pelvis impactor tests (lateral) (12.6 kg, 2.5 cm styrofoam)	2	24	
UMTRI pelvis impactor tests (lateral) (12.6 kg, 2.5 cm styrofoam + 2.5 cm ensolite)	2	10	
UMTRI pelvis impactor tests (lateral) (12.6 kg, 5 cm styrofoam + 2.5 cm ensolite)	1	20	
UMTRI pelvis impactor tests (lateral) (12.6 kg, 2.5 cm styrofoam + 7.5 cm ensolite)	1	26	
UMTRI pelvis impactor tests (lateral) (15.7 kg, without padding)	2	6	

# WorldSID 5th injury risk curves

## TR12350 PELVIS IMPACTOR TESTS

2nd step: TESTING

Impactor	Number of PMHS	Impactor speed (m/s)	Laboratory performing the test
UMTRI pelvis impactor tests (lateral) (15.7 kg, 0.5 cm ensolite)	1	8.4	TRL
UMTRI pelvis impactor tests (lateral) (15.7 kg, 1.3 cm styrofoam+ 2.5 cm ensolite)	1	8.4	TRL (if impact speed is achievable)
UMTRI pelvis impactor tests (lateral) (15.7 kg, 2.5 cm styrofoam+ 2.5 cm ensolite)	1	8.6	TRL (if impact speed is achievable)
UMTRI pelvis impactor tests (lateral) (35.2 kg, without padding)	7	6	TRL
UMTRI pelvis impactor tests (lateral) (35.2 kg, 2.5 cm ensolite)	2	5.5	TRL
INRETS pelvis impactor tests (lateral) (14.7 kg)	10	3.5	
INRETS pelvis impactor tests (lateral) (14.7 kg)	10	6	
INRETS pelvis impactor tests (lateral) (7.6 kg)	6	11	
INRETS pelvis impactor tests (lateral) (10.1 kg)	5	11	
ISO/TR9790 pelvis impactor test 1 (ONSER)	6	5-7	VRTC
	16	7-9	
	15	9-11	
	6	11-13	
	2	13-15	

# WorldSID 5th injury risk curves

## TR12350 SLED TESTS

2nd step: TESTING

Impactor	Number of PMHS	Mean PMHS speed relative to the wall (m/s)	Laboratory performing the test
Heidelberg, rigid flat	1	8.2	TRL
WSU, rigid flat	2	5.9	VRTC, TRL
WSU, rigid flat	2	8.4	TRL
WSU, rigid pelvis offset	3	9.2	TRL
MCW, rigid flat	8	5.9	VRTC, TRL
MCW, rigid flat	9	8.3	TRL
MCW, rigid thorax offset	4	6.3	TRL
MCW, rigid abdomen offset	2	6.4	VRTC, TRL
MCW, rigid pelvis offset	4	6.2	VRTC, TRL
MCW, rigid pelvis offset	1	8.0	TRL
MCW, padded flat	4	5.5	VRTC
MCW, padded flat	11	8.4	
MCW, padded pelvis offset	4	6.4	

# WorldSID **5th** injury risk curves

- The **construction of the injury risk curves** dedicated to the WorldSID 5th will start when the test results will be available
  - The analysis will be made
  - The scaled dummy responses will be paired with PMHS injuries
  - The injury risk curves will be built according to the guidelines proposed by ISO/WG6
  - The TR12350 will be updated

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Early 2013?

3rd step: INJURY RISK CURVES

Thank you for your attention

Questions?



ACEA

European Automobile Manufacturers Association

