WorldSID 50M.

PSI-03-11

BMW Group

WorldSID 50M.

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Open questions

- Which method and variables will be used to generate the IRC (ISO WG6 has decided to use the Survival Method)? → NHTSA, …
- Is there a quality criteria (data basis, best fit, …) to be fulfilled before the IRC are used?
- Which AIS will be addressed?
- Which risk of injury will be addressed?
- Which age will be considered for the IRC construction?
- Which body regions are addressed by the injury criteria?

Open questions will be addressed at the next WebEx meeting of experts working on the IRC for WS05F.

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Injury criteria in current protocols

Body Region	Protocol	
	FMVSS 214	ECE R95
Head	HIC	HIC
Shoulder	-	-
Thorax	Displacement	Displacement
	-	V*C
Abdomen	Force	Force
Spine	Acceleration	-
Pelvis	Pubic Force	Pubic Force
	-	Acceleration

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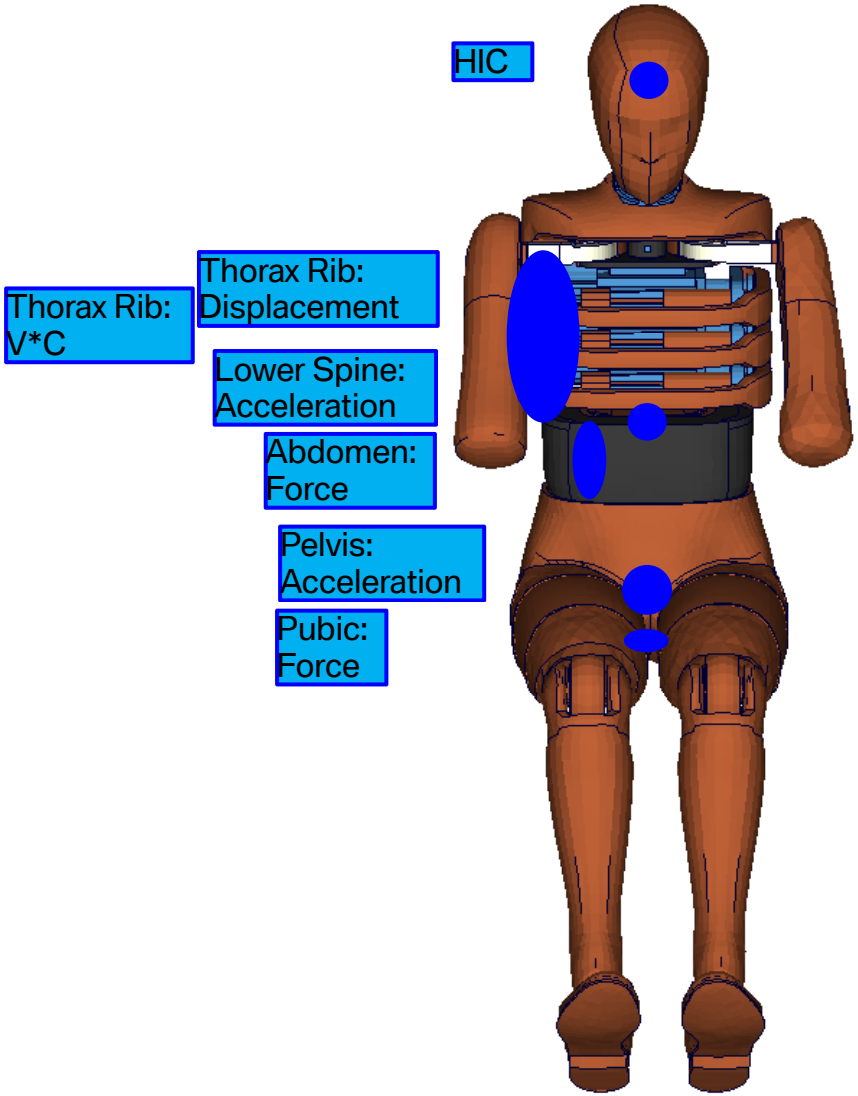
Injury criteria used with ES2re



Body Region	Injury Criteria
Head	HIC
Shoulder	-
Thorax	Displacement
	V*C
Abdomen	Force
Spine	Acceleration
Pelvis	Pubic Force
	Acceleration

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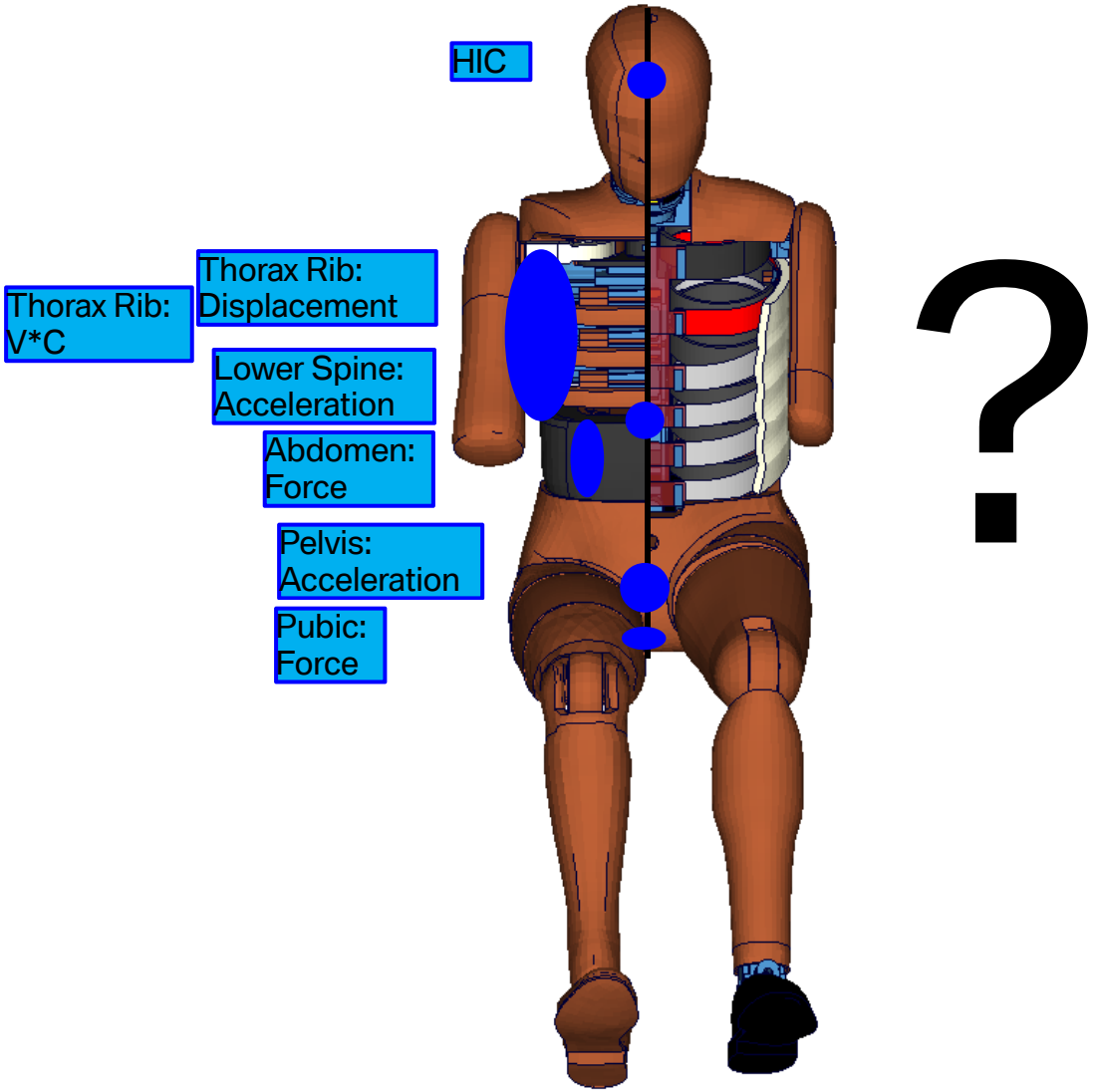
Injury criteria WorldSID 50M



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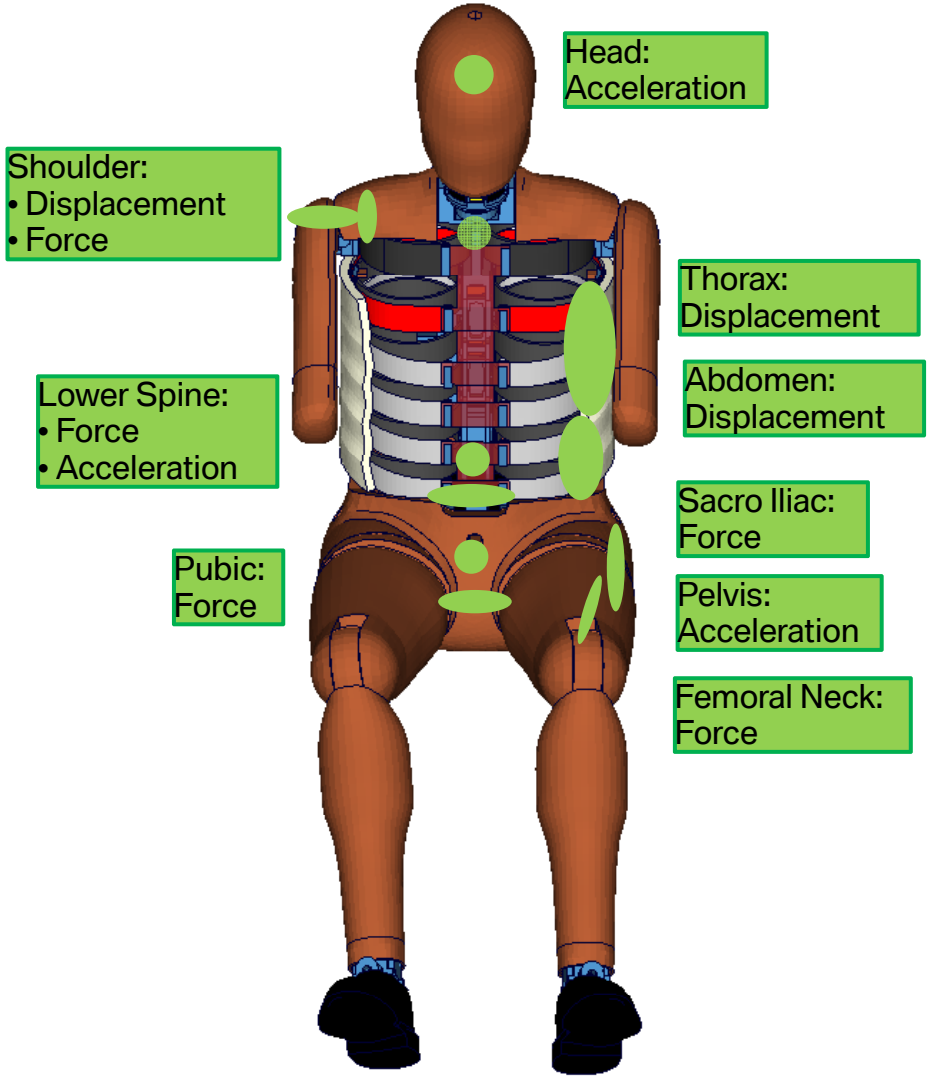
Measurement capabilities WorldSID 50M



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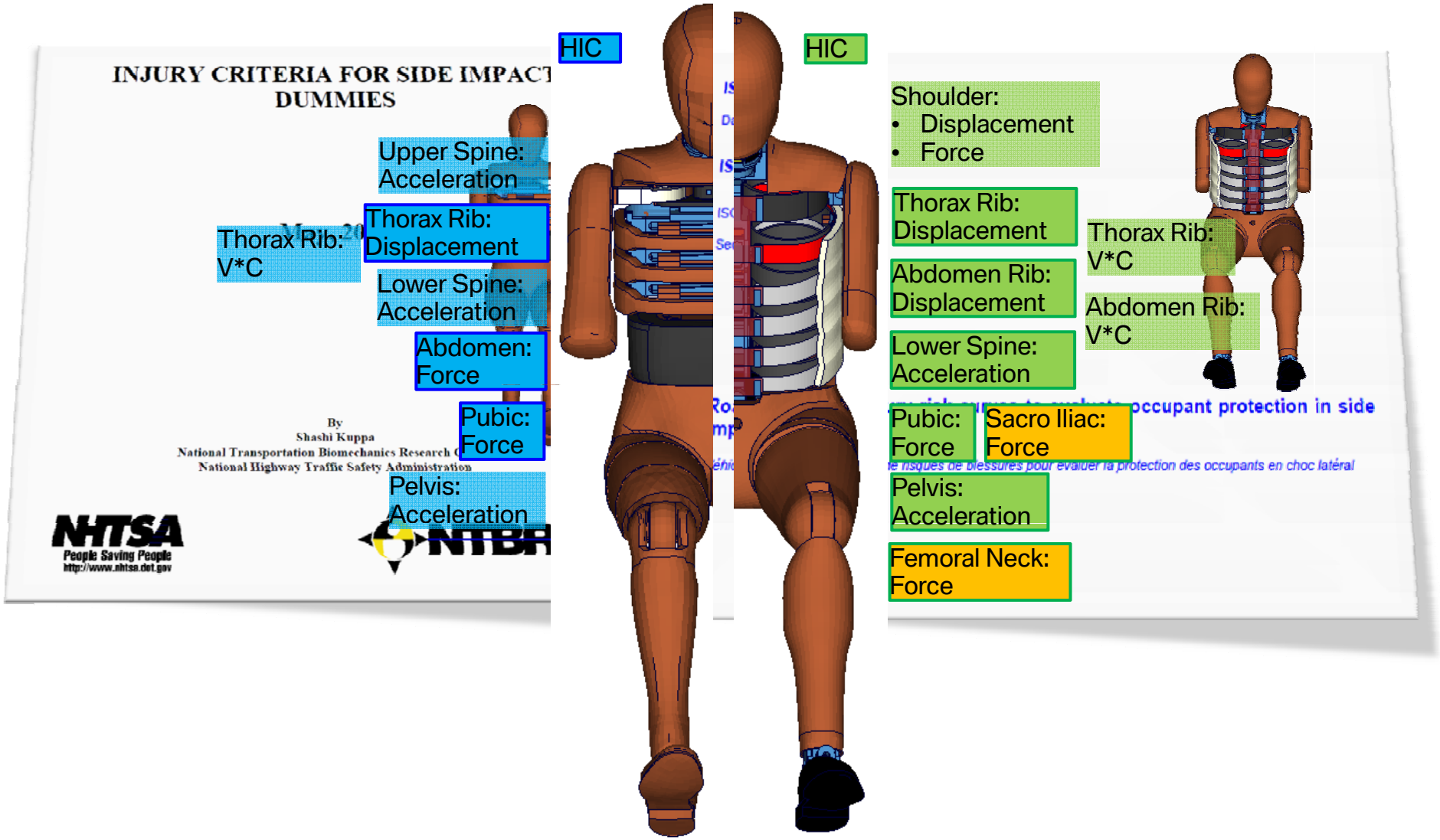
Preliminary Injury Thresholds for WorldSID 50M



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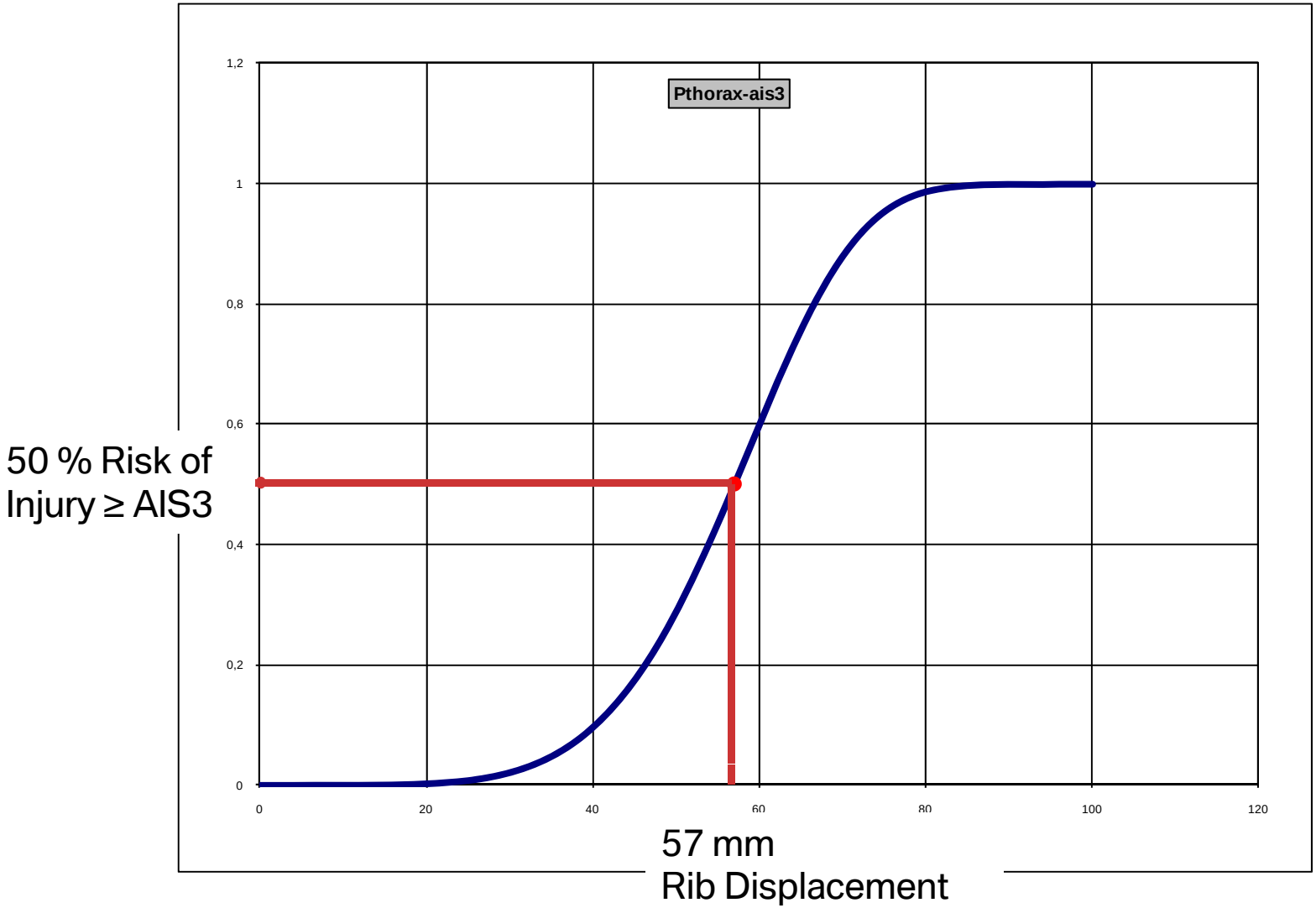
Preliminary Injury Thresholds for WorldSID 50M

Assumption: 50% injury risk AIS3+ is used in regulation



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Preliminary Injury Thresholds for WorldSID 50M

		Risk of Injury		
		50% >=AIS 3		
	* as used in FMVSS214	ES2 RE *	WS 50 *	* Survival Method (Weibul)
Shoulder	Deflection	-	65 mm	AIS2
	Force	-	2560 N	AIS2
Thorax	Displacement	44 mm	57 mm	
	V*C	-	0,82	
Abdomen	Displacement	-	92 mm	
	V*C	-	1,64	
	Force	2800 N	-	
Lower Spine	Acceleration	80 g	75 g	
Pelvis	Pubic Force	7000 N	3120 N	
	Acceleration	-	111 g	

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Preliminary Injury Limits for WorldSID 50M

How to proceed?

No final agreement on guidelines for building up IRC in the last meeting of ISO WG6. An agreement must be reached before any recommendation can be made. (next face2face meeting 11/2011)

Open questions will be addressed at the next WebEx meeting of experts working on the IRC for WS05F.

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Preliminary Injury Limits for WorldSID 50M

		Risk for a 45 year old person								
		AIS2+			AIS3+			AIS4+		
Body region	**Criterion**	5%	25%	50%	5%	25%	50%	5%	25%	50%
Shoulder	Maximum shoulder rib deflection (mm)	**39.1**	**57**	**69**						
	Maximum shoulder force Y (N)	**1705**	**2278**	**2640**						
Thorax	Maximum thorax and abdomen rib deflection (mm)				40.6	50.6	57.6	73.5	101.3	126.7
	Maximum thorax and abdomen rib VC (m/s)				0.17	0.47	0.79	1.31	2.6	4.21
Abdomen	Maximum abdomen deflection (mm)	60	72.4	79.8	101.1	160.5	221.4			
	Maximum abdomen VC (m/s)	0.92	1.27	1.47	2.08	4.2	6.83			
	Lower spine acceleration 3ms (m/s^2)	488	632	721	**673**	**848**	**995**			
Pelvis	Maximum pubic force (N)	1842	2825	3644	2231	2957	3414			
	Pelvis acceleration 3ms (m/s^2)	505	817	1042	924	1469	1860			

All data for the age adjusted risks are calculated by regression on age and the distribution assumption with the best model fit (based on the AIC value)

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