

Informal document **GRSP-51-34**
(51st GRSP, 21 - 24 May 2012,
agenda item 20)

51st GRSP Session

Draft new Regulation on child restraint systems

Pierre CASTAING

Terms of Reference for Phase 2 and Phase 3

1. The informal group shall consider in Phase 2, the development into the new draft Regulation for "enhanced Child Restraint Systems used on-board of motor vehicles" of the necessary amendments to integrate the category of non-integral CRS with ISOFIX attachments and to extend the I-size concept to these CRS for consideration by GRSP.
- 2. The completion date for Phase 2 shall be targeted for the fifty-first session of GRSP (May 2012).**
3. Phase 2 will develop definitions, performance criteria and test methods for non-Integral CRS with ISOFIX attachments (Restraint done for the adult safety belt).
4. In Phase 2, the test pulse for frontal impact (Increased severity and CRS integrity check) will be reviewed in the light of recent accident data.
5. In Phase 2, the strict application of recognized and accepted injury criteria related to the new generation baby/child crash test Q-dummies, as supported through the European Enhanced Vehicle-safety Committee (EEVC) and other EU research programs, will be reviewed in the light of recent accident data.
- 6. Develop transitional provision to withdraw ISOFIX application from Regulation No. 44 after WP.29 adopts Phase 1 and Phase 2.**
- 7. The completion date for Phase 3 shall be targeted for the fifty-third session of GRSP (May 2013).**
8. Phase 3 will develop the necessary amendments to upgrade Regulation No. 44 for the Seatbelt mounted CRS and Regulation Nos. 14 and 16 in order to introduce for this category of CRS the outcome of Phase 1 and 2.
9. The informal group will considers among others things, the technical expertise of EEVC working group 18 (WG.18), EEVC WG12, ISO TC22/SC12, the new program for the assessment of child-restraint systems (NPACS), the child advanced safety project for European roads (CASPER) as well as the results of the discussions held in the informal group and at GRSP.
10. If necessary, the informal group shall develop complementary test methods and propose alternative judgment criteria.
11. Consider appropriate measures to limit misuse of child restraint systems, in particular for children less than 15 months of age.

Extended Mandate

- The IWG asks GRSP to extend the mandate until the end of 2014
 - Draft regulation for phase 2 (May 2013)
 - Development of transitional provision to withdraw ISOFIX application from ECE R44 (December 2013)
 - Draft regulation for phase 3 (May 2014)

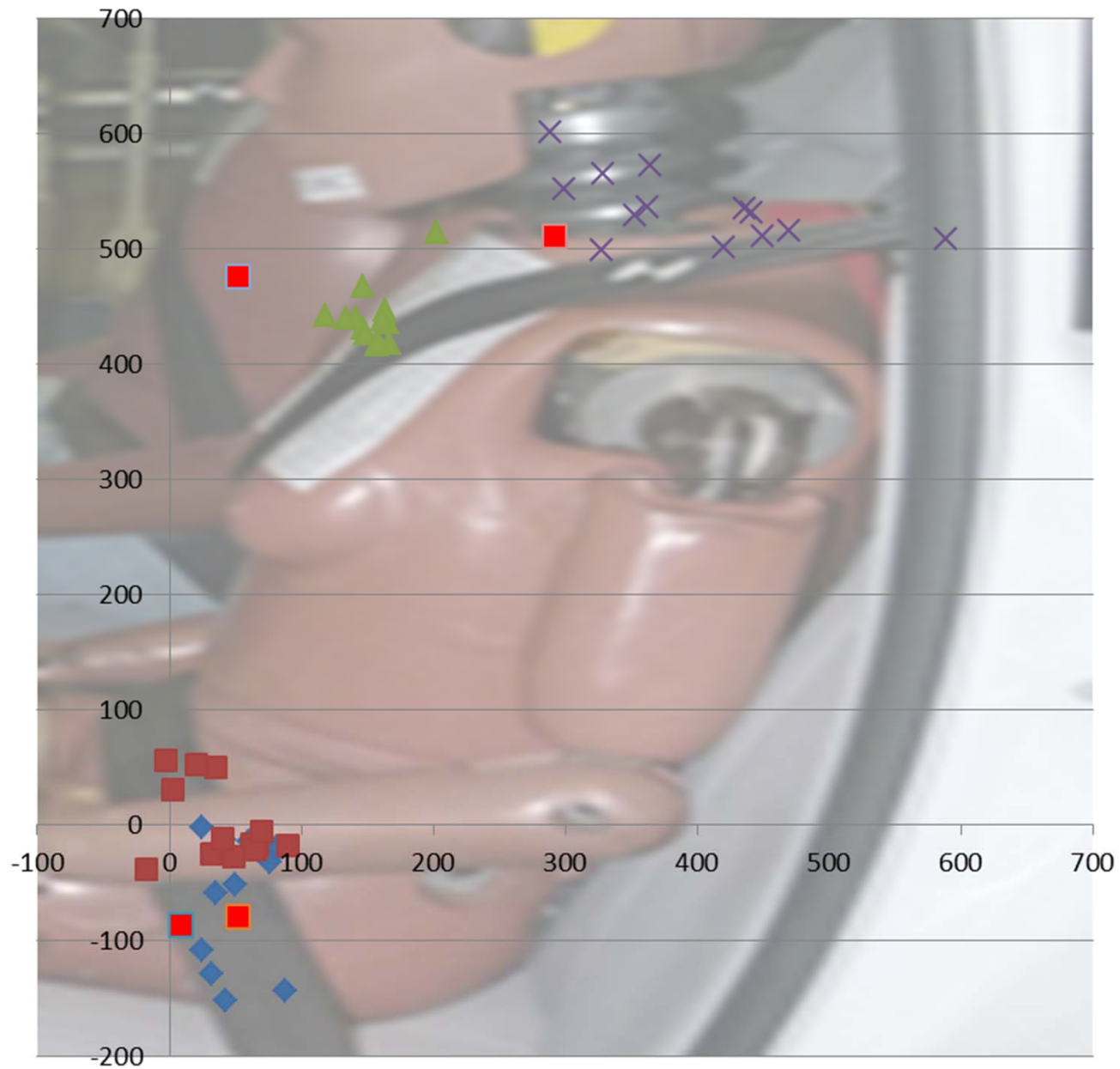
Meetings

- 01 February 2012 at EC – Brussels
- 11 & 12 April 2012 at CCFA – Paris
– Special dummies meeting on the 12
- 06 June 2012 at OICA – Paris
- 30 August 2012 at ACEA - Brussels

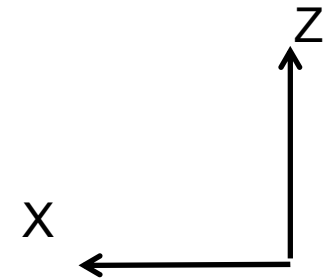
Work on progress

- Defines common interface on current vehicle fleet
 - UTAC study to define a reference belt routing using 5th female dummy

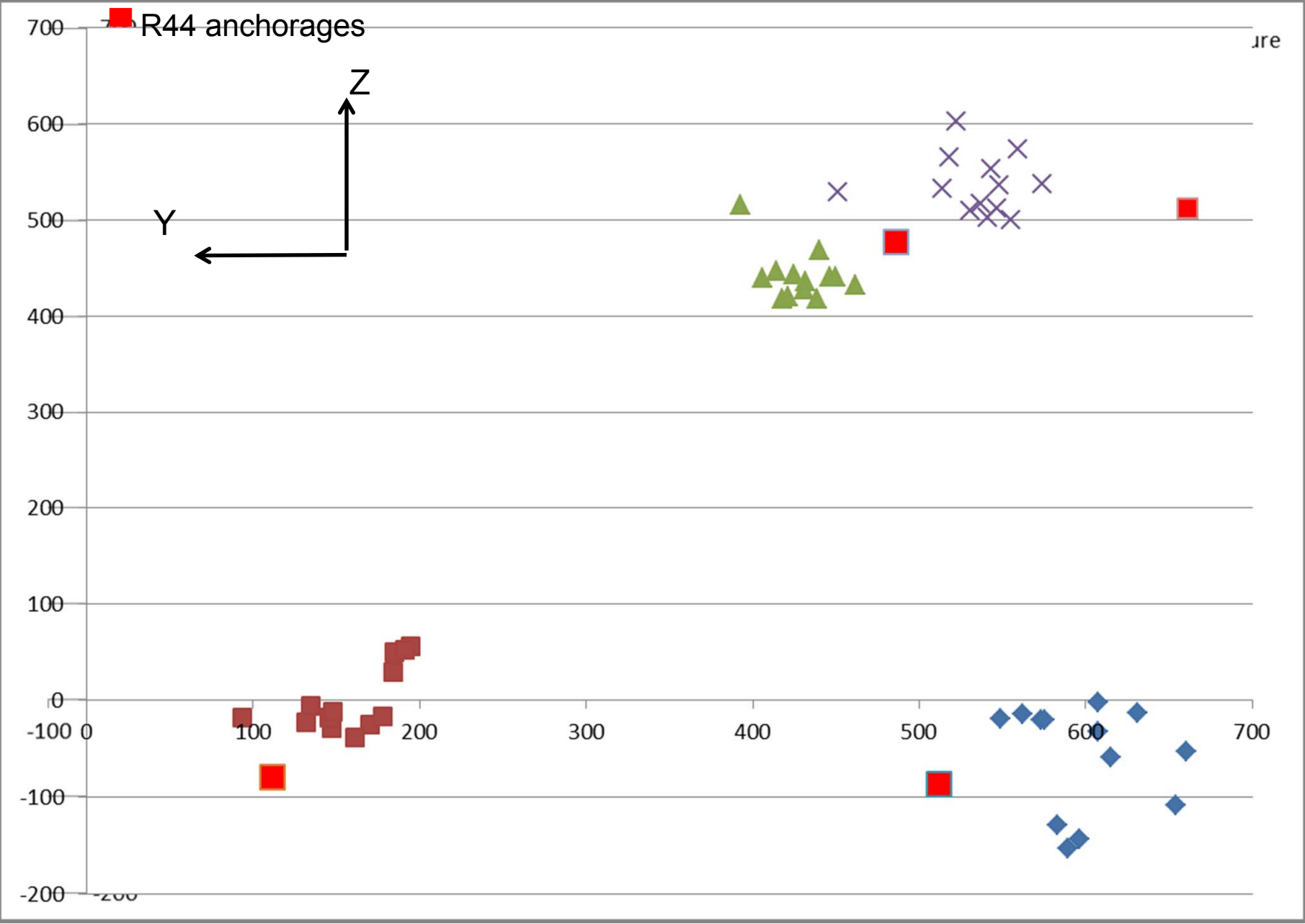




- ◆ Points Bas Fixation Ceinture
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■ R44 anchorages



Work on progress

- Accident analysis focusing on booster
 - CASPER Program reporting on boosters cushions and boosters seats available data (field and tests)
- « ISOFIX » Booster seats - Recent data from the field
 - Extracts from the first roadside survey of child restraint system use and misuse in Belgium

Accident data : Conclusions

- The protection of the abdomen is one of the priorities to improve the situation of restrained children in cars when restrained the seatbelt (with and without CRS)
- Abdominal injuries occur often on organs located relatively high in the abdomen (liver and spleen) = likely due to submarining or diagonal belt excessive loading
- Misuse is expected to increase the risk of abdominal injury (direct loading to the abdomen, increased risk of submarining, etc)
- Extra analysis:
 - appropriate/inappropriate use (what is the limit to be considered); misuse
 - side impact – Left vs right (corrolate with organ injuries)

Summary of roadside survey

- Injury risks on the abdominal segment booster cushions and booster seats is higher than in harness systems and close to the one of seatbelt use only. ISOFIX CRS shows a global reduction of rate of misuse including booster seats (no technical reason found for that) In our matrix 3 important factors generator of abdominal injury :
 - Belt under the arm
 - Belt over the horn of the CRS
 - “Far relax” position Booster connected with ISOFIX rigid anchorages does not show better results than when not connected (*only one test performed*)
- Lots of tests show us that the weakest part of the Q6 dummy is the abdomen and the abdominal sensors seem to be a good predicting tool to evaluate abdominal injury risk.
- The main criterion is the correct routing of the seatbelt !
- Tests prove that the “additional seatbelt positioner device” amplify the risk of submarining through a poor positioning of the belt on the abdomen.

Work on progress

- Child Dummy Subgroup
 - Validation of the drawing packages for Q0, Q1, Q1,5, Q3 dummies

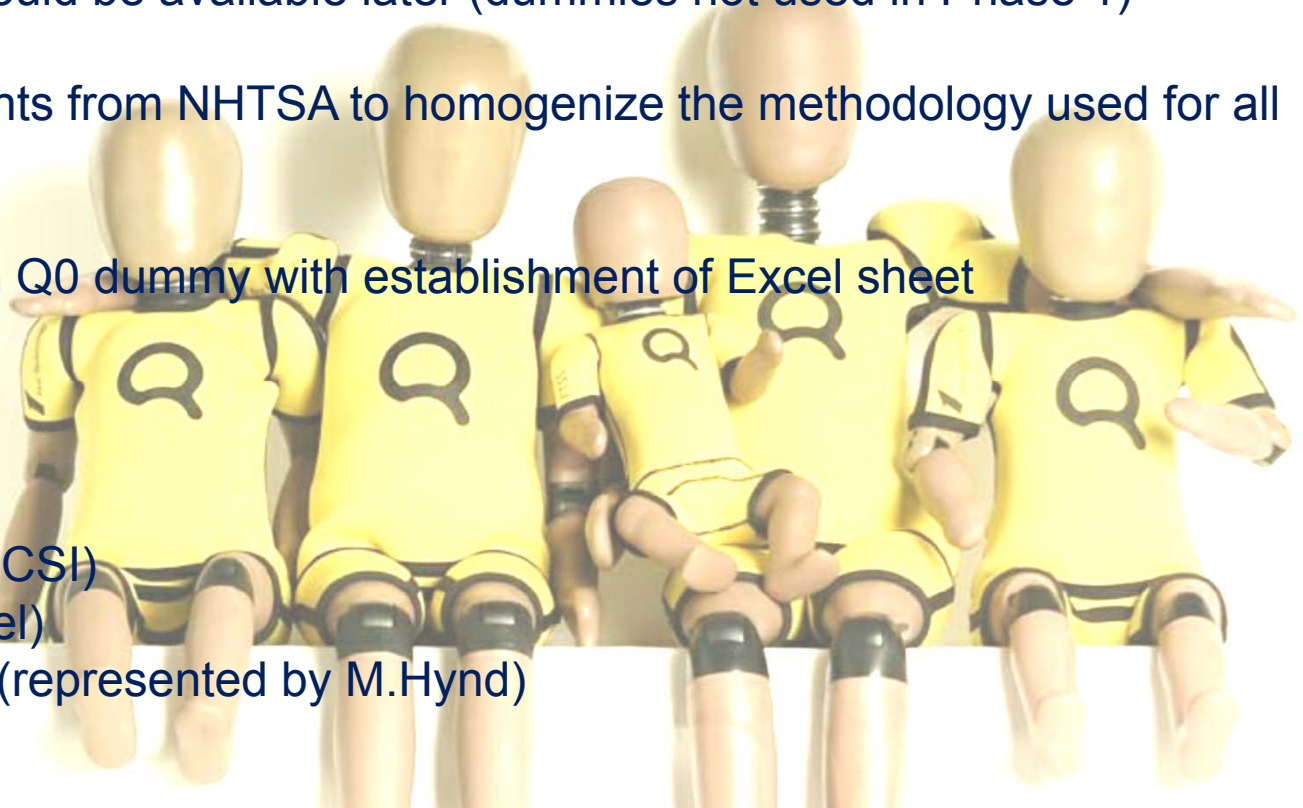
1- First meeting on April, the 12 in Paris

2- Representatives of laboratories from Germany/France/Italy/Japan/Spain/UK/US
+Humanetics

3- Data available for Q0 / Q1 / Q1 ½ /Q3

4- Data for Q6 and Q10 should be available later (dummies not used in Phase 1)

- Presentation of documents from NHTSA to homogenize the methodology used for all the dummies;
- Start a common work on Q0 dummy with establishment of Excel sheet with comments;
- Sharing of the work:
 - Q1 ½ → Dorel (and CSI)
 - Q1 → CSI (and Dorel)
 - Q3 → PDB and EC (represented by M.Hynd)

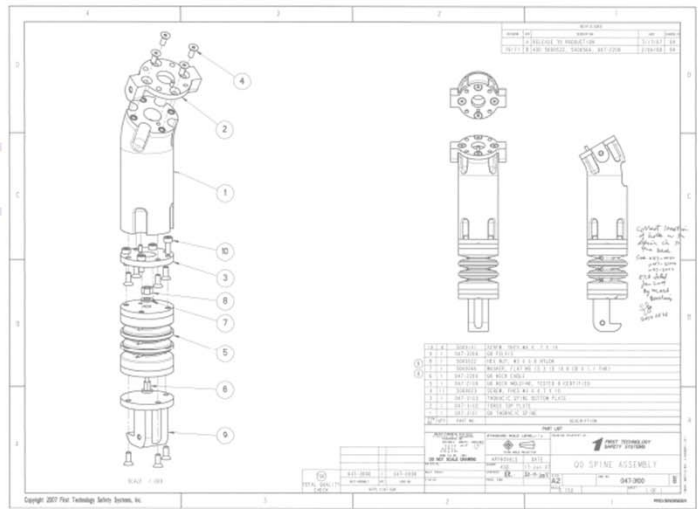
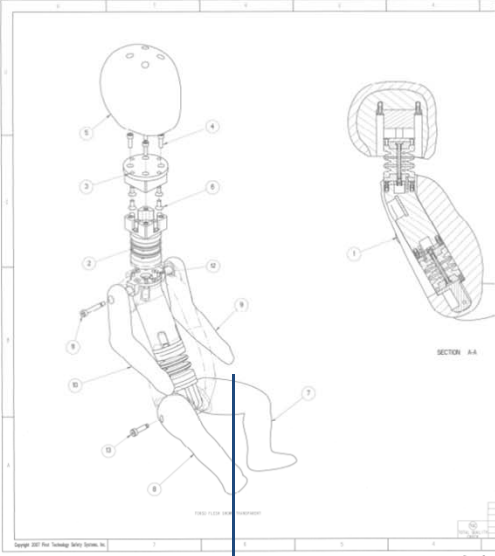


Nomenclature

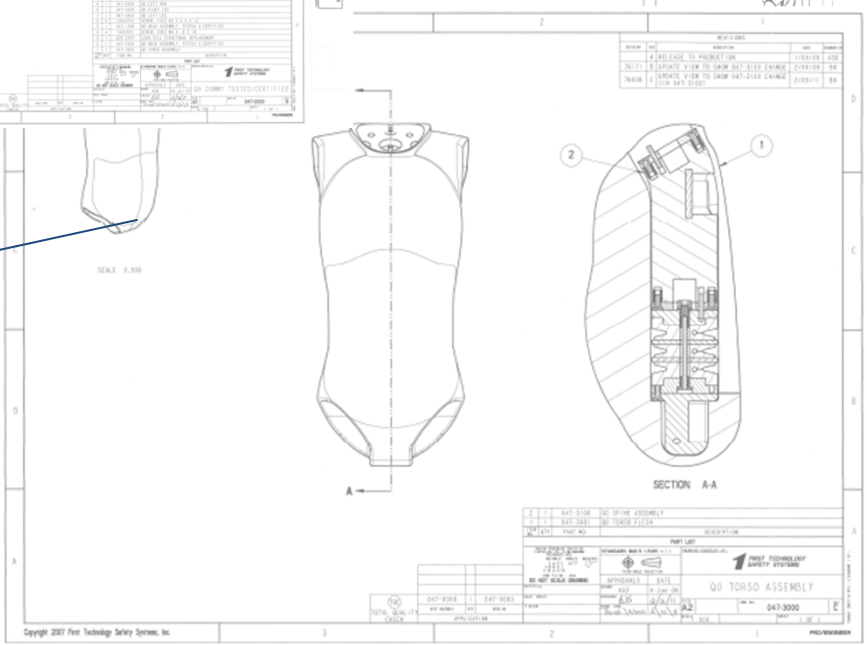
List of Contents
 Prepared: Kees Waagmeester
 Date: April 5, 2012
 Status: Draft

Drawing Package QO Dummy

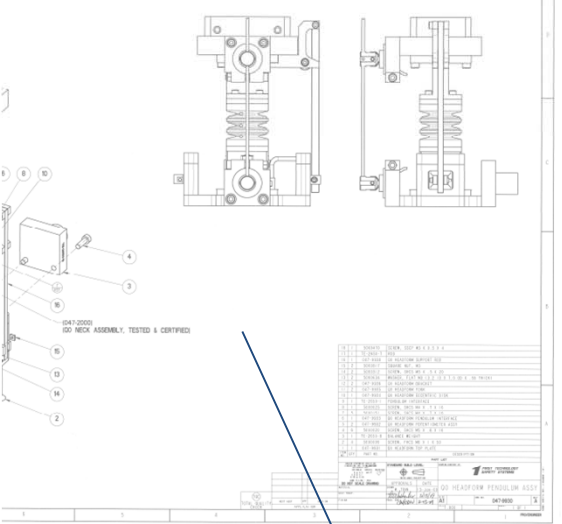
PDF Page nr	Drawing number	Drwg Revision	Drwg Sheet	Drwg Size	Description	Remark
1			1		Title Page	
2			1		List of Contents	
3			2		List of Contents	
4	047-0000	B	1	A1	QO Dummy Tested / Certified	
5	047-1000	A	1	A2	QO Head Assembly, Tested & Certified	
6	047-1001	A	1	A2	QO Head Skin	
7	000-2002	A	1	A3	M5 T-Insert	
8	020-2007	E	1	A3	Load Cell Structural Replacement	
9	047-2000	A	1	A3	QO Neck Assembly, Tested & Certified	
10	047-2001	C	1	A3	QO Accelerometer Mount	
11	047-2100	F	1	A3	QO Neck Molding	
12	047-2101	C	1	A3	Neck End Plate 2	
13	047-2102	D	1	A3	Neck End Plate 3	
14	047-2103	C	1	A3	Neck central Disc	
15	047-2200	D	1	A3	QO Neck Cable	
16	047-2201	A	1	A3	QO Neck Cable Ferrule	
17	047-2202	C	1	A3	QO Neck Cable Threaded Ferrule	
18	047-3000	C	1	A2	QO Torso Assembly	
19	047-3001	A	1	A2	QO Torso Flesh	
20	047-3100	B	1	A2	QO Spine Assembly	
21	047-3101	A	1	A2	QO Thoracic Spine	



Dummy drawings



Calibration tools



- Complete review of the data and report to Humanetics in order to improve the set For introduction of the dummies in the future regulation

1		Title Page	
1		List of Contents	
2		List of Contents	
1	A1	Q0 Dummy Tested / Certified	Add second sheet with general dimensions at least as user manual
1	A2	Q0 Head Assembly, Tested & Certified	Total mass + foam density
1	A2	Q0 Head Skin	Need general dimensions, foam density and weight with tolerances
1	A3	M5 T-Insert	
1	A3	Load Cell Structural Replacement	Common with other Q dummies; Replace Note 4 by Note 3
1	A3	Q0 Neck Assembly, Tested & Certified	Replace note 1 by Note 2. In revision box replace 020 2102 by 047 2102
1	A3	Q0 Accelerometer Mount	
1	A3	Q0 Neck Molding	Add mass
1	A3	Neck End Plate 2	
1	A3	Neck End Plate 3	
1	A3	Neck central Disc	
1	A3	Q0 Neck Cable	
1	A3	Q0 Neck Cable Ferrule	
1	A3	Q0 Neck Cable Threaded Ferrule	
1	A2	Q0 Torso Assembly	Put 3 sections with dimensions in the general assembly dimensions drawing
1	A2	Q0 Torso Flesh	Need general dimensions, foam density and skin hardness with tolerances

- Next steps :
 - collect the data from the participants before next IWG CRS meeting
 - Provide these data to Humanetics
 - Final set of data provided by Humanetics to be formatted in accordance with the standard presented by UK (numbering, etc.)