

ATD Harmonization Meeting - ATD Brand Consolidation Task Group

HYIII 10YO Child

MEETING MINUTES

February 10th, 2011

6:00am- 9:00am EST

Humanetics Headquarters in Plymouth, Michigan

Attachments: HYIII 10YO Voting Record
HYIII 10YO Presentation
Vinyl Material Review

Attendees:

In Person:

Jack Jensen (General Motors)
Steve Rouhana (Ford)
Hollie Pietsch (Ford)
Michael Jarouche (Humanetics)
Paul Depinet (Humanetics)
Michael Beebe (Humanetics)
Joe Bastian (Humanetics)
Mark Brown (Humanetics)

Via WebEx:

Marvin Hatchett (IIHS)
Hiroyuki Asada (Mitsubishi)
Brian Grenke (Chrysler)
James Elroy (EuroNCAP)
Bruce Donnelly (VRTC)
Jason Stammen (VRTC)
N. Rangarajan (GESAC)
Yuji Okuda (Humanetics)

****Voting members or their designees must attend the meetings in order to cast a vote on that day's topics.***

Introductions

Introductions of members in person and *WebEx* were conducted.

HYIII 95th Follow-up Review

The voting record from the 95th meeting held on January 13th was reviewed and participants that attended but did not cast a vote during the meeting were given the opportunity to vote. Hiroyuki Asada from Mitsubishi said he has no preference and supports the decisions of the group. He also declared Akihiko Akiyama from Honda also votes the same as Mitsubishi. Mitsutoshi Masuda of Toyota sent his vote in by email.

Michael Jarouche and Mike Beebe started a discussion to determine the process required to begin the manufacturing of the harmonized HYIII 95th and all subsequent harmonized dummies. The process proposed would include:

1. Release the harmonized drawing package
2. Build one harmonized dummy to view, test, and check the multiple brand fit of current parts
3. Set a date to begin producing the harmonized dummy

Mike Beebe will submit a schedule for the 95th during the next meeting. Based on the final vote, the harmonized HYIII 95th ATD will also be officially defined and presented at the next meeting.

95th Lumbar Follow-up

The final issue of the 95th ATD (which will also affect the 50th dummy) is the rubber lumbar. There may be slight dimensional differences between the two brands as well as some user durability observations. Joe Bastian has been working with Japan on some past rubber tearing and is awaiting final feedback from the corrective action that was implemented.

Jack Jensen stated that they use Denton brand lumbar on FTSS brand dummies because it is easier to achieve the seated height. There is debate on the exact height difference between the two brands. Paul Depinet said the SAE committee is meeting before the next harmonization meeting and will discuss the lumbar issue. He will bring a report and some data to the March meeting.

The molds and rubber were also discussed. FTSS has made some changes to the polyacrylate blend over the years to meet a *Toyota* bend test specification. Both Denton and FTSS rubber blends will need to be reviewed. The FTSS brand mold is newer and in better shape and Paul suggested that if the Denton brand is chosen, a new mold may be needed. There have been three molds in use for the FTSS brand over the years – an original ARL, a previous FTSS, and a new FTSS.

Users may bring data along with serial number records and photographs to the upcoming meetings if they have noticed any differences or experienced any problems with the two brands of 95th or 50th rubber lumbar.

Preliminary Definition of a Harmonized HYIII 95th ATD

Based on the current tally of votes, the harmonized HYIII 95th dummy will be defined as:

- Head assy - Denton brand
- Neck - follow the 50th recommendation
- Thorax – Denton brand with FTSS brand clavicle and link castings
- Lower Torso – Denton brand
- Lumbar - to be determined
- Arms – Denton brand
- Legs – Best combination of FTSS brand leg using Denton brand foot and ball knee slider
- Vinyl flesh is common for all HYIII family

Vinyl Material Review

A proposal by *Humanetics* was presented asking the task group to harmonize the vinyl flesh material before more dummies are finalized. Mike Beebe presented slides comparing the vinyl formulations of the FTSS, Denton, and the European brands (reference 10YO presentation attachment). The formulations are very similar; all three use the same resins, plasticizers, and stabilizers. Denton and FTSS vinyl is manufactured by the same vendor with slight variations in plasticizer concentration and color pigment. Mike presented manufacturer supplied information on the raw vinyl characteristics. The

tensile strength was shown to be different for the two brands. Mike agreed to review this with the vendor for accuracy and solicit an explanation on how the measurement is derived.

Jack Jensen and Hollie Pietsch started a discussion regarding targets that are applied to vinyl flesh and drift over time. This is a result of plasticizer leaching from the vinyl material and allowing the targets to slide. Paul Depinet added that leaching is characteristic of all vinyl, but the Denton brand uses more plasticizer, which results in less leaching. Joe Bastian and Mike noted that cure times may have an influence on leaching and also the different smells between the brands of vinyl. They agreed that it is very difficult to determine the perfect cure and *Humanetics* has been refining the molding process to help improve the overall quality of the molded vinyl.

The color pigment was discussed briefly as well. Since general pinks are harder to color match, Mike suggested using the European light brown for the harmonized vinyl. A reduction of vinyl trimming and fewer surface imperfections will be some of the manufacturing benefits of the brown vinyl color. Jack added that the color should not be too light or too dark relative to photography requirements.

Michael Jarouche and Jack suggested that the attribute list with questions be distributed and a vote be held during the next meeting. Mike Beebe agreed to review the tear strength measures and add them to the attribute chart. He will also get a brown color swatch to bring to the next meeting.

Voting Process Change

A suggestion to simplify the voting process was presented to the group. Presently a two-thirds majority is needed to win a vote. Jack Jensen proposed a simple majority be used instead. With a simple majority, anything over fifty percent carries the vote. A quorum of voters attending the meeting is still required. The group agreed that this was an acceptable change.

**Note – a quorum of voters present was not achieved at this meeting for the 10YO. Preliminary voting took place, but a final vote will be required at the next meeting. Those members that cast their vote at this meeting may choose to change it during the March meeting.*

General 10YO Review

Mike Beebe presented a harmonization review of the HYIII 10YO child (reference 10YO presentation attachment). The 10YO dummy was developed as a joint venture between FTSS and Denton beginning in 1998, making the history of this ATD unique. Three dimensional shapes and drawings were shared, allowing for fewer differences in the final product brands. The population size of the 10YO is about equal.

Head and Neck

Mike presented the attribute charts for the 10YO consisting of a general attribute review, user feedback review, and a user 3-D shape review. Of the general attribute review; the populations are equal, both brands meet the drawing package, both brands meet the certification requirements, and both brands meet the physical dimensions and characteristics for the head and neck.

Users were asked about their own experiences. It was discovered that many users either have not used the 10YO or have just one of the two brands. *VRTC* and *Ford* acknowledged that they have both brands of 10YO dummies. Hollie Pietsch noticed differences in the IRTRACC instrumentation between brands, and Jason Stammen from *VRTC* noticed a difference in the shoulder load cells (which will be discussed in the Thorax section).

Mike presented photographs of the head skin molds of each brand, stating that they produce the same shape. The difference in the molds is confined to casted type versus machined type. The Denton brand mold is machined and is preferred by manufacturing. Both head skins are the 5th female version and have solid noses.

Hollie asked if we should wait until the outcome of the 5th female review is complete before harmonizing the head. It was agreed that the head and other common parts across dummy sizes (i.e. the 50th and 95th lumbar) may need revisited based on future meeting conclusions and votes.

A preliminary vote was recorded. Please reference the Voting Record attachment.

Thorax

Jason Stammen from *VRTC* presented some slides documenting a difference in the design of the shoulder load cells for the 10YO. The clavicle showed more contact with the shoulder supports using the Denton load cell than with the FTSS model. The designs have different shapes and yoke shaft dimensions: the *Denton* version has a thicker yoke shaft diameter, taller height and a longer front face for broader measurement capabilities. Both brands of shoulder structural replacements conform to the drawing package; only the load cells have slight differences. After examining the shoulder position on a 10YO dummy brought to the meeting, users felt that the broader measurement face of the Denton version was not necessary; seat belt loading would not occur on the lower portion. The FTSS load cell meets the drawing package design.

VRTC has the largest inventory of both brands of 10YO dummies and has recorded some past durability issues that have been rectified. Present design durability issues will need to be addressed through the SAE committees.

The chest flesh molds for both brands are machined and in good condition. No preference was given from *Humanetics* manufacturing or engineering.

A preliminary vote was recorded. Please reference the Voting Record attachment.

Lower Torso

Mike's presentation on the lower torso stated that no parts are currently shared with other dummies. The Denton brand abdomen mold is machined and the FTSS brand is casted. *Humanetics* manufacturing prefers the machined mold. Both pelvis brand molds are machined and no preference was given. Both parts are seamlessly interchangeable between brands since the molds were created with shared 3-D shapes.

No other attribute items were discussed by users. A preliminary vote was recorded. Please reference the Voting Record attachment.

Leg Assemblies

Mike Beebe presented the attribute list for the leg assemblies. Jason relayed some upper leg flesh shrinkage observed over time, but could not definitively say which brand it was. No other user comments were voiced.

Humanetics manufacturing and engineering gave no preference for the upper leg, lower leg or foot molds since they are all machined and in good condition. Preference was given to the machined Denton brand knee mold since the FTSS brand mold is casted.

A preliminary vote was recorded. Please reference the Voting Record attachment.

Arm Assemblies

Mike Beebe presented the attribute list for the arm assemblies. No user comments voiced.

The Denton brand upper and lower arm molds are preferred by *Humanetics* manufacturing because of their ease of use. There was no preference on the hand mold given.

A preliminary vote was recorded. Please reference the Voting Record attachment.

Preliminary Definition of a Harmonized HYIII 10YO Child ATD

Since a quorum of voters present was not achieved, a vote will be taken at the beginning of the March meeting. If the outcome of today's meeting stands after the final vote, the harmonized HYIII 10YO dummy will be defined as:

- Head assy will follow 5th female recommendation
- Shoulder load cells are the FTSS brand
- Remainder of ATD is from the Denton brand
- Vinyl flesh is common for all HYIII family

March 10th Meeting Agenda

1. 95th finalization
2. 95th/50th lumbar discussion and vote
3. 10YO finalization and vote
4. Vinyl discussion and vote
5. Start the HYIII 50th review

**Please comment on the previous meeting minutes during the beginning of each meeting.*

The current harmonization schedule

January 13th – HYIII 95th Large Male
 February 10th – HYII 10YO Child
 March 14th / April 14th – HYIII 50th Male
 May 12th – EuroSID 2
 June 9th – 5th Small Female
 July 14th – HYIII 6YO Child
 Aug 11th - HYIII 3YO Child
 Sept 8th – CRABI
 Oct 13th - SID
 Nov 10th - FMH / Misc.

Meetings are held the 2nd Thursday of each month.
 Locations to be determined.

*March meeting rescheduled to Monday, the 14th.

References

HYIII 10YO ATD Population

FTSS Brand		Denton Brand	
Australia		Australia	0
Brazil	1	Mexico	0
Canada		Canada	2
China	1	China	0
Europe	1	Europe	5
India		Japan	2
Japan	2	Korea	1
Korea	4	Taiwan	0
Malaysia		United States	20
Russia			
United States	15		
Total	24	Total	28

General Overall Attribute Chart for Each Segment

Attribute	Denton Brand	FTSS Brand
Dummy Population (total of each currently in the field)	28	24
Current drawings (Does each brand meet requirements?)	ok	ok
Current Certification Test (Does each brand meet current corridors?)	ok	ok
Current External Dimensions/Weights/CG (Does each brand meet these specs?)	ok	ok

General Users Feedback Attribute Chart

Attribute	Denton Brand	FTSS Brand
Durability Data (breakage, cuts, long term certification test changes, foam break down, damping material glue failure,)	No issue	No issues
Reparability (which vinyl is easier to repair in the field)	No issue	No issues
Interchangeability (Can parts bolt on each Brand, external vs internal)	No Issues	No issues
Ease of use (seating in vehicle, assembly/disassembly,	No issues	No Issues

Head and Neck Assy

Attribute	Denton Brand	FTSS Brand
Color of vinyl (FTSS or Denton?)		
Vinyl Surface (shiny vs. mat finishes, feel) Denton is shiny and FTSS has a mat finish		
Current Mold sets (age, patterns,)	No preference	No Preference
Vinyl Shrinkage(Data on vinyl part shrinkage)		
Shape effects (hands, feet vs headskin, pelvis etc...)	Common head skin with 5 th female	Common head skin with 5 th female
Castings (investment vs. sand, shape effects)	Shoulder load cell different then drawing	
Interchangeability (weight fit between flesh parts?)	Shoulder load cell different then drawing	

Thorax

Attribute	Denton Brand	FTSS Brand
Dummy Population (total of each currently in the field)	28	24
Current drawings (Does each brand meet requirements?)	Load Cell does not meet	

	current drawings for Yoke diameter shoulder, but structural replacment	
Current Certification Test (Does each brand meet current corridors?)	No issues	No issues
Current External Dimensions/Weights/CG Does each brand meet these specs?)	No issues	No issues
Durability Data (breakage, cuts, long term certification test changes, foam break down, damping material glue failure,)	No issues	No issues
Reparability (which vinyl is easier to repair in the field)	No issues	No issues
Interchangeability (Can parts bolt on each Brand, external vs internal)	Shoulder load cell is different then drawing	
Ease of use (seating in vehicle, assembly/disassembly,	No issues	No issues

Lower Torso

Attribute	Denton Brand	FTSS Brand
Dummy Population (total of each currently in the field)	28	24
Current drawings (Does each brand meet requirements?)		
Current Certification Test (Does each brand meet current corridors?)		
Current External Dimensions/Weights/CG Does each brand meet these specs?)		
Durability Data (breakage, cuts, long term certification test changes, foam break down, damping material glue failure,)	No issues	No issues
Reparability (which vinyl is easier to repair in the field)		
Interchangeability (Can parts bolt on each Brand, external vs internal)		

Ease of use (seating in vehicle, assembly/disassembly,		
Color of vinyl (FTSS or Denton?)		
Vinyl Surface (shiny vs. mat finishes, feel) Denton is shiny and FTSS has a mat finish		
Current Mold sets (age, patterns,)	Denton abdomen Pelvis no preference	
Vinyl Shrinkage(Data on vinyl part shrinkage)		
Shape effects (hands, feet vs headskin, pelvis etc...)		
Castings (investment vs. sand, shape effects		
Interchangeability (weight fit between flesh parts?)		

Vinyl Material

Attribute	Denton Brand	FTSS Brand	European Brand
Color of vinyl (FTSS or Denton?)	Light Brown	Pink	Brown
Vinyl Surface (shiny vs. mat finishes, feel) Denton is shiny and FTSS has a mat finish	Clean with MEK Shiny	Clean with Acetone, Mat Finish	No Cleaning, Mat finish from mold
Same Resin, Plasticizer, stabilizer	More plasticizer, different ratio of pigment	Less Plasticizer, Different ratio of pigment	More plasticizer, Brown pigment
Trimming, patch holes, cut and trim flash, use of hot iron	Yes	Yes	None
Durometer Shore A	45 +/- 3	52 +/- 3	45 +/- 3
Tensile Strength	1200 psi	1284 psi	1200 psi
Elongation	400%	400%	400%

Color of vinyl (FTSS or Denton?)	Light Brown	Pink	Brown	Pigment Ratios provided
Tear Strength	60 pli	130 pli	60 pli	NO Spec provided
Resin, Plasticizer, Ratios	40.5% Resin 53.5% Plasticizer	47.2% Resin 40.14% Plasticizer	40.5% Resin 53.5% Plasticizer	44% Resin 42.4% Plasticizer
Durometer Shore A	45 +/- 3	52 +/- 3	45 +/- 3	Estimated to be 48 +/-5
Tensile Strength	1200 psi	1284 psi	1200 psi	NO Spec provided
Elongation	400%	400%	400%	NO Spec provided

Draft Harmonization Schedule

ATD Harmonization Schedule					
ATD Type	Voting Month	Release Drawing Package for build	Build one dummy verify & test	Completion Date	Notes
HYIII 95th Large Male	January	March 1	May 30	June - 11	Voting was done, but won't be final until Feb
HYIII 50 th HYIII 10 YO	February and March	March 1 10 YO May 1 50 th	June 30 10 YO July 30 50th	Jul-11 10 YO August -11 50th	
EuroSID 2 / RE	April	May 30	August 31	Sept -11	
HYIII 5th Female	May	June 30	Sept 30	Oct-11	
HYIII 6YO Child	June	July 30	Oct 30	Nov-11	
HYIII 3YO Child	July	August 31	Nov 30	Dec -11	
CRABI	August	Sept 30	Dec 30	Jan- 12	
DOT SID / H3	September	Oct 30	Jan 31-12	Feb-12	
FMH / Misc.	October	Nov 30	Feb 28-12	March-12	

-END-