

Minutes 9th WebEX Meeting of the BioRID TEG

Date & Timing: Wednesday December 14th 2011, 11:00 (CET), 5:00 a.m. (EDT)

Hosted by : Humanetics

Minutes drafted by: Bernd Lorenz (BASt)

1. Welcome

The chair welcomed the delegates around the world.

Apologies have been received from Dr. Koshiro Ono and Yoshiji Kadotani.

2. Approval of Agenda

The agenda was approved without changes.

3. Information/Discussion

3.1. Guidance/results from GTR No. 7 and GRSP December 2011 session in Geneva

The chairman of the GTR No.7 group Bernie Frost (UK DfT) gave an overview of the discussion and progress at the Geneva Informal Group meeting:

- Injury criteria

Bernie Frost reported that NHTSA presented results of PMHS tests. Questions had been raised about the HR height due to a still photo which showed the HR below the CG of the head of the PMHS. NHTSA noted that this was not the position of the HR during the actual tests and will provide further info.

Dr. Koshiro Ono (JARI) presented progress from Japan.

It was felt that the programs are progressing well.

- PDB-type tests at VRTC and OSRP

At the Washington meeting it was agreed to have a round-robin testing programme looking at the issues identified by PDB with their dummies in the Recaro rally-type seats. The results have been presented during the Geneva meeting. Bernie Frost noted that there was no additional information on the interaction between the shoulder and the seat, which PDB had identified as a possible issue from simulation work. OSRP data showed differences, but not the same as seen in Europe. Nevertheless there were clear differences between the two PDB dummies for upper neck My and lower neck Fz.

There was also discussion about whether CoV is appropriate when the measurements are so small [relative to likely thresholds].

- VRTC tried to look at the interaction with the seat further, with additional support in the lumbar region. This was achieved by setting the dummy deeper/rearward (pushing the knees rearward) in the Recaro seat. This increased the head backset by 8-14mm. No significant differences between the dummies with or without the additional lumbar support and increased backset were seen. The tests were performed using the modified (JNCAP) Annex 9 pulse.
- At the Geneva meeting it was also learned that TRL (on behalf of the European Commission) could move their tests around to give Humanetics some troubleshooting time with the PDB dummies, if the dummies and seats can be made available in January [this is now confirmed]. There is also a need to ensure that we all are working with the right dummies and a common definition of the test procedure, seating procedure, test pulse.

Bernie Frost pointed out that there is an obligation to present **a finished proposal to GRSP in December 2012**. This means that **we need to finalise the work of the TEG and IG in 9 months from now**.

Bernie Frost informed the group that he will organise a small GTR drafting committee on the assumption that the TEG work sorts out the remaining issues with the dummy.

Dr. David Hynd (TRL) noted that in addition the best injury correlations in the NHTSA PMHS tests were for NIC and NDC-rotation.

3.2. Status of current activities

Mr. Jack Jensen (GM) reported that the two PDB dummies were shipped back to Germany from OSRP and VRTC, and PDB repeated their original tests on Recaro seats, and found that the differences between the dummies were seen again. This was confirmed by Mr. Markus Hartlieb (PDB).

Markus Hartlieb proposed to develop an inventory/summary of all of the R&R testing in a matrix or table. This was mirrored by Agnes Kim (Ford) requesting additional information about the seat types used. Bernd Lorenz said that this was discussed some meetings ago. This information is to some degree available, but the status of the dummies used was unknown. Therefore it was agreed a while ago that new tests should be done with the dummies to the latest build level and new certification tests.

However, David Hynd mentioned that he may have a table such as this, but primarily it was production seats where the lack of repeatability of the seat dominated. Agnes Kim responded that the seat will be used in legislative tests, so this information should be included. Older seats in older studies could be very variable. Bernd Lorenz reported that Euro NCAP has looked at this and there were found significant variation between newer seats of the same model even of the same batch.

Bernie Frost reminded the group that Markus Hartlieb suggested at the Geneva meeting not using these seats any further and that seats should be used with a more typically seat to dummy interaction. Markus Hartlieb noted that the Recaro seat might be too far away from an average real vehicle seat. For the test series there is a need for a repeatable seat much closer to a real seat.

This is why the EC tests is performed with a lab seat, based on a production seat, and if this works to verify performance in actual seat tests.

3.3. Status of test program for the EC

Dr. David Hynd gave an overview of the EC test program. The seat back is reinforced, but the interface is entirely that of the original Volvo V70 seat with a rigid recliner (not the WHIPS recliner). The design of the lab seat is aiming at a fixed torso angle of 25 degree which needs to be confirmed during the test series. The lab seat is designed getting 8° recline angle, with damped return. So far 20 tests have been performed with one seat, for pulse tuning and getting the rig working, and no discernable degradation of the seat foams. The pulse used was JNCAP style. The seating procedure is based on the Euro NCAP procedure with minor changes. The intention is also to run tests with different back sets. He said that he would be happy to run the PDB dummies with the lab seat rather than the Recaro seat, if this is the wish of the Informal Group with regard to identify the differences between the VW and Daimler dummies.

A discussion about the influence of the lumbar spine and pelvis rotation started. It was felt that it would be beneficial to have rotation sensors mounted at the pelvis/L1 for the EC tests.

Markus Hartlieb offered to provide additional rotation sensors if available. Paul Depinet (Humanetics) may be able to provide two more and recommended to mount sensors at pelvis T8 L1 T1 and head [in the meantime sensor have been delivered to BAST].

Bernie Frost welcomed this additional information as this is something currently not assessed by the certification tests.

3.4. Status of new certification procedure (data collection for corridors)

Paul Depinet gave a presentation on the status of the new certification procedures.

He reported that Humanetics have now lots of certification data, but it will be good to see from EC/TRL work if there is a correlation between different regions of the corridors and the seat test results.

Humanetics proposed to reduce the draft corridor for the jacket tests to +/- 5%. He also suggested same tightening for the sled acceleration. The sled delta-v is already within +/- 5%. CV for production jackets improved over the last year and is 6%, cf. 10.4% for all dummies in the field for which data is available. It is important to note that there are a lot of jackets in the field that would have to be replaced if the +/-5% limit is introduced.

On request of Jack Jensen Paul Depinet answered that the jackets of the PDB dummies are very similar but both are at the top of the data set, well above the proposed corridor which means they tend to be stiffer. This would also mean that the problems seen by PDB would not be fixed by a jacket test itself. Bernie Frost agreed, but the test have been performed with a seat that PDB now say is not very representative and should not be used further. Jack Jensen replied that the Recaro seats happen to have very similar geometry to the Corvette, so the Recaro seats do represent some seats. For regulation this is important as it has to work with all seats. The Recaro seats should be more repeatable than standard seats, due to the lack of foam (like the idea of the EC/TRL tests).

Bernie Frost was worried that we may write-off a dummy just because of a very niche seat design. There are numerous instances in regulation where there are exemptions for niche products where the tests don't work so well. This is for the regulators to worry about, not the IG or TEG. It is valid to investigate the shoulder interactions with the seat design. If this problem is not present with this hard shoulder interaction we can move forward, and if it continues to be present with some seats may need to do something for those. But the bottom line is to reduce whiplash and remove seats from the market that would have a higher risk of injury. Jack Jensen agreed completely, but he just wanted to be sure that we don't entirely forget the Recaro seat results. This is why we do p.ex. frontal impact tests into a flat wall which gives manufacturers the chance to see the effect of design changes and gives regulators a repeatable test.

Agnes Kim mentioned that Ford is looking at future mainstream seat designs that are closer to the Recaro seat than typical current seats; currently they have these in niche vehicles, but not mainstream vehicles.

Bernie Frost pointed out that it is a fact of life that we may have to revisit the regulations if vehicle design changes, and don't mean to dismiss the PDB seats. However, he is concerned that there is an issue that is a function of the seat rather than the test tool. The attempt should be to try to separate and thereby move forward.

Dr. Zine Ben Aoun (Chrysler) stated that PDB did run the dummies without the arms to try to separate the dummy and seat issues, but no change in response between the dummies was found. Bernie Frost answered that the group should move forward with a more typical seat to see where we are with most of the market; can come back to these niche seats later. Programme that TRL running seems that it will help with this. He added for information, that any information that exposes limitations of the tools or procedures will not be ignored. As is well known, the European perspective is that the current GTR with the Hybrid III has significant limitations.

Bernd Lorenz raised the question whether it would be OK to wait to the end January TEG WebEx to see the data from the EC/TRL tests and then decide on the jacket tests limits as we can't afford to wait and change the jackets for the EC series, but at least can see the effect.

Bernd Lorenz also mentioned that Koshiro Ono noted that there is no possibility to test the jackets in Japan and asked whether this can this be sorted out in January? Mike Beebe said that Humanetics will try to solve this issue

3.5. Status of data analysis from current test series (OSRP, PDB, VRTC)

Bernd Lorenz mentioned the presentations at the Geneva meeting one week before this TEG WebEx which were noted to be preliminary results and asked whether there is more information available, now. Barbara Bunn (GM, chair of the OSRP Rear Impact Dummy Task Group) said that slides were added with the reproducibility of the Ford and GM dummies. However, it was her feeling that at the next day of the IG meeting it was decided that the CV was not meaningful so may skip this slide. Bernie Frost pointed out that the IG did not decide this, but did question whether it was appropriate. Barbara Bunn will distribute an updated presentation as soon as it has been reviewed.

Markus Hartlieb said that in some studies there were only a small number of repeats, which was not good for calculating of CV. Those studies should at least include max and min values to understand the range.

Bernd Lorenz reminded all participants [again] that if presentations are used for decision making they must be available on the UNECE web site.

Action All: Please provide presentations to Bernd Lorenz to be sent to the UNECE secretariat for putting them on the website. Please note that the file size of the UNECE firewall is restricted to a max of 3MB.

3.6. Repeatability & reproducibility testing conditions

Paul Depinet gave a presentation. BioRIDs used for R&R testing should be certified according to the new procedures which means:

- Do checklists and upgrade (Humanetics will assist)
- Jacket passes new corridor
- No HR and with HR tests
- Heavy impactor? (see presentation from Dr. Koshiro Ono at Geneva meeting)

David Hynd reported that the pulse used in the EC/TRL test series is according to the last proposal the JNCAP style $\Delta v=17.6$ kph triangular pulse as laid down in document GTR7-06-10. All participants agreed to use this pulse.

Decision: use pulse according to doc GTR7-06-10.

Bernie Frost noted that GTR7-06-10 is the drafting document, so it will change over time. The UNECE web site also has Rev1 for this doc, but the pulse section is identical (just a change to the preamble).

A discussion about the seating procedure followed as there is a need to identify a draft procedure to follow and agree on it. There is a need to address how to get/achieve the backset. The cert tests had fixed HR position, but there were big concerns that forcing the dummy to a given backset was a bad idea. So there is now an adjustable HR at the cert rig to get the same backset. It was reported that at the VRTC/OSRP the head was pushed fore-aft to get the backset, which was definitely ruled out for certification.

David Hynd confirmed that he will follow the Euro NCAP seating procedure during the EC/TRL test, because the GTR procedure is a cut-down version and he decided that it would be best to use the 'full' procedure, and later on see if we can get away with cutting this down or just adopt it.

Bernd Lorenz said that we may need one procedure for seat tests and may need something different for certification – whatever is appropriate to the test.

Paul Depinet mentioned that Hollie Pietsch (former Ford) presented that pulling the head to get a target backset would affect the results and shouldn't be done. Agnes Kim explained that this is true for certification tests, but a seat test takes longer and generally the spine will settle back to its original position by the time you run the test. It is possible to lean the dummy forward at the shoulders and adjust there to get the backset. Paul Depinet said that this is different to what was done in the PDB/VRTC/OSRP tests – pulling/pushing the pelvis and forcing the head.

Bernd Lorenz asked Humanetics whether they have seen differences in HR certification tests, depending on moving the head or the head restraint? Paul Depinet said that they are planning to run a comparison in January. He also mentioned that a consistent head contact measurement method should be used and he recommended to use the painted cap with conductive fabric.

It was also recommended when running multiple seats to swap the dummies between seats to make sure that there is no seat difference. Humanetics proposed that a minimum of 6 tests per dummy should be performed for R&R calculations. A common data format such as Diadem should be used for making data analysis easier and faster.

3.7. Proposals to add to EC/TRL testing

Paul Depinet gave a presentation with recommendations what should be done and considered for the EC/TRL test series. All dummies should be reviewed especially with regard to the jackets and according to the PADI and meeting the drawings. This could in some cases mean to replace all neck pins (rusty), to change back plate, fix all out of tolerance vertebrae, replace all bumpers (neck, thorax, spine) and to check thorax/vertebrae front/back size – check front gap with comb in place.

If differences amongst the dummies are found the worst 2 should be picked and it should be tried to swap parts between the dummies.

Mike Beebe asked for clarification whether the PDB re-tests also reproduced the OSRP pulse, and got similar results to the original PDB SRA-16 tests. This was confirmed by Jack Jensen. Paul Depinet asked also for clarification whether it is easier to get the GTR No. 7 Annex 9 pulse (like FMVSS 202a) right at multiple labs. This was again confirmed by Jack Jensen.

Bernd Lorenz pointed out that the group should be aware that we are investigating the BioRID for regulation, so that the relevant JNCAP style pulse (doc GTR-06-10) must be used.

Markus Hartlieb reported that PDB has a lot of experience with the Euro NCAP seating procedure which is definitely not a source of variation. He said that there is a big difference between seat and certification tests. In a seat test there will be lumbar loads very early and the spine will straighten up. This is not seen in the certification tests – these only look at the upper spine. Paul Depinet said that this is understood and he agreed to it. Humanetics is exploring what can be done quickly to look at the lumbar spine, but developing a new certification test would take time.

Paul Depinet said that a better way to get the backset is needed. David Hynd replied that during the EC/TRL we will have the backset that we get with each dummy – not force it to something different. However, he offered to repeat with force backset if that is of interest. The group felt that this is very much of interest.

4. Summary of meeting/actions

Bernd Lorenz summarized the specific objectives before the next meeting end of January.

He said that an agreed seating procedure is very important. The EC/TRL series is using the Euro NCAP procedure with small modifications. David Hynd explained that he is waiting for JNCAP seating procedure translation and said that he should be in a position to have a proposal for the next meeting.

A clearer idea of the influence of the with HR cert test – fixed HR position, or fixed backset (by adjusting HR position) – is needed. Humanetics agreed to have a closer look at this.

An analysis of the EC/TRL test series should be presented and discussed.

During the meeting the decision was made to use the doc GTR7-06-10 pulse for all further testing and evaluation.

Dr. David Hynd noted that EEVC WG12 once normalised CV's to the threshold for child dummies, because some of the measured values were very low – so small absolute differences led to large CVs. It may be worth to consider the method at the next TEG.

An action was laid on David Hynd to provide the report or method, if possible.

Bernd Lorenz thanked all participants for their attendance and contributions.

5. Next Meeting(s)

10th WebEx BioRID TEG: 27th of January (rescheduled to 31st of January)

Face to Face meeting(s):

23rd of February BAST Bergisch Gladbach (WebEx shall be available) – please confirm attendance well in advance for security and arrangement reasons!

19th/20th of March, London (Joint session with GTR 7)