

Draft 4th progress report of the informal group on Phase 2 of gtr No. 7
(Head restraints gtr Phase2)

Note:

The text reproduced below was submitted by the chair of GTR7 phase2 and proposes amendments to the 3rd progress report of the informal group on Phase 2 of gtr No.7 (ECE/TRANS/WP.29/2012/34). The proposed amendments are marked in bold and in strikethrough characters.

A. Background

1. At its 143rd session in November 2007, the World Forum for Harmonization of Vehicle Regulations (WP.29) agreed to provide guidance to the Working Party on Passive Safety (GRSP) for the development of the draft gtr on head restraints (ECE/TRANS/WP.29/1064, para. 81) and that Phase 2 of the gtr should consider, as indicated in informal document No. WP.29-143-23-Rev.1, the following issues:

- (a) The head restraint height of 850 mm;
- (b) The appropriate dynamic test, including the test procedure, injury criteria and the associated corridors for the biofidelic rear impact dummy II (BioRID II).

2. At its twenty-seventh session in June 2009, the Executive Committee of the 1998 Agreement (AC.3) agreed on the two-step approach suggested by the representative of the United Kingdom and of the United States of America. This approach considers whether BioRID II can more effectively address injuries occurring in low speed rear impact crashes and focus on reducing injuries in higher speed rear impact crashes as a second step.

3. At its twenty-eight session in November 2009, Japan submitted to AC.3 a proposal for developing amendments to the gtr, prepared jointly with the United Kingdom and the United States of America, and the revised timetable. AC.3 agreed to develop the amendment to the gtr.

4. The first interim report of this activity was provided to the 152nd session of WP.29/AC.3 in November 2010 (ECE/TRANS/WP.29/2010/136). The second interim report was provided to the 154th session of WP.29/AC.3 in June 2011 (ECE/TRANS/WP.29/2011/86).

B. Status

5. The Informal working group has met seven times with the last occasion being in Washington DC on 10 June 2011. Participation includes both industry and government representatives from the regions of Asia Pacific, North America and Europe.

6. The Informal working group is addressing the head restraint height issue in two parts:

7. The first part is to review the procedure for measuring the height of the head restraint and in particular to determine the effective height rather than the physical height of the device. A small sub-group, including representatives from the manufacturing sector and coordinated by the Netherlands, has made good progress in establishing a revised procedure which should be ready for detailed discussion at the next Informal working group meeting. The second part is to make recommendations for the height requirement. This will be discussed following agreement on the measurement procedure.

8. Regarding BioRid, significant progress has been made concerning evaluation of repeatability and reproducibility. However, while most evaluations have indicated good performance in these two areas, there are ongoing research activities to address concerns about reproducibility raised by one representative.

9. A round robin programme, using the BioRid specimens that had exhibited variance, was agreed upon at the Washington meeting. The dummies were shipped to the United States where General Motors and the National Highway Traffic Safety Administration (NHTSA) conducted tests. It was intended that the dummies would then be returned to Europe where the round robin would continue, and additional test series, funded by the European Commission, would complete the programme. Unfortunately, the dummies were

recalled to their owners following the US programme and therefore the round robin was not completed. Nevertheless, the European programme is continuing, although with alternative dummies.

10. Injury criteria are being evaluated by NHTSA and by Japan Automobile Research Institute (JARI). The NHTSA work is complete but the Japanese study has been delayed as a result of the tsunami earlier this year. JARI expects to be in a position to provide their analysis for consideration by the informal working group in the first quarter of 2012.

11. The informal working group continues to work toward providing recommendations to GRSP at their 2012 sessions, although the additional testing programme and the unforeseeable delays on development of injury criteria have caused some slippage in the programme. The informal working group will advise WP.29/AC.3 of any impact that these delays may have on the delivery of their recommendations at the 156th session in March 2012.

12. The next meeting of the informal working group will be held in London during the week beginning 19 March (immediately after the 156th session of WP.29) in conjunction with the informal working groups on WorldSid and Pole Side Impact.

13. NHTSA reported preliminary PHMS test analysis that the IV-NIC rotation is a potential injury criteria. NHTSA also states the NDCr, NDCx are a possible criteria. Japan reported the progress of FEM study that indicated a good correlation between IV-NIC Rotation, (flexion side) and Neck strain/strain-rate. NHTSA also stated that they needs more PHMS test data and introduced their future test plan with various seat performance conditions.

14. TRL reported the outcome of a Europe Commission project study that evaluated the dummy reproducibility and repeatability by using sled test. The results indicated some specific channels do not provide adequate reproducibility (C.V). The dummy response was sensitive to the change which suggested that certification test and better control of material properties might be needed. The spine bumper, jacket and pelvis fresh will be examined and dummies refurbished.

15. Netherlands introduced a proposal to increase head restraint height.(GRSP-51-24) The expert from OICA stated that the discussion should focus first on the definition of the measurement method and then on the height thresholds. GRSP agreed to resume discussion at its December 2012 session on the basis of a possible proposal on draft UN GTR No. 7 phase 2 that may be submitted by the informal working group.

16. The representative of the United Kingdom, on behalf of the Chair of the informal working group, reported on the work progress of the group that it had been difficult to deliver the injury criteria; the informal working group would require a 12 month extension of its mandate. AC.3 gave its consent to extend the mandate of the informal working group until December 2013.

17. A proposal for a protocol to manage drawings, calibration and maintenance procedures associated with test tools referenced by UN Regulations and UN Global Technical Regulations in the framework of the 1958 and 1998 Agreements through ECE/TRANS/WP.29/2012/124 and WP.29-158-19. WP.29 adopted ECE/TRANS/WP.29/2012/124 as amended by the informal document.

18. Japan reported the IV-NIC (Rotation/Flex) risk curve proposal. Two IV-NIC risk curves had been derived. One was from Human model FEM simulation base on 20 cases of real world accidents. The second one was made over based on previous NHTSA's PHMS test results by translating AIS to WAD index with a hypothesis. The informal working group will continue discuss this with next meeting and develop

injury criteria with more data(PHMS) and BioRID assessment values with benefit analysis.

19. Humanetics reported the sled test result using the republished dummies. The results indicated better reproducibility with C.V values but still it needs data analysis. TEG chair proposed additional sled test series with Europe Commission project rig seat and PDB hard bucket seat. The test results will be discussed at the next informal meeting (mid-February 2013).

20. NHTSA reported the progress of injury criteria development by PHMS tests. NHTSA stated that Potential “global” injury criteria as followed:

- USA: IV-NICrot, NDCrot, NDCx, NIC
- Japan: IV-NICrot , NIC, UNFx, UNMy, LNFx, and LNMy

However, BioRID measures should be discussed by collaboration work with further PMHS tests by NHTSA and test data analysis by JARI (Japan).

21. At the work shop that held in middle of March 2013 at BAST, effective head rest height measurement procedure had been examined by using actual vehicle. The work shop finding had reflected to draft text in Annex 1. The workshop also concluded that the backset can be measured without HRMD.

22. Netherlands proposed head restraint height requirements (GRSP-53-xx) and GRSP will resume discussion at them in December 2013 session on the working document by submitted by Netherlands, United Kingdom, North Ireland and Germany.

25. The representative of the United Kingdom, on behalf of the Chair of the IWG on UN GTR No. 7 Phase2, gave a status of IWG progress. AC3 discussed about how to proceed on following objects as followed:

- (i) the measurement of height of head restraint and then
- (ii) the dynamic test

AC.3 preferred to proceed in a one-step approach, to consider a complete proposal, including a draft Addendum to M.R.1 and agreed to extend the mandate of the IWG until the end of 2015.

26. At the workshop that held in middle July 2013 at BAST, the backset measurement and dummy seating procedure had been examined. The workshop concluded that backset and also BioRID reference point (back of head) can be measured by coordinate measuring apparatus (without HRMD usage). On the other hand, the procedure for installation of BioRID will continue to examine.

27. NHTSA, JARI (Japan) and Chalmers University reported their research progress and discuss on recommended injury criteria.

NHTSA reported that best PMHS injury predictor is IV-NICrot with 50% chance of AIS 1+ injury and potential BioRID injury criteria as best PMHS injury predictor and Japan reported BioRID tentative injury criteria from WAD risk curve that corresponds to IV-NICrot.

Chalmers University research reported that correlation between real world insurance claims and specified model sled test performance indicates BioRID injury criteria.

The injury criteria will resume to discuss with one additional PHMS data and series of sled test by republished dummy which will conduct by VRTC.

28. PDB reported the status of dummy drawings check and it is almost ready to incorporate to addendum 1. (M.R.1). Informal working group will prepare an informal document to next GRSP. (GRSP-54-05) And this addendum included recommended five certification tests and inspection tests.

29. GRSP discussed on head restraint height requirement for taller people by comments from US, OICA and Netherlands. GRSP agreed to resume consideration of this agenda item on the basis of final proposals submitted by the IWG and of further justification concerning ECE/TRANS/WP.29/GRSP/2013/17 and to keep GRSP-54-18-Rev.1 and GRSP-54-23 as references.

30. Humanitecs report dummy certification update, especially the bumper in BioRID spine material (Urethane rubber) is unstable stiffness in its aging in informal working meeting February 2014. They reported update replacement of bumper material requires three to four month for delivering to VRTC testing. (WebEX in June 2014)

31. The representative of the United Kingdom, on behalf of the Chair of the informal working group, reported on the work progress of the group that expected delivery timeline for recommended injury criteria to GRSP December 2014 and recommended GTR7 phase 2 amendments to GRSP May 2015.

32. The small working group of injury criteria will be held in Berlin on 8 and 9 September in conjunction with IRCOBI 2014 meeting. And informal group meeting and other TEG (WebEX) meeting has planned between September and before GRSP December session 2014 for preparing the recommended injury criteria to GRSP.