



**Economic and Social  
Council**

Distr.  
GENERAL

ECE/TRANS/WP.29/AC.3/25  
18 December 2009

Original: ENGLISH

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**ECONOMIC COMMISSION FOR EUROPE**

**INLAND TRANSPORT COMMITTEE**

World Forum for Harmonization of Vehicle Regulations

Executive Committee (AC.3) of the 1998 Global Agreement

**PROPOSAL TO DEVELOP AMENDMENTS TO GLOBAL TECHNICAL  
REGULATION No. 7 CONCERNING HEAD RESTRAINTS<sup>\*/</sup>**

Technical Sponsor: Japan

The text reproduced below was adopted by the Executive Committee (AC.3) of the 1998 Global Agreement at its twenty-seventh session, in November 2009. It is based on document ECE/TRANS/WP.29/2009/130, which had been submitted by Japan, as amended by informal document No. WP.29-149-30 (ECE/TRANS/WP.29/1079, para. 102). This document shall be appended to the global technical regulation in conformity with paragraph 6.2.7. of the Agreement.

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<sup>\*</sup>/ In accordance with paragraph 6.2.7. of the 1998 Agreement (ECE/TRANS/180), the proposals to develop global technical regulations or their amendments shall be appended to them in the Global Registry. The present document is submitted in conformity with that mandate.

## **I. OBJECTIVE OF THE PROPOSAL**

1. The representative of Japan proposes the development of Phase 2 of gtr No. 7 and has incorporated the amendments proposed by the United State of America. <sup>2/</sup> He also proposes the establishment of an informal group for the development of this Phase. The informal group will discuss appropriate methods for testing and evaluating injuries due to rear impact crashes.

## **II. BACKGROUND**

2. At its one-hundred-and-forty-third 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).

3. At its one-hundred-and-forty-eighth session, in June 2009, the Executive Committee of the 1998 Agreement (AC.3) agreed on the two-step approach suggested by the representatives of the United Kingdom and of the United States of America. This approach will consider 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.

4. To address minor neck injuries (maximum abbreviated injury scale 1 (MAIS)) that occur in low speed rear impact crashes, insurance industry groups, such as the International Insurance Whiplash Prevention Group (IIWPG) (Insurance Institute for Highway Safety (IIHS) and Thatcham), have been conducting dynamic evaluations of seats. The European new car assessment programme (EuroNCAP) introduced dynamic evaluations of seats in 2008, and the Japanese new car assessment programme (JNCAP) introduced dynamic evaluations of seats in 2009. However, the testing and evaluation methods vary from one programme to another. Additionally, the European Enhanced Vehicle-safety Committee (EEVC) Working Group 12 has been investigating the appropriate dynamic test, to address minor injuries in low speed crashes, including the test procedure, injury criteria and the associated corridors for the BioRID II dummy. At its June 2009 session, AC.3 gave its consent to establish the informal group, under the chairmanship of the United Kingdom and with the technical sponsorship by Japan, to evaluate whether the BioRID II dummy can be used to develop an amendment to gtr 7 to reduce low speed rear impact injuries.

5. At higher speed rear impact crashes ( $\Delta V \geq 18$  km/h), there are as many minor injuries as recorded in the low speed crashes and there are a significant number of more severe injuries (MAIS 2 and MAIS 3) occurring in some countries. The United States of America is currently evaluating

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<sup>2/</sup> ECE/TRANS/WP.29/2008/115, ECE/TRANS/WP.29/2009/47 and ECE/TRANS/WP.29/2009/48

several dummies and a dynamic test that could address these injuries. As a second step, AC.3 will resume consideration of development of a high speed test at its November 2010 session.

### **III. SUBJECTS FOR REVIEW AND TASKS TO BE UNDERTAKEN**

6. With regard to head restraint height, the informal group should decide:
  - (a) How to define the effective height;
  - (b) The height requirements.
  
7. With regard to low speed dynamic test, the informal group should:
  - (a) Define test conditions that reflect accidents in the real world, including the performance of seat backs and head restraints as a system;
    - (i) Tests conducted on the whole vehicle as available on the market, and/or on production seats mounted on sleds;
    - (ii) Number and conditions of sled pulses;
  - (b) Working within the accepted knowledge concerning the mechanism of minor neck injury and other rear impact injuries, identify parameters that may be used to advance developments in occupant protection through, for example;
    - (i) Analyzing accidents;
    - (ii) Performing volunteer tests (low speed only) and simulations with human body finite elements (FE) models;
  - (c) Evaluate dummies that reflect the above mechanism with high fidelity to the human body and which demonstrate an acceptable level of perfection as a measuring instrument;
    - (i) In particular, the dummy evaluations shall include an assessment of their biofidelity in the critical areas associated with the safety technology under review, their repeatability and their reproducibility;
    - (ii) Define the dummy sitting conditions to minimise variation in test results;
    - (iii) Harmonize the test dummy and calibration test;
  - (d) Evaluate indicators of human body injury that reflect the minor neck and other rear impact injury mechanisms;

- (i) E.g. measure the relative movement between the upper and lower parts of the neck and the forces applied to each of these parts;
- (e) Define reference values which should be based on the results of injury risk analysis and feasibility studies.

8. With regard to evaluation, the informal group should evaluate the effects on reduction of injury and cost-effectiveness of the proposals.

#### **IV. WORK SCHEDULE**

9. In a first step (under the chairmanship of the United Kingdom and with the technical sponsorship by Japan)

- (a) In the year 2008
  - (i) June – Submission of the official proposal from the representative of Japan for the development of the Head Restraint gtr Phase 2 at the one-hundred-and-forty-fifth session of WP.29.
- (b) In the year 2009
  - (i) June – Approval by WP29/AC.3
  - (ii) December – 1<sup>st</sup> informal group meeting
- (c) In the year 2010
  - (i) February – 2<sup>nd</sup> informal group meeting
  - (ii) May – 1<sup>st</sup> progress report with new working schedule proposal
  - (iii) Date to be determined – 3<sup>rd</sup> informal group meeting
  - (iv) November - Report progress and resume consideration of the development of a high speed test at WP.29 AC.3
- (d) In the year 2011
  - (i) Low speed - gtr formal document submitted to GRSP
  - (ii) Low speed - gtr will be presented for vote to the WP.29

10. In a further step (discuss on high speed under [to be determined].)

(a) [To be determined]

(i) Higher speed – Dynamic test requirement draft submitted to GRSP

(ii) Higher speed - gtr formal document submitted to GRSP

(iii) Higher speed – gtr will be presented for vote to the WP.29

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