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**ECONOMIC COMMISSION FOR EUROPE**

**INLAND TRANSPORT COMMITTEE**

**World Forum for Harmonization of Vehicle Regulations**

One-hundred-and-forty-second session  
Geneva, 26-29 June 2007  
Item 5.4. and 18.1. of the provisional agenda

**1998 AGREEMENT**

Decisions by consensus vote on those elements of draft global technical regulations that have not been resolved by the Working Parties subsidiaries to the World Forum

United States of America position concerning the head restraint global technical regulation and issues for discussion by AC.3

Transmitted by the representative of the United States of America

The text reproduced below was transmitted by the representative of the United States of America in order to outline the policy decisions needed on the pending issues. It is based on the AC.3 decision taken at its March 2007 session and on informal document No. WP.29-141-23 (ECE/TRANS/WP.29/1058, para. 89).

## **I. INTRODUCTION**

1. During the one-hundred-twenty-sixth session of WP.29 of March 2002, the Executive Committee of the 1998 Agreement (AC.3) adopted a Program of Work, which includes the development of a global technical regulation (gtr) to address neck injuries in crashes. The United States of America (U.S.A.) volunteered to lead the group's efforts and develop a document detailing the recommended requirements for the gtr. The U.S.A. presented an informal document (WP.29-134-12) in November 2004 proposing the work and highlighting the relevant issues to be addressed in the gtr. This proposal was adopted at the March 2005 session of WP.29 (TRANS/WP.29/AC.3/13). At the November 2004 WP.29 session, the Executive Committee charged the Working Party on Passive Safety (GRSP) to form an informal working group on Head Restraints (working group) to discuss and evaluate relevant issues concerning requirements for head restraints and to make recommendations regarding a potential gtr.

2. Since that point the working group has met eight times, the last time in December 2006. The working group has been able to achieve consensus on many issues, but continues to have difficulties in resolving the larger issues concerning backset limits and how to evaluate active head restraints. The discussions of the working group are documented in their four Progress Reports, which have been presented to AC.3 and in a presentation given by the U.S.A at the March 2007 AC.3 session (WP.29-141-23).

3. This document outlines the main policy issues preventing resolution on backset limits and active head restraints. The U.S.A. recommends that AC.3 decide on these issues at the June 2007 WP.29 session and either provide guidance to the working group on how to continue or, if consensus cannot be reached, the gtr should be withdrawn.

## **II. DISCUSSION**

4. Whiplash injuries are a world-wide problem. In rear impact crashes annually it is estimated that there are 272,464 injuries in the U.S.A., 309,939 in Japan, 260,000 in Republic of Korea, and 340,000 in the European Community 15. Because the number of whiplash injuries is similar among the 1998 Agreement Contracting Parties, it is expected that the benefits gained from a gtr would also be similar.

### **A. Backset**

5. Reducing the backset between an occupant's head and the head restraint is an effective means to reduce the incidence and severity of whiplash injuries in crashes. In the U.S.A. Final Regulatory Impact Analysis concerning head restraints (working paper HR-1-3), we showed that by regulating the backset limit, we could increase the benefits of head restraints. In the current draft of the gtr, the working group recommends that backset can be measured using the H-point or the R-point as the initial reference point. The acceptance of the R-point measuring method is based on a new test procedure developed and presented to the working group in December 2006, by OICA. OICA expects to present the results of the validation of their test procedure by the May 2007 GRSP session.

6. Since the H-point method and the R-point method use different measuring tools, the measured backset result most likely will be different for the same seat. Using statistical analysis, we can estimate the R-point backset that produces the same benefits as the H-point backset.

7. At the September 2006 working group meeting, OICA and Japan each presented a method to measure backset using the R-point as a reference. From testing results of this earlier iteration of the OICA test method, the U.S.A. was able to estimate that the R-point backset was 15 mm less than the H-point backset (HR-7-12). Due to concerns with measurement variability, OICA revised the test procedure to that which they presented at the December 2006 meeting. This new method is very similar to the method presented by Japan. Japan's method also showed that the average R-point backset was approximately 15 mm less than the H-point backset, although there were only three measurements. Based on this prior research, the U.S.A. expects for OICA's revised test method that the R-point equivalent backset to be 10 – 15 mm less than the H-point backset.

8. When we examine the U.S.A. benefit analysis for regulating height and backset, we see that all the benefits for the front seat passengers come from regulating the backset. These benefits are achieved by improving the current situation in the U.S.A. fleet. For the gtr, the U.S.A. recommends a backset limit of 55 mm when measured from the H-point and 40 - 45 mm when measured from the R-point. At this limit there are significant benefits and the costs of the regulation are reasonable (Figure 1).

9. Other participants have argued that such a backset limit would pose serious challenges for manufacturers and force head restraints very close to occupant's heads, such that there would be many complaints from the public that the new head restraints were uncomfortable. To avoid these problems, these participants recommend a backset limit of 55 mm when measured from the R-point, which equates to a 70 mm limit when measured from the H-point. Based on the U.S.A. calculations, this higher limit would produce zero benefits in the U.S.A. and is unacceptable for the gtr.

10. The choice for the contracting parties is between establishing new requirements for backset in the gtr that will result in significantly fewer whiplash injuries than current head restraint systems, or establishing backset requirements that will require little change to existing head restraint systems. The latter choice will result in minimal burdens on the industry, minimal risk of public complaints about comfort, and minimal impact on current levels of whiplash injury in rear-end crashes.

11. Decisions to be made by AC.3:

- H-point backset limit at 55 mm; equivalent R-point backset limit at 40 - 45 mm
- H-point backset limit at 65 - 70 mm; equivalent R-point backset limit at 55 mm

## **B. Active Head Restraints**

12. The issues of backset limits and the evaluation of active head restraints are interrelated. Active head restraints automatically reduce the backset in a crash, thereby reducing the incidence and severity of whiplash. Because of their design, some active systems may not be able to meet static backset requirements in an undeployed position, but they are very effective in the real-world. Currently, there are many vehicles that have active head restraints. The U.S.A. wants to encourage the introduction of these advanced systems provided we can ensure comparable whiplash protection from these systems. To this end, the U.S.A., in its own regulation, has incorporated an optional dynamic test.

13. In drafting the gtr, the working group considered the U.S.A. dynamic test, but many expressed concerns about using the Hybrid III test dummy. The group also acknowledged that more research is needed to assess alternative test dummies. The working group considered developing a test procedure to activate an active head restraint system and measure it statically in the deployed position. Unfortunately, this idea could not be realized because the discussion led back to which dummy to use to activate the system. As a final idea, some participants of the working group discussed requiring a less stringent backset for active systems. This concept was contingent on being able to provide a definition for active systems, which has previously proved to be difficult for the working group, and providing a plan with a timeline to develop a whiplash dummy and dynamic test.

14. The U.S.A. took the approach of testing active head restraints in a simulated crash. In this case, a backset requirement is not needed, because the dynamic test checks the performance of the system. The U.S.A. agrees that the Hybrid III dummy was not designed to measure whiplash, but until a better dummy is developed, this test and dummy assures that the occupants of seats with active head restraints are protected. We do not agree with the approach of providing a less stringent backset for active head restraints, because this approach provides no assurance that occupants will actually be protected in a rear crash. If an active system does not work, a less stringent backset requirement will result in much less protection for the occupant.

15. Decisions to be made by AC.3:

- Use the only currently available dynamic test (from the U.S.A.) and the Hybrid III dummy as interim measures and work toward developing a better dynamic test and a better rear impact test dummy.
- Allow Contracting Parties to define and regulate an active head restraint and leave a placeholder in the gtr until a better dynamic test and dummy have been developed.

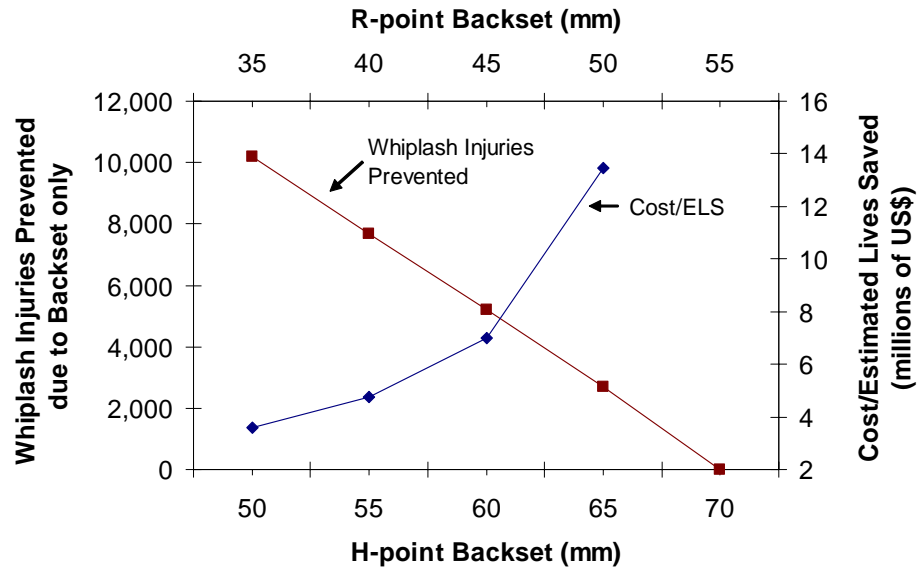


Figure 1

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