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(86th GRSG, 19-23 April 2003,
agenda item 4.)

Informal document No. ~~8~~
(~~131st WP.29, 11-14. November 2003,~~
~~agenda item:3.5.4.)~~

Proposal to develop **new regulation(s)**

**PROTECTION OF BUS OCCUPANTS IN CASE
OF ROLLOVER ACCIDENT**

(STRENGTH OF SUPERSTRUCTURE)

Transmitted by the representative of Hungary

according to para.39. of the Report of WP.29. 130. session (TRANS/WP.29/926) which says:

“The delegate from Hungary underlined the special problems of the high deck and double deck buses in case of rollover accidents. He raised his concerns about the current rollover test requirements for these vehicles and recalled three severe accidents. WP.29 supported, in principle, future efforts and activities in GRSG to avoid these accidents and to reduce their consequences, but recalled the need to have a previous working document before authorizing any new activity.”

This proposal follows the „Guidelines regarding proposing of gtr” (TRANS/WP.29/882) but the outcome – depending on the decision of WP.29 – could be:

- a modified version of the new ECE R.66, or
- a new annex 4. to the unified ECE bus regulation R.107/Rev.1. (TRANS/WP.29/2003/71)
- and/or a new gtr

Therefore this proposal relates generally to new regulation(s)

1. OBJECTIVE OF THE PROPOSAL

1.1 The objective of the proposed new regulation(s) is to protect the occupants of buses in case of rollover accident:

- all categories of buses (vehicle category 1-2 in the resolution gtr-0) should be involved
- structural integrity (strength of superstructure) and integrity of survival space should be regulated.

1.2. There are three ECE regulations dealing with the general construction of buses and coaches:

Reg.36.	Large buses
Reg.52.	Small buses
Reg.107.	Double decker buses

Now these three regulations – using the example of EU directive 2001/85/EC – will be integrated into one regulation. Now the existing ECE Reg.66 (Strength of the superstructure of large buses) covers only the buses belonging to Reg.36. The integrated bus regulation will need an extended regulation for the strength of superstructure.

Working out new regulation(s) for all bus categories (Strength of superstructure) it could be adopted to the new, integrated ECE bus regulation, and/or could be a gtr as well. That means, these regulations could be developed parallel like other gtr and ECE regulations. This could result harmonised technical requirements and test methods for both gtr and ECE regulations in this subject.

2. BACKGROUND OF THE PROPOSAL

2.2. Old and new accident statistics have been presented in GRSG about bus rollover accidents:

- I. 78th GRSG, April 2000, informal doc. No.6
- II. 80th GRSG, April 2001, informal doc. No.5.
- III. 83rd GRSG, October 2002, informal doc. No.7
- IV. 84th GRSG, May 2003, informal doc. No.4
- V. 85th GRSG, October 2003, informal doc. No.1.

More than 230 rollover accidents were collected and analysed in these documents which could give good basis to the technical discussions. Further informal documents could be also considered, like:

- 83rd GRSG, October 2003, informal doc. No.6
(The problem of high-deck coaches in the standard rollover test)
- 83rd GRSG, October 2003, informal doc. No.10
(Brief description of a serious bus rollover accidents)

2.2. Both the accident statistics mentioned above and arguments of the vehicle lateral stability (the ratio of the CG's height and track) prove that the high buses (HD and DD) as well as the small buses have increased risk for rolling over, compared to the traditional large buses, in the same situation.

2.3. The existing national regulations (see ADR, SANS and FMVSS in para.3.3.) show that there is an international demand and tendency to extend the scope and validity of the existing ECE Reg.66. to other bus categories, too. This is a logical demand and effort which could be harmonised in the new regulation(s).

- 2.4. The European Commission also raised the question of the minibuses – regarding to their strength of superstructure – in its Memorandum dated on 16. May. 2002. and asked for the extension of the scope of Reg.66. to the small buses in GRSG.
- 2.5. In the “Results and Conclusions” of the ECBOS project, (sponsored by European Commission in 5th Framework) it is urged to extend the scope of regulation R.66 and the directive 2001/85/EC to the small buses too.

3. DESCRIPTION OF THE PROPOSED NEW REGULATION(S)

3.1 The philosophy of the proposed new regulation(s) could be similar to that one used in ECE Reg.66:

- in a standardised rollover accident – which could be the basis of the approval test,
- the strength of the superstructure shall assure
- a well defined unharmed survival space
- in which the restrained passengers have high level probability to avoid serious injury.

3.2. The standardised rollover test could be similar to the basic approval test used in Reg.66: the bus – without any kind of speed – rotates down into a well defined ditch. The only thing to be considered is the geometry of the ditch which should be adjusted to all categories of buses. This question has to be studied and discussed.

3.3. Other equivalent approval tests methods may be also specified in the new regulation(s), similarly to Reg.66.

3.4 It is important to emphasise that it does not seem to be necessary:

- to develop new test method, test technology
 - to introduce new instrumentation
 - to develop new calculation method
- All of these may be based on the existing practices.

3.5. The frame of the new regulation(s) could be:

- Scope and purpose, application
- Definitions
- General requirements: precise formulation of the ideas given in para. 3.1 and 3.2
- General specifications: considerations (if any) for the individual bus categories, like articulated buses, bus families (group of buses) etc.
- Basic test method: rollover test with complete vehicle. Test conditions and procedure
- Optional equivalent test methods, like body section rollover test, quasi-static test, calculation, simulation, etc. (Could be 4-5) Test conditions and procedures.

4. EXISTING REGULATIONS AND STANDARDS

There are no regulations in the Compendium of Candidates. The following international regulations and national documents are available as technical references, examples in developing the new regulation(s)

4.1. Regulations of Economic Commission for Europe (ECE)

ECE Reg.66. Uniform provisions concerning the approval of large passenger vehicles with regard to the strength of their superstructure. This regulation is in force.

ECE Reg.66. /Rev.1. Uniform provisions concerning large passenger vehicles – The strength of their superstructure.

The new draft is under discussion in GRSG (TRANS/WP.29/GRSG/2003/25.)

4.2. Directives of European Commission (EC)

2001/85/EC Special provisions for vehicles used for the carriage of passengers comprising more than 8 seats in addition to the driver's seat. Annex IV – Strength of superstructure

4.3. National standards/regulations

Australia

ADR 59/00 Omnibus rollover strength
Modified version of ECE Reg.66.
Applicable for light and heavy omnibuses
Obligatory

South Africa

SANS 1563 The strength of large passenger vehicle superstructures (rollover protection)
Application for M2 and M3 vehicles, where the passenger capacity is over 16
Obligatory

United States of America

FMVSS 220 School bus rollover protection
Applicable for school buses
Obligatory
