

REPORT OF THE IG/R.66 MEETING
(Held in Warsaw, 17-18 June, 2008)

1. The expert group IG/R.66 was invited by the institute ITS (Mr J.W. Kownacki) to hold its 6th meeting in Warsaw. The list of participants is given in Annex 1. (21 participants)
2. Based on a preliminary agenda, the final one was agreed at the meeting. Four subject groups were planned for discussion, they are shown in Annex 2, together with the associated working documents. The complete list of the IG/R.66 working documents is given in Annex 3.
3. The main ideas and results of the presentations and discussions are summarised briefly below.

4. Collecting further information

French expert presented a DEKRA (German institute) document dealing with bus accidents. Some interesting figures from the document:

- around 1 million buses and coaches are in service in 24 European countries.
- in 15 countries 684 fatalities occurred in the year 2000 involving buses (Germany, France and Spain produced the 63% of this figure)
- among the bus accidents in which at least one bus occupant was seriously injured or killed, the rollover takes place with 18% in the DEKRA database.

The Spanish expert presented additional and enhanced information to that given at the previous meeting in Madrid. INSIA had analysed the geometrical, mass, and CG parameters to that of 1880 M2 and M3 category vehicles, being approved (or having the approval extended) during the time interval 1993-2008 on the basis of Reg.66.00. and R.66.01. Small buses and double-deck coaches are not in the sample. Some basic technical parameters were:

- Total length: 5,9 – 18 m (7 bus were longer than 18 m)
- Total height: 2,5 – 3,91 m
- Unladen kerb mass: 2,5 – 18 tonnes
- Height of CG (unladen): 0,97 – 1,68 m

There are no exact, well defined technical limits (from below and above) between the “large buses” being covered by Reg.66 and the small buses and double-deck coaches being out of the scope of Reg.66.

5. Information about the work of Polish-American team

Polish expert informed the expert group about the team's work to prepare safety standard for small (paratransit) buses in case of rollover and side impact accidents. He pointed out the four major phases of the work:

- Elaboration of FEM technology with this purpose (this phase is finished)
- Elaboration of three-levels test system: material properties, behaviour of joints and real rollover test (this phase is also finished)
- Drafting and introducing the safety standard (being under way)
- Further activity to reach the obligatory use of the standard.

The expert informed the group about the activities in USA collecting bus accident information and he mentioned that the rollover of buses has a rate of 29% among the bus accidents having occupant injury. An analysis is going on to compare the effectiveness of FMVSS 220 and ECE Reg.66.

6. Preparation of Summary Document to GRSG

On the basis of a German proposal tabled at the previous meeting in Madrid the expert group began drafting a Summary Document, but was unable to finish it. Since then: seven experts had sent comments or proposals to the German expert (Mr. Becker) who improved the draft accordingly.

GRSG gave more tasks to the expert group in the ToR. Briefly:

- a) Collect and evaluate the available accident statistics and information
- b) Propose the bus categories to be included in the scope of Reg.66, if needed
- c) Draft a proposal for modification of Reg.66, if needed; and
- d) Propose other possible actions to enhance safety in bus rollover accidents.

Finishing the task "a" the group decided to concentrate on task "b". All these efforts and the proposals of the group are summarised in the Summary Document to be presented to GRSG.

The group finished the discussion of the Summary Document and agreed on the final text. The German expert will circulate this improved text among the participants for further comments. The group agreed to propose only editorial changes.

The expert from IRU could not participate at the meeting but he presented his concern about the increased mass of the superstructure above the CG of a double-deck coach which the manufacturer might need to add to comply with R.66. He would prefer the application of an ESC system to avoid rollover rather than ensuring survival space.

The Hungarian experts expressed his strong dissenting opinion with the proposal of the majority of the group. He proposes to extend the scope of Reg.66 to small buses (Class B) and DD coaches without any limitation. The arguments of this opinion will be presented to GRSG in a separate informal document to. The French professional accidentologist from CEESAR strongly expressed his dissenting position with the proposal of the majority of the group regarding DD coaches and insisted that he is clearly disassociated from the decision taken by the majority of the group. Based on DD coach accidents that he has studied, for his own professional credibility and for his

own peace of mind he can not be associated with any decision that does not mandate compliance with Reg.66 for DD coach.

If GRSG accepts the proposal given in the Summary Document, the group is ready to perform task “c”.

7. Enhanced safety of occupants in rollover

In this subject group 5 working documents were prepared for discussion (see Annex 2) These documents are dealing with the following subjects:

- The possible fields of increasing passenger safety in rollover accidents of buses
- Emergency exits: new approach to determine their number and location
- Laminated glass as side window; and
- Effectiveness of different safety belts to avoid undesirable motion of passengers.

There was no time to discuss these subjects and prepare proposals to GRSG. If GRSG decides so, the group is ready to prepare proposals in these subjects. These subjects are out of the scope of Reg.66, they belong to other regulations, mainly to Reg.107. The possible goals of these proposals could be:

- to reduce the ejection of passengers (partial and total)
- to increase the escape possibility of the passenger through emergency exits.

8. Others

- 8.1. The group agreed how to proceed with the Report of the meeting.
- 8.2. The final, approved version of the Report and the Summary Document will be sent together, to the UNECE Secretariat by the chairman in September.
- 8.3. The possible next meeting of IG/R.66 depends on the decision of GRSG whether to accept the group’s proposals. Therefore the group did not decide anything about the next meeting.

LIST OF PARTICIPANTS

Name	Country	Institution, company, organization
Harry Jongenelen	Netherlands	RDW
Pascal Reyntjens	Belgium	Van Hool
Alan Davis	France	IRISBUS
Dariusz Michalak	Poland	SOLARIS
Leslaw Kwasniewski	Poland	Warsaw Techn. Univ.
Jean-Paul Delneufcourt	EU	European Commission
Petr Pavlata	Czech Republic	VCA
Teresa Vicente	Spain	INSIA-UPM
Patric Botto	France	CEESAR
Michael Becker	Germany	EVOBUS
Allan McKenzie	UK	SMMT
Annie Luchie	Belgium	CLCCR/AGORIA
Mátyás Matolcsy	Hungary	GTE
Jerzy W. Kownacki	Poland	ITS
Cristophe Delleville	France	PSA Peugeot Citroen
Ondrej Vaculin	Czech Republic	Tüv Süd Auto Cz
Parshant K Benerjee	India	Tata Motors
Zbigniew Barszcz	Poland	Pimot
Wojciech Przybylski	Poland	ITS
Slawomir Cholewinski	Poland	ITS
Filip Skibinski	Poland	ITS

The following experts excuse themselves by e-mail

Sándor Vince-Pap	Hungary	JÁFI-AUTÓKUT
Giulio Mendogni	Italy	VECO
Francisco Aparicio	Spain	INSIA
Colin Copelin	UK	IRU

SUBJECT GROUPS AND BELONGING WORKING DOCUMENTS

A) Collecting further information

- GRSG-IG/R.66 - 6 - 1 Accident overview and selection of scenarios
In Germany and Europe ... (French)
- 6 - 3 Geometrical analysis of current coaches: implication in roll-
over tests ... (Spanish)

B) Information about the work of the Polish-American team

- GRSG-IG/R.66 - 6 - 4 (Polish)

C) Preparation of the final report to GRSG

- GRSG-IG/R.66 - 4 - 18/Rev.2 Summary document (German)
- 6 - 2 Commission position paper regarding (EC) the extension of
the scope of Reg.66

D) Enhanced safety of occupants in rollover

- GRSG-IG/R.66 - 5 - 1 Possibilities to enhance... (Chairman)
- 5 - 2 Emergency exits and their use... (Hungarian)
- 5 - 10 Draft communication regarding emergency windows. (EC)
- 5 - 5 Some thoughts about... (Hungarian)
- 4 - 9 Information to the discussion of the safety belts (Hungarian)

LIST OF WORKING DOCUMENTS

Number	Title	Document by
<i>Madrid meeting</i>		
GRSG-IG/R.66-1-1	The working method of IG/R.66	Chairman
GRSG-IG/R.66-1-2	Preliminary time-table of IG/R.66	Chairman
GRSG-IG/R.66-1-3	Accident statistics and accident analysis (Available sources)	Chairman
GRSG-IG/R.66-1-4	Required protection level for all bus categories in rollover (Possible approach)	Hungarian expert
GRSG-IG/R.66-1-5	The rollover process and the severity of rollover accidents, considering all bus categories	Hungarian expert
GRSG-IG/R.66-1-6	Requirements on extending the scope of R.66 (The first reflections, starting to think about it)	Hungarian expert
GRSG-IG/R.66-1-7	Agenda of the Madrid meeting	Chairman
GRSG-IG/R.66-1-8	Spanish accidents with buses involved injury mechanism analysis	Spanish expert (INSIA)
<i>Warsaw meeting</i>		
GRSG-IG/R.66-2-1	Bus rollover accident analysis (Children injury mechanisms...)	French expert
GRSG-IG/R.66-2-2	Bus rollover statistics from Hungary	Hungarian expert
GRSG-IG/R.66-2-3	World wide information about bus rollovers	Hungarian expert
GRSG-IG/R.66-2-4	Available technical publications	Hungarian expert
GRSG-IG/R.66-2-5	Accidents with buses in Germany	German expert
GRSG-IG/R.66-2-6	German bus accidents, reported by the Hungarian media	Hungarian expert
GRSG-IG/R.66-2-7	Remarks to the ECBOS summary report	Hungarian expert
GRSG-IG/R.66-2-8	Czech Overall Statistic Data	Czech expert
GRSG-IG/R.66-2-9	APSN Workshop (Bus and Track Safety)	Czech expert
GRSG-IG/R.66-2-10	Structural response of paratransit buses in rollover accidents	Polish expert
GRSG-IG/R.66-2-11	Spanish rollover statistics 1995-2004	Spanish expert
GRSG-IG/R.66-2-12	In depth analysis of DD coach rollover	Spanish expert

Budapest meeting

GRSG-IG/R.66-2-5/Rev.1	Accidents with buses/coaches in Germany	German expert
GRSG-IG/R.66-3-1	Regulatory background to the scope of R.66	Hungarian expert
GRSG-IG/R.66-3-2	Deformation mechanism of bus superstructures in rollover	Hungarian expert
GRSG-IG/R.66-3-3	Rollover accidents in Norway	Norwegian expert
GRSG-IG/R.66-3-3/Add.1	Extended Norwegian working document	Norwegian expert
GRSG-IG/R.66-3-4	More detailed analysis of DD coach and SB rollover accidents	Hungarian expert
GRSG-IG/R.66-3-5	Possibilities to enhance occupant safety in bus rollover accidents	Hungarian expert
GRSG-IG/R.66-3-5/Rev.1	Improved version of the original doc.	Hungarian expert
GRSG-IG/R.66-3-6	Double deck bus accident in Germany	German expert
GRSG-IG/R.66-3-7	Accident investigation on minibuses (M2 Class B)	German expert
GRSG-IG/R.66-3-8	Considerations to the extension of the scope of R.66	Chairman
GRSG-IG/R.66-3-9	Test results and remarks on midi bus rollover safety	Hungarian expert
GRSG-IG/R.66-3-10	Crash and safety assessment program for paratransit buses	Polish expert
GRSG-IG/R.66-3-11	Draft crash and safety standard for paratransit buses	Polish expert
GRSG-IG/R.66-3-12	US-Polish task group for small bus rollover simulation address to the Informal Group	Polish expert
GRSG-IG/R.66-3-13	UK contribution to IG/R.66 meeting in 2007 Budapest	UK expert
GRSG-IG/R.66-3-14	Coach roof structure deformation analysis for real world coach accidents to ECE R.66 regulation	French expert
GRSG-IG/R.66-3-15	Some information about two new DD coach accidents	UK and Hungarian experts
GRSG-IG/R.66-3-16	Bus sales and registrations in Czech Republic	Czech expert

Prague meeting

GRSG-IG/R.66-4-1	Preventing passenger ejection from buses, coaches and minibuses	UK expert
GRSG-IG/R.66-4-2/rev.1	Considerations to the extension of the scope of R.66 to all bus categories	Chairman
GRSG-IG/R.66-4-3	Applicability of the approval tests to DD coaches and small buses	Hungarian expert
GRSG-IG/R.66-4-4	Summarized statistical information about DD and SB rollover accidents	Hungarian expert

GRSG-IG/R.66-4-5	Some experiences with windows and windscreens in bus rollovers	Hungarian expert
GRSG-IG/R.66-4-6	Dutch overall statistical data with regard to buses and coaches	Dutch expert
GRSG-IG/R.66-4-7	Emergency exits and their use on buses focusing on rollover accidents	Hungarian expert
GRSG-IG/R.66-4-8	Buses and coaches – running park and new registrations	Italian expert
GRSG-IG/R.66-4-9	Information to the discussion of the effectiveness of 2pts versus 3 pts belts	Hungarian expert
GRSG-IG/R.66-4-10	Not finished and not circulated	
GRSG-IG/R.66-4-11	Data about the number of registered buses, bus categories and bus rollover accidents	Chairman
GRSG-IG/R.66-4-12	Official statistical data on minibuses, buses and coaches	Belgian expert
GRSG-IG/R.66-4-13	Questionnaire for European experts on coaches and buses	Spanish expert
GRSG-IG/R.66-4-14	Comparative study for coach accidents (Standard and DD coaches)	French expert
GRSG-IG/R.66-4-15	Large passenger, goods and agricultural vehicle safety...	UK expert
GRSG-IG/R.66-4-18	Summary document	German expert

Madrid meeting

GRSG-IG/R.66-5-1	Possibilities to enhance safety in bus rollover accidents	Chairman
GRSG-IG/R.66-5-2	Emergency exits and their use on buses, focusing on the rollover, but considering every accident situation	Hungarian expert
GRSG-IG/R.66-5-3	Some new rollover information	Hungarian expert
GRSG-IG/R.66-5-4	Viewpoints to the extension of the scope of R.66 to all bus categories	Hungarian expert
GRSG-IG/R.66-5-5	Some thoughts about the side windows from laminated glazes	Hungarian expert
GRSG-IG/R.66-5-6	French statistics on the vehicle park and accidents	French expert
GRSG-IG/R.66-5-6 /Add1	Bus and coach general accidentology data	French expert
GRSG-IG/R.66-5-7	Possible frame (structure) to the scope of R.66 in the future	Hungarian expert
GRSG-IG/R.66-5-8	Dynamic response and crashworthiness of paratransit buses	Polish expert
GRSG-IG/R.66-5-9	Bus and coach market in Poland	Polish expert
GRSG-IG/R.66-5-10	Draft communication regarding emergency windows	EC expert
GRSG-IG/R.66-5-11	Proposals to working document GRSG-IG/R.66-4-18	Hungarian expert

GRSG-IG/R.66-5-12	Geometrical analysis of current coaches	Spanish expert
GRSG-IG/R.66-5-13	Coach rollover crash, Arboga	Swedish expert
GRSG-IG/R.66-5-14	Minibus M2. Fatal accident reports	French expert
GRSG-IG/R.66-5-15	Total number of bus registrations in Czech Republic between 2002-2008	Czech expert
<i>Warsaw meeting</i>		
GRSG-IG/R.66-6-1	Accident overview and selection of scenarios in Germany and Europe DEKRA presentation on DEKRA symposium	French expert
GRSG-IG/R.66-6-2	Commission position paper regarding the extension of the scope of R.66.	EC expert
GRSG-IG/R.66-6-3	Geometrical analysis of current coaches: implications in rollover tests	Spanish expert
GRSG-IG/R.66-6-4	Structural integrity and safety of public transit buses. (2008 update on papers)	Polish expert
GRSG-IG/R.66-4-18 /Rev.2.	Summary document, revised version	German expert