Informal document No. **GRSG-94-03**
(94th GRSG, 21- 24 April 2008
Agenda item: 2)

REPORT OF THE IG/R.66 MEETING

(Held in Madrid, 17-18 January, 2008)

Transmitted by the Chairman of the Group

1. The expert group IG/R.66 was invited by Prof. Aparicio (INSIA) to hold its 5th meeting in Madrid. The list of participants is given in Annex 1. The meeting was chaired by dr. Matolcsy Mátyás (Hungary)

2. The final agenda of the meeting was agreed at the scene, the 4 subject groups and the belonging working documents for discussion are shown in Annex 2. These documents were distributed among the participants of IG/R.66. 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 listed briefly below.

4. Collecting further information

The expert group continued to collect information about the extent of bus fleets in different countries and the distribution of bus categories, about rollover accidents and accident statistics, etc. The comparison of the different data, statistics is rather difficult, because the countries are not using the terms, definitions, categorisation used in the ECE regulations.

French, Polish, Czech statistics have been shown. Considering these data Annex 4 has been developed and it summarizes all the information collected by the group during its meetings.

French experts (IRISBUS, CEESAR) showed a bus accident statistics collected in the years 1980-2005, containing 94 accidents. Some interesting information:

- Among the accidents in which at least one bus occupant was seriously injured, the rate of frontal collision/rollover is almost the same: 45%/42%.
- The rate of the double deck coaches in this statistics is 5% and the risk of fatality in these vehicles is twice as that of the single deck coaches.
- The cause of injuries, the injury mechanisms are as follows:
  - Projection in the passenger compartment, mainly slight injuries 63%
  - Intrusion caused by the superstructure deformation, mainly fatal and serious injuries 18%
  - Complete ejection, mainly fatal and serious injuries 8%
  - Partial ejection, mainly fatal and serious injuries 5%
  - Asphyxiation, mainly fatal 6%

Swedish expert presented a rollover accident of a high decker coach, the superstructure collapsed (9 fatalities and 42 injuries) The bus had a certain – not specified – driving speed in the accident, but the roof deformations were due to the lateral impact forces.

French expert (PSA Peugeot- Citroen) informed the group about fatal accidents involving small buses on the French territory. For two years period (2001-2003) of observation, a total of 10593 fatal road accidents were collected. 80 involved buses and coaches. 6 happened to small buses, among which 1 was rollover (11 occupants, 3 fatalities, 5 injuries – one ejection)

Czech expert showed a rollover accident of a double deck coach in 2003, rolling down on a slope with a complete rotation (19 fatalities, 37 injuries among which 27 were serious)

The Hungarian expert completed the Hungarian bus rollover statistics (105 bus rollovers during 8 years among which 4 happened to DD coaches and 44 to small buses) and showed two special rollover accidents – happened similarly to one DD and one HD coach – having less than 90^{o} rotation while the coaches landed on a rising wayside. He called the attention to the UK presentation given on the Prague meeting that although UK did not support to extend the scope of R.66 to DD coaches, their statistics contained 26 DD bus rollover accidents altogether with 242 injuries, but there was no fatality.

The Spanish expert presented an analysis using 1500 coaches being approved on the basis of R.66. They studied the main geometrical parameters and mass data (length, overall height, height of CG, drop of the CG, empty mass, mass of passengers, etc.) and their correlations.

Some new information were presented about the approval methods used in different countries chosen by the manufacturers in relation to R.66. The list of the improved information:

- The Nederland: mainly computer simulation, but the full scale bus rollover test (basic test) was also used
- Spain: quasi-static calculation (based on laboratory test results)
- UK: quasi-static calculation
- Hungary: quasi-static calculation and full scale bus rollover test (in the last 5 years about 15 approvals were made)
- Belgium: quasi-static calculation
- France (UTAC): quasi-static calculation
- EVOBUS (Germany): dynamic computer simulation after correlation of the simulation/calculation with full scale rollover tests and testing of parts those contribute to the strength of superstructure.
- Czech Republic: quasi- static calculation (In the last 8 – 9 years around 35 approvals and extension of approvals were issued in Cz.R. 50 – 70 were made by Czech technical services and the difference in approval were made in other countries)

5. Information about the work of the Polish-American team.

Polish expert gave a power point presentation about the team's work, in the frame of which a safety standard has been drafted for Florida state (USA). The scope of this stan-

dard covers small (paratran0ist) buses giving requirements and approval test methods for roof strength in rollover and protection of passengers in side impact. The roof strength requirements are based on regulation ECE R.66 (standard rollover test, residual space) but it standardizes the method of computer simulation and this description differs from R.66. The draft standard is ready, now the validation works are going on concerning both the prescribed laboratory tests and computer simulations. Different paratransit buses are considered (different constructions, materials, technologies, etc.) they are checking the energy criteria, energy balance as well.

6. Preparation of the final report to GRSG

German experts – as they offered and undertook on the Prague meeting – prepared a draft. The expert group decided to go through the draft paragraph by paragraph and make the proposed and accepted modifications, corrections. It was agreed that the tables will be taken out from the text and will be annexed at the end of the text.

In the lack of time the group could not finish the discussion of the whole draft. It was agreed that all experts may send their further comments, proposals to the German experts, who will prepare an improved draft for the next meeting for final discussion. The group hoped that they can finish this discussion on the next meeting. This report will concentrate to the question of the scope of R.66 (extension of the scope) giving proposals to GRSG. The other tasks given in the ToR of the expert group will be treated on the basis of GRSG decision.

The experts had a preliminary exchange of view about the extension of the scope of R.66 on the basis of which the final proposal may be drawn up on the next meeting.

The further working documents belonging to this subject group (see Annex 2) were not discussed because the lack of time.

7. Enhanced safety of occupants in rollover

There were 7 interesting working documents on the agenda (see Annex 2) dealing with the emergency exits, laminated side windows on buses, safety belts, etc. but the lack of time did not give opportunity for their discussion.

8. Others

The group agreed how to proceed the Report of the meeting.

IG/R.66 was invited to hold its next meeting in Warsaw, in ITS. The meeting will be in June, there two preliminary possibilities: 12-13 of June or 19-20 of June. Until the next GRSG meeting in April the final date will be agreed by the hosts and the chairman and the IG/R.66 members will be informed.

Annex 1.

LIST OF PARTICIPANTS

Name	Country	Institution, company, organization
Harry Jongenelen	Netherlands	RDW
Pascal Reyntjens	Belgium	Van Hool
Alan Davis	France	IRISBUS
Bohuslav Kovanda	Czech Republic	TÜV-SÜD Auto Cz
Colin Copelin	UK	IRU
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
Johannes Lukaszewicz	Germany	BMVBS
Michael Becker	Germany	EVOBUS
Allan McKenzie	UK	SMMT
Annie Luchie	Belgium	CLCCR/AGORIA
Mátyás Matolcsy	Hungary	GTE
Rocio Grimaldi	Spain	INSIA
Francisco Aparicio	Spain	INSIA
Jerzy W. Kownacki	Poland	ITS
Jan Petzall	Sweden	Road Administration
Cristophe Delleville	France	PSA Peugeot Citroen
Claude Brion	France	Renault

The following experts excuse themselves by e-mail

Sándor Vince-Pap	Hungary	JÁFI-AUTÓKUT
Juhani Intosalmi	Finland	Vehicle Administration
Giulio Mendogni	Italy	IVECO
Ras Hashemi	UK	CIC

Annex 2.

SUBJECT GROUPS AND BELONGING WORKING DOCUMENTS

A) Collecting further information

GRSG-IG/R.66	- 5 - 6	French statistics …(French)
	- 5 -6/Add1.	Bus and coach general… (French)
	- 5 - 3	Some new rollover information (Hungarian)
	- 5 - 9	Bus and coach market in Poland (Polish)
	- 5 -12	Geometrical analysis… (Spanish)
	- 5 -13	Coach rollover crash… (Swedish)
	- 5 -14	Minibusz M2. Fatal accident reports (French)
	- 5 -15	Total number of bus… (Czech)
	- 4 - 14[(1)]	Extracts from a FISITA paper… (French)
	- 4 - 15[(1)]	Large passenger, goods and… (UK)

P.P. presentation about a DD coach rollover accident (Czech)

[(1)] Having the written form of the earlier PP presentations, the expert may come back to these subjects by comments, questions

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

GRSG-IG/R.66	- 5 - 8	Dynamic response and crashworthiness… (Polish)

C) Preparation of the final report to GRSG

GRSG-IG/R.66	- 4 - 18	Summary document (German)
	- 5 - 4	Viewpoints to the extension… (Chairman)
	- 5 - 7	Possible frame … (Hungarian)
	- 5 - 11	Comments and proposals… (Hungarian)

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)

Engineering requirements for train windows… (UK)
(Change of opinion about this document)

Annex 3.

LIST OF WORKING DOCUMENTS

Number	Title	Document by
	Madrid meeting	
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)
	Warsaw meeting	
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 paratranzit 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

Annex 4.

DATA ABOUT THE NUMBER OF REGISTERED BUSES, BUS CATEGORIES AND ABOUT BUS ROLLOVER ACCIDENTS

1. **Norway** (GRSG-IG/R.66-3-3 and -3-3/Add.1)

1.1. Total number of buses (2005) 28.783

Class I.	1.809
Class II	3.876
Class III	2.024
Small bus	
17<PC<22	2.832
PC<17	18.242

1.2. Rollover accidents (2002-2005)

Class II and III	33
Class A and B	9

1.3. Casualties in rollover

Fatality	5
Serious injury	13
Slight injury	166

In the presentation 6 bus rollover accidents were shown, one among these happened to a DD coach in 2006.

2. Czech republic

2.1. The yearly bus registration figures in Czech Republic (GRSG-IG/R.66-3-16)

	2004	**2005**	**2006**
All new and used buses	1037	908	1129
Only new buses	954	816	944
Class I.	237	159	279
Class II	569	489	476
Class III	57	67	91
M2	63	51	39
Others	28	50	59

2.2. The number of registered buses in Czech Republic (GRSG-IG/R.66-5-515)

	2004	**2005**	**2006**	**2007**
M2	1.037	3.534	3.460	3.418
M3	12.836	13.345	13.826	14.203
Total	19.948	20.134	20.327	20.414

3. Germany

3.1. Data about bus fleet

The number of registered DD buses and coaches together in Germany is 1850 (January, 2007). The estimated ratio of DD city buses in this figure could be 2-3 %, the high majority is tourist coach. The production of DD coaches is in the range of 180-200 units/year. The number of small buses (M2) is under investigation.

3.2. Accident and casualty data (GRSG-IG/R.66-2-5/Rev.1; GRSG-IG/R.66-3-7)

German overall accident data, 2004

All road accidents in this year: 2.261,689

	All road users	Bus and coach occupants
fatalities	5.842	16
Serious injuries	80.801	460
All casualties	445.968	4.994

3.3. GIDAS (Hanover and Dresden area) data base (1995-2005)

Reconstructed road accidents: 8.717
Among these buses and coaches: 20
minibuses: 6

Rollover accidents of buses
large buses 2
among these DD 1
minibuses (class B) 3

4. Belgium (GRSG-IG/R.66-4-12)

4.1. The bus fleet in 2004

large buses and coaches 15.281
minibuses 18.794
total: 34.075

Yearly new registrations (2002-2004)
large buses and coaches 900-1100
minibuses 300-1400

Remarks: minibus means < 3,5 tons
Large bus and coach means < 3,5 tons
In which the rate of small buses is about 10%

4.2. Casualty figures (2000-2002)

KSI in all road users	31.315
KSI in all buses	157
Fatality in all road users	4.309
Fatality in large buses	6

5. UK (the data were given by SMMT, at end 2005)

Number of registered large buses (M3)	101054
among these DD bus and coach (DD coach around 5%)	19600
Large bus yearly registration	6000-7500
Number of registered small buses (< 17 passengers)	88500
Small bus yearly registration	5000-6500

6. Hungary (GRSG-IG/R.66-3-4)

6.1. The total bus fleet in Hungary (2005) 17.855

Estimated values for different categories

Class I		3500-4000
Class II		9000-9500
Class III		1400-1450
among these HD	300-350	
DD	20-25	
Class A		-
Class B		3100-3200
Others, not specified		100-200
New registrations per year		800-900

DD ratio in fleet of Class II and III	25/10.600	≈ 0,23%
DD accident ratio in all rollovers	3/97	≈ 3,20%
SB ratio in total fleet	3200/17,855	≈ 7,90%

6.2. Bus rollover accidents in Hungary

All bus rollovers (2001-2006)		94
DD rollovers		3
Small bus (SB) rollovers (2002-2006)		50
DD ratio in the total fleet	25/17.855	≈ 0,15%
DD accident ratio among Class II and III	3/37	≈ 8,10%
SB accident ratio in all rollovers	50/94	≈ 53,2%

7. Italy (GRSG-IG/R.66-4-8)

7.1. The total bus fleet in 2005 and its distribution

Class I.	15.610
Class II.	14.618
Class III.	7.965
DD coach	n.d.a.
Small buses	15.343
Total:	**53.536**

In small buses class A and B as well as small school buses are considered, too.

7.2. The yearly registration of these categories in the years 2000-2006

Class I	1100-1600
Class II	1200-1600
Class III.	620-950
Small buses	1150-1570
Total:	**4850-5570**

8. Netherlands (GRSG-IG/R.66-4-6)

8.1. Data about the bus fleet

	2003	**2004**	**2006**
Class I. and II.	5500	5393	
Class III.	4700	5000	
	10.200	10.396	10.845

8.2. Casualty figures for these buses (1997-2006)

	Total number	average/year	% among all road users
Fatalities	26	1,3	0,113
Hospitalized injuries	353	18,6	0,151

9. Spain (GRSG-IG/R.66-4-13)

9.1. National fleet of buses and coaches (2005)	58.248
Total number of passenger km	$53x10^9$
9.2. Number of bus and coach accidents	1.822
on urban roads	1.402
on rural roads	420
rollover bus accidents	177
fatalities among bus occupants	26
serious injuries	153
KSI in bus rollovers	62

10. Poland (GRSG-IG/R.66-5-9)

10.1. Buses sold in Poland (new registration)

	2004	**2005**	**2006**
Total	1083	1059	1288
among these city bus	308	392	603

10.2. Buses sold in Poland in Jan.-Aug. 2007

City bus	488
School bus	4
Intercity coach	267
Tourist coach	103
Total	862

11. France (GRSG-IG/R.66-5-6)

11.1. Data about the French bus fleet

	2003	**2004**	**2005**	**2006**	**2007**
Class I. and A	22.499	23.165	24.271	24.991	25.670
Class II., III. And B	63.377	63.936	64.146	65.124	66.482
total fleet	85.876	87.101	88.417	90.055	92.152

11.2. Yearly new registrations

GVW	**2003**	**2004**	**2005**	**2006**
< 3,5 t	74	107	75	79
3,6 < VW < 6 t	628	598	700	657
> 6 t	4.282	4.174	4.667	5.114
Total	4.984	4.869	5.442	5.860

11.3. Number of passengers and kilometres in 2005 transported by coaches

	Passengers	**kilometres**
Scheduled regular transport	$945{,}6 \times 10^6$	$795{,}1 \times 10^6$
without passenger		$258{,}8 \times 10^6$
Occasional transport	$278{,}5 \times 10^6$	$497{,}8 \times 10^6$
without passenger		$95{,}4 \times 10^6$

11.4. Casualties in buses and coaches in accident where buses where involved

	2002	**2003**	**2004**	**2005**
No. of bus accidents	1643	1405	1295	1320
No. of fatalities	10	44	21	14
No. of serious injuries	47	85	31	170
No. of all injuries	905	872	732	926

11.5. Scientific study of 94 accidents with coaches (GRSG-IG/R.66-5-6/Add.1) in which at least one person on the coach was seriously injured.

The time period of the study	1980-2005
No. of accidents	94
No. of occupants on board	4780

Service types when the coach accident happened

school transport or trip	43%
long distance journeys	33%
regular, scheduled service	10%
one day excursion	10%
transporting elderly people	4%

Types of accidents

Frontal collision	45%
Tip over and rollover	42%
Other accidents	13%

The risk of fatality in DD coaches is 2 times higher than in single deck vehicles.
The proportion of DD vehicles is 5%
In these coach accidents 17% of the occupants were killed or seriously injured

The injury mechanisms of the occupants:

Protection inside the vehicle (mainly light injuries)	63%
Intrusion (mainly serious or total)	18%
Total ejection (mainly serious or total)	8%
Partial ejection (mainly serious or total)	5%
Asphyxiation (mainly total)	6%

12. Florida (USA)

The number of newly registered paratransit buses (passenger capacity 16-20) in Florida is around 300 unit/year.

13. CLCCR information

The ratio of DD coaches and SB-s in the total fleet is different country by country according to their traditions, passenger transportation systems, and their market demand. There are no generally valid figures for all countries. As a first approach, for Western Europe:

DD ratio in total fleet	5%
M2 ratio in total fleet	6%
22 seater's ratio in total fleet	10%

14. IRU information

DD coaches are mostly in service on international long distance travels and are using motorways, which explains why they appear to be more present on the roads than as it is the case in reality and why they are less involved in rollover accidents than the other vehicles.

15. World wide figures (GRSG-IG/R.66-3-4)

The Hungarian expert collected a lot of statistics and information published by different authors which were available and published, presented since 1973. The total number of these bus rollover accidents is 570. During the first 25 years DD coaches were not in operation, so 400 rollover accidents may be considered, in which 29 DD coach rollovers happened:

DD accident ratio in all rollovers 29/400 ≈ 7,25%

The SB's rollover investigations started in 2002, 67 rollover accidents were reported since that time (including the Hungarian ones, too) while the total number of bus rollovers during this period is 249.

SB accident ratio in all rollovers 67/249 ≈ 26,9%

Bus categories	Hungary 2004		Norway 2005		UK 2005		Italy 2005		Nederland 2006	
Class I	3.500-4000	20-22%	1809	6,3%			15.610	29%	≈5.500	≈51%
Class II.	10.400-10.900	58-61%	3876	13,5%	101.100	53%	14.618	27%		
Class III.			2024	7%			7.965	15%	≈5.300	≈49%
DD coach	20-25	0,15%	15-25	0,09%	≈ 9.50	0,5%	n.d.a.		n.d.a.	
Small bus	3100-3200[2]	17-18%	21.074	73,2%	88.500	46,5%	15.343[1]		n.d.a.	
Total fleet	17.800	100%	28.783	100%	190.550	100%	53.536	100%	10.800	100%
Yearly new bus registrations	800-900		n.d.a		11.000-14.000		≈5.000			

n.d.a. = no data available
(1) including small school buses, too
(2) no class A in use