

# Minutes of 3<sup>rd</sup> meeting of the Informal Group on Frontal Impact

Held at United Nations Economic Commission for Europe  
Palais des Nations – Salle (room) 16 - Geneva  
9<sup>th</sup> December 2008

## 1 Welcome and Introductions

The chairman Pierre Castaing opened the meeting and welcomed the delegates. The list of the participants can be found in the attachment.

## 2 Roll call

R. Thomson/S informed the group that he has left Chalmers University and is now working for VTI, Swedish National Road and Transport Research Institute.

**Attendees and Apologies for Absence: See Annex 1**

## 3 Approval of Agenda

**Doc. INF GR / FI-03-01**

Two additional presentations were announced by R.Thomson for agenda item 5.2. *Accident Analysis* and by JAP for agenda item 5.5. *PDB validation*. Presentations under 5.2. *Accident Analysis* from D, 5.3. *Thorax Injury* from S and 5.4. *Test Severity* from S (input from VC Compat) were not available. A document for 5.6. *List of Issues* will be presented by VDA before the next meeting. After these amendments the agenda was adopted.

## 4 Approval of the Minutes of last meeting

The chairman clarified that when the minutes say 'Pierre Castaing' it means chairman, when it says 'France' it means France.

Some corrections were made to:

- page 2 'Deutsch' to read 'Dutch'
- page 2 add a sentence 'Data concerning Germany ad UK will be presented.'
- page 3 'ensure mini test severity' to read 'ensure minimum test severity'

After these minor editorial corrections the minutes were accepted.

**Doc. INF GR / FI-02-09\_Final**

## 5 Actions from the Minutes of last meeting

5.1. Amendment of the minutes of the First Meeting (Secretary)  
Will follow.

5.2. Accident analysis

5.2.1. Germany: has made some analysis of the GIDAS and national database but is not complete yet. A presentation will follow in March.

5.2.2. Japan presentation on full width impact standard on reduction of fatalities. Basic conclusion: 1076 deaths prevented over a period of 5 years.

**Doc. INF GR / FI-03-02**

5.2.3. A first part of a comprehensive study in progress, focussing on self protection, was

presented by France. Bases are 47440 injured occupants involved in 40000+ accidents. First conclusion: link between car mass and severity weight (heavier = safer). Cars that scored excellent in EuroNCAP front impact tests are good for self protection but are very stiff. Cars that scored medium have almost the same severity rate regardless of the weight. If the severity rate would be identical for all cars (17.2% which is best rate for heavy vehicles) then the gain for front impact accidents the gain would be between 30 and 50% for the mortality rate and around 30% for the severe injuries. For all impacts the gain is around 10% both for mortality and severe injuries. France developed a graph showing the benefit for a chosen severity rate. Next step is to introduce partner protection. Results could be shown next meeting. Secondly the relationship between the accidentology and the PDB crash needs to be shown.

Germany asked if the EuroNCAP score includes the modifier. France confirmed the knee modifier of 2 points is included in the results.

France will redo the calculation without the modifiers as they are not really relevant for accidentology.

UK asked about the confidence levels for the graphs. France replied this comes from the amount of data which depends on the car models. In some cases there are more than 1000 cases / model.

France will calculate the confidence level and show this next meeting.

Sweden asked which model years are included. France replied that data is based on the fleet as of 2005 but this of course includes older model years.

UK asked what the effect of the new definition (> 24h in hospital = severe injury) is on the outcome of the analysis. It could be related to a hospital emission policy and not to an injury. France replied they don't have any further in depth data as it is based on national database which uses this new definition, however, the mortality rate can be used without any concerns.

**Doc. INF GR / FI-03-03**

- 5.2.4. Sweden presentation on single vehicle collisions based on the RISER project. National statistics for single vehicle accidents (SVA) report 40% are frontal impacts which account for 4% of SVA fatalities

**Doc. INF GR / FI-03-04**

### 5.3. Thorax Injury

- 5.3.1. Input from APROSYS (United Kingdom) on the development of a full width frontal impact test for Europe. The CCIS data show that thorax and lower extremity injuries are the most relevant body regions to be protected while the GIDAS data show this for the thorax and the head. Summary: 56 km/h, 50<sup>th</sup> % driver and passenger, rear seat occupants is optional. The objectives are effect of including the deformable face and the rear seated dummies, repeatability and reproducibility and practicality. The effect of the deformable face: the deformation of the vehicles differs substantially; the deceleration of the vehicle was affected as well. It is still an open question if a deformable face is necessary if a full frontal impact is introduced as there are advantages and disadvantages. Also it is unclear if rear seated dummies need to be included in such a test as the number of casualties are very low. The potential benefit could be up to 2 billion €/year whilst the cost is estimated at 455 million €/year for implementation in Reg. 94. These numbers need to be further refined in future work pending performance criteria and limits.

**Doc. INF GR / FI-03-05**

- 5.3.2. Sweden: no information yet from Sweden.

- 5.3.3. France: presentation on the evolution of the mortality rate and fatal injury frequencies in frontal impact between 46 and 75 km/h of EES shows that the introduction of airbags,

pretensioners and load limiters resulted in a decrease of 12-11% down to 2-5% respectively for drivers and front passengers. The injury data show a substantial decrease of thorax injury frequency since 1990 till today. This trend is different in the UK and it needs to be understood why.

**Doc. INF GR / FI-03-06**

#### 5.4. Test severity

5.4.1. MPDB/PDB comparison (Nederland) Presentation comparing car to MPDB, car to ODB and car to car. The small family car was defined as having an average weight of 1500 kg. The PDB is closer to a car pulse than the ODB but still not as good as the MPDB. The small family car to MPDB test, the crash pulse is representative for a collision with an average European vehicle and is a good representation of what actually happens on the roads. There is a difference in loading at the start of the crash between a barrier and a car because the barrier is perfectly homogeneous. This can amongst others influence the triggering of the restraint system (late triggering in car to car test). This means additional criteria or tests are required to assess partner protection and avoid misuse of the PDB. The conclusions are that the barrier guarantees good structural interaction and is crucial to ensure engagement of the energy absorbing structures and in-time triggering of the restraint systems. A car to MPDB is the best method to imitate a car to car collision. Additional assessment criteria need to be set up. France agrees that it is too early to introduce something on partner protection and believes this presentation is beyond the terms of reference of this group. Netherlands believes that only changing the barrier, will not affect car design a lot. France also believes that if the scope of the Regulation and/or EuroNCAP is extended to 3.5 t, the difference will be noticeable. Germany noted that the final conclusion only refers to the acceleration levels and not the structural interaction. A high level of self protection has already been achieved by the current legislation and EuroNCAP. We need to be careful that extending this even further does not lead us in the wrong direction. Germany asked why a closing speed of 90 km/h was chosen for the car to MPDB. Netherlands replied it represents the same energy as the 64 km/h EuroNCAP test. UK asked how this test should be introduced in legislation: should the barrier weight be constant, should it vary depending on the car tested. Netherlands replied this needs to be looked at further. FIA remarked that the Audi Q7 has very rigid structural parts which penetrated the Fiat 500. What is the message to the public? Chairman: Stop the increase of stiffness in particular when the mass of the vehicles to be tested will be increased to 4.5 tons. Netherlands replied Euro NCAP tests car up to 2.5 tons. In Netherlands the mass of an average car is 1. to 1.6 tons. This corresponds to the best seller Toyota Ego. So, change the type approval test by e.g. a test against an average car. Chairman: R. 94 barrier does not represent an average car in NL.

**Doc. INF GR / FI-03-07**

5.4.2. PDB pulse (France) Presentation on the influence of the PDB on the pulse in view of the PDB introduction in Reg. 94. More than 200 PDB test have been carried out around the world. The mean acceleration of the PDB is higher than for EEVC 56 and 60 km/h by about 30 to 40% and therefore is also an restraint test. The PDB generates high intrusion (compared to EEVC test) and thus severe for the restraint system whilst the full frontal has higher acceleration but no intrusion. Netherlands asked if EuroNCAP does not change its test and only the Regulation is changed will car designs have to be changed. France replied they believe EuroNCAP will change its test procedure if the Regulation is changed. Germany asked if the cars tested with the PDB are the same as those tested in EEVC. France confirmed this is the case

**Doc. INF GR / FI-03-08**

5.4.3. input from VC Compat (Sweden) No input from Sweden

## 5.5. PDB validation

5.5.1. EES calculation method (France) is based on the measurement of the deformed volume of the PDB. Boundary effects are eliminated. Software is available that transposes the energy in the barrier into EES (software will be put on the PDB website). 49 PDB tests at 60 km/h show a direct relation between the mass and the energy absorbed by the barrier. The typical energy absorption of the PDB amounts to 30–165 kJ.

5.5.2. Misuse of PDB (Germany) Presentation on mobile PDB and mobile rigid barrier tests. Tests performed: MPDB-PDB, MPDB-ODB, MRB-PDB, and MRB-ODB. The mass of the MPDB was 1600 kg (average from VC-COMPAT database). The results show that the PDB can not detect a rigid impactor while the ODB can. The PDB can absorb much more energy than the OD. Cars with reduced/shortened front end deformation zone can fulfill the PDB test but not the current ODB test. Introduction of PDB and cancellation of ODB will lead to more rigid cars. Netherlands asked why Germany believes the cars will be stiffer and thus higher eight? Germany said it is a potential but stiffer cars are not necessarily heavier. Netherlands asked if a full width test would be included, would Germany no longer have this concern. Germany agreed this is the case. France has problems to link the conclusions with the tests performed. Germany replied that the French presentation looked at current cars on the road whilst the German presentation looks at the effect on future models.

**Doc. INF GR / FI-03-10**

5.5.3. Japan preliminary presentation testing mini cars against PDB 60 km/h and ODB 56 and 64 km/h. The study concluded that the ODB bottoms out even for the minicars. The front rail penetrated into the PDB and deformed its front block significantly. Deformation in the PDB was much smaller than in the ODB. Significant differences were seen in the deformation of the front rail between PDB and ODB. Deformation in 60PDB was extremely smaller than that in 56 and 64 ODB. No significant difference was seen in dummy injury criteria for chest and legs between 60PDB and 64ODB. 64ODB showed the highest EES, while 60PDB and 56ODB resulted in EES of the same level. 56ODB showed the lowest EES, while 60PDB and 64ODB resulted in EES of the same level. If the test of heavy weight car is finished, Japan will report the details in 4th informal meeting.

**Doc. INF GR / FI-03-11**

## 5.6. List of issues

5.6.1. Update of Swedish document (Secretary)

5.6.2. Issues to be added (Germany) VDA stated a presentation will be circulated before the next meeting.

**Doc. INF GR / FI-03-09**

## 6 Next Meetings

The 10<sup>th</sup> of March 2009 in Paris

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## 7 A.O.B.

The Netherlands remarked that changing only R. 94 and not also Euro NCAP makes no sense. In relation with Euro NCAP the necessity of a full width test should be analyzed.

The chairman added that the work of the FI Informal Group should be kept in ECE-Regulation system. In the March-meeting it should be discussed how to go further: what is missing, possible compromise.

UK stated he is concerned that there are a lot of references to EuroNCAP whilst this is not in the merit of this group. The success of amendments of Regulations should not be defined by EuroNCAP taking over the new procedures or not. Replace R. 94 barrier by PDB might not lead to higher cost for the society. Compatibility is creeping in the discussion. There is no firm opposition to PDB but there might not be enough benefit to replace R. 94 barrier by PDB at this time. Also if the PDB should be included in Regulation, then a clear benefit needs to be established, unless compatibility is taken into account. The introduction of a full width test in the actual economic situation must be considered carefully but it might make vehicles safer.

Chairman: Since 1998 compatibility research is going on with only small real progress. France is willing to make progress and a step forward. A good compatibility criterion is a task for the future. PDB will solve the problem of increasing stiffness of heavier cars. Input on cost/effectiveness is requested.

The chairman expressed his concern about a possible extension of the scope of the current Reg. 94 (EC wish to go up to 3.5 t) and EuroNCAP wish to start testing vans. This will increase the stiffness even further and it is not good.

Germany has made its position clear and supports UK. It is difficult to present a new Regulation without seeing any benefit. Euro NCAP leads to stiffness increase in particular for 3.5 ton vehicles.

Chairman: French accident data show benefit. He agrees that Euro NCAP should not influence work for R. 94.

Germany stated 5 Euro NCAP members are present in the FI Informal Group. The governments should take care that Euro NCAP does not go in the wrong direction.

## 8 Actions

- 8.1 Amend the minute of the first meeting => Secretary
- 8.2 Amend the minute of the second meeting => Secretary
- 8.3 Document on German accident analysis: for March meeting
- 8.4 Document on French accident analysis: more detailed for March meeting
  - 8.4.1 Excludes modifiers
  - 8.4.2 Determines confidence interval data
- 8.5 Injury mechanism (thorax injury) => Sweden will provide data for the March meeting.
- 8.6 Thorax injury frequency => All: report similar data than Doc FI\_03-06
- 8.7 Thorax injury frequency => Germany to update data from EU Project SARAC I&II
- 8.8 Input from VC-Compat => Sweden will provide data for the March meeting.
- 8.9 EES Calculation method => France to put the software on the PDB web site.
- 8.10 PDB test result on heavy weight cars => Japan
- 8.11 Present car to car test results => JAMA
- 8.12 Update the Swedish document => Secretary
- 8.13 VDA to present Document FI\_03-09
- 8.14 Input open questions, what is missing, next steps => All

## 9 Attachments and Working Documents





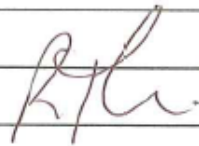
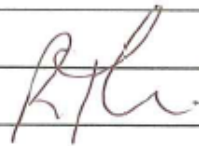







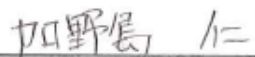
<b>Annex No.</b>	<b>Presented by / on behalf of</b>	<b>Title</b>
1	PC	Attendance list
2	PC	Actions list
3	PC	Documents list

P CASTAING & E FAERBER  
Group Chairman & Secretary  
26 January 2009

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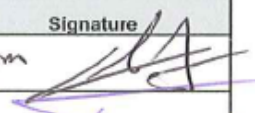
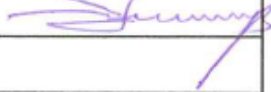
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<b>Action Number</b>	<b>Action</b>	<b>Target Date</b>	<b>Action By</b>	<b>Comp Date</b>
<b>3.1</b>	Amend the minute of the first meeting	09/03/10	Secretary	
<b>3.2</b>	Amend the minute of the second meeting	09/03/10	Secretary	
<b>3.3</b>	Document on German accident analysis: for March meeting	09/03/10	Germany	
<b>3.4</b>	Document on French accident analysis: more detailed	09/03/10	France	
<b>3.5</b>	Injury mechanism (thorax injury)	09/03/10	Sweden	
<b>3.6</b>	Thorax Injury frequency	09/03/10	All	
<b>3.7</b>	Update of EU project SARAC I&II	09/03/10	Germany	
<b>3.8</b>	Input from VC-Compat	09/03/10	Sweden	
<b>3.9</b>	EES Calculation method =>Put the software on the PDB web site.	09/03/10	France	
<b>3.10</b>	PDB test result on heavy weight cars	09/03/10	Japan	
<b>3.11</b>	Update the Swedish document	09/03/10	Secretary	
<b>3.12</b>	VDA to present Document FI_03-09	09/03/10	VDA	
<b>3.13</b>	Input open questions, what is missing, next steps	09/03/10	All	

Document Number	Title	Origin
3.12	Draft minutes of the 3 <sup>rd</sup> Meeting of the informal group on frontal impact	Secretary
3.11	PDB research in Japan	Japan
3.10	Mobile Progressive Deformable Barrier and Mobile Rigid Barrier Tests	BASt
3.09	Detailed discussion of the VDA position on the proposal for draft amendments to UN-ECE R94	VDA
3.08	Influence of the PDB on the pulse	France
3.07	Additional research on PDB and MPDB	Netherlands
3.06	Evolution of mortality rate and fatal injury frequencies in Frontal impact since 1990.	France
3.05	APROSYS - Development of a Full Width Frontal Impact Test for Europe	UK
3.04	Single Vehicle Collisions - Extracts from the RISER project.	Sweden
3.03	Accident analysis - Work progress regarding Self-Protection V2	LAB
3.02	Evaluation of the Effect of the Implemented Full-Width Frontal Impact Standard on Reduction of Fatalities in Japan	Japan
3.01	Agenda of the 3 <sup>rd</sup> Meeting of the informal group on frontal impact	Chairman
2.09	Minutes of the 2 <sup>nd</sup> Meeting of the informal group on frontal impact	Chairman
2.08	VDA position on the proposal for the draft amendments to Regulation N° 94	VDA
2.07	Japan research on Regulation N°94 amendments	Japan
2.06	Outstanding issues with PDB test	UK
2.05	Accident analysis - Work progress regarding Self-Protection V1	LAB
2.04	First finding of additional research	Netherlands
2.03	UNECE Reg. 94 – Past, Present & Future	Netherlands

2.02	Issue to be resolved in evaluation of Regulation N°94 amendments	Secretary/Sweden
2.01	Agenda of the 2 <sup>nd</sup> Meeting of the informal group on frontal impact	Chairman
1.04	Draft Minutes of the 1 <sup>st</sup> Meeting of the informal group on frontal impact	Secretary
1.03	Agenda of the 1 <sup>st</sup> Meeting of the informal group on frontal impact	Chairman
1.02	Proposal of rules of procedure and terms of reference	Chairman
1.01	ECE/TRANS/WP.29/GRSP/2007/17 – Proposal for draft amendments	France