

REPORT OF THE INFORMAL EXPERT GROUP  
about the ad-hoc meeting dealing with the development of Regulation 66  
(Prague, 14-15 December 2000)

1) The participants of the meeting:

Belgium	Ms Reyntjens, Pascale
Czech Republic	Dr Hanke, Miroslaw Dr Sotochin, Vladimir Mr Pavlata, Petr
Finland	Mr. Intosalmi, Juhani
France	Mr Minne, Francois
Germany	Mr Becker, Michael Mr Steinmetz, Gregor
Hungary	Dr Matolcsy Mátyás
Italy	Mr Mendogni, Giulio
Spain	Mr Lafuente, Ignatio Mr Ruiz, Salvador Mr Sanchez, Miguel

The following persons indicated (by e-mail) that they cannot attend the meeting, but they are continuously participating in the work of the expert group and they need the further information and papers:

UK	Mr Corfield, Ian
Holland	Mr Coe, Peter Mr Huibers, Jos
OICA	Mr Biver, Michel
Spain	Prof. Aparicio, Francisco
South-Africa	Prof. du Preez, Rudi

Prof. du Preez has sent some written comments by e-mail to the subjects being on the agenda of the ad-hoc meeting. The host of the meeting was the Ministry of Transport of Czech Republic, the chairman was dr. Matolcsy M.

2) Before the ad-hoc meeting the chairman has circulated the following documents:

- a) Annex [X<sub>2</sub>] to Reg.66: "View-points to the structural description of the superstructures"
- b) Annex [X<sub>3</sub>] to Reg.66: "Standard rollover of full scale vehicle as the basic approval test method (sent earlier, before the Madrid meeting)"
- c) Addition to the "Definitions" (to para.2. in the main text)
- d) Problems to be discussed when discussing the extension of the "Scope"
- e) Questions when considering the effects of seat belts in Reg.66.
- f) Technical paper: "Is the pendulum impact test acceptable for approval of bus superstructure?"

3) The expert group discussed Annex [X<sub>3</sub>] to Reg.66. (see doc. "b" above) and after modifications it is presented to GRSG for discussion. Connecting to the discussion the followings should be mentioned:

- There is an Appendix attached to Annex[X<sub>2</sub>] in which the rollover test is described as a time-dependent dynamic process. The expert group agreed that it is important to the

computer simulation (Annex [X<sub>6</sub>] ), but the final place of this Appendix is not decided yet, it could be attached to Annex [X<sub>6</sub>] . The group will come back to this question when discussing Annex [X<sub>6</sub>]

- On the Madrid meeting Germany suggested to test the articulated buses as one unit, instead of two separated parts of the vehicle. The group came back to this interesting idea and expressed its view that at least one test should be done to prove that there is no unexpected complication with this type of rollover test.
  - Hungary raised again the problem of the high-decker buses: the existing rollover test with the 800 mm of depth can not separate the weak structures from the strong ones because of the geometrically limited deformation. Evidences were given in doc. “d”
  - Based on the Spanish document (see para.8. of this Report) a discussion run on about the axle suspensions, whether they should be fixed or free during the rollover test. The strong majority of the group woted for fixed suspension.
- 4) The group discussed Annex [X<sub>2</sub>] to Reg.66. (see doc.”a”) and during the general discussion the following arguments were raised for the necessity of this Annex (In the existing Reg.66. there is no Annex like this):
- unified way and practice is given to the manufacturers, how to describe (define) the load bearing parts of the superstructure in case of rollover (Now there is a reference to that in the main text, para 3.2:2.2.)
  - this unified description is the basis for the Technical service when evaluating a modification of the earlier approved body: whether the modification is significant or not from the point of view of the strength of the superstructure, new approval test (or some additional test or calculation) is needed for a new approval (or extension of approval) A reference should be given in the main text, para. 6.1.3.3
  - this could be the basis of checking the conformity of production (COP) Only the body parts and elements, described in this Annex should be checked periodically in the manufacturing process. A reference should be given in the main text, para.7.
  - this should be the basis of the body model to be checked in the case of equivalent approval test methods (body sections in section rollover tests; rings and sections in case of quasi-static calculation; body model in computer simulation) References should be given in Annex [X<sub>4</sub>] [X<sub>6</sub>] [X<sub>7</sub>]

During the discussion the following observations were made:

- the small manufacturer are not strong in structural mechanics, they could have difficulties to prepare the body description (Finland)
- the requirements of the structural description should not be design restrictive (Belgium, France)
- the group has to find a good solution: the description should be neither too detailed, nor too general (Germany)
- this Annex could be the best solution for COP, because this problem is absolutely not solved in the existing Regulation (Czech Republic)

The group decided to continue this discussion on its next meeting.

- 5) There was no thorough discussion about the extension of scope, because this is not a fully agreed subject. If GRSG gives the task to the group to study the technical aspects of this subject, the group is ready to do that.
- 6) The effect of belted passengers on the strength of superstructure is also a sensitive and not fully agreed subject. But GRSG made a decision that further studies, evidences and data are needed. Therefor the group decided to collect available information about the behaviour of

passengers (dummies) during a rollover test, having no seat belt, two points belt or three points belt. (see doc. "e") The following group members are kindly asked to circulate data, results, experiences getting out from earlier made tests and simulations:

- INSIA (Spain) results of computer simulation
- UVMV (Czech Republic) body section rollover and simulation
- IDIADA (Spain) results of tests and simulation
- IKARUS, AUTÓKUT (Hungary) experiences from rollover test
- UTAC (France) checking what is available
- CIC (UK) computer simulation
- TNO (Holland) maybe some test results.

The last two institutions did not participate in the meeting, so they should be asked by the chairman.

- 7) There was a brief discussion about the pendulum impact test. Hungary presented the promised technical paper (see doc."f") in which all of the major objections against the pendulum test as an equivalent test are listed and discussed. The group strengthened its earlier proposal to delete the pendulum test from the regulation.
- 8) Spain (INSIA) circulated a promised technical paper about the tilting tests of buses for determining the CG's position. The tests were made by free axle suspensions. During the discussion the advantages of the two ways were listed:
 

**Advantages of free suspension**

  - it is closer to the real rollover situations
  - there is no need to make fixing devices and parts
  - it results higher CG's position which provides higher level of safety

**Advantages of fixed suspension**

  - it makes valid the princip of equivalency between the "standard" rollover test and other approval tests
  - without this body section rollover tests and quasi-static approval tests can not be used
  - it makes much easier the computer simulation of the "standard" rollover test
  - the ISO standard No.10392/1992 also uses the fixed suspension.
- 9) Spain (INSIA) circulated a technical paper during the meeting, titled: "Spanish experiments relating to the authorisation of V.G.D.T.P. in accordance with Regulation 66". showing the INSIA's test methods and experiences with Reg.66.
- 10) Czech Republic (UVMV) made an oral presentation about a bus rollover accident (4 fatalities with serious damage of the residual space) and the research work involving rollover test with full scale vehicle and also with body sections and the computer simulation of these tests. It is interesting to mention that this computer simulation proved the possibility of the limited deformation of the superstructure, raised by Hungary.
- 11) The next ad-hoc meeting will be organised 9<sup>th</sup>-11<sup>th</sup> of May, 2001. There is an invitation from Belgium, the chairman of the ad-hoc expert group will negotiate about the final arrangement.

08.01.2001.

dr. Matolcsy Mátyás  
chairman of the expert group