



EUROPEAN COMMISSION  
ENTERPRISE AND INDUSTRY DIRECTORATE-GENERAL

Sustainable Growth and EU 2020  
Sustainable Mobility and Automotive Industry

**Minutes (Draft)**  
**3<sup>rd</sup> Meeting of the**  
**IG GTR9-PH2 Task Force Bumper Test Area**

**18 March 2013, 2:00 p.m. – 5:30 p.m.**  
**U.S. Department of Transportation, NHTSA offices,**  
**1200 New Jersey Avenue SE, Washington D.C. 20590**

\* \* \*

**1. Opening of the meeting;**

Mr Broertjes welcomed the attendees at NHTSA and thanked NHTSA for kindly hosting this meeting. Mr Broertjes chaired the meeting; Mr Kinsky acted as the secretary.

**Attendees** (in alphabetical order):

The attendance list is attached as scan at the end of this document.

In addition, Ms. Dausse (Renault) and Messrs. Burleigh (Humanetics), Carroll (TRL), Edwards (Alliance), Gielow (Mercedes), Hardy (TRL) and Tedesco (General Motors) attended the meeting via WebEx/telephone.

**2. Adoption of agenda;**

Documents TF-BTA-3-03 to -06 had been provided in advance and are available on the UNECE website. Several additional documents had been handed-in on short notice that will be presented under the respective agenda items (see below).

Besides this, the agenda was adopted without amendments.

**3. Adoption of the draft meeting minutes of the 2<sup>nd</sup> meeting (TF-BTA-2-02);**

Comments were received from Mr Roth that in section “Geometries of vehicles regarding the bumper design elements (ACEA/OICA)” his statements referred to legislation testing. The beginning of the section should read: “Mr Roth showed one example of a vehicle on the market sold by his company (see TF-BTA-2-05). He pointed out that the **legislation** test zone is smaller than the actual leg protection zone. The vehicle was **tested for European legislation (as well as by Euro NCAP)** and performed well.”

The minutes were amended accordingly and will be put on the website as document TF-BTA-2-02r1.

#### **4. Update on the EC study and Terms of Reference (TRL);**

Mr Carroll presented an update of the activities done by TRL on behalf of the European Commission (document TF-BTA-3-06r1 which is an update of the presentation provided in advance). He explained that in EEVC there had been some discussion in Working Group 10 on the use of a 45° plane or a 60° plane in late 1990. However, it cannot be discovered why finally a change to 60° had been decided but obviously the decision was related to already existing legislation in Europe (UNECE Regulation 42) as well as the US (part 581). Mr Carroll finally pointed out that legislation is used in a different context in the bumper requirements compared to the pedestrian requirements.

Also, Mr Carroll presented some information from Euro NCAP tests were vehicles performed different at positions outside the bumper corners. Also, some geometric measurements were taken for the top-selling vehicles in the UK. Mr Carroll pointed out that the differences between the test areas are clearly seen between earlier and current generations of the same car.

Finally, Mr Carroll outlined that TRL will conduct some tests with both, the EEVC LFI as well as the FlexPLI to discover differences in the protection level between earlier and current vehicles front ends. These activities are planned to be done as the next steps.

Mr Roth wondered whether TRL could also consider the influence of the front ends’ design, specifically whether this has an influence on the protection level. Mr Carroll promised to consider this if possible.

Regarding the timing of the TRL activities, Mr Kinsky reminded that the timing could become an issue especially when considering the tough schedule of the Informal Group that oversees the activities of this Task Force. The chair pointed out that the timing should be considered by TRL and therefore should not create issues.

Mr Bilkhu wondered whether, seeing accident figures, the number of accidents could be decreased with the amendment of the test procedure. Mr Carroll promised that they will conduct analyses of the statistics under consideration of this aspect. Dr. Konosu added that some figures on this from Japan are available that will be shown later during the meeting.

Seeing the discussion to change the bumper corners, Mr Roth pointed out that the physical abilities of the impactors, especially the influence of rotation during the tests, need to be considered. He promised to show some details on this later during the meeting.

The discussion came back to Mr Bilkhu’s question on accidentology: Will the number of accidents and specifically of injuries be decreased? This should be the starting point of

the investigation. Mr Broertjes explained that the Commission sees a need for the amendment of the bumper test area as it is obvious that a number of manufacturers are benefiting from engineering solutions to decrease the testable area. The accident data will be checked but it needs to be noted in advance that an absence of detailed data does not prove that there are no injuries in this area of the vehicle front. According to the Commission's opinion the absence of detailed data may just lead to the assumption that accidents/injuries are equally distributed over the vehicle width.

Mr Nguyen added that from the perspective of the US a benefit analysis needs to also contain the effects of an impact outside of the test area. For NHTSA, it will not be acceptable to amend the bumper corners definition without detailed justification.

Finally, Mr Roth added that the analysis should also consider the changes of the front end designs relating to CO2 emissions and fuel consumption.

#### **5. Information on the rationale for the current test procedure, if available (All);**

Mr Kinsky presented a document that highlighted some historic arguments for today's front end designs (document TF-BTA-3-09). He explained that these references were found when privately checking some old files and that they should neither be seen as an extended research on this subject nor as a position paper of industry. The intention is just to provide some information as requested by the group.

Mr Kinsky explained that obviously in early times of pedestrian safety discussion it was assessed to be beneficial for pedestrians deflecting them to the vehicle sides where possible. The contact with the vehicle front end was seen to create higher risks for severe injuries than the contact with the ground. This may have initially caused design changes as they are seen today more often. However, it remains to the task force to assess these details.

*[Note of the secretary: See also agenda item 4 where TRL presented some information on this from EEVC WG.10.]*

#### **6. Information on injury risks outside the current bumper corners (All);**

Mr Takagi presented information from Japan on the injury risk outside the bumper corners (document TF-BTA-3-04r1), summarizing accident data from 1993 to 2003. He concluded that leg injuries also occur outside the vehicle center but that the relation to the bumper test area is unknown. Mr Edwards noted that the number of accidents is higher at the curb side (which is the left side when looking from the driver's seat considering the right hand traffic in Japan) and obviously may be influenced by the pedestrians' behaviour which was confirmed. Also, it was clarified on request of Mr Knotz that the area C refers to "center", A to the "headlamp area" and B to the area in between. It was explained that it is sometimes hard to distinguish this but that the number of injuries in principle is higher in the center of the vehicle.

#### **7. Information on impactors' abilities (EEVC LFI as well as FlexPLI) to be used outside the bumper corners (All);**

Dr. Konosu came back to the presentation given during the last meeting on J-NCAP testing with the FlexPLI outside the bumper test area (document TF-BTA-2-04). He explained that some questions were brought up on this that are now clarified in a revised version TF-BTA-2-04r1. Specifically, information has been added to explain the asymmetry of the test results at the front end of the car shown and to explain the relationship between the timing of the ligament elongation and the yaw angle. It was noted that the test results show that the yaw angle increases significantly when testing outside the currently agreed bumper corners.

Mr Takagi presented document TF-BTA-3-05. He explained that indeed the test results change when the impact angle is changed and NTSEL feels that this needs to be considered. Mr Knotz wondered whether there are vehicle data underlying to this since of course vehicle design measures may have a significant influence. He recommended using standard rigs for the testing that are available. Mr Bilkhu added that also to his experiences at least for the EEVC LFI the stiffness of the structure tested has a significant influence on the reliability of the test results and decreases with increasing stiffness.

Mr Roth presented document TF-BTA-3-03 comparing some simulations done with the FlexPLI and the Total Human Model for Safety (THUMS). *[Note of the secretary: The document shown was supplemented by some videos. Mr Roth kindly provided an extended version of his presentation afterwards for publication on the Task Force's website that adds some sketches of the respective impactor behaviour. This document is available as TF-BTA-3-03r1.]* He explained that the FlexPLI, compared to the THUMS, well reflects the behaviour in two dimensional testing but that clearly deviates from the THUMS when hitting curved shapes. He concluded that the impactor behaves not biofidelic in those areas.

Mr Broertjes thanked Mr Roth for the work. He was wondering whether it would possible to e.g. replace one THUMS leg by the FlexPLI – so to say using the FlexPLI as prosthesis for the THUMS. This may provide more complex information on the biofidelity of the FlexPLI at more outside positions. It was noted that, however, there may be different codings used for the two simulation models that could prevent this to be done. Also, it is most likely a huge amount of work since the proper functioning of this new model would need to be validated. Mr Knotz confirmed this assessment from his experiences with the simulation models.

Mr Stammen asked what the behavior is at the vehicle centreline and it was confirmed that the 2D testing does not seem to be an issue. Mr Hardy wondered whether the effects would be the same at the other car side: the standing position of the leg of the THUMS may influence the test result. Mr Roth answered that this was not considered in this part of their company internal study but that the differences between FlexPLI and THUMS will remain. Mr Gehring added that the behavior may vary at different positions and that according to his opinion clearly the mass of the upper body is missing which may change things.

Mr Schmitt pointed out that his company had the same experiences (see document TF-BTA-3-07). *[Note of the secretary: The document shown included videos but a version was kindly provided by Mr Schmitt for publication on the Task Force's website that only includes sketches of the respective impactor behaviour.]* He explained that the non-biofidelic behavior is similar for the FlexPLI as well as for the EEVC LFI – both impactor clearly rotate and slide along the bumper surface. Mr Schmitt wondered how this could

be considered in the test procedure. Mr Edwards suggested testing in a normal angle to the bumper but Mr Gehring explained that, from a test labs point of view, it is difficult to define the normal angle since different surfaces at the bumper fascia have different normal angles at the same y-position of a vehicle.

Finally, Ms Dausse confirmed that her company came to identical conclusions: Her presentation (document TF-BTA-3-08) with superimposed impactors (FlexPLI and EEVC LFI) shows that the impactors behave identical. *[Note of the secretary: The document shown included videos but a version was kindly provided by Ms Dausse for publication on the Task Force’s website that only includes sketches of the respective impactor behaviour.]* Rotation clearly is an issue at outside positions but she had not yet discovered at which angle it becomes a serious issue.

Finally, Mr Roth presented vehicle data (see document TF-BTA-3-10) in addition to the one example he had shown during the last meeting (document TF-BTA-2-05). He explained that also at these vehicles the area that provides protection to the lower leg is much larger than the area that is tested for legislation. Mr Gehring wondered what the basis for the protection zone is and Mr. Roth confirmed that this is the test area of Euro NCAP.

**8. Review of the action list from the last meeting, definition of new action items (All);**

|                      |   |              |
|----------------------|---|--------------|
| Industry             | Provide geometries of vehicles regarding the bumper design elements   | ongoing      |
| Industry             | Possibly provide vehicles and/or parts for testing at TRL   | ongoing      |
| TRL                  | Provide further information from past discussion regarding the rational of using the 60° planes                 | finished     |
| All                  | Provide information on injury risks caused by impacts outside the bumper corners (national accident data, etc.) | ongoing      |
| Euro NCAP and others | Provide information from NCAP or other tests of test points outside the bumper corners                          | ongoing/done |

No new items defined.

**9. Miscellaneous items;**

None.

## **10. Conclusion of the meeting.**

The chair thanked Mr Burleigh for his support with the WebEx possibilities for this meeting.

For the next meeting, it was mentioned that this should be considered to take place again in connection with the IG GTR9-PH2 meeting, maybe again as a half day meeting. However, the chair noted that the group also needs to consider that it may be needed to separate the work of the Task Force from the work of the IG since the Informal Group may finish their work in the near future.

*[Note of the secretary: During the meeting of the Informal Group on gtr No 9 – Phase 2 it was finally agreed to hold the next meeting on 11 September 2013 in OICA offices in Paris.]*

Attachment: Attendance list

TF-BTA 3rd Meeting  
 18 March 2013, NHTSA offices, 1200 New Jersey Avenue SE, Washington D.C.

List of Attendees

Date, Place

| NAME, First Name  | Position / Organization      | Email                              | Signature |
|-------------------|------------------------------|------------------------------------|-----------|
| Broertjes, Peter  | EC                           | Peter.Broertjes@ec.europa.eu       |           |
| Stammen, Jason    | NHTSA                        | Jason.Stammen@dot.gov              |           |
| Suntay, Brian     | TRC Inc.                     | Brian.Suntay.CTR@dot.gov           |           |
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| MEDRI, MARISA     | NHTSA                        | marisol.medri@dot.gov              |           |