

Minutes of the 7th meeting of the Task Force Bumper Test Area (TF-BTA) within the IG GTR9-PH2	
Venue	(web conference)
Date	29 August 2014 & 9 September 2014
Status: Final	
<i>Note of the secretary: The meeting was originally planned for 29 August 2014. Since not all agenda items could be finalized in this session it was agreed to have a second session on 9 September 2014. These minutes reflect the running order of the discussion but does not reflect the split of the discussion into two sessions.</i>	

1. Welcome
(Chair)

Mr. Broertjes welcomed all attendees and thanked them in advance for their contributions. Mr. Broertjes chaired the meeting, Mr. Kinsky provided the secretariat. Mr. Kinsky noted that he may have difficulties to control the presentations and take minutes at the same time. Messrs. Schmitt and Roth volunteered to support the secretary with drafting the minutes or controlling the presentations.

2. Roll call of participants

Peter Broertjes/European Commission

Winfried Schmitt/BMW

Franz Roth/Audi

Dr. Francois Coulongeate/Audi

Olaf Insel/Volkswagen (part-time only)

Cort Corwin/Shape (part-time only)

Oliver Zander/BAST

Dirk-Uwe Gehring/BGS Böhme & Gehring

Cire Sall/Renault

Irina Dausse/Renault

Jolyon Carroll/TRL

Shunsuke Takagi/NTSEL/JASIC

Dr. Atsuhiko Konosu/JARI/JASIC

Takahiro Issiki/JARI/JASIC

Yukou Takahashi/Honda R&D/JASIC

Iwao Imaizumi/Honda R&D/JASIC

Thomas Kinsky/General Motors Europe/Opel

3. Adoption of the agenda

(all)

(document TF-BTA-7-01)

The agenda was reviewed and adopted without further amendments.

4. Review of the draft minutes of the 6th Meeting in Paris

(all)

(document TF-BTA-6-02)

The secretary noted that comments had been received from OEM's and BAST. The draft minutes were modified accordingly. However, for the wording in agenda item 6.3 of the 6th meeting – the details of the update to be given to the May 2014 GRSP – the secretary felt that the respective wording should not be changed: It had been shown and was agreed during the last meeting. Mr. Zander explained that he wanted to make clearer that the group discussed about A) that the bumper test area definition using a corner gauge strongly depends on the outer vehicle contour and B) that the bumper test area definition using the dimensions of the bumper beam depends on underlying hard vehicle structures. Besides this, Mr. Zander emphasized that the use of the bumper beam was not an additional request to the bumper corner definition by using the corner gauges but a compromise offered instead of BAST's request of assessing the entire vehicle width.

It was agreed this part of document TF-BTA-6-02 will not be changed but that the additional comments are considered here in this document. All other changes were adopted and the finalized minutes will be provided as document TF-BTA-6-02r1.

5. Short Review of the TRL Report for the European Commission

(J. Carroll)

(Document TF-BTA-6-09)

Mr. Carroll presented the final report delivered by TRL to the European Commission (see document TF-BTA-6-09). He explained that the document covers three main subjects: a historic review, analyses of the pedestrian protection performance of current vehicles as well as analyses of the proposed measures to extend the bumper test area. Mr. Broertjes added that this report will also be presented on the website of the European Commission.

Mr. Roth wondered how the cost benefit analysis would be considered in the further work of the Commission. Mr. Broertjes noted that the TRL figures present a benefit from the discussed changes to the bumper test area. Mr. Zander added that, however, cost benefit analyses should cover the whole world since the bumper test area is a gtr subject. With this, also e.g. the US will need to carry out their own cost benefit analysis for the US. Mr. Broertjes explained that he in fact wishes to achieve a safety level where no further costs will be added. Manufacturers also need to take into consideration that it is not

intended to change current vehicles and future changes are expected to be cost neutral compared to today's solutions. Mr. Kinsky added that, however, also conducting the witness tests with a Technical Service represents certain efforts and that industry will have to pay for these efforts. Therefore, industry requests to decide for one procedure for the determination of the bumper test area.

6. Discussion on the new test procedure

(all)

(documents TF-BTA-7-03, TF-BTA-7-04, further documents expected)

Mr. Schmitt presented document TF-BTA-7-03 on behalf of the European Automobile Manufacturers' Association ACEA. He admitted that a decrease of the bumper test area can be seen in average but noted that this does not necessarily mean also a decrease in the protection level. Also, decreases may be caused by other influences. Finally, Mr. Schmitt summarized some arguments shared in the TF-BTA discussion and suggested to start with the wording as presented in document TF-BTA-7-04 as basis for the future amendments to legislation. This proposal uses the corner gauge for the determination of the bumper corners as discussed during the last meeting.

Mr. Gehring noted that the TRL report already mentions that design changes might be expected in a way that a similar discussion could come up again in some years. Mr. Schmitt responded that, from a manufacturer's view, the proposed wording addresses the main topics as discussed in this Task Force and that the proposal provides OEM's as well as Type-Approval authorities worldwide with the possibility to fulfil a clear legislative language without causing functional issues.

Mr. Gehring was nevertheless again worrying about effects on vehicle design. Mr. Roth pointed out that for compliance with different bumper standards interaction with structural parts is needed. Therefore, the bumper corners always must be in front of the longitudinal beam for functional reasons. Mr. Schmitt added that he would expect consumer organization like Euro NCAP to prevent industry from doing "fancy things". Mr. Zander wondered why, in this case, the bumper area could not be just defined up to the ends of the longitudinal beams as bumper test area.

Mr. Roth wondered whether BAST and BGS Böhme & Gehring were having a view focused too much on the situation in Europe. He explained that clear legislative language is necessary especially for countries with self certification. A test procedure that allows checking the outer contour of a vehicle provides for such certification environments. However, after some further discussion Mr. Zander disagreed that the corner gauge provides a practical solution because it does not address the issue and pointed out that BAST therefore insists on the consideration of the bumper beam for the determination of the test area.

Mr. Broertjes outlined that two options exist: Prepare one document that contains the corner gauge proposal and, within square brackets, also the proposal to consider the bumper beam. Alternatively, two different documents could be prepared with the same content as mentioned above, which may make it easier for GRSP to come to a conclusion.

It was finally agreed that different documents should be prepared, one for the corner gauge only and a second one for the corner gauge PLUS the bumper beam.

Mr. Takagi then presented the position of Japan (see document TF-BTA-7-05). He noted that in principle both procedures for the determination of the bumper test area seem acceptable. However, when using the bumper beam it cannot be guaranteed reasonably that the impactor is not used outside its biomechanical limits as discussed in the work of this Task Force. Japan therefore supports the use of the procedure with the corner gauge.

Mr. Takahashi explained in addition that in such a case – using the impactor outside its biomechanical limits – technical measures would be needed to prevent the impactor from rotating (see document TF-BTA-7-06). This may facilitate the use of measures that could be injurious to the human body. However, the details as well as the effects would need further investigation that will take much more time than currently available for the work of this group.

The chair welcomed the clear statements of Japanese TF-BTA members. He wondered whether the group then could already agree to only use the corner gauge as the proposal of TF-BTA to GRSP. However, Mr. Zander stated that Germany will maintain their position to use the bumper beam width as an additional criterion. Mr. Gehring clarified that exactly the issue described in document TF-BTA-7-06 could happen within a bumper test area defined by bumper corners only because it is not the bumper cover but the stiff structure underneath mainly influencing a possible rotation of the impactor. Mr. Schmitt noted that this approach is not reasonable as it implies that that the outer surface is considered to be completely soft.

The chair then wondered whether the size of the corner gauges could be decreased: The European Commission wished to exclude possibilities to limit the bumper test area as shown at an SUV imported to Europe. The size of 610 x 114 mm still seems to allow certain styling elements to limit the bumper test area. Mr. Broertjes wondered whether a squared size of 114 x 114 mm would also serve for the determination of the bumper corners.

Mr. Schmitt then presented document TF-BTA-7-12. He explained that industry was requested to provide their opinion on several open issues. For the determination of the lower and upper bumper reference lines, serving as the height limits for the bumper corner determination, it was noted that those can be determined physically or using math data. On request of Mr. Broertjes as well as of Mr. Gehring he explained this in more detail. Mr. Zander was concerned that the old bumper corners may still be needed for the new procedure but Mr. Broertjes explained that clearly the old bumper corner definition will be deleted. However, he finally noted that some re-refinement of the wording may be needed to clarify the subject.

Mr. Schmitt also explained industry's position on the decrease of the dimensions of the corner gauge. He noted that numerous examples exist where a small corner gauge leads to an over-assessing of single styling elements, such as e.g. air intakes or fog lamps, which do not necessarily influence pedestrian safety. However, Mr. Zander noted that e.g. fog lamps may create injury risks for pedestrians.

Finally, Mr. Schmitt provided some arguments against an extension of the test area to the full width of the vehicle as originally suggested by BASt. He explained that, besides the shortcomings of the impactor when testing outside the 60° bumper corners, the test area may often be at the mirrors or the tires. Mr. Zander replied that BASt had always proposed to exclude the mirrors.

Mr. Roth added that also the lower bumper reference line may not be the perfect solution: It was noted that for some vehicles some inlets and feature lines could inappropriately influence the lower bumper reference line determination. Mr. Insel added that it is important to cover the main issues by the test procedure but that it may not be possible to address each single styling feature. He therefore suggested going back to the original industry proposal using the corner gauge only in the area where a structural interaction is required in US legislation. Mr. Broertjes explained that the clear intention is to cover the whole vehicle front and that the height and width of the corner gauge may vary but in general he sees agreement in the group to use such a corner gauge over the whole vehicle front.

Mr. Gehring concluded that obviously a number of issues exist with determining the bumper test area when considering all styling elements. He therefore suggested to only consider the BASt proposal and define the bumper test area using the bumper beam width. Mr. Broertjes again pointed out that the BASt proposal of course will be considered but that the majority of the group seems to be prepared using the corner gauge. He also noted that width and height of the tool could be modified: The width of the knee of the FlexPLI is 118 mm, doubling this to also consider the testing constraints would result in a corner gauge width of 236 mm. It may not be possible then to consider the whole legform height, as suggested in between by Mr. Insel, but the surface of the corner gauge could e.g. be squared. This would result in a corner gauge tool of 236 x 236 mm. After some further discussion of this latest proposal, Mr. Kinsky pointed out that of course industry would need some time to double check the possible effects but initially this new proposal may be a good suggestion.

Then, the position of Japan on the test area was presented by Dr. Konosu and Mr. Imaizumi (see document TF-BTA-7-10). They explained that the proposal of the European Commission would be acceptable for Japan. They highlighted that this proposal may not need a detailed scientific justification since the basics of the original test procedure, the 60° angles for the test area, are maintained. In addition, it was shown that the representativeness of the FlexPLI may be in question for inclinations above 30°. Finally, for the proposal of the Commission just an assessment of the technical feasibility may be needed and this could be finalized on short notice. Both, Dr. Konosu as well as Mr. Imaizumi

stated that Japan wishes to conclude the discussion on the bumper test area as soon as possible.

Dr. Coulougeat presented some more information regarding the behavior of the FlexPLI knee element compared to the human knee behavior using THUMS simulation (see document TF-BTA-7-08). He explained that the THUMS knee shows a different behavior due to the fact that the FlexPLI design does not completely follow the human body composition. He concluded that the FlexPLI may not be able to represent the human knee behavior, especially when rotation influences the kinematics of the knee. Mr. Schmitt had provided similar investigation results from his company (see document TF-BTA-7-07). These results show that the differences in the design of the THUMS model and the FlexPLI lead in general to – in several cases significantly – higher test results for the ACL and PCL elongation with the FlexPLI. This effect seems to be related to the FlexPLI design.

Dr. Konosu pointed out that, however, such comparison needs to be done with human knees but not with two different tools that may have used different validation procedures. Mr. Gehring wondered whether the results of those investigations can be understood as verification that there are no issues with the rotation of the FlexPLI for the other criteria to be assessed. Dr. Coulougeat responded that this had not been investigated.

Afterwards, Mr. Roth presented document TF-BTA-7-09. He explained that his company did a case-by-case analysis of accident data to assess whether the injury risk outside the existing corners of bumper is higher compared to the area inside and whether an extension of the bumper test area would be beneficial. Mr. Roth explained that in average about 74 % of the vehicle front ends are already covered by the current test area. Outside this area, neither the number of injuries in total nor the number of severe injuries is higher than inside but a trend to a lower frequency can be seen for the outside area. For vehicles launched to the market after 2006, there are even no severe injuries. **(Notes of the secretary:** *Mr. Roth confirmed afterwards that the one AIS2 case outside the current bumper test area for after 2006 vehicles was included by mistake since the respective injuries were not caused by the vehicle. Mr. Roth provided a corrected version of his presentation (see document TF-BTA-7-09r1).* **Further comments on this, not part of the official discussion in the meeting:** *Mr. Zander commented on Mr. Roth's presentation that the one case, where an AIS 2 leg injury (tibia fracture) occurred outside of the current bumper test area, reports an injury where the source is not fully clear. However, a later investigation showed that for this case it can be seen, that a pedestrian contact occurred outside the bumper test zone. Furthermore, spot checks of accidents coded with pedestrian contact inside the bumper test area resulted in actual pedestrian contacts outside this area. Mr. Roth commented on this again that the contact cannot necessarily be seen as the source of injury for this case, GIDAS clearly states that the injuries are caused by the road surface. However, it is common practice that, in case of uncertain details, cases are not considered for the analyses.)* However, Mr. Roth also stated that (accident (and injury) numbers generally are low and therefore may not be representative.

Mr. Zander stated that still 4 out of 21 injuries **(Note of the secretary:** *May need to read*

3 out of 20, following the discussion of Messrs. Roth and Zander noted above.) are outside of 60° bumper corners but that BAST would strongly recommend to do something to include all accidents. Also, he wished a case-by-case analysis to include the details of the cases. The secretary noted that BAST had initially volunteered to do this analysis (see minutes of the 5th meeting) and that Mr. Zander had already explained in the 6th meeting that this may be too time consuming. Mr. Roth added that, however, the majority of the cases is already covered.

Mr. Zander wondered if it could be concluded from the presentation of Mr. Roth that the bumper test area could be defined in a very pragmatic and easily applicable way by just using 74 % of the entire vehicle width. This idea was rejected by Mr. Roth, referring to the information shown by industry in this group regarding the limitations of the impactor.

Mr. Zander then presented details from a Euro NCAP test at BAST (see document TF-BTA-7-11) where a vehicle was tested also outside the bumper corners at the end of the bumper beam. Testing was possible without any further problems and at the time of impactor peak loadings the legform showed a similar kinematic behavior when compared to the test performed to an adjacent area inside the bumper corners. Mr. Zander stated that also Euro NCAP concluded that testing of oblique surfaces did provide reliable legform results in some cases but did not in others. He added that even ACEA formerly proposed to assess the structural parts behind the bumper cover and that TRL stated in their report the potentially injurious nature of hard structures outside the current bumper test area. Mr. Zander said that BAST agrees with the general opinion that the structural injurious elements behind the bumper covers should be considered and therefore believes that the consideration of the entire bumper beam width is indispensable. The chair thanked Mr. Zander for his presentation but also noted that the issues with the legform rotation as shown by other members of the Task Force must be considered. Mr. Kinsky added that the cost benefit analysis done by TRL may at least challenge whether an extension of the test area can be justified at all. However, understanding the rationales of the Commission and seeing the wishes of the contracting parties industry supports an extension of the test area but clearly cannot support to always check two different methods of determining the test area. The chair noted that industry could bring up their arguments on this at GRSP.

Discussion then turned to the need of an offset from the bumper corners to the test area. Industry had explained that an interaction of the FlexPLI with some structure may be needed to control the behavior of the FlexPLI. Mr. Zander explained that according to BAST's experiences no offset is necessary. Mr. Broertjes stated that 42 mm should be sufficient which represents half of the width of the main body of the tibia section as discussed in an earlier meeting. Mr. Kinsky noted that the initial contact of the FlexPLI with the vehicle surface may also occur in the knee area and that therefore the halved width of the knee element, i.e. 118 mm divided by two, should be used. Mr. Broertjes noted that also Japan had pointed out to need some structural interaction to achieve stable test results. However, the subject was not finally concluded but it was agreed that the draft amendments should initially contain 42 mm within the bumper corners.

With regard to the dimensions of the corner gauge, it was noted that this also had not yet been finally decided. The chair noted that from the latest discussion the dimension of 236 x 236 mm seems to be a good compromise and offered to put this into square brackets in the draft amendment for the time being.

Finally, it was noted that a justification may be needed for the documents. Mr. Zander stated that it also must be proven that vehicles aimed to be affected by the new definition of the bumper test area are really affected. After some discussion it was agreed that the chair will prepare, with the help of the secretary and BAST, draft amendments for the amendment of UN Regulation 127, based on document TF-BTA-7-04. Two amendments will be prepared as discussed above, one containing the definition of the bumper corners using the corner gauge and one adding the bumper beam width as a second criterion for the test area. The secretary noted that formally TF-BTA is a sub group to the gtr 9 Phase 2 Informal Group and it was consequently agreed to also prepare respective amendments for the gtr No. 9.

The secretary pointed out that still a decision on the transitional provisions may be needed. Mr. Broertjes explained that the clear target of the European Commission is an enforcement of the requirement together with the FlexPLI and that the same conditions should apply. A final decision on this can be made in GRSP.

7. Review of action list, if needed
(Secretary)

Not needed.

8. Miscellaneous items, if any
(all)

None.

9. Next meeting, if needed

No next meeting was agreed but it was noted that an ad-hoc meeting can be called up in case one of the parties wishes to discuss further details.