Minutes of the 6th meeting of the Informal Group on Global Technical Regulation No. 9 – Phase 2 (IG GTR9-PH2)	
Venue	U.S. Department of Transportation, NHTSA offices, 1200 New Jersey Avenue SE, Washington D.C. 20590
Date	19 - 20 March 2013
Status: **Final**	

A) List of Attendees

The attendance lists for days 1 and 2 are attached as scans at the end of this document.

In addition, Ms. Dausse (Renault), Ms. Klinkenberger (Hyundai - 2nd day only) and Messrs. Borde (Faurecia - 2nd day only), Burleigh (Humanetics), Edwards (Alliance), Gay (Cellbond), Hardy (TRL), Padmanaban (JP Research - 1st day only) and Tedesco (General Motors) attended the meeting via WebEx/telephone.

B) List of Actions

(Note: Modified wordings for open action items A-4-03 and A-5-08 are indicated in **bold letters**.)

ID	Open Action Item	Responsibility	Due
A-4-03	Review of TEG FlexPLI thresholds / criteria	ALL	**7th** meeting
A-5-08	Clarify the details on how to bring the amendment into the gtr 9 (discussion with GRSP chair and UNECE secretariat)	Chair	**7th** meeting
A-6-01	Clarify, whether a solid model (3D model) is available / needed	Chair	7th meeting
A-6-02	Start 100 % check of one master leg	BASt	7th meeting
A-6-03	Review information (drawings and manual) provided by Humanetics	BASt, Cellbond, Concept, OICA, all	7th meeting
A-6-04	Update manual again under consideration of IG comments, if any	Humanetics	Before the draft

			amendment is agreed in Geneva
A-6-05	Deliver feedback on document GTR9-6-25	Alliance, all	7th meeting
A-6-06	Provide information on the master leg tests to BASt	all involved labs	1st week of April
A-6-07	Analyze data (A-6-06) and provide document on this	BASt	1st week of June 2013
A-6-08	Check information from logbooks and provide combined information on this	All	1st week of May 2013
A-6-09	Review information on this (GTR9-6-07, GTR9-6-11, GTR9-6-21) to come to a conclusion on the rebound issue	All	7th meeting
A-6-10	Prepare a joint document explaining the different approaches to derive the impactor thresholds	BASt and JASIC	1st week of May 2013
A-6-11	Review the document (A-6-10) prepared by BASt and JASIC	NHTSA, all	1 July 2013
A-6-12	Provide the certification reports for the legform used in document GTR9-6-20, if possible	OICA	ASAP

(Note of the secretary: Following action item A-6-12, the requested information was provided before these draft minutes were shared. The information was already added to the records of this meeting as document GTR9-6-28 to assure that all information needed is available.)

C) List of Meeting Documents

(Note: Documents which were submitted during the meeting are indicated in **bold letters**.)

Document No.	Rev.	Handed in by	Document title
GTR9-5-02	**1**	Chair/ Secretary	Minutes of the 5th meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) - **Final**
GTR9-6-01	**1**	Chair/ Secretary	Agenda for the 6th meeting of the Informal Group on Global Technical Regulation No. 9 - Phase 2 (IG GTR9-PH2) - **Final**

GTR9-6-02		Chair/ Secretary	Draft minutes (this document)
GTR9-6-03		OICA	FlexPLI Testing: Propelling Accuracy
GTR9-6-04		Chair	Guidelines for the development of drawings for a test tool to be added as an Addendum to UN Mutual Resolution No. 1 (M.R.1) - (ECE/TRANS/WP.29/1101)
GTR9-6-05		Chair	Schedule to prepare an Addendum for FlexPLI for the M.R.1
GTR9-6-06		Humanetics	FlexPLI GTR User Manual Rev. E 2013
GTR9-6-07		BASt	Definition of FlexPLI Biofidelic Assessment Interval
GTR9-6-08	**1**	BASt	Derivation of FlexPLI thresholds
GTR9-6-09		BASt	FlexPLI Drawings
GTR9-6-10		BASt	FlexPLI Pre- & Post-Test Procedure
GTR9-6-11		JASIC	Consideration of the Rebound Phase
GTR9-6-12		JASIC	Validation of Flex-GTR model
GTR9-6-13		OICA	Proposal for a wording to consider tolerances of the normal ride height
GTR9-6-14	**1**	NHTSA-VRTC	FlexPLI Round Robin Testing
GTR9-6-15	**1**	JP Research/ Alliance	Summary JPR Report Evaluating the Methodology and Assumptions Made in Doc. GTR9-5-14 and GTR9-5-19
GTR9-6-16		JP Research/ Alliance	JPR Report Evaluating the Methodology and Assumptions Made in Doc. GTR9-5-14 and GTR9-5-19
GTR9-6-17		Alliance	Large Truck/SUV Challenges
GTR9-6-18		Ford	FlexPLI Round Robin Test Results
GTR9-6-19	**1**	Shape	FlexPLI Round Robin Test Results
GTR9-6-20		OICA	Discussion on Impactor Thresholds
GTR9-6-21		OICA	Flex-PLI Rebound Issue: Industry Proposal (Update)
GTR9-6-22		JASIC	FlexPLI Drawing Review (Surface Level)
GTR9-6-23	**1**	Cellbond	FlexPLI Drawing Review
GTR9-6-24		Bertrandt	Durability Study SN-03
GTR9-6-25		**BASt**	**Comments on GTR9-6-15 (JP Research review of JASIC & BASt FlexPLI Injury Reduction Estimate)**
GTR9-6-26		**JASIC**	**Development of Injury Probability Functions for the Flexible Pedestrian Legform Impactor**
GTR9-6-27		**JASIC**	**Comments on Alliance and JP Research Documents (GTR9-6-15 and GTR9-6-16)**
GTR9-6-28		**OICA**	**Certification test results of the OEM legform used in document GTR9-6-20**

(Note of the secretary: Document GTR9-6-28 was provided after the meeting; see also footnote under section B).)

D: Summary of Meeting

1. Welcome

Mr. Damm welcomed the attendees of the 6th meeting at NHTSA's offices in Washington. He thanked NHTSA for providing the meeting rooms and the equipment. Also, he appreciated that Humanetics provided the WebEx access for the meeting.

Mr. Chris Bonanti, Associated Administrator Rulemaking at NHTSA, also welcomed the attendees to the US and specifically to NHTSA and wished the Informal Group a fruitful meeting.

The meeting was chaired by Mr. Damm (chair) and Dr. Konosu (vice-chair) and the secretariat will be provided by Mr. Kinsky.

2. Roll call of participants

See attendance list.

3. Adoption of the agenda

The secretary introduced the agenda and the documents that had been handed in. He explained that the documents GTR9-6-03 to GTR9-6-24 were made available on the website for the discussion in this meeting and to which agenda items the documents refer to in detail.

The agenda was finally adopted as document GTR9-6-01r1.

4. Review of the draft minutes of the 5th Meeting (GTR9-5-02)

Comments had been received from BASt, JASIC and OICA. The comments were reviewed in detail and the amended minutes were finally accepted and made available as document GTR9-5-02r1.

5. Report from the 52nd session of GRSP held in December 2012

5.1. Status report and extension of the mandate of the Informal Group (Chair) A-5-10

The chair reported from the discussion in GRSP in December 2013: The request to extend the mandate was presented to GRSP with document GRSP-52-32 (third progress report). Representatives accepted the request and it was also presented to WP.29 (WP.29-159-20) in March 2013 (the week before this meeting). Unfortunately, the 5th meeting was too close to GRSP so that it could not be presented in the third progress report. It is therefore planned to now prepare a further progress report, summarizing the discussion in the 5th and the 6th meeting, that will be presented to the May 2013 session of GRSP and then to the June 2013 session of WP.29.

(Note of the secretary: Action item A-5-10 was consequently closed.)

5.2. Details on the format of gtr9 amendments A-5-08

(Chair)

The chair reported that unfortunately the subject could not be discussed during the GRSP session in December 2012. However, it has already been agreed that this will happen at GRSP in May 2013. It was therefore agreed to postpone the due date of **action item A-5-08** to the 7th meeting.

6.	**Availability of drawing package and manual, process to review those data** (Chair, Humanetics, all) (documents GTR9-5-04, GTR9-5-31, GTR9-6-04, GTR9-6-05, GTR9-6-06, GTR9-6-09, GTR9-6-22, GTR9-6-23)	A-3-11, A-5-01, A-5-02, A-5-04

The chair noted that the drawings had been provided by Humanetics after the 5th meeting as agreed; the drawings were made available in a zip file on the website of this group (document GTR9-5-31). Action item A-3-11 therefore can be closed.

The chair explained that the process to review the drawing packages should be started in the meeting. He introduced document GTR9-6-04 that was prepared together with the chair of the Informal Group on gtr No 7 – Phase 2 as guidelines for the preparation of addenda to the Mutual Resolution No. 1 (M.R.1) to assure that future amendments of any UN gtr/UN Regulation provide the necessary level of detail e.g. for the test tools used in a UN gtr/UN Regulation.

On request of Mr. Martin he explained that of course not all details of a test tool can be given on the drawing, such as the production processes used or detailed material specifications. A first description of the necessary requirements is given in above mentioned guidelines. Also, Mr. Martin wondered whether a solid model (3D model) will be made publically available. The chair responded that this has not yet been discussed and may need advice of GRSP and WP.29 (**action item A-6-01**). Mr. Martin explained that NHTSA is considering such details to assure that complicated test tools as dummies or the FlexPLI can be produced by all interested parties in a guaranteed quality.

The chair also explained the schedule how a check of the consistency of the drawing could be done (document GTR9-6-05). He wondered whether attendees agree to this schedule. Mr. Zander stated that he agrees to this and has already prepared a more detailed proposal on the check of consistency of the drawings, so-called “deep dive” (document GTR9-6-09). BASt clearly supports that checks are done using at least two legform impactors and maybe randomly with other legs. Then, it must be guaranteed afterwards that the design remains frozen on that build level which is represented by the drawings and that further legs have the same performance. However, BASt can just offer to check one leg in detail. Mr. Zander then presented document GTR9-6-09 in detail. He explained that BASt/BGS Boehme & Gehring will perform the work on behalf of BASt.

Mr. Gay offered that his company could support the activities if a second leg was available.

Mr. Schmitt inquired as to the details of the required work. He explained that in fact each tool would need a quality check and that at the moment just consistency checks of the drawings can be done. However, to do a proper assessment clearly more than one impactor would be needed. Mr. Burleigh added that currently SN-01 is awaiting a revision and the E-leg cannot be used for Humanetics internal purposes. Dr. Konsou wondered whether these details indeed are necessary and Mr. Stammen explained that from the US perspective it is: NHTSA is checking in

such cases for each dummy whether or not it is consistent with the drawings. Mr. Stammen also wondered whether a list of master legs and master leg build level legs would be available for these purposes. Mr. Burleigh replied that the information on the build level can be given to each owner of a FlexPLI.

Dr. Ries suggested that after the checks of a legform against the drawings also the certification tests should be done. Mr. Zander confirmed that certification tests at the end of a legform check would be wise since BASt noted that the performance of a leg may vary after being disassembled and reassembled. BASt will consider this and other parties should also do so.

After some further discussion it was finally confirmed by the chair that as a first step a 100 % check of one legform as offered by BASt will be done according to the proposed schedule. Afterwards, it can be decided whether or not a necessity is seen to also double-check a second leg for consistency. This was agreed by the attendees **(action item A-6-02**).

Document GTR9-6-22 was presented then by Mr. Takahashi. He explained that in first checks JASIC found the drawings to contain some unnecessary information but to also miss some information. JASIC will further review the drawings. Mr. Gay presented document GTR9-6-23 and explained that Cellbond also found some information to be missing, e.g. more detailed material specifications for alloy or nylon parts, or to be imperfect. Also, some drawings seem to be missing.

On request of Mr. Burleigh the chair clarified that the idea is to deliver the information on the activities or the results respectively via the secretary to Humanetics for feedback. By now, BASt, Cellbond, Concept (for the manual), JASIC and OICA offered to participate in those activities, other parties are of course welcome to support this (**action item A-6-03**).

Mr. Burleigh introduced the updated manual – revision E of early 2013 – of the FlexPLI (document GTR9-6-06). He highlighted several changes that were made compared to the earlier version of the manual. Mr. Burleigh stated that he would welcome comments and he will consider them accordingly. The chair proposed to allow the attendees some time to check the manual and to then prepare a next version. Mr. Gay was wondering whether all the drawings mentioned in the manual will be available since Cellbond is missing some of them in the drawing package. Mr. Burleigh promised to double-check this and to make missing information available.

After some discussion it was then finally agreed that Mr. Burleigh (or Humanetics respectively) will deliver a further update of the manual in due time before the FlexPLI planned amendment in Geneva (**action item A-6-04**).

The chair explained the objective to have a draft addendum for the M.R.1 ready for the 7th meeting of this group.

Also, it was noted that with the discussion above the action items A-5-01, A-5-02, A-5-04 can be closed.

7. Information on FlexPLI build levels: necessary updates of existing impactors, related costs A-4-05
(Humanetics, all)

The question had been brought up by OICA and Mr. Burleigh explained that this information can just be delivered individually, depending on each legs build level. However, Dr. Ries and Mr. Roth both pointed out that it should be possible to have a rough overview on what needs to be

done. After a short discussion Mr. Burleigh confirmed that all legs produced as of late March/early April 2012 – after the decision on the new corridors was made in the Task Force "Review and Update of Certification Corridors" (TF-RUCC) – have the master leg build level.

(Note of the chair/secretary: Mr. Burleigh kindly confirmed the correct date after the meeting: All legforms supplied after 12 June 2012 meet the master leg specifications.)

It was finally agreed that the respective action item A-4-05 can be closed.

8. Discussion (ongoing) on cost-benefit assessment A-5-09
(NHTSA, BASt, all)
(documents GTR9-5-14, GTR9-5-19, GTR9-6-15r1, GTR9-6-16, **GTR9-6-25, GTR9-6-27**)

The Alliance had already presented in earlier meetings the subject of the cost benefit assessment to the Informal Group. Mr. Bilkhu now specifically addressed the concerns of the US manufacturers with the two documents GTR9-5-14 and GTR9-5-19. These concerns were reported in a study of JP Research, a contractor of the Alliance (document GTR9-6-16). Mr. Bilkhu presented the summary (document GTR9-6-15r1) of JP Research's findings. He concluded that the methods used by JASIC and BASt may potentially lead to unrealistic assessments of the benefit for the US. On request of Mr. Martin he confirmed that "unrealistic assessment" in this case means "overestimation".

Mr. Martin wondered whether the Alliance can draw different conclusions from their project. After some discussion on this it was noted that further work on this may be needed at least for future US rulemaking as NHTSA does not fully agree with the all assumptions made by the Alliance.

Mr. Zander commented that estimation of a benefit is a common process and may not be correct in all cases. However, benefits can just be estimated and a certain approach has to be used for this. The method of shifting the injury severities is a well-known process in Europe and is widely accepted there. However, the Alliance stated to have some concerns with this approach. Also, Mr. Zander pointed out that the assessment of JP Research may not have used the right figures of the GIDAS database. He presented a short document on this (document GTR9-6-25). Mr. Bilkhu promised to double-check the information. Mr. Edwards wondered whether it is an appropriate approach to shift injuries by one AIS and Mr. Zander confirmed that this is an approximation. However, it needs to be noted that only those injuries are shifted where an improvement can be expected by the new tool. This does not necessarily lead to a shifted MAIS. After some discussion it was finally agreed that the Alliance will double-check the comments of BASt and provide feedback before the next meeting; all other parties are invited to also do so (**action item A-6-05**).

Dr. Konosu added that the data summarized by JASIC are Japanese data and that they are seen to be acceptable for Japan. However, it is true that the US may have a different situation. Then, the US should assess their data but cannot simply compare Japanese data to the PCDS data. Mr. Bilkhu agreed that an analysis for the US is needed and explained that the benefit estimates are normally conducted by a regulatory agency, NHTSA in this case. Mr. Edwards added that the intention of the Alliance is just to get a better understanding of the assumptions made by JASIC.

On request of the chair, Mr. Stammen explained that NHTSA for the time being has no further comments on the cost benefit analysis. He explained that the preamble can reflect the discussion above which would be sufficient for NHTSA. Mr. Martin added that all presentations

made were very valuable for NHTSA and will be considered in their rulemaking process. It was therefore concluded that action item A-5-09 from the 5th meeting can be closed.

Mr. Bilkhu added that, however, the US may have certain specifics that anyway may lead to different assessments of the cost benefit issue. Specifically, the bumper requirements in part 581 are in contradiction to the pedestrian safety requirements and – responding to a question of Mr. Broertjes on this in between – at the moment no vehicle complies to both, part 581 and (European) pedestrian legform test requirements. Some discussion on this came up, also mentioning that similar issues could exist with future UNECE-R 94 (frontal impact) requirements that currently are in discussion in Geneva. It was finally concluded that rulemaking processes in the US need to consider all these details in their future activities.

To finalize the discussion on this subject for the time being, Dr. Konosu presented a summary of his comments (document GTR9-6-27). He stated that the intention of Japan was to prepare information for their country and that other attendees of this meeting are very welcome to do the same for their countries.

9. Testing activities with the master legs

9.1. Status of testing activities with the master legs, issues to be reported A-5-03

(All involved labs)
(documents GTR9-6-14, GTR9-6-18, GTR9-6-19, GTR9-6-24)

NHTSA had conducted tests with two of the master legforms and the legform purchased by the Vehicle Research and Test Center (VRTC) against three vehicles. The results were presented by Mr. Suntay (document GTR9-6-14). Mr. Suntay explained that the test results indicate good repeatability and good reproducibility. However, some other issues were noted such as the problem to meet the certification corridor for one channel with one of the legs, slight mass differences which were in the tolerances but that required adaptations of the firing conditions etc.

On request of Mr. Zander Mr. Suntay explained that tests on the vehicles were conducted at centerline. Mr. Knotz inquired what the build level of the VRTC legform was. Mr. Burleigh promised to double-check this and to report at the next meeting. Mr. Stammen added that VRTC plans to conduct inverse certification tests later this year in their lab which will allow the assessment of whether VRTC leg meets the new corridors of the inverse certification tests.

Ms. Chaka presented the test results of the Ford lab with the same two master legforms (document GTR9-6-18). She also reported that issues were seen similar to those at VRTC. Also, Ms. Chaka noted that specifically large SUV's and pick-up trucks will have difficulties from an engineering standpoint to be designed according to the FlexPLI requirements.

Mr. Corwin presented the test results achieved by Shape (document GTR9-6-19). He noted that the assessment of test results at Shape has not yet been finalized but that the final results will be shared in the 7th meeting. Also, he mentioned that, following the discussion above and the unclear build level of the VRTC leg, his presentation will need to be updated. (Note of the secretary: A modified version was later provided during the meeting as document GTR9-6-19r1) However, Mr. Corwin explained that the main idea was to compare two different bumper systems at two cars which each are offered in North America and Europe and comply with the regulations in those countries/reigions. Messrs. Schmitt, Bilkhu, Zander and Suntay provided some comments on additional information that could be (or should be respectively) added such as comparisons of time histories, velocity data, more information on the differences of the

bumper systems etc. Mr. Corwin promised to consider this in the revised version.

On behalf of Mr. Kolb (Bertrandt), who unfortunately could not be present, Mr. Roth presented document GTR9-6-24. He concluded that the test results lead to some question marks since the behavior of the legform especially in the inverse tests shows some clear trends to get worse. However, Bertrandt did not have a chance to double-check what the root cause for the steadily decreasing test results in the inverse tests was. Mr. Zander wondered whether the time history curves could be provided that may allow better assessment. Mr. Roth will bring this back to Mr. Kolb. Mr. Knotz asked to also add more information about other conditions such as velocities etc. Mr. Stammen and Mr. Zander added that it would also be useful to know more about the tests that had been conducted in between. Mr. Martin wondered whether information is available on the time periods – were tests conducted with longer time gaps in between or just at some consecutive days. Also, he wondered how long it takes to conduct two consecutive tests. Mr. Knotz and Dr. Konosu explained how labs usually conduct the tests. Finally it was concluded that Mr. Roth will try to clarify all these details with Mr. Kolb and come back to this.

Also, some discussion came up on the certification tests. Mr. Zander pointed out that this again proves that the inverse tests better detects issues with the legform. Dr. Konosu replied that, however, the test can also not deliver more detailed information on the reasons. After some further discussion Mr. Zander agreed to check whether any subsequent inverse certification test was performed afterwards at BASt. Also, the logbook information will be made available to complete the picture on this.

Mr. Martin asked whether the detailed data for the tests (the ones discussed last but also for all other tests with the master legs) could be made available. This was confirmed by all involved parties. BASt volunteered to collect these data. It was agreed that the following information should be shared:
- legform serial number;
- production date (if not available: delivery date to costumer - before or after design freeze in late March/early April 2012?); ***(Note of the chair/secretary: Mr. Burleigh kindly confirmed the correct date after the meeting: All legforms supplied after 12 June 2012 meet the master leg specifications.)***
- peak values of certification tests (inverse as well as pendulum) and time history curves, if possible;
- date (and, if possible, also the time of the day) of certification tests and the lab that conducted the certification;
- any special observations that may have been made;
- amount and type of tests conducted in between.

It was agreed that all labs involved in the master leg testing will deliver this information to BASt. Preferably, other labs should also provide this information of their legforms. The information should be provided during the first week of April 2013 the latest (**action item A-6-06**). BASt will analyze the information and prepare a summary document on this by the first week of June 2013 the latest (**action item A-6-07**). Finally, BASt will also check the information provided with the logbooks and provide combined information on this by the first week of May 2013 (**action item A-6-08**). These action items replace action item A-5-03.

9.2. Further experiences from testing with the FlexPLI, if available
(All)
(documents GTR9-6-03, GTR9-6-10)

Mr. Kinsky presented document GTR9-6-03. He concluded that an instable free flight is expected to influence the final test results. Such an instable flight can be noted by recorded values in the time history curves during this free-flight phase. Industry therefore sees a need to also specify the free flight of the FlexPLI before it hits the object (during certification or during a vehicle test) and proposes the measurement values to be in a specific corridor. This corridor should cover the last 30 ms before the impact and in this corridor the values for bending moment and ligament elongation should not exceed 5 % of the impactor threshold. Also, OICA proposed that the measurement curves should not be shifted to zero at t = 0.

A similar subject was presented by Mr. Zander with document GTR9-6-10. He also concluded that the free flight should be specified in more detail. BASt proposed a 30 ms long period before the impact in which the bending moments should not exceed 15 Nm. In addition, BASt proposes to clarify that the zeroing of the corridors should be done when the impactor is still free hanging and no load is applied to it. On request he clarified that BASt, at least for the time being, has no proposal on the ligament elongations. Dr. Konosu proposed to use a pragmatic approach and just limit these elongations at 1 mm. He explained that this is also done in Japan.

Mr. Martin asked where in fact t = 0 is fixed and whether this has an influence on the two proposals. Mr. Zander and Mr. Kinsky responded both that this is not seen since in fact the t = 0 does not really have a meaning here: It does not influence the test results and the corridor for the free flight just needs to include half of one wave length for the assessment.

After some discussion it was agreed to study the two proposals and to come back to this during the next meeting.

9.3. Exclusion of the rebound phase from the test result evaluation A-5-05, A-5-06
(OICA, BASt, all)
(documents GTR9-5-08, GTR9-5-30, GTR9-6-07, GTR9-6-11, GTR9-6-21)

The chair mentioned that three proposals for the subject are available. He proposed to first receive all presentations and then enter into discussion on this.

Mr. Takagi presented document GTR9-6-11. He stated that it does not seem necessary to specify the rebound phase in detail since this is also not done in other legislation.

The presentation of BASt (document GTR9-6-07) was introduced by Mr. Zander. He explained that, according to his opinion, it would be more appropriate to define a biofidelic assessment interval that covers all possible cases as explained.

Dr. Ries presented the ideas of OICA on the rebound phase. He explained that it seems to be very hard to specify a rebound phase since it may be different for different vehicle categories. However, he pointed out that the method proposed by OICA covers the waste majority of vehicles and only in very rare cases additional checks would be necessary.

The chair invited the audience to discuss the issue. Discussion came up on when the rebound phase starts. Mr. Zander confirmed on request of Mr. Roth that the interval should be considered in which the FlexPLI behaves like the human or the human model respectively. Dr. Ries pointed out that then the interval proposed seems much too long since the legform is only for the first contact confirmed to be biofidelic. Also, this period may be different for tibia

and knee. He and Mr. Roth wondered how BASt specified the length of their Biofidelic Assessment Interval and Mr. Zander responded that an objective method and automatic evaluation method was requested. There is no clue that the impactor biofidelity is limited to the pure contact phase with the vehicle only. The BAI can solve this issue. In addition, it covers all potential critical loadings during the test. Partly, the BAI interval is even shorter than the interval proposed by industry in document GTR9-5-30. This was demonstrated in document GTR9-6-07. The secretary reminded the attendees that some information on this had also been shown in the TF-BTA meeting held on 18 March 2013 and that the information is already available on the website. (Note of the secretary: The documents referred to were presented in the 3rd meeting of the Task Force Bumper Test Area as documents TF-BTA-3-03, TF-BTA-3-07 and TF-BTA-3-08 and are available on the respective UNECE website.)

After some discussion the chair proposed that the detailed discussion on this should be held during the next meeting and that a final conclusion should be made then (**action item A-6-09**). Also, it was noted that the action items A-5-05 and A-5-06 can be closed with the presentations above.

10. Technical feasibility: possible vehicle countermeasures to meet FlexPLI requirements A-3-12
(OICA, all)
(document GTR9-6-17)

Ms. Chaka presented document GTR9-6-17, explaining the issues that are seen for the compliance of heavier trucks and SUV with the pedestrian safety requirements. Ms. Chaka explained that several customer requirements and needs prevent the vehicles from meeting the legform requirements or that the vehicles would no longer be able for several of their original purposes. In addition, many of these vehicles would need to comply with both, the FlexPLI as well as the upper legform to bumper test requirements due to their varying ride heights and ground clearances. This seems to be impossible from an engineering point of view.

Mr. Kinsky reminded the group that already during the discussion defining the gtr No 9 requirements it had been highlighted that the pedestrian safety tests that are used today have just been developed for the typical (sedan-type) vehicles and similar vehicle-designs.

The chair noted that for other vehicle categories no further information was provided. Obviously, no issues with the design of such vehicles towards FlexPLI requirement are seen. He therefore proposed to close the respective action item A-3-12 which was agreed. Also, the chair noted that the wording of the preamble will consequently reflect the issues mentioned for specific vehicles.

11. Status of discussion in the "Task Force Bumper Test Area"
(European Commission, all)

Mr. Broertjes gave an oral update of the discussion in the group. He noted that there seems to be an issue with decreasing test areas that needs to be addressed. The UK Transport Research Laboratory (TRL) as the contractor of the European Commission showed in their assessment of several vehicle geometries that the test areas narrow for later versions of some vehicle models compared to earlier version. Furthermore, Mr. Broertjes noted that several attendees had shown information on the difficulties that may occur with testing outside the current test areas. The Commission (or their contractor respectively) now needs to assess whether the FlexPLI can

be used for testing outside the current bumper corners.

Mr. Broertjes concluded that the Task Force will assess all information that was provided and that this will be discussed during the next meeting of the TF-BTA that could be preferably be held together with the next meeting of this group.

12. Draft of the amendment to gtr No. 9

12.1. Discussion on injury thresholds / criteria A-4-03

(BASt, OICA, all)
(documents GTR9-5-20, GTR9-5-23c1, GTR9-6-08 (later **GTR9-6-08r1**), GTR9-6-12, GTR9-6-20, **GTR9-6-26**)

Mr. Zander presented an overview on document GTR9-6-08. He pointed out that it is not the intention of BASt to change the injury criteria. Mr. Zander explained the process used at BASt to derive the threshold values and noted that his approach was slightly different than the approach of JAMA/JARI. He also highlighted the agreements made during the work of the former FlexPLI Technical Evaluation Group (TEG) on the FlexPLI thresholds. He concluded that, however, as both approaches were combined the impactor threshold values also depend on the actual performance of the latest impactor version and therefore should be adapted accordingly, if necessary.

Dr. Konosu presented document GTR9-6-12 that explains how the FlexPLI model was validated at JAMA/JARI. Dr. Konosu showed that in the process used in Japan the performance of the impactor does not influence the impactor thresholds.

On behalf of OICA members Mr. Kinsky presented the findings of industry (document GTR9-6-20). The presentation showed that the performance of the master legs cannot be generalized as assumed by BASt since another leg with the same build level shows a different performance. Mr. Kinsky concluded that industry proposes to stick to the agreements of the TEG regarding the impactor thresholds. Dr. Ries added that for the time being it seems to be more important to get impactors with a stable performance than re-discussing the thresholds that can be used with these impactors.

Mr. Zander required OICA to provide the certification reports of the legform with the different performance to allow an assessment of these data. Mr. Kinsky promised to double-check this and to come back to this (**action item A-6-12**).

(Note of the secretary: The requested information was provided after the meeting but was already added to the records of this meeting as document GTR9-6-28. Discussion can take place during the next meeting.)

Mr. Nguyen explained that NHTSA for the time being is not yet prepared to accept the currently proposed injury threshold values, especially since the injury risk curves are missing. Both, Mr. Takahashi and Mr. Zander offered to show their injury probability assessments which both are representing different approaches. Mr. Martin clarified that of course the performance thresholds of the impactors have to be agreed but that the question of the injury risk curves is a separate information that is needed to derive the injury risk of the threshold values from and to justify respective rulemaking.

In response to this, Mr. Takahashi presented a document that he had already shown in the 2012 SAE World Congress (document GTR9-6-26; the full paper SAE 2012-01-0277 is available for purchase at the website http://papers.sae.org/2012-01-0277/). He explained that a two-step

approach was used in this: In a first step the injury probability functions were developed and then these were double-checked against the data of the EEVC LFI for validation purposes. Mr. Takahashi concluded that finally this process showed equivalent injury probabilities for the FlexPLI and the EEVC LFI, that the bending moment threshold well corresponds to the EEVC LFI's acceleration and that the MCL elongation is slightly more conservative then the knee bending angle of the EEVC LFI.

Mr. Nguyen appreciated the presentation of Mr. Takahashi and mentioned that NHTSA would welcome to also see similar information for the BASt approach, if possible. However, he also stated that for the time being NHTSA would appreciate to allow contracting parties to the gtr agreement to use the threshold values a bit flexible, especially when seeing the conflict of the US with the part 581 requirements. Mr. Broertjes strongly opposed that flexibility or options should be allowed. Requirements should be set so that all contracting parties can use them. Ms. Chaka pointed out that NHTSA may have also difficulties with the headform test where such flexibility is not provided. Mr. Knotz added that such flexibility then must also be provided for other contracting parties, for example China or India or Russia, if they came up with such a request. However, he doubts that this could work. Mr. Damm added that the presentation of Mr. Takahashi had shown the comparability of the requirements of the FlexPLI with those of the EEVC LFI and that NHTSA had agreed to the original gtr No. 9. Mr. Broertjes supported that therefore this should not be an issue.

Mr. Hardy commented that the data shown by Mr. Takahashi referred to the 1998/2002 EEVC report where in fact 15 degrees were used for the bending angle of the EEVC LFI. The 19 degrees referred to in Mr. Takahashi's presentation were derived later in the work of TRL for the European Commission when doing the feasibility assessment for the phase 1 of the European requirements. In this study of TRL in 2004, new data from Matsui et al. were included. Mr. Takahashi explained that the Matsui paper contained mistakes. Therefore, the data of a study of Dr. Konosu were used that are correct.

Coming back to document GTR9-6-12, Mr. Zander wondered why the validation of the FlexPLI against vehicle models now should be skipped. Simplified vehicle models could be used for such purposes where the load paths can be modified. This had also been done in other cases in the past. Dr. Konosu and Mr. Takahashi replied that this may be time consuming and that it nevertheless adds variability. Mr. Zander stated that he nevertheless would prefer to have simulation and physical testing against a simplified vehicle model.

Regarding the OICA presentation (see document GTR9-6-20), Mr. Zander stated that the presentation would be erroneous due to some wrong statements. He noted that e.g., as described in GTR9-5-20, the vehicle tests were not used for the proposal to modify the impactor thresholds. Furthermore, he stated that if using the TEG agreed methodology for determining the impactor thresholds, as suggested by GTR9-6-20, e.g. the maximum permissible tibia bending moment would be at 321 Nm.

Mr. Zander then presented the process used by BASt to define the injury criteria and to derive the impactor thresholds in more detail (document GTR9-6-08r1). He pointed out that the BASt approach is based on the same original approach as the Japanese one but was then decided to use different data. However, both approaches lead to injury thresholds and were finally leveled in the Technical Evaluation Group. On request of Mr. Martin Mr. Zander explained that the JASIC approach is not based on tests with the original legform prototypes but the BASt approach does consider these test results at a certain point in the process. After some discussion on this it was agreed that Mr. Zander and Mr. Takahashi will develop a joint

document explaining the two approaches to derive the impactor thresholds and especially where the differences are. It was agreed that this should be done by the 1st week of May 2013 (**action item A-6-10**).

Some discussion then came up on what NHTSA would need for their internal discussion. Mr. Nguyen explained that this has not yet been finally discussed. Dr. Konosu proposed that a schedule should be developed that can be followed to assure that every information is available in time. On request of the chair Mr. Martin promised that NHTSA will review the TEG document that already explained several of the information mentioned above (document TEG-127) and that he will provide some initial comments to Mr. Zander and Mr. Takahashi. As soon as the document of BASt and JASIC is available, NHTSA will review this and submit comments. All other attendees of course are also invited to do so; comments should be made available before 1st July 2013 (**action item A-6-11**).

Dr. Ries asked to clarify whether this now means that the current impactor thresholds will be maintained. Also, he pointed out again that it is more important to first guarantee a stable performance of the tool itself. The chair responded that by now no decision on this can be made and that this therefore will be decided in the next meeting. Consequently, **action item A-4-03** will be postponed to the 7th meeting. Mr. Zander added that for this discussion it would be extremely helpful to get further information about the performance of other legforms on master leg build level as already agreed for action item A-6-06.

12.2. Proposal on tolerances for initial vehicle ride height A-5-07
(OICA, all)
(document GTR9-5-24, GTR9-6-13)

During the last meeting, OICA was requested to provide some wording that could be used for the gtr to define the tolerances for the initial vehicle ride height. Mr. Schmitt presented this proposal (document GTR9-6-13).

The chair proposed to take the wording into the draft gtr9 amendment for discussion in Geneva, if needed.

It was agreed that action item A-5-07 can be closed.

12.3. Review of the draft gtr9 amendment
(Chair, Vice-chair, all)
(document GTR9-5-29)

The chair proposed that a small reference group starts preparing and reviewing the draft gtr9 amendment including the preamble.

The group should consist of representatives of Germany, Japan, the US and OICA, it is requested to keep the number limited to allow effective work. The intention is to have WebEx and telephone meeting to prepare the document. A first draft informal document is planned to be submitted for the 53rd session of GRSP in May 2013. This proposal was agreed.

13. Review of activity list, work plan and identification of further open issues
(Chair, all)

(documents GTR9-5-28, GTR9-4-03r1)

The chair noted that several issues have not yet been finalized. The necessary discussion will be done during the next meeting. His report to the May 2013 session of GRSP and to the June 2013 session of WP.29 will reflect this accordingly.

14. Consideration of schedule
(Chair)

Document GTR9-5-28 already contains an adapted overall schedule. The chair explained that the informal group will consider this in its further work to assure that the gtr9 amendment can be submitted to December 2013 GRSP meeting as a formal document for GRSP discussion and decisions.

15. Review of action list
(Secretary)

The secretary noted that the open actions item A-3-11, A-3-12, A-4-05, A-5-01, A-5-02, A-5-04, A-5-05, A-5-06, A-5-07, A-5-09 and A-5-10 of the last meeting (see document GTR9-5-02r1) were closed during this meeting.

Action items A-4-03 as well as A-5-08 (see above under section "B) List of Actions") were postponed to the 7th meeting.

Finally, new action items A-6-01 to A-6-12 were assigned as indicated above and will be reviewed during the next meeting.

16. A.O.B.

None

17. Next meeting

It was agreed to hold the next (7th) meeting on 9 – 10 September 2013 (Monday/Tuesday) at OICA offices in Paris (4, Rue de Berri, 75008 Paris, France). The chair proposed to start at the first day at 10 a.m. the earliest to allow those people having a short travel to do this on Monday morning.

On request of the chair of the Task Force Bumper Test Area, Mr. Broertjes, it was clarified that the 4th meeting of TF-BTA will be held on Wednesday, 11 September 2013, in the morning.

Finally, it was also proposed to schedule a phone / WebEx meeting to discuss specific items in between the 6th and the 7th meeting. A date for this meeting will be announced at a later stage. ***(Note of the secretary: It was agreed in between to hold this meeting on 3 July 2013. Also, it was agreed that the WebEx meeting will be referred to as 7th meeting to allow a consistent tracking. Consequently, in September there will be the 8th meeting.)***

Attachment to section A) List of Attendees

List of Attendees **IG GTR9-PH2 6th Meeting**

Date, Place **19 March 2013, NHTSA offices, 1200 New Jersey Avenue SE, Washington D.C.**

NAME, First Name	Position / Organization	Email	Signature
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List of Attendees — **IG GTR9-PH2 6th Meeting**

Date, Place — **19 March 2013, NHTSA offices, 1200 New Jersey Avenue SE, Washington D.C.**

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List of Attendees — **IG GTR9-PH2 6th Meeting**

Date, Place — **20 March 2013, NHTSA offices, 1200 New Jersey Avenue SE, Washington D.C.**

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List of Attendees — IG GTR9-PH2 6th Meeting

Date, Place — 20 March 2013, NHTSA offices, 1200 New Jersey Avenue SE, Washington D.C.

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Versailles, Mary	NHTSA		
Kinsky, Thomas			