

Final

The 8th Flex-PLI Technical Evaluation Group (Flex-TEG) Meeting

Date: 19th May 2009 (10:30 – 17:30)

Place: TUV Rheinland Group – Cologne, Germany

Attendances

A. Konosu (Chairperson/J-MLIT/JARI), B. Been (Secretariat/FTSS-Europe)

O. Zander (BAST), P. Lessmann (BGS), O. Ries (ACEA/VW),

R. Fleischhacker (ACEA/Porsche), T. Kinsky and B. Dreyer (ACEA/Opel)

A. Sipido (ACEA/Ford), C. Hess and M. Netter (ACEA/Audi)

Y. Takahashi (JAMA/HONDA), W. Liebers (TUV), K. Wolff (Continental)

S. Mueller (MESSRING), C. Roesch (Cellbond)

M. Burleigh (FTSS-Europe)

1. Opening: Welcome and Self introduction

- The chairperson expressed his appreciation to the participants and to Mr. Liebers (TUV) for providing the conference room.
- The members introduced themselves.

2. Finalization: Draft Agenda of the 8th Flex-TEG Meeting (TEG-085)

- The draft agenda for the 8th Flex-TEG meeting (TEG-085) was discussed.
- After the discussion, the draft was finalized with several modifications (TEG-085-Rev.1).

3. Finalization: Draft Minutes of the 7th Flex-TEG Meeting (TEG-083)

- The draft minutes of the 7th Flex-TEG meeting (TEG-083) was discussed.
- After the discussion, the draft was finalized with several modifications (TEG-083-Rev.1).

4. Finalization: Status of the Action Items (TEG-086)

- The draft status report of the action items (TEG-086) was reviewed.
- No objections, and then it was finalized only changing its title as finalized one (TEG-086-Rev.1).

5. Information and Discussions: Flex-GTR-prototype Technical Evaluation Test Results

5.1. Japan Reports

5.1.1. Repeatability & Reproducibility of Flex-GTR-prototype, and Comparability between the Flex-GT and Flex-GTR-prototype (TEG-072-Rev.1)

- The Chairperson reported the results of the investigations conducted in Japan on the repeatability and reproducibility of Flex-GTR prototype as well as the comparability between the Flex-GT and Flex-GTR prototype (TEG-072-Rev.1).
- It was reported that while both the pendulum test and simplified vehicle test indicated that the repeatability and reproducibility of Flex-GTR-prototype were good, the Flex-GTR prototype had somewhat higher output than from the Flex-GT.

5.1.2. Comparability of the Flex-GTR-prototype output under the symmetric right and left bumper corner impact (TEG-087)

- The Chairperson reported the results of JAMA-JARI's investigations of the comparability of the Flex-GTR-prototype output in symmetric right- and left-bumper corner impacts (TEG-087).
- An investigation using a simplified vehicle indicated good comparability of the Flex-GTR-prototype output in symmetric right- and left-bumper corner impacts.

5.1.3. JAMA Round Robin Tests (TEG-088)

- The Chairperson made an interim report on the results of the round-robin tests implemented in JAMA on the Flex-GTR prototype (TEG-088).
- He also reported that these tests primarily investigated the repeatability, durability, and usability of the Flex-GTR prototype and that good results had been obtained.

5.2. BAST and ACEA Reports

5.2.1. BAST Report (TEG-089)

- Mr. Lessmann (BGS) reported the results of the tests BAST/BGS conducted on the repeatability and reproducibility of the Flex-GTR-prototype, comparability between the Flex-GT and Flex-GTR prototype, and comparability of the Flex-GTR-prototype output in symmetric right- and left-bumper corner impacts (TEG-089).
- Investigation results are as follows.
 - The investigation results from both the inverse test and actual vehicle test indicated good repeatability of the Flex-GTR prototype.
 - The reproducibility results of the Flex-GTR prototype in the inverse test were good, but some results from the actual vehicle test were not good.
 - The output of Flex-GTR prototype was generally higher than that of Flex-GT in the results obtained in Japan.
 - There were some differences in the comparability of the Flex-GTR-prototype output in symmetric right- and left-bumper corner impacts, unlike the results in Japan.
- The Chairperson commented that the test results from actual vehicle tests involve factors related to the impactor and other factors. It is therefore necessary to analyze the factors to distinguish the impactor factors from other factors.
- Some others commented that it would be better to evaluate the impactor using the inverse test, simplified vehicle tests, etc. as a basic principle.
- The Chairperson explained that there is uncertainty in the sensitivity value of the Tibia-3 gauge for the Flex-GTR prototype (SN03), so the gauge will be recalibrated near future and the new result will be presented to TEG members. If the gage is damaged, it will be replaced.
- Additionally, it was agreed that Japan and Europe will share information about the optimum method for launching the impactor and cooperate to facilitate stable launching if possible.

ACTION-041: Japan and Europe will share information about the optimum method for launching the impactor and cooperate to facilitate stable launching if possible.

5.2.3. ACEA Report (TEG-090, TEG-091)

- Mr. Ries (ACEA/VW) introduced the history of evaluations of Flex-PLI so far implemented in ACEA (TEG-090). He reported that the Flex-GTR prototype specifications resolve most of the conventional problems. He said, however, that he cannot make final comments because the evaluation test in ACEA is not completed.
- Mr. Kinsky (ACEA/Opel) reported the results of the tests implemented in Opel (TEG-091). He said that the newest green vehicles in Euro-NCAP can exceed the tentative Flex's injury thresholds. However, he also said that, while the impactor itself had been considerably improved, the vehicle feasibility study was not yet completed. He therefore felt it is too early to prepare regulations.

5.3. FTSS Reports: Proposal for Update on Design for the Flex-GTR-prototype (TEG-092)

- Mr. Burley (FTSS-Europe) presented an idea for improving the Flex-GTR prototype based on the results of Flex-GTR prototype evaluation tests conducted so far (TEG-092).
- Basically, this involves mainly improving electrical parts, so it was approved by TEG.

6. Discussions and Finalizations: Dynamic Calibration Method for Flex-GTR-prototype (Pendulum Test Method or Inverse Test Method)

6.1. JAMA/JARI Reports (TEG-093)

- The Chairperson reported the study results concerning the inverse test implemented in JAMA-JARI (TEG-093). He reported that the inverse test exhibits no significant merit but takes longer time for preparation and costs more to implement than the pendulum test.
- BAST and ACEA asserted that the major advantage of the inverse test is that it enables tests with the impactor placed in the same conditions as in the actual vehicle test (in a free condition).
- Mrs. Roesch (Cellbond) commented that current rigid impactors are expensive to operate because it is necessary to replace the knee parts and the flesh parts before each use. However, Flex-PLI does not require such replacement and if one honeycomb is used for 20

actual vehicle tests in the inverse test, the operation cost will be lower than that for current rigid impactors.

- Mr. Takahashi (JAMA) stated that inverse tests were not actually implemented by each member company of JAMA. JAMA-JARI opinions were based only on the results of the tests implemented in JARI, and the opinions largely differ from those of BAST and ACEA, so we will take your opinions home and examine them in JAMA-JARI.
- The Chairperson declared that each TEG member should examine this subject in their home organizations and that whether to adopt the inverse test to calibrate the Flex-GTR prototype shall be decided at the next (9th) Flex-TEG meeting.

ACTION-42: TEG members shall examine the applicability of the inverse test as the calibration test until the next TEG meeting and decide whether to adopt the inverse test for calibrating the Flex-GTR prototype at the next (9th) TEG meeting.

6.2. BAST Reports: Tentative Corridor for the Inverse Test (TEG-094)

- Mr. Zander (BAST) proposed a temporary calibration corridor for the inverse test (TEG-094).
- Mr. Bernerd (FTSS) pointed out a possible flaw in the calibration corridor technique.
- Mr. Zander (BAST) answered that he is ready to adopt any better technique.
- The Chairperson requested that the calibration corridor be prepared by incorporating the results of the inverse tests in Japan.
- Mr. Zander agreed to prepare it in such a manner if Japanese data are provided.

ACTION-43: Mr. Zander shall prepare the calibration corridor for the inverse test by sharing the results of the inverse tests in Japan.

7. Discussions and Finalizations: Injury Criteria and Thresholds

7.1. Review of Human Tibia Injury Threshold Value

7.1.1. JAMA Proposal (TEG-084)

- Mr. Takahashi (JAMA) proposed an injury threshold value for the human tibia (bending moment: 361Nm) (TEG-084).
- Mr. Zander (BAST) asked whether experiment result data on females are appropriate.
- Mr. Takahashi (JAMA) responded that males and females have the same material properties of human bones, so inclusion of experiment data on females does not cause any problem if they are scaled in terms of dimensions and shapes.
- Mr. Zander stated that there are some results from examinations in BAST and would report them in 7.3.3.

7.2. Review of Human MCL Injury Threshold Value

7.2.1. JAMA Review (TEG-095)

- Mr. Takahashi (JAMA) proposed an injury threshold value for the MCL of the human body (Knee Bending angle: 19 deg) (TEG-095).
- TEG members had no objection on the value.

7.3. Finalizations for Injury Threshold Values for the Flex-GTR-prototype

7.3.1. Correlation between the Flex-GTR-prototype and Human Lower Limb Output (TEG-096)

- The Chairperson reported the analysis result of correlations between the human body and Flex-GTR prototype (TEG-096). He reported that the Flex-GTR prototype had a higher output than Flex-GT in our evaluation tests, so the Flex-GTR-prototype correlations with the human body were reanalyzed.
- Furthermore, it was proposed to extend the rubber to the bottom end (by 100 mm) because the modification improves its correlations with the maximum tibia bending moment applied to the human body.
- TEG members agreed upon extending the rubber because it improves the correlations with the maximum tibia bending moment applied to the human body.

7.3.2. JAMA Proposal for the Injury Threshold Values for Tibia and MCL of the Flex-GTR-prototype (TEG-097)

- Mr. Takahashi (JAMA) proposed the injury threshold values for the Flex-GTR prototype as obtained using TEG-084, -095, and -096 (Tibia bone bending moment 380Nm; MCL elongation 21mm) (TEG-097).
- TEG members had no objection on the MCL injury threshold values.
- As for the tibia, BAST made another proposal for the tibia bone injury threshold value (Sec. 7.3.3, TEG-098).

7.3.3. BAST: Tibia Injury Threshold Value Proposal (TEG-098)

- Mr. Zander (BAST) proposed the injury threshold value for the Flex-GTR prototype obtained from BAST analysis (tibia bone bending moment 304Nm) (TEG-098).
- Because two different tibia bone injury thresholds had been proposed from JAMA and BAST, the Chairperson directed proposing a single value that is agreeable for TEG members by the next (9th) TEG meeting through cooperation between JAMA, BAST, and other TEG members who experts on this subject.

ACTION-44: JAMA, BAST, and other TEG members who experts on the injury threshold values, will collaborate and propose an agreeable single threshold value for tibia by the next (9th) TEG meeting.

8. Discussions and Decisions: Evaluation Test Schedule for the Flex-GTR-prototype (TEG-099)

- The Chairperson proposed the schedule for lending the Flex-GTR prototype. He reported that NHTSA and KATRI had also requested to borrow the prototype.
- TEG members discussed and subsequently agreed upon TEG-099.

ACTION-45: TEG members shall perform evaluation tests on the Flex-GTR prototype based on the TEG-096 schedule.

9. Discussions and Finalization: ISO MME code for Flex-PLI

9.1. Suggestion for the ISO MME code for Flex-PLI, MESSRING (TEG-073-Rev.1)

- Mr. Mueller (MESSRING) proposed standardizing the measurement items for Flex-PLI (TEG-073-Rev.1).
- There being no significant objections, TEG members agreed. It is planned that MESSRING propose the agreement to the ISO examination group.

ACTION-46: MESSRING shall propose the TEG agreement to the ISO examination group.

10. Information: DRAFT Proposal for gtr 9 amendments using Flex-PLI requirements

10.1. Information on the DRAFT Proposal for gtr 9 amendments by adding Flex-PLI requirements, Japan (voluntary activity)

- The Chairperson introduced the draft for amendments of gtr 9, which had been prepared by Japan voluntarily. He reported that the draft would be submitted by Japan at the GRSP meeting next week as an informal document (GRSP-45-8 to GRSP-45-11).
<http://www.unece.org/trans/main/wp29/wp29wgs/wp29grsp/grspinf45.html>
- Preparing the draft for amendment itself is not a TEG task, the Chairperson therefore just requested to check its technical parts.
- After discussion, TEG members agreed to do so.

ACTION-46: TEG members will check the contents of the draft amendments of gtr 9 prepared by Japan voluntarily.

11. Discussions: Working schedule for the Flex-TEG

- The Chairperson requested that the subjects left unsolved should be implemented by the end of August at the latest.
- The Chairperson also requested that the next TEG meeting be held in early September because it is necessary to prepare the draft amendments of gtr 9 by Sept. 10 as a formal document to be submitted to the GRSP meeting in December 2009.
- TEG members agreed that after discussion.

12. Future Action Plans

- The Chairperson requested that TEG members are going to conduct their activities according to the action items and activity schedule agreed at this meeting.
- TEG members agreed.

13. Status report for the 45th GRSP Meeting (May. 2009)

- The Chairperson stated that the Chairperson will draft a summary of this meeting, and finalize the summary after consolidating the opinions of TEG members.
- TEG members agreed.

14. AOB

- Mr. Bernard (FTSS) requested approval for changing the secretariat of this meeting to Mr. Mark (FTSS) starting from the next (9th) meeting.
- TEG members agreed.
- Mr. Kinsky (ACEA/Opel) commented that BGS cooperated freely with Opel during their Flex-PL test in Opel, so FTSS should consider some service for BGS.
- Mr. Bernard (FTSS) replied that he will take this subject to his home organization and examine it.

15. Closing

- The chairperson again expressed his appreciation to the Flex-TEG members for participating in this meeting as well as to Mr. Liebers (TUV) for providing the conference room and lunch.

- All members were invited to the next (9th) Flex-TEG meeting.
