

Final Minutes of Meeting
2nd Meeting of Flex PLI Technical Evaluation Group (Flex-TEG)

Date: November 22, 10:00 - 17:30

BASt (<http://www.bast.de/>) – Bergisch, Germany

Participants:

- Atsuhiko Konosu, J-MLIT (JARI) – Chairman
- Hiroyuki Inomata, J-MLIT (JASIC)
- Thomas Kinsky, ACEA (GM Europe)
- Bernd Lorenz, Germany (BASt)
- Oliver Zander, Germany (BASt)
- Dirk Uwe Gehring, BGS
- Peter Lebmann, BGS
- Walter Liebers, TUV Rheinland Group
- Francois Minne, UTAC
- Wiebe Onvlee, FTSS Europe - Secretary
- Robert Fleischhacker, ACEA (Porsche)
- Oskar Ries, ACEA (Volkswagen)
- Sven Olav Siems, ACEA (Volkswagen)
- Iwao Imaizumi, JAMA (Honda)
- Takehiro Inoue, JASTI.

Agenda

1. Welcome
2. Adoption of the agenda of 2nd Flex-TEG MT (TEG-011)
3. Adoption of the draft minutes of 1st Flex-TEG MT (TEG-010)
4. Test results for the Flex-G from Japan and BASt
 - 4.1. Minor Modifications.
 - 4.2. Repeatability and reproducibility of the Flex-G (Thigh, Leg, Knee)
 - 4.3. Report on Flex-G car tests results.
5. Flex-G testing (at BASt/BGS)
 - 5.1. Presentation of tests results at BASt.
 - 5.2. Demonstration o tests at the BGS facility.
6. Discussion
 - 6.1. Schedule of each task
 - 6.2. Others
7. Confirmation of future action plan
8. Others
9. Closing

1. Welcome

- A word of welcome was given by Mr. Bruhning from BASt.
- The Chairman thanks the participants in the second meeting of Flex-TEG and the members of BASt providing the location.
- Inomata (J-MLIT) stated that thanked the participants, declared the intent of the MLIT to support the meeting, and called for the continued, positive participation and cooperation of the participants.

2. Adoption of the agenda of 2nd Flex-TEG MT (TEG-011)

- A revised version of the agenda (TEG-011-R1) was prepared based on the agenda sent before the meeting (TEG-011).
- The meeting was run along with the revised version of the agenda (TEG-011-R1).

3. Adoption of the draft minutes of 1st Flex-TEG MT (TEG-010)

3.1 Review of the draft minutes

- Comments of the group have been incorporated in the minutes Revision 1.
- Modified contents are follows, 1) part of the statement of 4.1 was changed (addition of the fact that continued study was required regarding the durability of the impactor), 2) the meaning of the "Delegations" of the Annex 1 was clarified (meaning not the participants, but the appointed members of the individual organizations), and 3) the omission of members in the Annex 1 was corrected.
- The revised version of the minutes (final version) was designated as TEG-010-R1. The corrected parts were shown in blue.

3.2 Review of the action items

- The Action list described in the minutes (TEG-010/TEG-010R1) was reviewed. The state of progress regarding each item on the Action list was confirmed.
- ACTION 1: Confirmation of the appointed members of the individual organizations absent at the 1st meeting → No contact from the U.S., continued registration of two members from South Korea. Autoliv indicated it wanted to cancel its registration as a member of Flex-TEG (rather than participate in the Flex-TEG activities, it simply wanted to conduct the tests).
- ACTION 2: Confirmation of GRSP of TASK added at the 1st meeting → Confirmation scheduled at 38th GRSP.
- ACTION 3: Confirmation of content and timing of tests at Autoliv and South Korea → Autoliv is canceling this, while South Korea wants to run the tests after December (content of tests to be adjusted later).
- ACTION 4: Regarding disclosure of names of vehicles used in JAMA-JARI Study (ESV paper 05-0106) → JAMA cannot disclose them on its part. Basically, it wants to keep the discussion general (because if disclosing the names of the vehicles, separate discussion of individual vehicles is liable to result). However, for the Honda vehicle, Honda gave permission for disclosure of the name (Civic 2004 model used).
- ACTION 5: Confirmation of parent body of Flex-TEG → Confirmation scheduled for 38th GRSP.
- Note that regarding the findings of ACTION 4, BASt and ACEA were of the opinion that for the purpose of scientific discussions, all the vehicle names have to be disclosed and again requested disclosure of the vehicle names.

4. Test results for the Flex-G from Japan and BAST

4.1. Minor modifications have been made to the design of 1st Flex-G serial number 01.

- Some changes have been made to the 1st prototype Flex-G s/n 01 (TEG-012). These modifications have been incorporated on all available Leg forms that have been produced.
- The modifications consist of:
 - Modification of the screw attachment to ensure that the torque setting of the screw is more repeatable through a more consistent joint friction.
 - added support spacers to sustain the bone core more strongly
 - Knee groove in knee joint has been changed to improve knee rotation and durability.
 - Spring/cable arrangement changes.
 - The dynamic verification test has been changed.
- A presentation is given by Mr. Konosu. The changes have increased repeatability and durability.
- The specification of the neoprene and rubber deceleration materials is required by the group.
- Developing a detailed test procedure is a possible work item for future research.

4.2. Repeatability and reproducibility of the Flex-G (Thigh, Leg, Knee)

- Presentation was given by Mr. Konosu, presentation in document TEG-013.
- Questions raised by the group on the test speed and time interval between the tests.
- Mr. Konosu replied that the bending rate of the tests has been compared with the bending rate of the leg on a vehicle impact at 40 km/h. As for the time interval, about 10 minutes was observed between tests.
- Results of the certification results of legs 2-6 have been presented (TEG-014). The results are all within preliminary corridors. There is no direct comparison between old and new certification, as S/N 01 has already been changed.
- The members of the group require more information on the details on the possible procedure change (range), rubber sheets used and time interval between tests. The time-history plots are required for a proper evaluation of results. Mr. Konosu is requested to share the data.
- Mr. Konosu is requested to circulate test results 2 weeks before the meeting, in order to support discussions. The minor modifications described in section 4.1 were made after these test series was done.

[ACTION-007]

The Chairman will send the properties of the materials of the pads used in the assembly dynamic calibration tests to the Flex-TEG members.

[ACTION-008]

The Chairman will disclose waveform data of typical assembly calibration tests (digital data) to the Flex-TEG members.

4.3. Report on Flex-G car tests results.

- Mr. Imaizumi presented results of vehicle tests done at Jama (TEG-015). Jama are proposing to increase the knee ligament value.
- Remark was made that the results of the Flex-2004 and Flex-G did not show that the same measures taken on the car did not result in the same results. Tests are comparable with the results shown in the ESV paper. Only tests on the civic have been repeated.
- Mr. Konosu states that a stiffer leg and thigh on the Flex-G compared to the Flex-2004 may have caused the difference in knee ligament displacement.
- Questions were raised on the test results with the TRL leg. The bending angle results looked to be questionable and require clarification.

5. Flex-G testing (at BAsT/BGS)

- The BAsT/BGS was toured to examine the state of the tests for confirmation of the repeatability and reproducibility of the Flex-G in the assembled state and the calibration tests.
- BAsT/BGS is scheduled to continue running confirmation tests.

6. Discussion

6.1. Schedule of each task

- A presentation of schedule was given in TEG-016 test schedule.
- The group is of the opinion that the test program with this tool as a regulatory tool does not seem useful as testing up to 40 km/h is not possible.
- ACEA do not think that it possible to test the Flex-G up to 40 km/h on current pedestrian friendly car design (by TRL leg). Existing legs need to be modified to allow 40 km/h tests.
- And, ACEA was of the opinion that to conduct a technical feasibility study for vehicles of Task 3, it is necessary to first improve the movable range of the knee of the Flex-G.
- It is decided to postpone most of the test program until after the modification program (see TEG-016-R1).

6.2. Others

Propose to perform some base line comparison test (as in ESV paper) to get a level of knee bending required for the modified design.

7. Confirmation of future action plan

- As discussed J-MLIT and JAMA will go into the modification activity as shown in the **revised planning**.
- BAST will continue testing as planned.

[ACTION-009]

Japan: will make improvements to movable range of knee of Flex-G.

[ACTION-010]

BAST/BGS: will run confirmation tests on repeatability and reproducibility of Flex-G in assembly state .

8. Others

- A request is made to submit any information that is to be presented at the meeting two weeks prior to the meeting. This would allow all participants to study the information beforehand.
- Herr Liebers suggested that a "catching" system attachment be incorporated in the design of the FLEX-GT. A presentation was shown on a speed measurement system was shown of a leg form impactor.

9. Closing

- The meeting was closed at approx 4.00 PM.
- The Chairman again expressed his thanks to the participants in the 2nd Flex-TEG meeting and to the people of BAST who provided the meeting place.
- New meeting planned after finalization of the modification program, in March 2006. No fixed date has been set as yet (The Chairman inform that later).

Annex 1

Delegations (Appointed members from each organization) (22 Nov. '05)

Governmental Parties		
EU/EEVC	D. Cesari C. Masson	INRETS
Germany	B. Lorenz O. Zander	BAST
NHTSA/Transport Canada Korea	J.-W. Lee Y.-H. Youn	KATRI Korea Univ. of Tech.- Education
MLIT of Japan	A. Konosu	JARI
Industrial Parties (related to car product)		
OICA / ACEA	O. Ries	Volkswagen
OICA / ACEA	S. O. Siems	Volkswagen
OICA / ACEA	T. Kinsky	GM-Europe
OICA / ACEA	R. Fleischhacker	Porsche
OICA/ JAMA	M.Tanahashi I. Imaizumi	Honda Honda
CLEPA		
Alliance		
KAMA		
Independent Parties		
UTAC	F. Minne	
TUV	W. Liebers	
Dummy Manufacturers		
First Technology Safety Systems	W. Onvlee	FTSS-Europe
JASTI	T. Inoue	

Annex 2

Schedules (22 Nov. '05)

Schedule for Flex-TEG Activities (22 Nov. 2005)	2005				2006				2007									
	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Flex-TEG Meeting		●		●														
<u>Development (Modification)</u>																		
Modification Activities					←----- (J-MLIT, JAMA) -----→				←----- (J-MLIT, JAMA) -----→									
Production of Modified Impactor	←----- Flex-G -----→				←----- Flex-GT -----→				←----- Flex-GTR (usability mod. only) -----→									
<u>Evaluation as a Regulatory Test Tool</u>																		
Usability	←----- (BAST, J-MLIT, JAMA) -----→				←----- (BAST, J-MLIT, JAMA, ACEA, Korea) -----→				←----- (BAST, J-MLIT, JAMA, ACEA, Korea) -----→									
Repeatability	←----- (BAST, J-MLIT, JAMA) -----→				←----- (BAST, J-MLIT, JAMA, ACEA, Korea) -----→				←----- (BAST, J-MLIT, JAMA, ACEA, Korea) -----→									
Reproducibility	←----- (BAST, J-MLIT, JAMA) -----→				←----- (BAST, J-MLIT, JAMA, ACEA, Korea) -----→				←----- (BAST, J-MLIT, JAMA, ACEA, Korea) -----→									
Durability	←----- (BAST, J-MLIT, JAMA) -----→				←----- (BAST, J-MLIT, JAMA, ACEA, Korea) -----→				←----- (BAST, J-MLIT, JAMA, ACEA, Korea) -----→									
Comparison for above issues (TRL-LFI and Flex-PLI)	←----- (BAST, J-MLIT, JAMA) -----→				←----- (BAST, J-MLIT, JAMA, ACEA, Korea) -----→				←----- (BAST, J-MLIT, JAMA, ACEA, Korea) -----→									
<u>Review for the Injury Thresholds</u>																		
Leg									←----- (All-TEG) -----→									
Knee									←----- (All-TEG) -----→									
<u>Technical Feasibility Study</u>									←----- (JAMA, ACEA) -----→									
Evaluation of Protection Level (provided by the Flex-PLI and the new threshold values)									←----- (All-TEG) -----→									

Annex 3 List of documents

Document number	Document name	Dated [dd/mm/y]
TEG-001	TEG-001_Agenda for 1st Meeting of Flex PLI Technical Evaluation Group.doc	1/9/2005
TEG-002	TEG-002_Flex-G_General_Information_050904.pdf	5/9/2005
TEG-003	TEG-003_Flex-G_Preparation_Manual_050904.pdf	5/9/2005
TEG-004	TEG-004_2005.09.02 - BAST Flex-G Test Programme.pdf	2/9/2005
TEG-005	TEG-005_Revised Agenda for 1st Flex-G_MT.pdf	6/9/2005
TEG-006	TEG-006_2005_06_ESV_JAMA-Flex.pdf	21/4/2005
TEG-007	TEG-007_2005_06_ESV_JMLIT-Flex.pdf	21/4/2005
TEG-008	TEG-008_2005_06_ESV_NHTSA_TRL-Flex.pdf	10/3/2005
TEG-009	TEG-009_Attendance list 1 st Flex-PLI Meeting	6/9/2005
TEG-010	TEG-010_DRAFT Minutes 1st Flex PLI meeting_051011.pdf	11/10/2005
TEG-010-R1	TEG-010-R1_Modified_Minutes 1st Flex PLI meeting_051122.pdf	22/11/2005
TEG-011	TEG-011_Agenda for 2nd Meeting of Flex-TEG.pdf	22/11/2005
TEG-011-R1	TEG-011-R1_Modified_Agenda for 2nd Meeting of Flex-TEG.pdf	22/11/2005
TEG-012	TEG-012_Flex-G_Minor_Modifications_onto_SN01_051122.pdf	22/11/2005
TEG-013	TEG-013_Flex - G_Repeatability_and_Reproducibility_for_Thigh_Leg_Knee.pdf	22/11/2005
TEG-014	TEG-014_Flex - G_Assembly_Test_Results_and_Tentative_Corridors_051122.pdf	22/11/2005
TEG-015	TEG-015_Report_on_Flex-G_Car_Test_Results_051122_final.pdf	22/11/2005
TEG-016	TEG-016_Flex-TEG_Schedule_051115.pdf	22/11/2005
TEG-016-R1	TEG-016-R1_Flex-TEG_Schedule_051122.pdf	22/11/2005
TEG-017	TEG-017_Attendance list 2nd Flex-PLI .pdf	22/11/2005
TEG-018	TEG-018_DRAFT Minutes 2nd Flex-TEG_060228.doc	28/2/2006

Annex 4 List of Actions

Action number	Action	Dated [dd/mm/y]
ACTION-001	The chairman will verify the representatives of the organizations that did not attend this Flex-TEG Meeting.	06/09/2005
ACTION-002	The chairman will obtain approval for the added tasks at the next GRSP meeting.	06/09/2005
ACTION-003	The chairman would check with Autoliv (Sweden) and Korea on their experiment contents and schedules.	06/09/2005
ACTION-004	Mr. Tanahashi to inform the group if manufacture will allow disclosure of detailed model information per test shown in ESV paper 05-0106.	06/09/2005
ACTION-005	The chairman would confirm the parental body of the Flex-TEG Meeting at the next GRSP and other meetings.	06/09/2005
ACTION-006	The chairman would present at the GRSP meeting a proposal for releasing Flex-TEG information material to the public through the GRSP website.	06/09/2005
ACTION-007	The Chairman will send the properties of the materials of the pads used in the assembly dynamic calibration tests to the Flex-TEG members.	22/11/2005
ACTION-008	The Chairman will disclose waveform data of typical assembly calibration tests (digital data) to the Flex-TEG members.	22/11/2005
ACTION-009	Japan: will make improvements to movable range of knee of Flex-G.	22/11/2005
ACTION-010	BASt/BGS: will run confirmation tests on repeatability and reproducibility of Flex-G in assembly state.	22/11/2005