Informal document No. **GRSP-46-21**
(46th GRSP, 8-11 December 2009,
agenda item 4(a))

Transmitted by the expert from Japan

Status Report on Flexible Pedestrian Legform Impactor Technical Evaluation Group (Flex-TEG) Activities

Flex-TEG Activities

1st - 10th Flex-TEG meetings were held in Europe

- ✓ 1st Flex-TEG Meeting (OICA office, Paris, 5-6 Sep. 2005)
- ✓ 2nd Flex-TEG Meeting (BASt, Bergisch Gladbach, 22 Nov. 2005)
- ✓ 3rd Flex-TEG Meeting (BASt, Bergisch Gladbach, 24 Apr. 2006)
- ✓ 4th Flex-TEG Meeting (BASt, Bergisch Gladbach, 2 Apr. 2007)
- ✓ 5th Flex-TEG Meeting (BASt, Bergisch Gladbach, 7 Dec. 2007)
- ✓ 6th Flex-TEG Meeting (BASt, Bergisch Gladbach, 31 Mar. 2008)
- ✓ 7th Flex-TEG Meeting (BASt, Bergisch Gladbach, 8 Dec. 2008)
- ✓ 8th Flex-TEG Meeting (TUV Rheinland Group, Cologne , 19 May 2009)
- ✓ 9th Flex-TEG Meeting (BASt, Bergisch Gladbach, 3-4 Sep. 2009)
- ✓ 10th Flex-TEG Meeting (BASt, Bergisch Gladbach, 1-2 Dec. 2009)

1st Meeting was held at OICA office in Paris

2nd to 10th Meetings were held at BASt or TUV Rheinland Group meeting room located at near the Cologne cathedral.

Flex-TEG Activities, contd.

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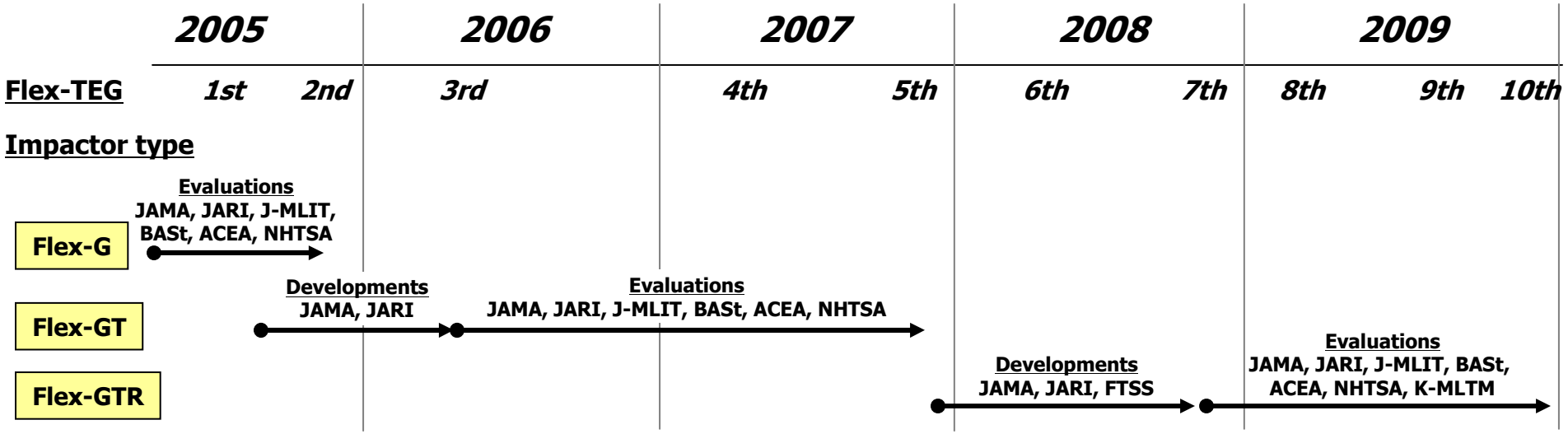


Latest Flex-TEG Activities (10th Flex-TEG meeting)

10th Flex-TEG meeting
Date : 1st-2nd December 2009
Place: BASt, Bergisch Gladbach, Germany

Attendances

A. Konosu（Chairperson/J-MLIT/JARI）
M. Burleigh（Secretariat/FTSS-Europe）
O. Zander (BASt)
D. Gehring and P. Lessmann (BGS)
J. Stammen (NHTSA/VRTC) by WebEx
A. Malloy (TRC) by WebEx
Y. W. Yoon (K-MLTM/KATRI)
R. Fleischhacker (ACEA/Porsche)
T. Kinsky (ACEA/Opel)
C. Hohmann (ACEA/VW)
C. Hess (ACEA/Audi)
N. Lubbe (ACEA/Toyota Europe)
Y. Takahashi (JAMA/Honda R&D)
W. Liebers (TUV Rheinland Group)
K. Wolff (Continental)
J.C. Kolb (Bertrandt AG)
D. Martin (DTS) by WebEx
M. Winkler (MESSRING)

Total: 19 persons

Main Agenda of the 10th Flex-TEG meeting

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

6. Finalizations: Flex-GTR Specifications (Usability)

7. Finalizations: Dynamic Calibration Test

8. Finalizations: Injury Threshold Values

9. Finalizations (remove brackets): Proposal for gtr 9 amendments submitted to GRSP by Japan in Sep 2009 (ECE-TRANS-WP29-GRSP-2009-21e.pdf)

10. Future Action Plans

Latest Flex-TEG Activities (10th Flex-TEG meeting)

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

◆Evaluation Tests were conducted by NHTSA, K-MLTM, ACEA, JAMA and BASt.

Round Robin Tests

- ✓ ***Usability: No serious troubles happened in general.***
- ✓ ***Durability: No serious troubles happened in general. (NHTSA would like to conduct an impactor test to a car, which can not pass the current gtr 9 requirements completely, if possible)***

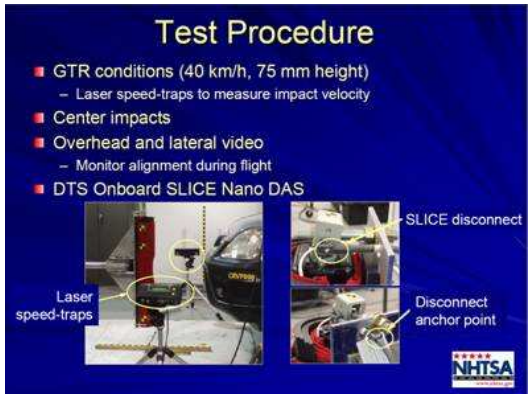
Technical Feasibility Study

- ✓ ***JAMA: Finished.***
- ✓ ***ACEA: Not finished yet.***

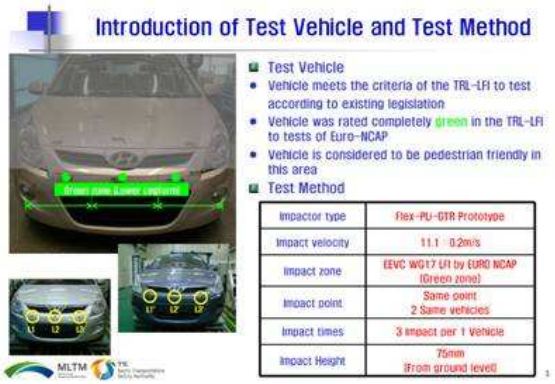
Influence of Impact Conditions

- ✓ ***BASt-ACEA: Conducted their analysis in order to set tolerance of impact conditions.***

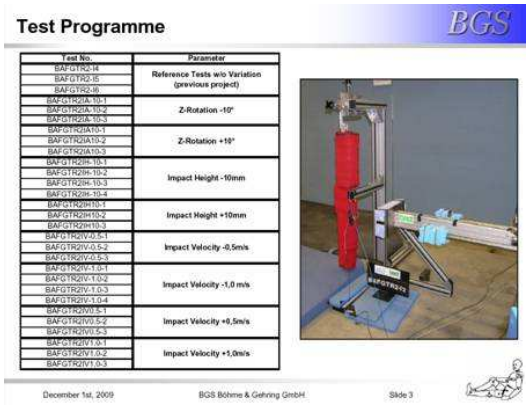
NHTSA test series



K-MLTM test series



ACEA-BASt test series

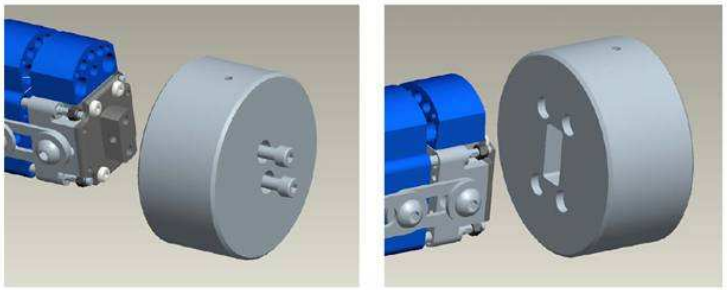


Latest Flex-TEG Activities (10th Flex-TEG meeting)

6. Finalizations: Flex-GTR Specifications (Usability)

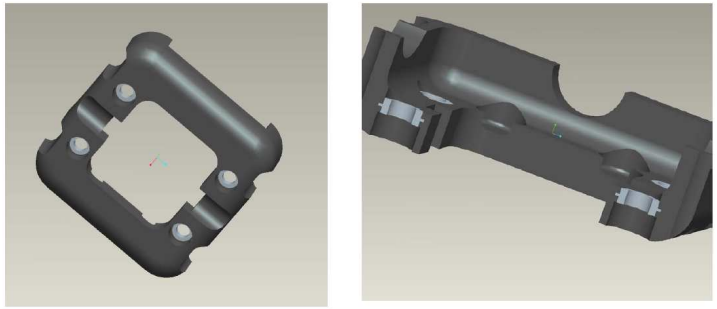
◆Minor Improvements were proposed by FTSS in order to improve usability or durability.
◆Information of CAE model is provided by FTSS.

New ballast weight attachment for pendulum rig



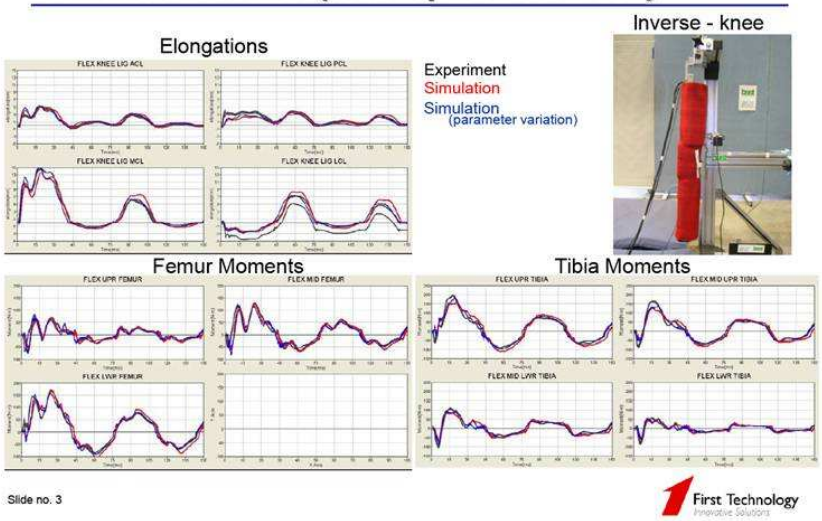
New proposal avoids need to remove femur top plate and is easier to locate and fit

Spacer tubes to prevent plastic compression



Aluminum spacer tubes molded into protective cover

Validation results (development version)



FLEX PLI GTR Model development

- Early stage generic models (4 codes) have been released mid 2009,
  Pamcrash, LS-Dyna, Abaqus and Radioss
- Well-validated models are targeted for release within the next couple of months

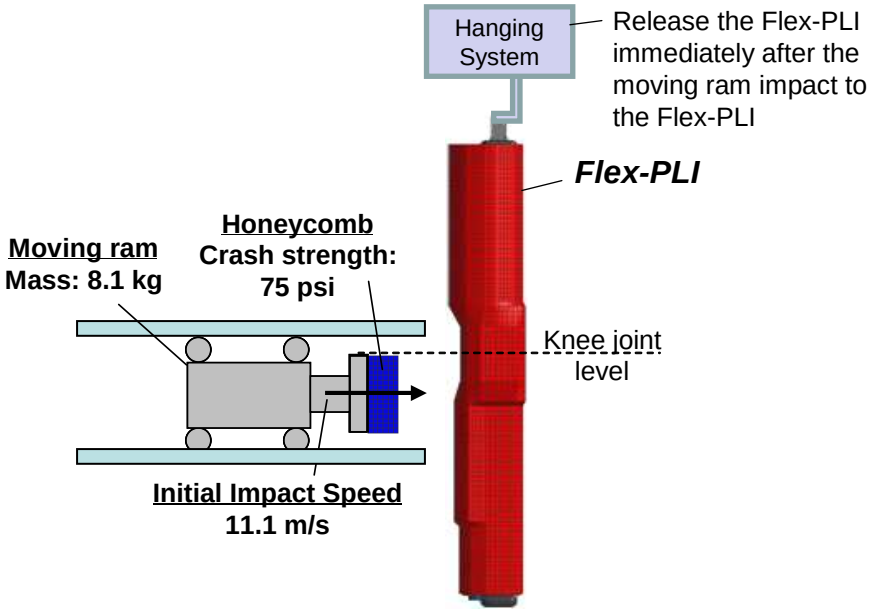
Latest Flex-TEG Activities (10th Flex-TEG meeting)

7. Finalizations: Dynamic Calibration Test

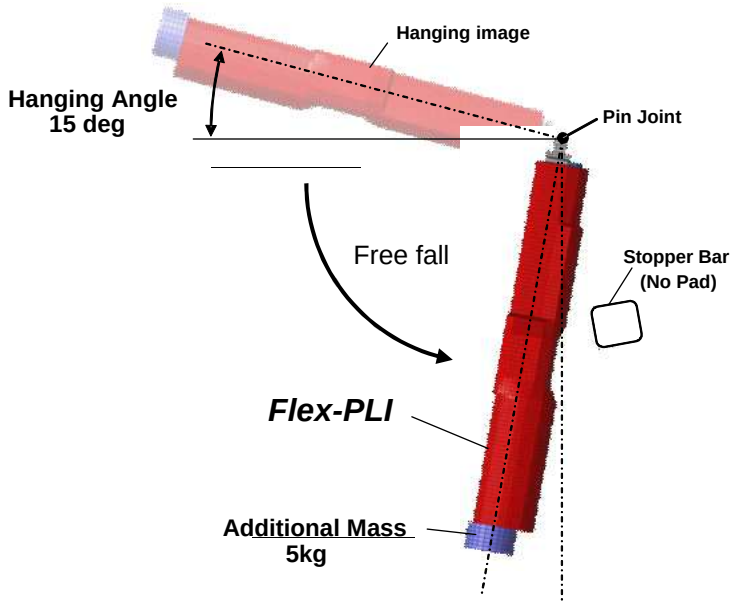
◆**Combined Test Method of Inverse Test and Pendulum Test was agreed by TEG members at the 9th TEG meeting, and then finalized each detailed test condition as well as requirement corridors.**

Method	Remarks
Combined Test Method **Combined the Inverse test and Pendulum test**	**Step 1: Inverse test has to be conducted just before the homologation test series** **Step 2: Pendulum test has to be conducted after every 10 car test** **Step 3: Inverse test has to be conducted after every 30 car test (need not to do pendulum test in this time)**

Inverse type Certification Test



Pendulum type Certification Test



Latest Flex-TEG Activities (10th Flex-TEG meeting)

8. Finalizations: Injury Threshold Values

- **Injury threshold values were discussed and then TEG agreed following contents.**
- **TEG decided to ask to GRSP that how to treat the ACL/PCL requirements (difficult to decide by TEG)**

	Decisions	Remarks
1. Tibia	• **340 Nm** • **[Relaxation Zone]**	• **340 Nm was lead from biomechanical point of views (from BASt and JAMA biomechanical studies)** • **[] was set for Relaxation Zone because ACEA still need to check technical feasibility issues**
2. MCL	• **22 mm**	• **22 mm was lead from biomechanical point of views (from BASt correlation study and JAMA biomechanical studies)**
3. ACL/PCL	• **[Monitoring only with [13] mm for the reference or Nothing (ACEA)]** • **[Monitoring only with [13] mm for the reference (JAMA)]** • **[13 mm Mandatory (BASt)]** **-> ask to GRSP**	• **[] was set because it was difficult to decide which is the best way for gtr 9 amendment from the technical point of view. TEG will ask to GRSP which is the best way.** • **Percentage of only ACL/PCL damage in the car-pedestrian accidents is very small, 3%, besides there are not good enough biomechanical data (only two data available) for the ACL/PCL threshold values (JAMA, ACEA opinion)** • **Need to set it as mandatory (BASt opinion) because** **a) Amended gtr 9 should provide at least the same level of protection as before (current gtr9 sets shearing displacement requirement for the current legform impactor)** **b) Existing biomechanical data (two cases)** **c) No injury risk curve does not mean no risk of injury**

Latest Flex-TEG Activities (10th Flex-TEG meeting)

9. Finalizations (remove brackets): Proposal for gtr 9 amendments submitted to GRSP by Japan in Sep 2009 (ECE-TRANS-WP29-GRSP-2009-21e.pdf)

◆TEG updated the contents of the Proposal for gtr 9 amendments which was submitted to GRSP by Japan in Sep 2009 based on the 10th Flex-TEG meeting results.

UNITED NATIONS **E**

Economic and Social Council

Distr.
GENERAL

ECE/TRANS/WP.29/GRSP/2009/21
24 September 2009

Original: ENGLISH
ENGLISH AND FRENCH ONLY

ECONOMIC COMMISSION FOR EUROPE

INLAND TRANSPORT COMMITTEE

World Forum for Harmonization of Vehicle Regulations

Working Party on Passive Safety

Forty-sixth session
Geneva, 8-11 December 2009
Item 4(a) of the provisional agenda

GLOBAL TECHNICAL REGULATION No. 9
(Pedestrian safety)

Phase 2 of the global technical regulation - flexible legform impactor

Proposal to develop amendments to global technical regulation No. 9 (pedestrian safety)

Submitted by the expert from Japan */

The text reproduced below was prepared by the expert from Japan in order to propose the use of the Flexible Pedestrian Legform Impactor (FlexPLI) and the rigid lower legform impactor

Updated Items

- ***Transition Period***
  (EEVC WG17 pedestrian lower legform Impactor -> Flex-PLI)
- ***General Specifications of Impactor***
  (Mass, C.G. and Inertia)
- ***Car Test Methods***
  (Impact Conditions)
- ***Calibration Test Methods***
  (Impact Conditions and Requirements corridors)

Formal documents of 46th GRSP from Japan
(ECE-TRANS-WP29-GRSP-2009-21e)
http://www.unece.org/trans/main/wp29/wp29wgs/wp29grsp/grsp2009.html

Latest Flex-TEG Activities (10th Flex-TEG meeting)

10. Future Action Plans

- ✓*ACEA: Technical Feasibility Study*
- ✓*BASt-ACEA: Discussions and Decisions on the Relaxation zone for tibia (need or not)*

Thank you for your attentions!