Transmitted by the expert from Japan

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(47th GRSP, 17-21 May 2010, agenda item 4.1)

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

1st - 11th Flex-TEG meetings

- 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)
- 11th Flex-TEG Meeting (ACEA office, Brussels, 21 Apr. 2010)

1st Meeting  
OICA office in Paris

2nd - 10th Meetings  
BAST or TUV Rheinland Group meeting room at around Cologne

11th Meeting  
ACEA office in Brussels
Flex-TEG Activities, contd.

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- 11th Flex-TEG Meeting (ACEA office, Brussels, 21 Apr. 2010)
Latest Flex-TEG Activities (11th Flex-TEG meeting)

11th Flex-TEG meeting
Date: 21st April 2010
Place: ACEA office, Brussels, Belgium

Attendances

A. Konosu (Chairperson/J-MLIT/JARI)*
M. Burleigh (Secretariat/FTSS-Europe)*
O. Zander (BASt)
D. Gehring (BGS)
F. Minne (UTAC)*
O. Ries (ACEA/VW)*
T. Kinsky and B. Buenger (ACEA/Opel)
R. Fleischhacker (ACEA/Porsche)
C. Hess (ACEA/Audi)*
A. Sipido (ACEA/Ford Europe)
N. Lubbe (ACEA/Toyota Europe)
A. Otubushin (ACEA/Hyundai Motor Europe)*
A. Otubushin (ACEA/BMW)*
F. Travert (ACEA/PSA)
R. Ciclloni (ACEA)*
Y. Takahashi and I. Imaizumi (JAMA/Honda R&D)*
D. Martin (DTS)*
C. Roesch (Cellbond)
* Phone and Internet Access

Total: 20 persons
# Main Agenda of the 11th Flex-TEG meeting

5. **Information: Flex-GTR-prototype Technical Evaluation Test Results**
   (ACEA)

6. **Finalizations: Injury Threshold Values**
   (Tibia Relaxation Zone, ACL Requirement)  
   *Main Discussion Topic!*

7. **Information: Catch rope bracket, 400 Nm Loading Test and CAE status**
   (FTSS)

8. **Minor Updates: gtr 9 amendment**
   (Corrigendum: Knee measurement locations)

9. **Future Action Plans**
Latest Flex-TEG Activities (11th Flex-TEG meeting)

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

◆ Evaluation Tests had been conducted by ACEA.

Round Robin Tests (ACEA)

✓ Still some open questions due to limited experiences and missing availability of a simulation tool
✓ Ongoing to allow all manufactures at least some tests
✓ Proposal: Test data during impactor Rebound Phase shall be ignored.
  ✓ TEG agreed.
  ✓ ACEA/BGS will make a proposal how to cut the rebound phase test data within two weeks.

Technical Feasibility Study (ACEA)

✓ Continuing, FE Model necessary to assess impact on vehicle design

Remove rebound phase test data
6. Finalizations: Injury Threshold Values
(Tibia Relaxation Zone, ACL Requirement)

- TEG had an extensional meeting regards to 1) Tibia Relaxation Zone and 2) ACL requirement on 26 April, and then finally, TEG made their proposals as follows,

<table>
<thead>
<tr>
<th>TEG Proposal for Tibia Relaxation Zone (Main Points)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tibia Requirement (Relaxation Zone)</strong></td>
</tr>
<tr>
<td><strong>Initial 5 years</strong></td>
</tr>
<tr>
<td><strong>Preamble</strong></td>
</tr>
<tr>
<td>For feasibility reasons, TEG is proposing to introduce relaxation zones with a total width of 264 mm allowing a maximum tibia bending moment of 380 Nm for the first five years after the agreement of the incorporation of the FlexPLI into the GTR, providing the possibility to verify its technical need.</td>
</tr>
<tr>
<td><strong>After 5 years</strong></td>
</tr>
<tr>
<td>Corresponding data should be collected and evaluated until the end of the initial 5 years. Based on those results the relaxation zone should be kept, modified or dropped.</td>
</tr>
</tbody>
</table>

| **Main Text**                                       |
| Relaxation zone: 380 Nm (264 mm width)              |
| A contracting party may restrict application of the relaxation zone requirement in its domestic legislation if it decides that such restriction is appropriate. |
| *(update after 5 years based on the above preamble)* |
## TEG Proposal for ACL Requirement (Main Points)

<table>
<thead>
<tr>
<th>ACL/PCL Requirement</th>
<th>Initial 5 years</th>
<th>After 5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preamble</strong></td>
<td>TEG strongly recommends to the contracting parties of the 98 agreement to monitor the ACL/PCL elongation against a threshold value of 13 mm for the first five years after the agreement of the incorporation of the FlexPLI into the GTR.</td>
<td>13 mm mandatory unless the results of possible new research will lead to additional biomechanical data, providing additional information on biomechanical limits, allowing the development of a set of injury risk curves, and the derivation of corresponding threshold values. Based on the results, it should then also be decided whether the PCL criterion should be introduced as a mandatory threshold value or kept on being monitored against the ACL threshold.</td>
</tr>
<tr>
<td><strong>Main Text</strong></td>
<td>ACL/PCL threshold = 13 mm. TEG recommends to the contracting parties of the 98 agreement to monitor the ACL/PCL elongation against a threshold value of 13 mm for the first five years after the agreement of the incorporation of the FlexPLI into the GTR.</td>
<td>(update after 5 years based on the above preamble)</td>
</tr>
</tbody>
</table>
Latest Flex-TEG Activities (11th Flex-TEG meeting)

7. Information: Catch rope bracket, 400 Nm loading test results and CAE status (FTSS)

◆ FTSS informed Catch rope bracket, 400 Nm loading test status and CAE status.

Catch rope bracket (optional parts)
- TEG accepted the catch rope bracket as one of an optional part of Flex-PLI.

400 Nm loading test results
- No serious issue occurred under 400 Nm loading tests on the bone cores so far.
- TEG offered to FTSS to continue the 400 Nm loading tests to change the bending stopper cable start timing to 400 Nm (for tibia relaxation zone).

CAE status
- FTSS explained that their CAE Models are validated at material, component, pendulum and inverse test level. Requirements were set for next release based on OEM vehicle testing.
- ACEA asked to continue the model validation/improvement under car impact test level based on feedback from car impact test to use for their technical feasibility study.

4 Point Catch Rope Bracket Proposal
- Ø9 rope holes
- Replaces current end protective covers
- Weight 13 grams heavier than covers
- Proposal currently being reviewed by TUV
- Material high-strength 7075 aluminium 6 mm thick

Gage Output Graphs

FLEX PLI GTR Model development status
- FLEX PLI GTR Beta model versions have been released in February 2010
  - Models are validated at material, component, pendulum and inverse test level
- Eight OEM’s tested the model and simulated one or more vehicle tests
  - Correlation results have been discussed at the 5th consortium meeting in Braunschweig, Germany (March 25th)
  - Some OEM’s already achieved very good correlation results
  - Some improvement points were identified and requirements are defined for the next (production) release to be expected this year
Latest Flex-TEG Activities (11th Flex-TEG meeting)

8. Minor Updates: gtr 9 amendment  
(Corrigendum: Knee measurement locations)

Corrigendum on the Knee measurement locations were made by JARI.

Corrigendum: Knee measurement locations  
✓ TEG accepted the editorial corrigendum (editorial corrections).

Wrong Numbers
Instruments locations

Correct Numbers
Instruments locations

Figure 17: Flex-PLI; instrument locations
Latest Flex-TEG Activities (11\textsuperscript{th} Flex-TEG meeting)


\textbf{ACEA/BGS:}
- Make a proposal how to cut the rebound phase test data within two weeks (by 5\textsuperscript{th} May 2010).
  - Information: ACEA made a proposal, and then other 11\textsuperscript{th} TEG members agreed.

\textbf{FTSS:}
- Continue 400 Nm loading test to change the bending stopper cable start timing to 400 Nm (for tibia relaxation zone).
  - Information: JAMA/JARI are going to conduct the 400 Nm loading test to assembled bone instead of FTSS before the 47\textsuperscript{th} GRSP meeting.

\textbf{Japan:}
- Japan are going to submit an informal document regards to corrigendum on the ECE/TRANS/WP.29/GRSP/2010/2 based on the 11\textsuperscript{th} Flex-TEG meeting results (to 47\textsuperscript{th} GRSP meeting).

\textbf{ACEA:}
- Continue their Technical Feasibility Study.

\textbf{FTSS:}
- Continue to enhance their CAE model validation/update under car impact test level.
Thank you for your attentions!