

**Informal Group on GTR9 Phase2
(IG GTR9-PH2)
6th Meeting**

– Validation of Flex-GTR model -

March 12, 2013

Japan Automobile Standards Internationalization Center (JASIC)

Outline

1. Background
2. Validation matrix

1. Background

- At the 5th IG GTR9-PH2 meeting, BAST proposed to revise the current "Flex-GTR injury threshold values" because of the difference between the output values of "Flex-GTR-prototype" and "Flex-GTR master legs" under dynamic certification test conditions as well as car test conditions (see details: GTR9-5-20).
- However, the current "Flex-GTR injury threshold values" were obtained by converting "Human injury threshold values" into "Flex-GTR injury threshold values" using "transfer functions" which were obtained from the relationships between the output values of "Human model" and "Flex-GTR model" (see details: GTR9-5-27). Therefore, the output values of "Flex-GTR-prototype" were not used to determine "Flex-GTR injury threshold values" .
- On the other hand, the output values of "Flex-GTR model" were used to determine "Flex-GTR injury threshold values", therefore, we decided to validate the "Flex-GTR model" against the latest certification test methods/corridors which were set by using the output values of "Flex-GTR master legs", to clarify whether or not the revision of the threshold values is necessary.

1. Background, contd.

Threshold Determination Process (ref. GTR9-5-27)

Biomechanical Data Scaled to the Size of the Legform

Survival Model using Weibull Distribution

Human Injury Probability Functions

Transfer Functions (Human \rightarrow FlexPLI)

FlexPLI Injury Probability Functions

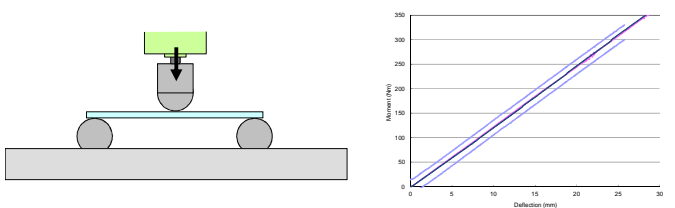
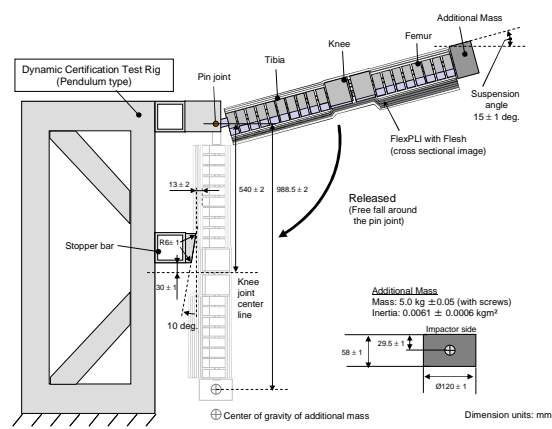
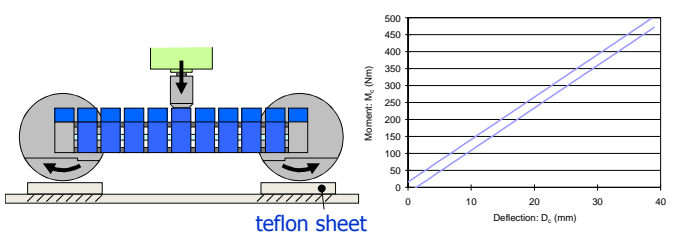
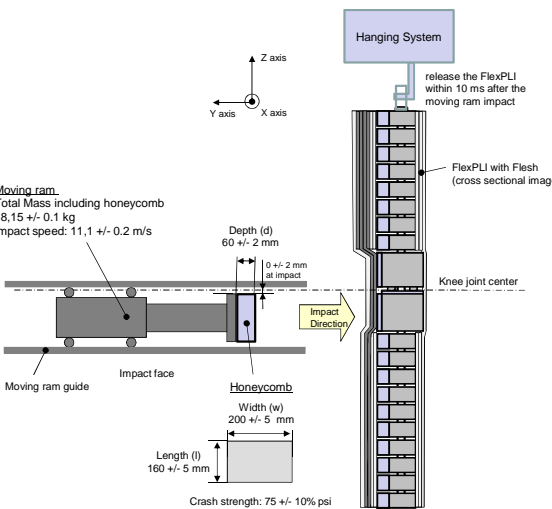
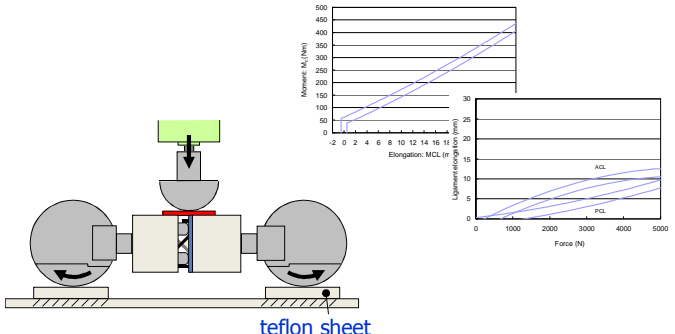
FlexPLI Injury Thresholds

Correlation of
FlexPLI Model
Response with
Human Model
Response

All the details provided in GTR9-1-06r1

2. Validation matrix

- We are conducting "Flex-GTR model" validation using following validation matrix.

<p>1. Tibia/Femur bonecore 3-point bending</p>		<p>4. Pendulum</p>	
<p>2. Tibia/Femur assy 3-point bending</p>		<p>5. Inverse</p>	
<p>3. Knee assy 3-point bending</p>			

2. Validation matrix, contd.

- We propose NOT to include "Flex-GTR model" validation against car test into the validation matrix because:
 - A "car model" validity also affects the validation results. (can NOT conduct a pure validation of "Flex-GTR model")
 - To obtain car test data using "Flex-GTR master leg", we need to get one of the "Flex-GTR master legs" back to Japan which are currently used in Europe and USA. That will affect the progress of the Europe and/or USA round robin test or other activities (i.e. activities such as testing or in-depth drawing check may need to be suspended)

Thank you for your attention