

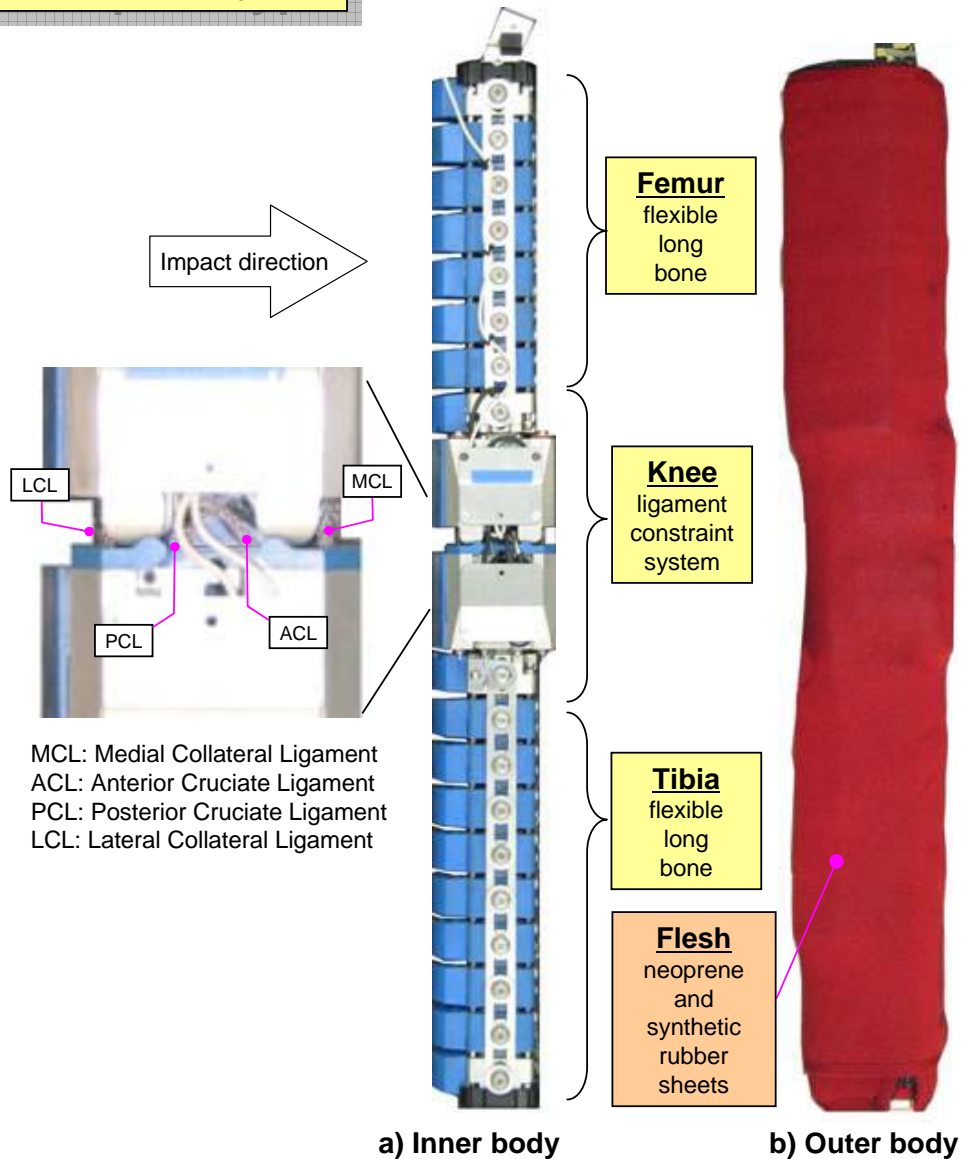
Technical Evaluation Tests for the Flex-GTR-prototype
Repeatability & Reproducibility of the Flex-GTR-prototype and Comparability
between Flex-GT and Flex-GTR-prototype

Back Grounds

- Prototypes of the [Latest version](#) of a biofidelic Flexible Pedestrian Legform Impactor, [Flex-GTR-prototype](#), were [developed in November 2008](#).
- However, [detailed technical evaluations](#) on the [Flex-GTR-prototype were not conducted yet](#).
- In this research therefore [conducted several technical evaluations](#) as follows,
 - ✓ E1: Evaluation on the [Repeatability](#) of the [Flex-GTR-prototype](#)
 - ✓ E2: Evaluation on the [Reproducibility](#) of the [Flex-GTR-prototype](#)
 - ✓ E3: Evaluation on the [Comparability](#) between the [Flex-GT](#) and the [Flex-GTR-prototype](#)
- This presentation shows the technical evaluation results in detail.

Materials

Flex-GTR-prototype



Flex-GTR-prototype, contd.

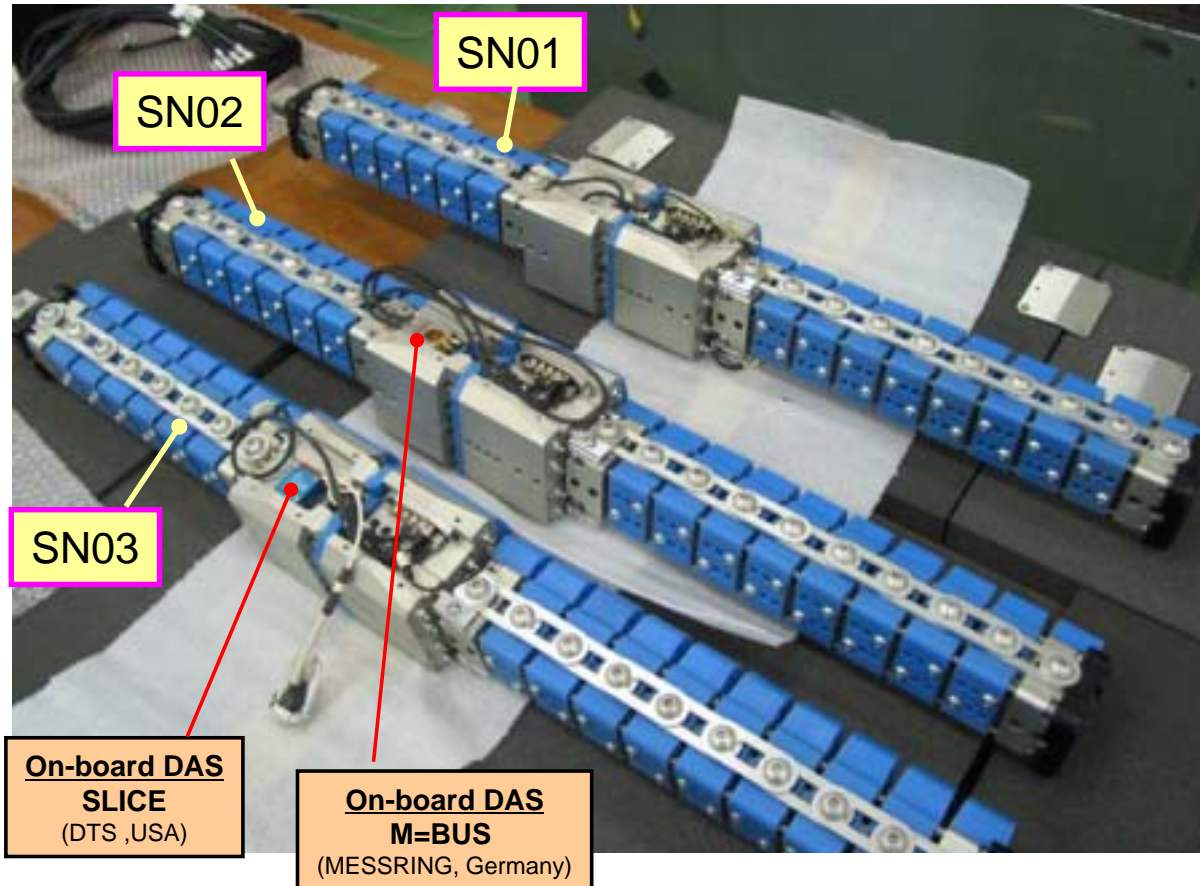
Flex-GTR-prototype (SN01, SN02, SN03)

Data Acquisition systems (DAS)

SN01: Off-board DAS

SN02: Can select On-board DAS (M=BUS) or Off-board DAS

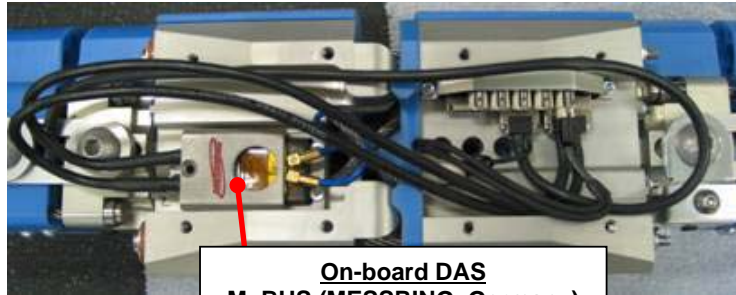
SN03: Can select On-board DAS (SLICE) or Off-board DAS



Flex-GTR-prototype, contd.

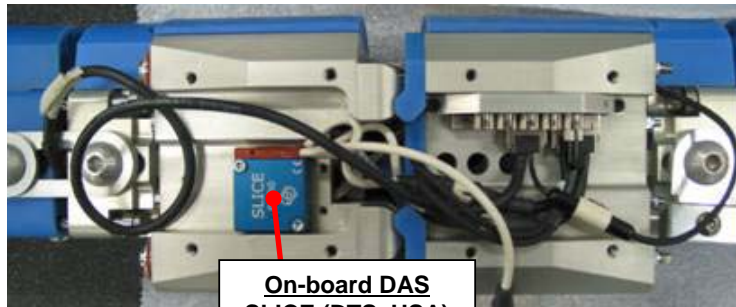
Onboard DAS

On-board DAS (M=BUS) for SN02



On-board DAS
M=BUS (MESSRING, Germany)

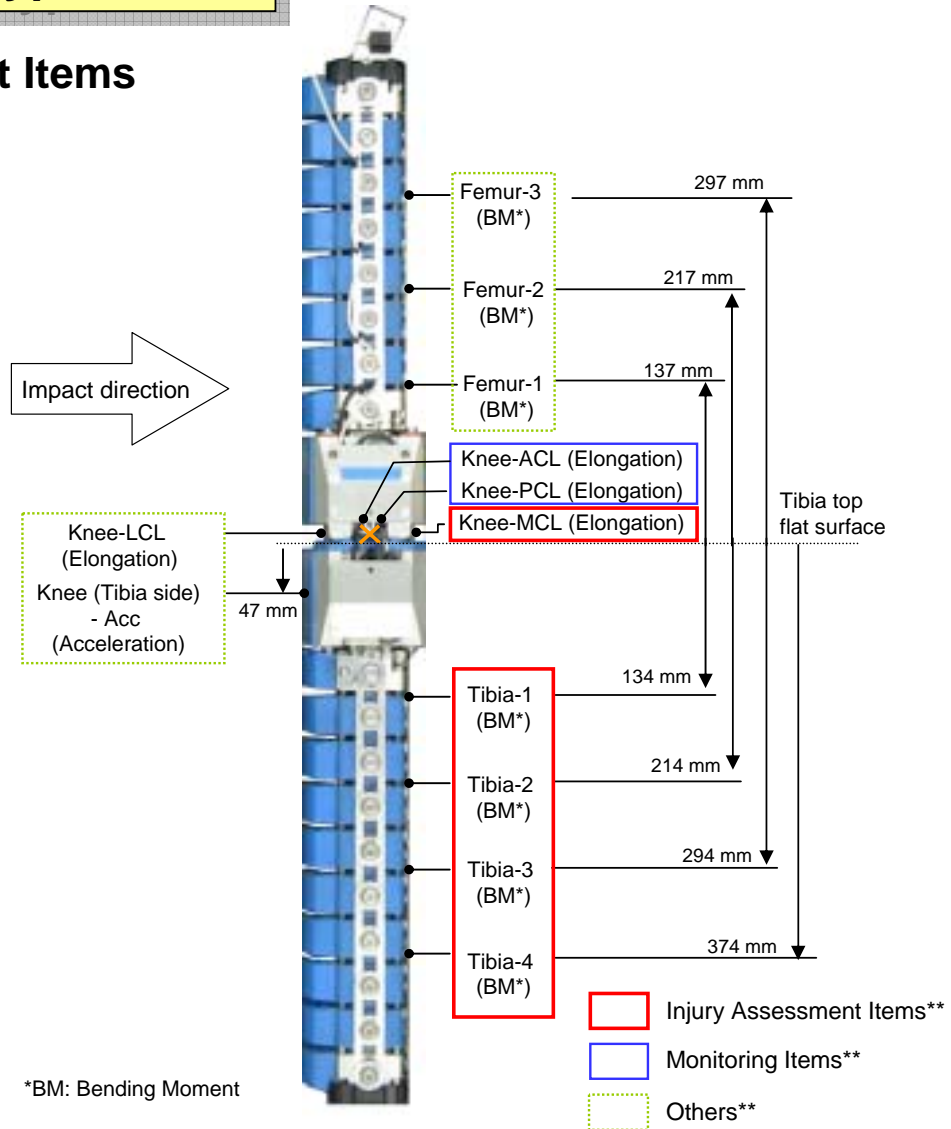
On-board DAS (SLICE) for SN03



On-board DAS
SLICE (DTS, USA)

Flex-GTR-prototype, contd.

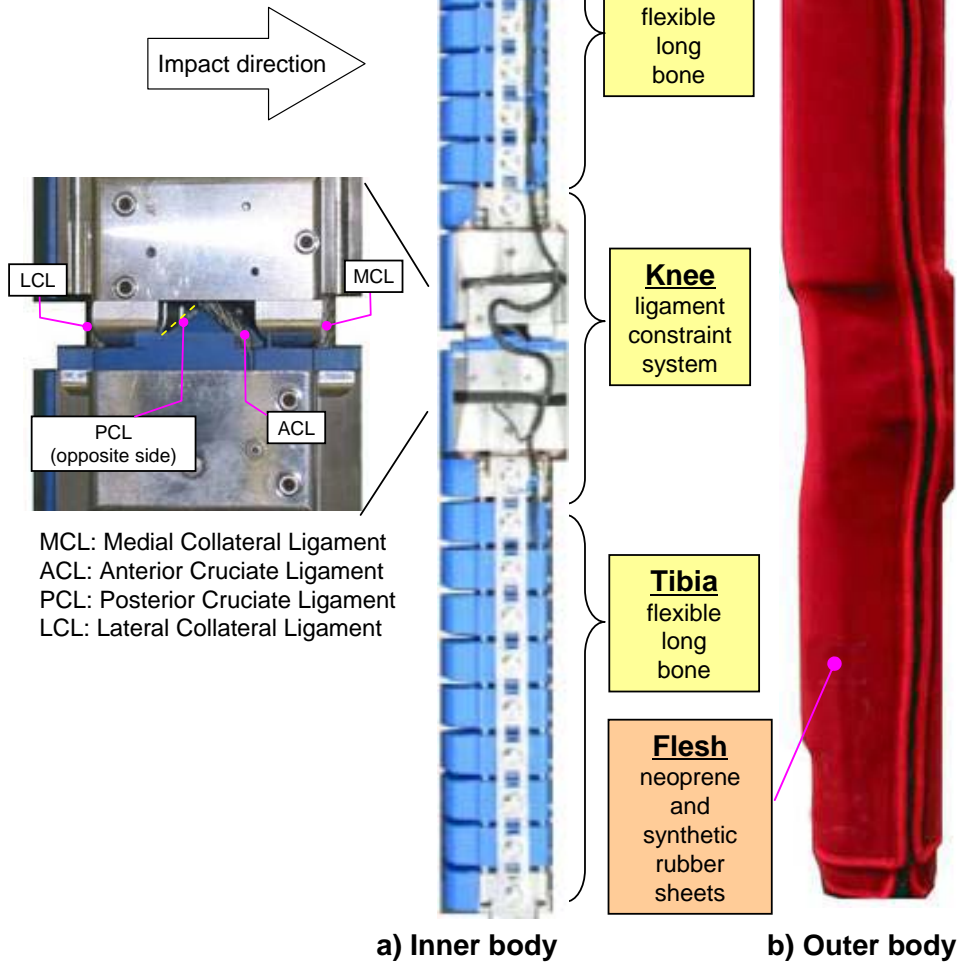
Measurement Items



*BM: Bending Moment

** Based of the Flex-TEG discussion

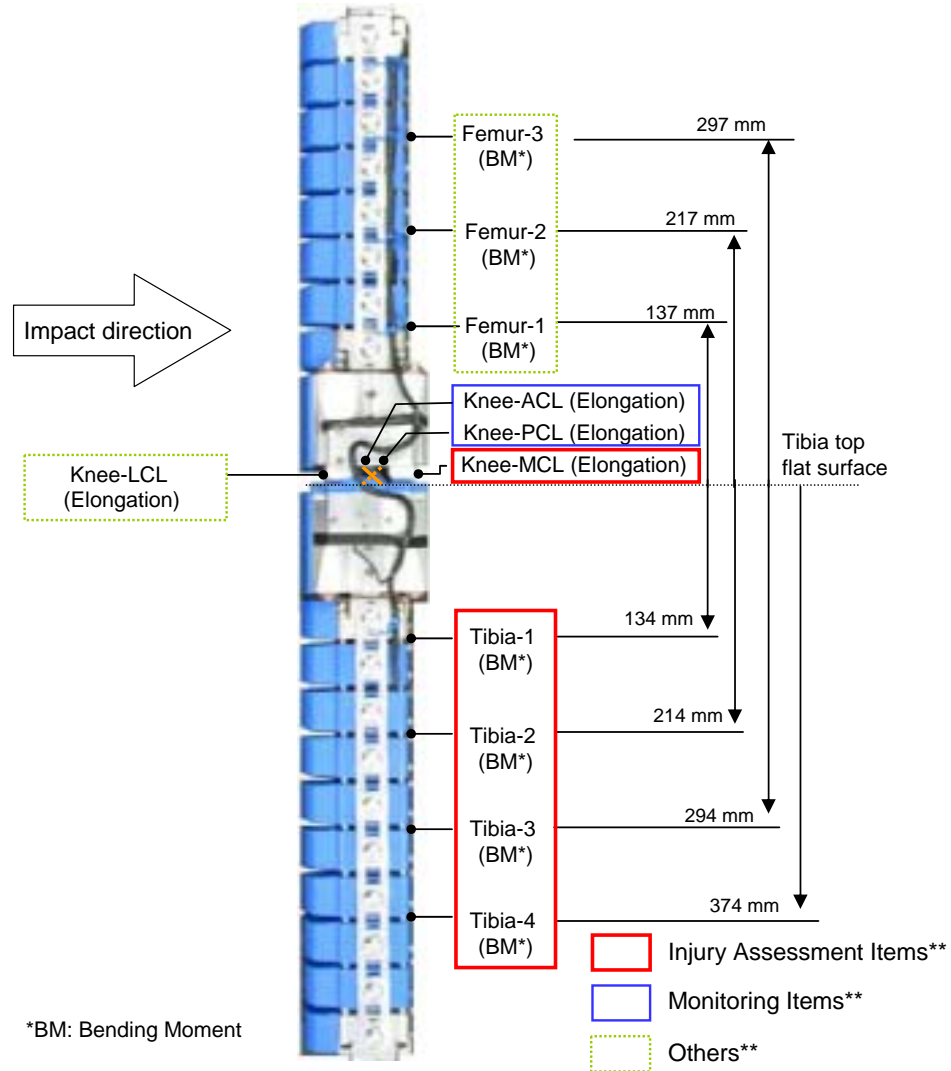
Flex-GT



Flex-GT, contd.

Data Acquisition System Off-board DAS

Measurement Items



** Based of the Flex-TEG discussion

Test Rigs

**Assembly Pendulum type
Calibration Test Rig (Type 1)**
(can accommodate Flex-GT and Flex-GTR-proto)



Test Rigs, contd.

Assembly Pendulum type
Calibration Test Rig (Type 2)
(can accommodate Flex-GTR-protos only)

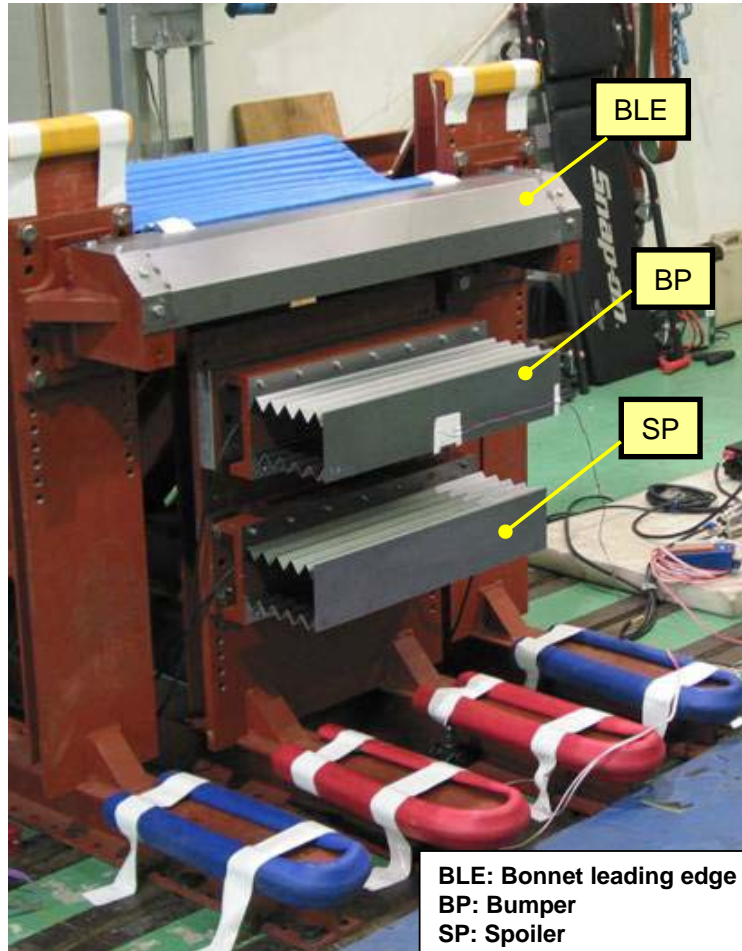


Test Rigs, contd.

Simplified Car: Type 1

Photo

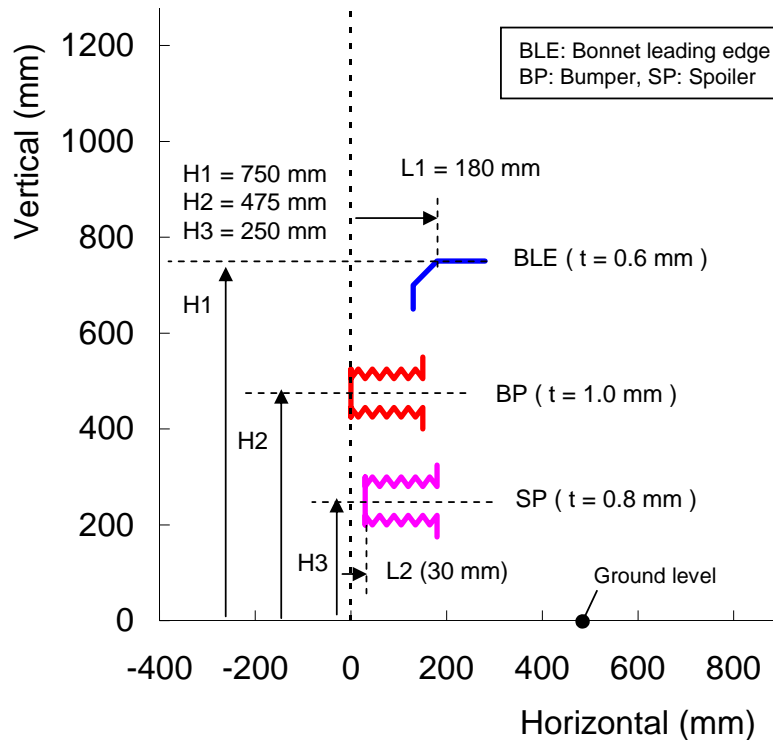
Overview



Test Rigs, contd.

Simplified Car: Type 1

Cross Sectional Dimensions align with the Car Center Line

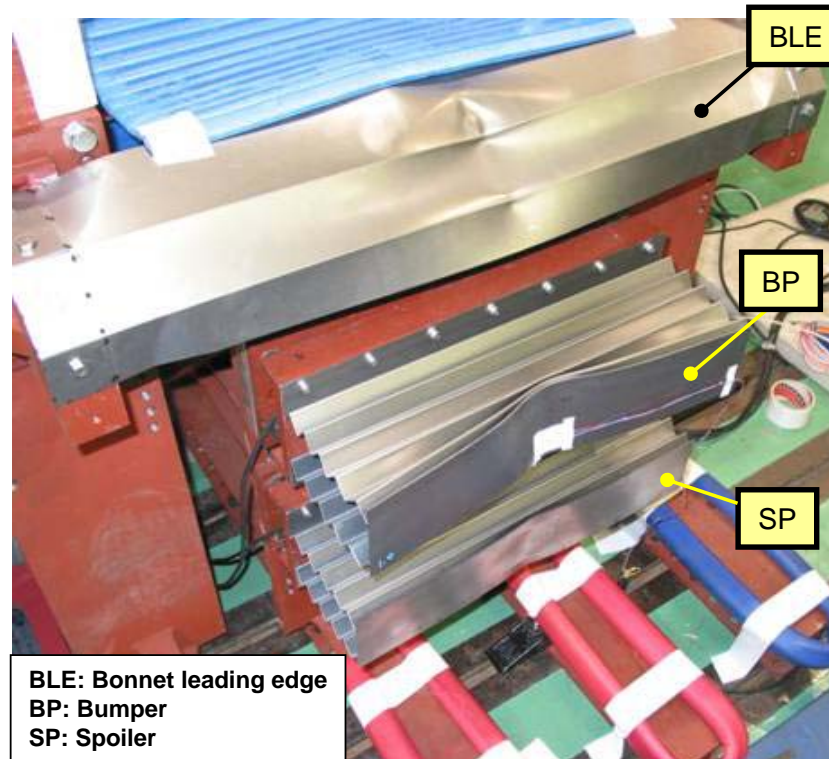


Dimensions are same with the TEG-045. However, different lot of the BLE, BP, and SP are used (New lot).

Test Rigs, contd.

Simplified Car: Type 1 Photo

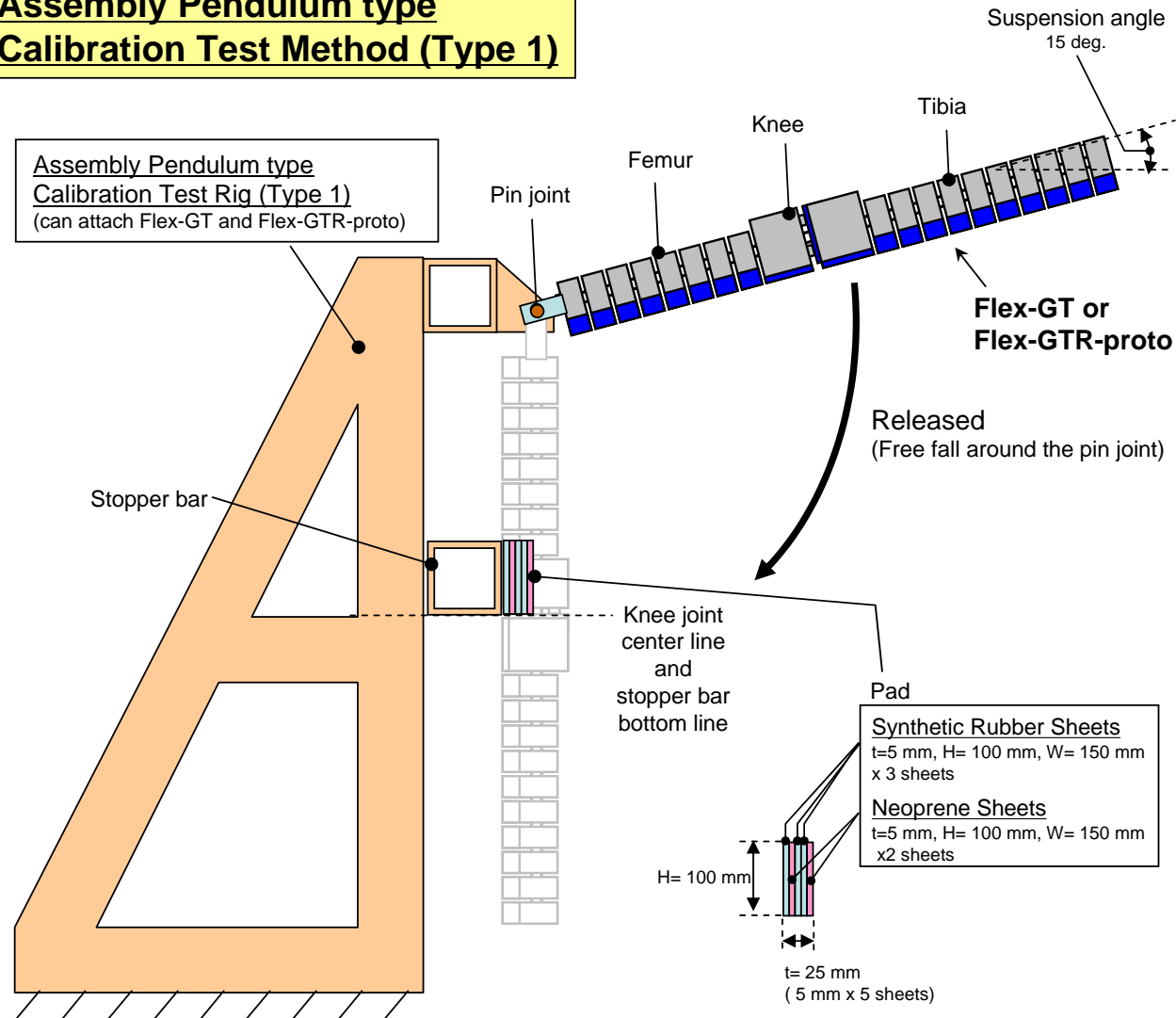
After the test



Test Methods

Test Methods

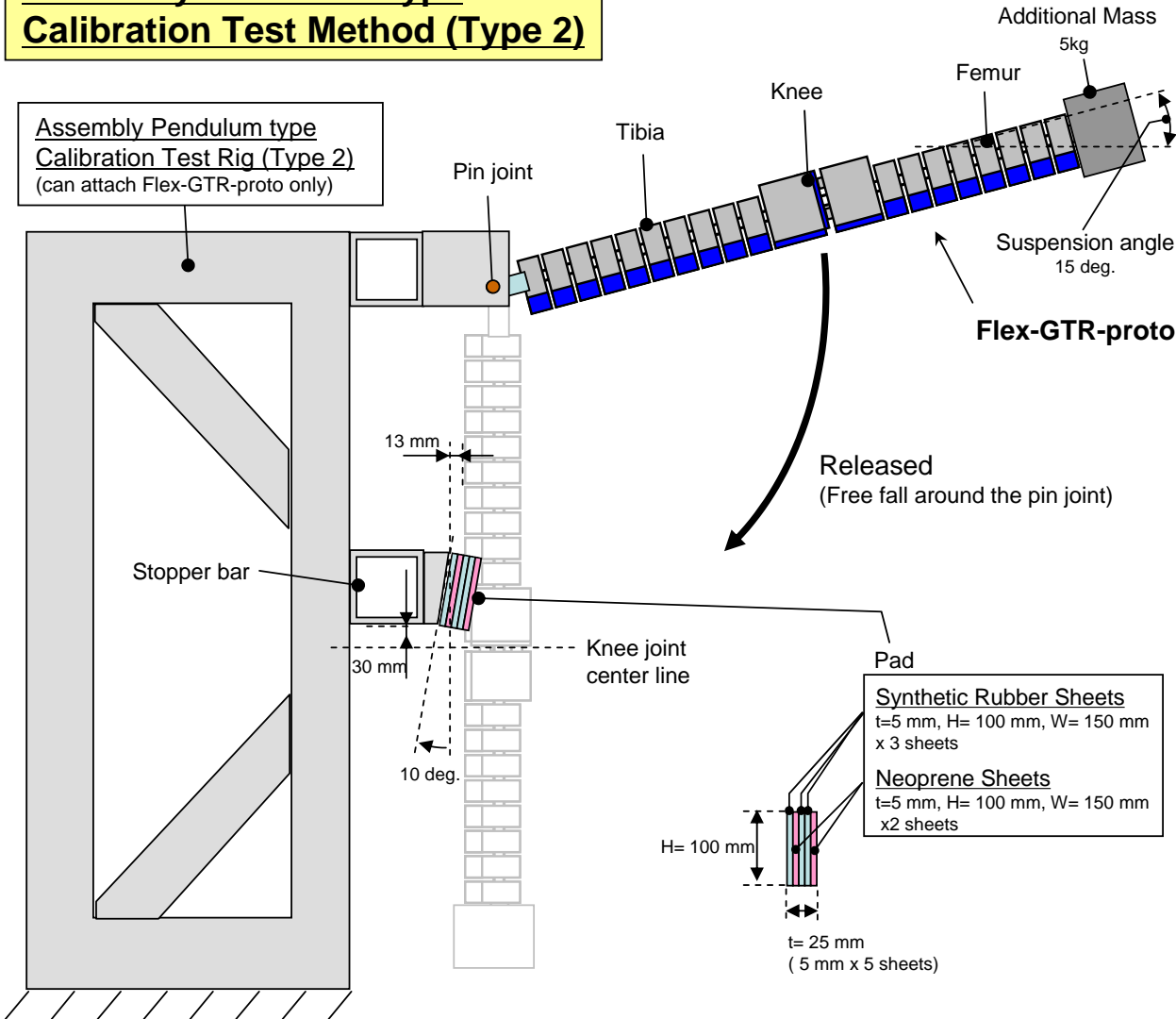
Assembly Pendulum type Calibration Test Method (Type 1)



Test Methods, contd.

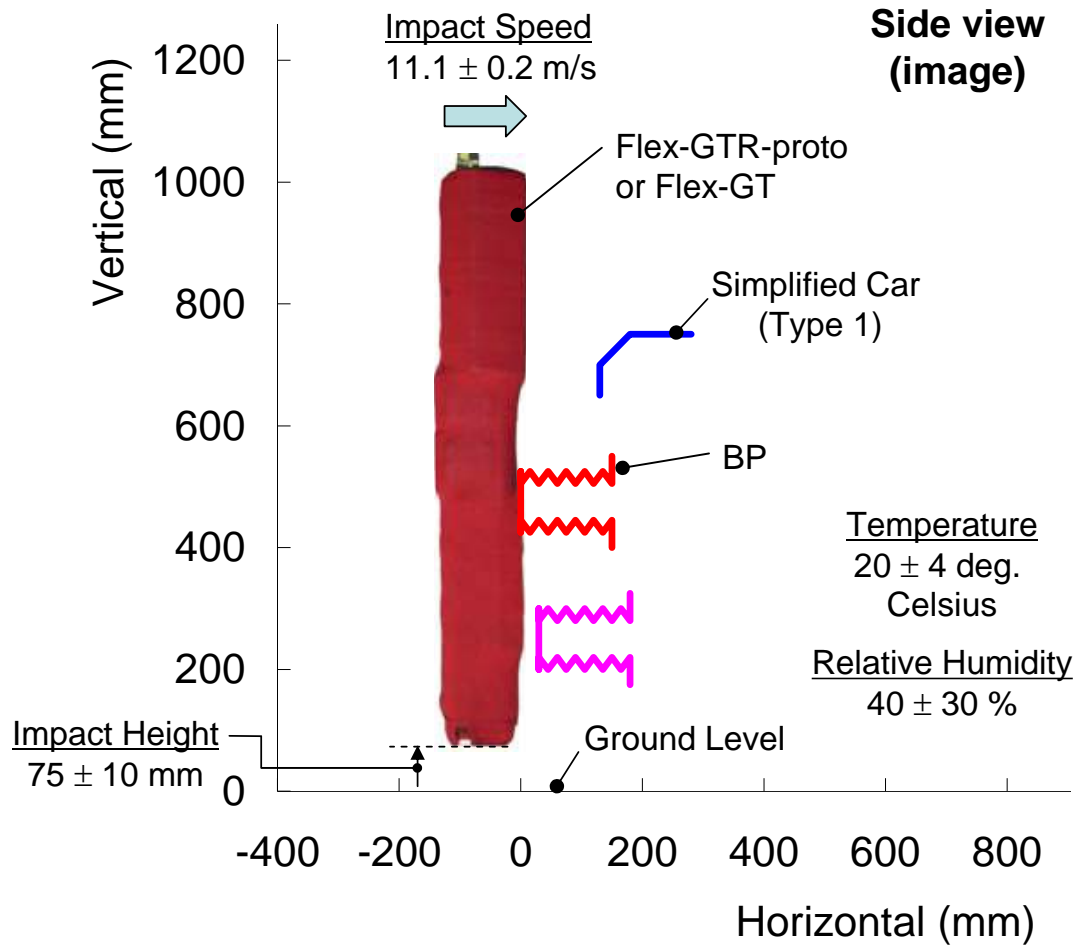
Assembly Pendulum type Calibration Test Method (Type 2)

Assembly Pendulum type
Calibration Test Rig (Type 2)
(can attach Flex-GTR-proto only)



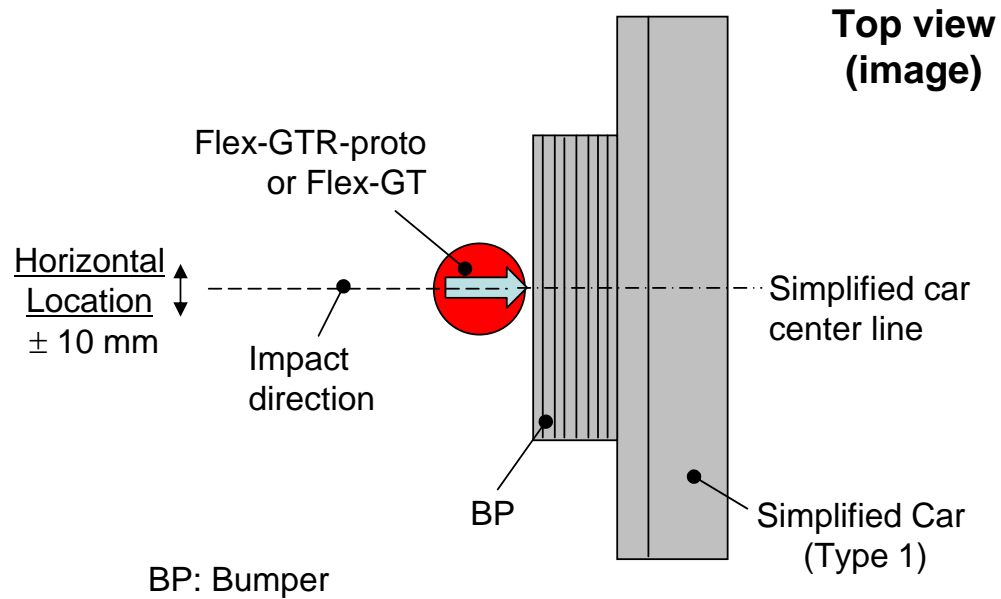
Test Methods, contd.

Simplified Car (Type 1) Test Method



Test Methods, contd.

Simplified Car (Type 1) Test Method



Test Matrix

Test Matrix

Assembly Pendulum type Calibration Test Matrix

Test ID	Impactor		DAS	Assembly Pendulum Type Calibration Test Method	
	Type	SN			
E1	P1	Flex-GTR-PROTO	SN01	Off-board	Type 2
	P2				
	P3				
E2	P4	Flex-GTR-PROTO	SN02	M=BUS	
	P5				
	P6				
E1	P7	Flex-GTR-PROTO	SN03	Off-board	
	P8				
	P9			SLICE	
E3	P10	Flex-GTR-PROTO	SN01	Off-board	Type 1
	P11		SN02	M=BUS	
	P12		SN03	SLICE	
	P13	Flex-GT	SN03	Off-board	

E1: Evaluation on the Repeatability of the Flex-GTR-prototype
E2: Evaluation on the Reproducibility of the Flex-GTR-prototype
E3: Evaluation on the Comparability between the Flex-GT and the Flex-GTR-prototype

Test Matrix, contd.

Simplified Car (Type 1) Test Matrixes

Test ID	Impactor		DAS	Simplified Car
	Type	SN		Type
S1	Flex-GTR-proto	SN01	Off-board	Type 1
S2		SN02	M=BUS	
S3				
S4				
S5				
S6				
S7	Flex-GT	SN03	Off-board	

Diagram illustrating evaluation groupings:

- E1** (Repeatability of the Flex-GTR-prototype): S1, S2, S3, S4, S5, S6
- E2** (Reproducibility of the Flex-GTR-prototype): S2, S3, S4, S5, S6
- E3** (Comparability between the Flex-GT and the Flex-GTR-prototype): S1, S2, S3, S4, S5, S6, S7

E1: Evaluation on the Repeatability of the Flex-GTR-prototype
E2: Evaluation on the Reproducibility of the Flex-GTR-prototype
E3: Evaluation on the Comparability between the Flex-GT and the Flex-GTR-prototype

Tentative Injury Assessment Reference Values (t-IARV)

Injury Criteria	Purpose	Proposed/Discussed Injury Assessment Reference Values at the 7th Flex-TEG meeting			Tentative Injury Assessment Reference Values (t-IARV) in this research
		TEG-077	TEG-076	TEG-078	
<u>Tibia</u> BM*	Injury Assessment	318 (Nm)	-	-	318 (Nm)
<u>Knee-MCL</u> Elongation		-	23 (mm)	16, 20 (mm)	20 (mm)
<u>Knee-ACL</u> Elongation	Monitoring Only	-	-	12.7 (mm)	12.7 (mm)
<u>Knee-PCL</u> Elongation		-	-	12.7 (mm)	12.7 (mm)

* BM: Bending Moment

Test Results

E1: Evaluation on the Repeatability of the Flex-GTR-prototype

E1: Repeatability of the Flex-GTR-prototype

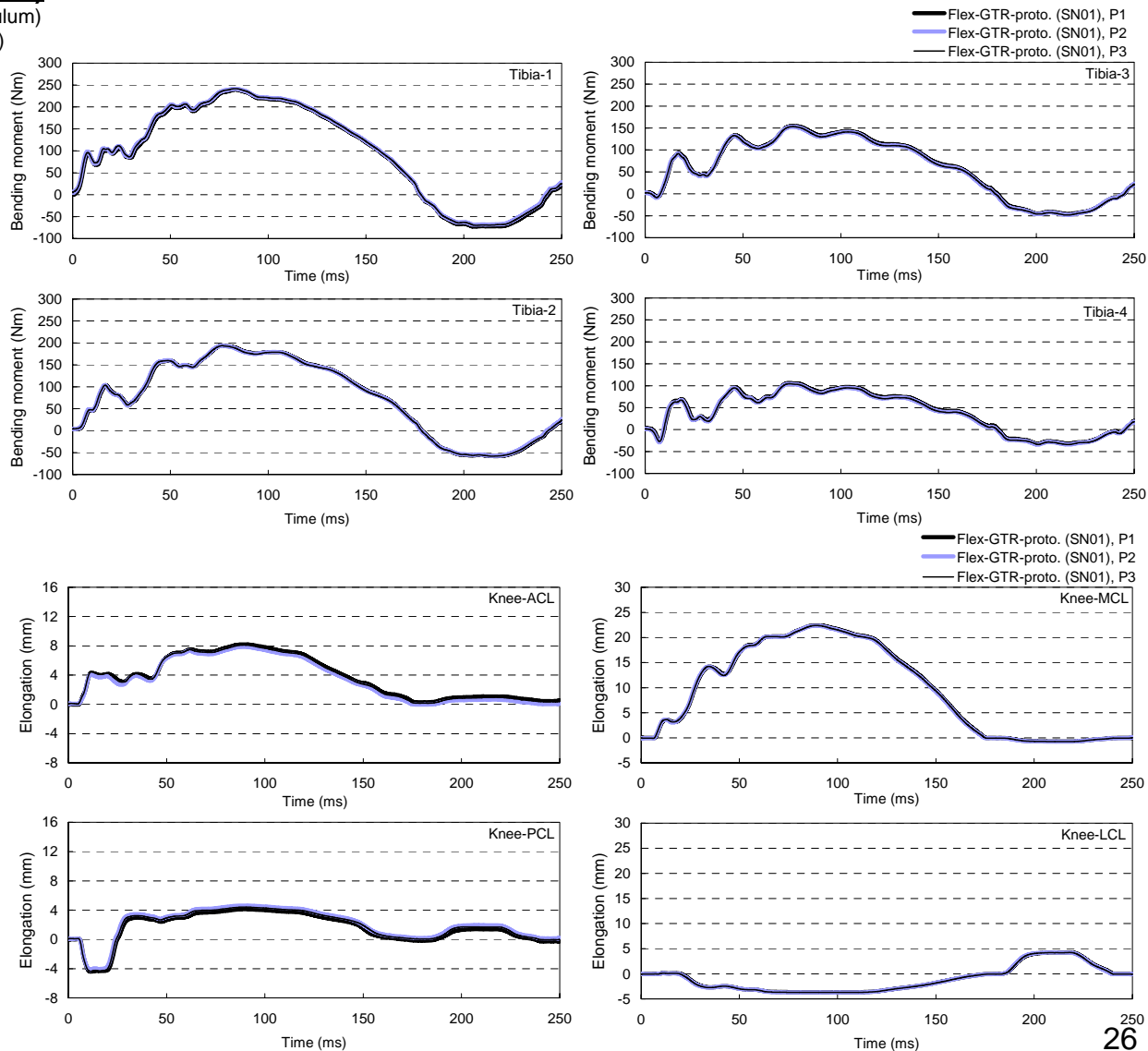
Dynamic Assembly Pendulum Test Series

Impactor: Flex-GTR-prototype (SN01)

Test Method: Flex-GTR-proto. (assembly, pendulum)

Test Rig: Flex-GTR-proto. (assembly, pendulum)

- Tibia-1
- Tibia-2
- Tibia-3
- Tibia-4



- Knee- ACL
- Knee-PCL
- Knee-MCL
- Knee-LCL

E1: Repeatability of the Flex-GTR-prototype

Dynamic Assembly Pendulum Test Series

Impactor: Flex-GTR-prototype (SN01)

Test Method: Flex-GTR-proto. (assembly, pendulum)

Test Rig: Flex-GTR-proto. (assembly, pendulum)

	Max. values**						
	Tibia-1 (Nm)	Tibia-2 (Nm)	Tibia-3 (Nm)	Tibia-4 (Nm)	Knee-ACL (mm)	Knee-PCL (mm)	Knee-MCL (mm)
Flex-GTR-proto. (SN01), P1	239.7	194.0	154.9	106.4	8.19	4.11	22.4
Flex-GTR-proto. (SN01), P2	241.2	193.6	152.8	104.1	7.85	4.62	22.3
Flex-GTR-proto. (SN01), P3	241.8	193.6	153.4	104.5	8.10	4.41	22.4
Avg.	240.9	193.7	153.7	105.0	8.05	4.38	22.4
St. Dev.	1.08	0.23	1.08	1.23	0.18	0.26	0.06
CV (%)	0.45	0.12	0.70	1.17	2.19	5.85	0.26
Judgement	Good	Good	Good	Good	Good	Acceptable	Good
t-IRAV*	318	318	318	318	12.7	12.7	20
St.Dev./t-IRAV (%)	0.34	0.07	0.34	0.39	1.39	2.02	0.29
Judgement	Good	Good	Good	Good	Good	Good	Good

* t-IRAV: Tentative Injury Assessment Reference Values

** Injury assessment items and monitoring items were evaluated.

Judgements

Good: < 3%
Acceptable: 3% ≤ and < 7%
Marginal: 7% ≤ and < 10%
Not Acceptable: > 10%

Injury
Assessment
Items

Monitoring
Items

E1: Repeatability of the Flex-GTR-prototype

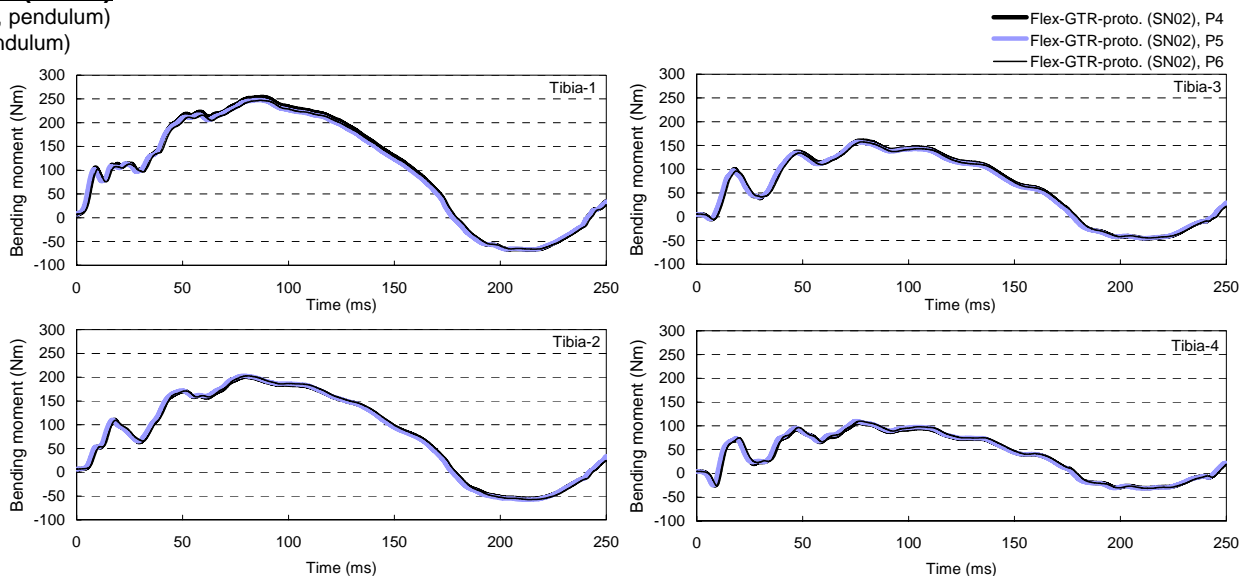
Assembly Pendulum Test Series

Impactor: Flex-GTR-prototype (SN02)

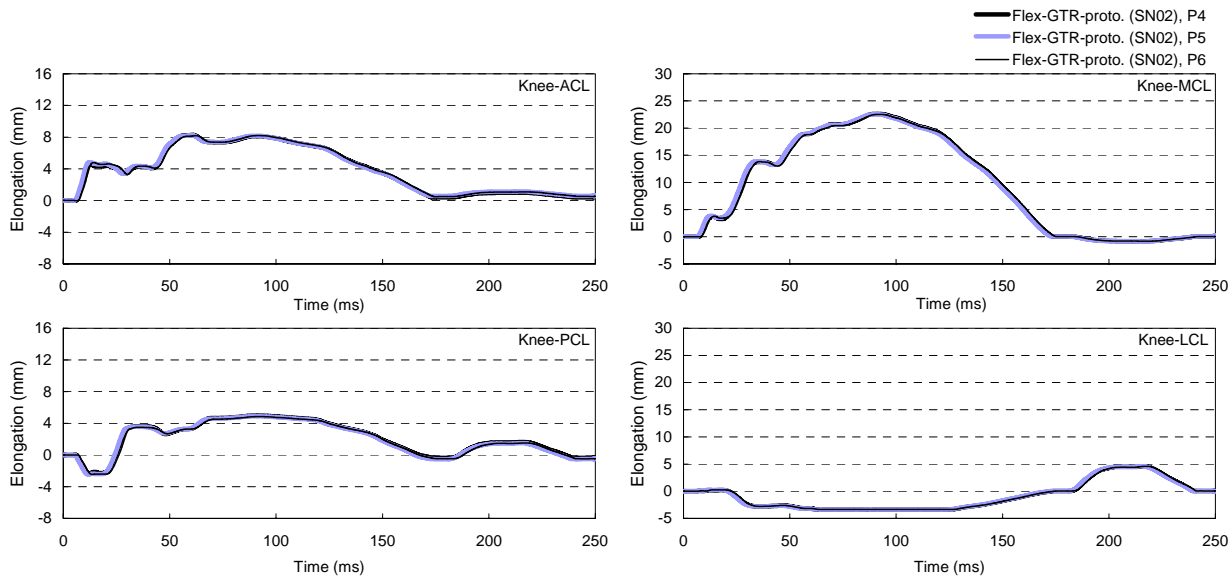
Test Method: Flex-GTR-proto. (assembly, pendulum)

Test Rig: Flex-GTR-proto. (assembly, pendulum)

- Tibia-1
- Tibia-2
- Tibia-3
- Tibia-4



- Knee-ACL
- Knee-PCL
- Knee-MCL
- Knee-LCL



E1: Repeatability of the Flex-GTR-prototype

Assembly Pendulum Test Series

Impactor: Flex-GTR-prototype (SN02)

Test Method: Flex-GTR-proto. (assembly, pendulum)

Test Rig: Flex-GTR-proto. (assembly, pendulum)

	Max. values**						
	Tibia-1 (Nm)	Tibia-2 (Nm)	Tibia-3 (Nm)	Tibia-4 (Nm)	Knee-ACL (mm)	Knee-PCL (mm)	Knee-MCL (mm)
Flex-GTR-proto. (SN02), P4	253.9	201.1	160.3	106.8	8.28	4.97	22.6
Flex-GTR-proto. (SN02), P5	247.4	203.1	157.4	110.0	8.24	4.90	22.5
Flex-GTR-proto. (SN02), P6	246.7	202.8	157.7	109.9	8.20	4.85	22.5
Avg.	249.3	202.3	158.5	108.9	8.24	4.91	22.5
St. Dev.	3.97	1.08	1.59	1.82	0.04	0.06	0.06
CV (%)	1.59	0.53	1.01	1.67	0.49	1.23	0.26
Judgement	Good	Good	Good	Good	Good	Good	Good
t-IARV*	318	318	318	318	12.7	12.7	20
St.Dev./t-IARV (%)	1.25	0.34	0.50	0.57	0.31	0.47	0.29
Judgement	Good	Good	Good	Good	Good	Good	Good

* t-IARV: Tentative Injury Assessment Reference Values

** Injury assessment items and monitoring items were evaluated.

Judgements

Good: < 3%
Acceptable: 3% ≤ and < 7%
Marginal: 7% ≤ and < 10%
Not Acceptable: > 10%

Injury
Assessment
Items

Monitoring
Items

E1: Repeatability of the Flex-GTR-prototype

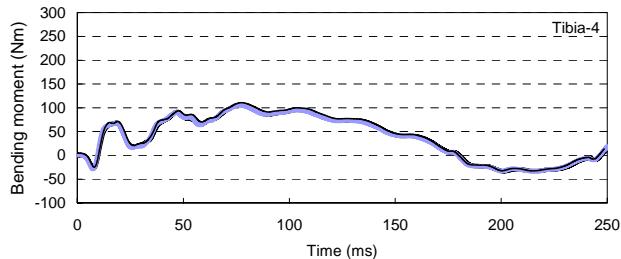
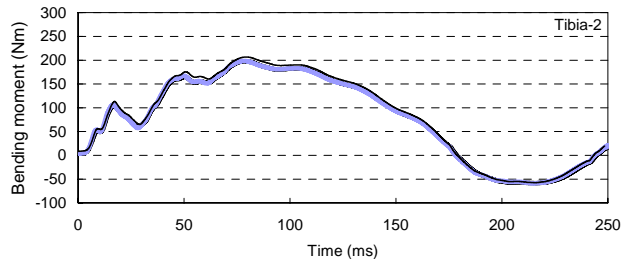
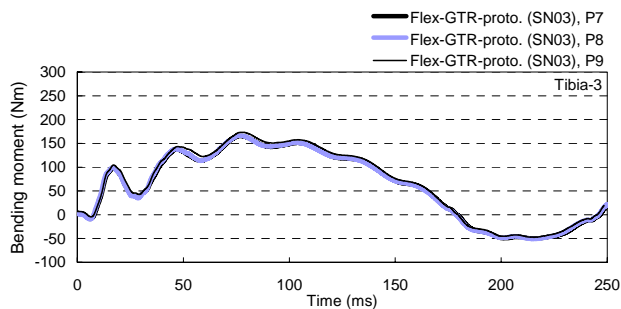
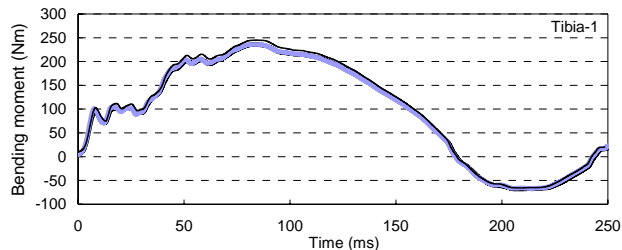
Assembly Pendulum Test Series

Impactor: Flex-GTR-prototype (SN03)

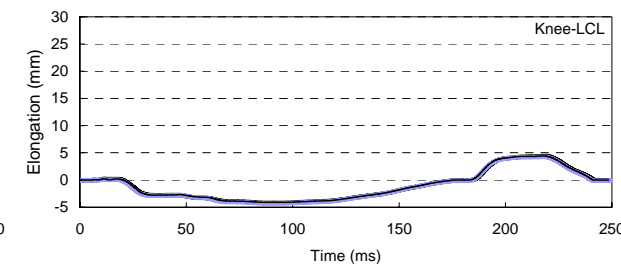
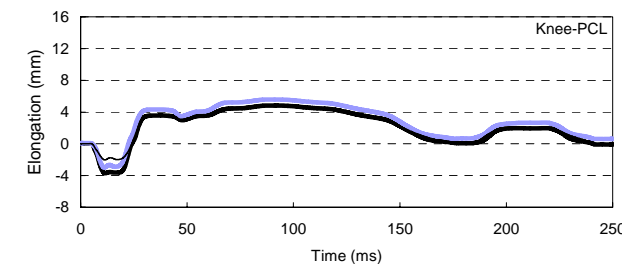
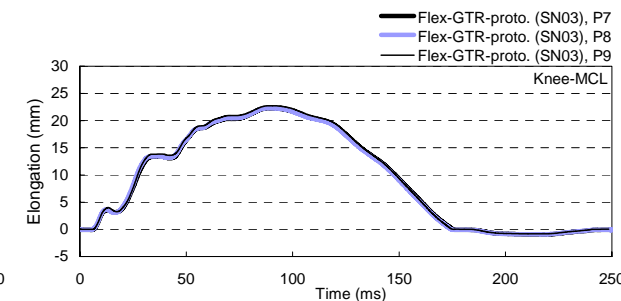
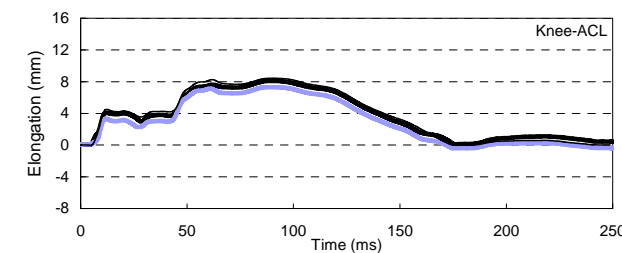
Test Method: Flex-GTR-proto. (assembly, pendulum)

Test Rig: Flex-GTR-proto. (assembly, pendulum)

- Tibia-1
- Tibia-2
- Tibia-3
- Tibia-4



- Knee-ACL
- Knee-PCL
- Knee-MCL
- Knee-LCL



E1: Repeatability of the Flex-GTR-prototype

Assembly Pendulum Test Series

Impactor: Flex-GTR-prototype (SN03)

Test Method: Flex-GTR-proto. (assembly, pendulum)

Test Rig: Flex-GTR-proto. (assembly, pendulum)

	Max. values**						
	Tibia-1 (Nm)	Tibia-2 (Nm)	Tibia-3 (Nm)	Tibia-4 (Nm)	Knee-ACL (mm)	Knee-PCL (mm)	Knee-MCL (mm)
Flex-GTR-proto. (SN03), P7	235.8	197.7	165.5	105.9	8.09	4.83	22.3
Flex-GTR-proto. (SN03), P8	236.0	198.5	166.3	105.6	7.31	5.57	22.3
Flex-GTR-proto. (SN03), P9	245.1	206.9	173.4	110.8	8.43	4.96	22.7
Avg.	239.0	201.0	168.4	107.4	7.94	5.12	22.4
St. Dev.	5.31	5.10	4.35	2.92	0.57	0.40	0.23
CV (%)	2.22	2.54	2.58	2.72	7.23	7.72	1.03
Judgement	Good	Good	Good	Good	Marginal	Marginal	Good
t-IARV*	318	318	318	318	12.7	12.7	20
St.Dev./t-IARV (%)	1.67	1.60	1.37	0.92	4.52	3.11	1.15
Judgement	Good	Good	Good	Good	Acceptable	Acceptable	Good

* t-IARV: Tentative Injury Assessment Reference Values

** Injury assessment items and monitoring items were evaluated.

Judgements

Good: < 3%

Acceptable: 3% ≤ and < 7%

Marginal: 7% ≤ and < 10%

Not Acceptable: > 10%

Injury
Assessment
Items

Monitoring
Items

E1: Repeatability of the Flex-GTR-prototype

Simplified Car Test Series

Impactor: Flex-GTR-prototype (SN02)

Test Method: Subsystem (Free flight)

Test Rig: Simplified Car (Type 1)

Flex-GTR-proto. (SN02), S2



Flex-GTR-proto. (SN02), S3



Flex-GTR-proto. (SN02), S4



Flex-GTR-proto. (SN02), S5



0 ms

10 ms

20 ms

30 ms

40 ms

E1: Repeatability of the Flex-GTR-prototype

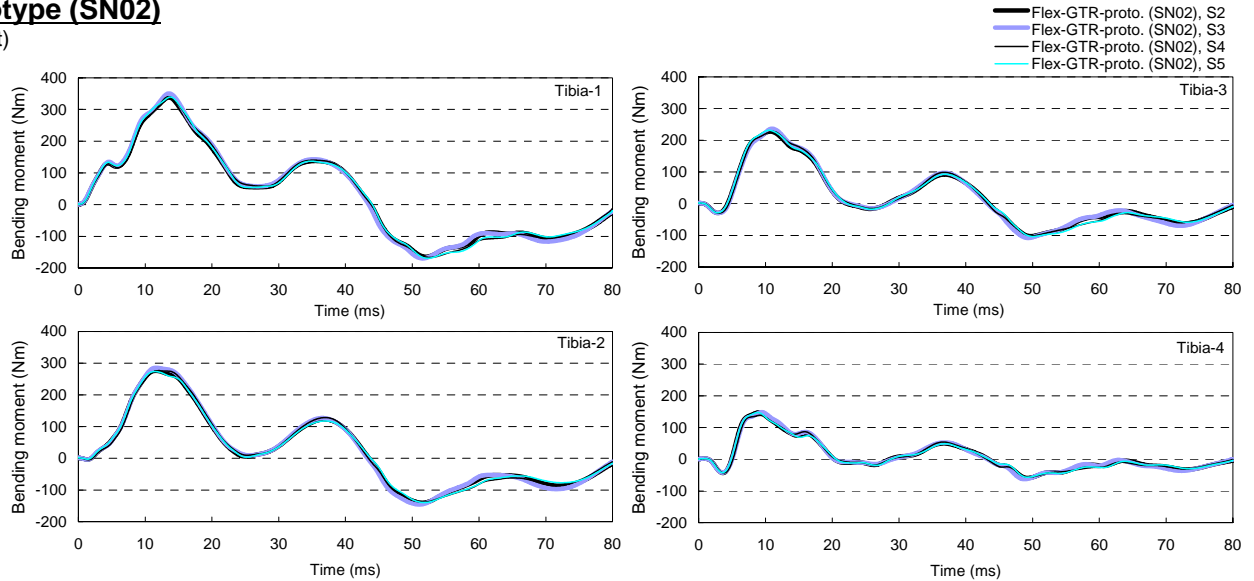
Simplified Car Test Series

Impactor: Flex-GTR-prototype (SN02)

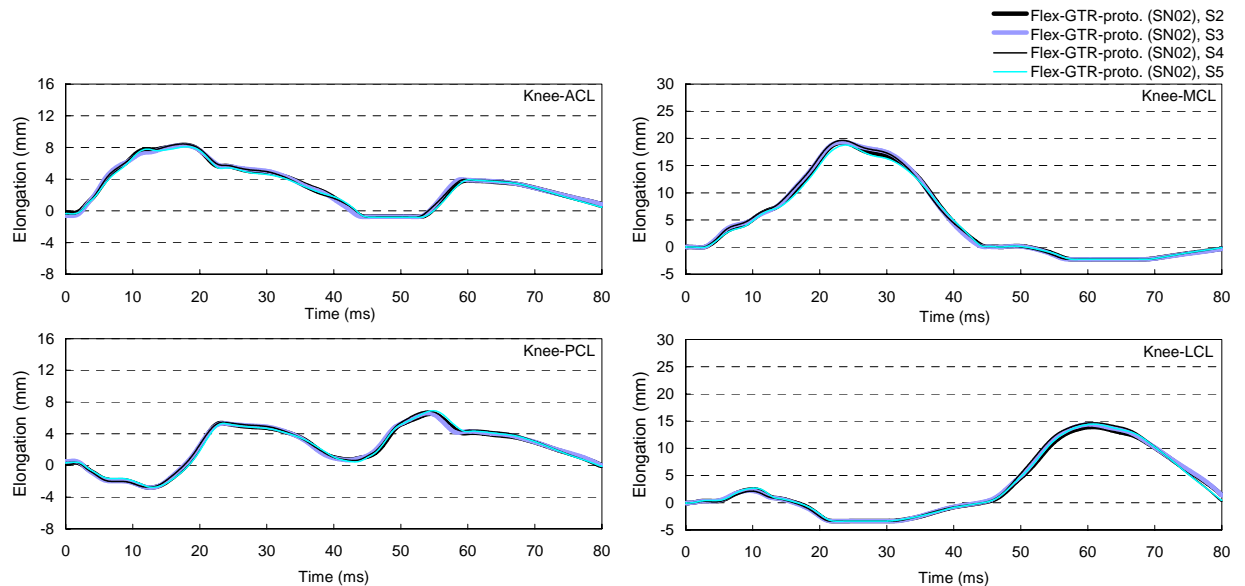
Test Method: Subsystem (Free flight)

Test Rig: Simplified Car (Type 1)

- Tibia-1
- Tibia-2
- Tibia-3
- Tibia-4



- Knee-ACL
- Knee-PCL
- Knee-MCL
- Knee-LCL



E1: Repeatability of the Flex-GTR-prototype

Simplified Car Test Series

Impactor: Flex-GTR-prototype (SN02)

Test Method: Subsystem (Free freight)

Test Rig: Simplified Car (Type 1)

	Max. values**						
	Tibia-1 (Nm)	Tibia-2 (Nm)	Tibia-3 (Nm)	Tibia-4 (Nm)	Knee-ACL (mm)	Knee-PCL (mm)	Knee-MCL (mm)
Flex-GTR-prot. (SN02), S2	338.2	276.3	227.7	147.7	8.32	6.52	19.3
Flex-GTR-prot. (SN02), S3	350.6	285.5	236.5	148.5	8.28	6.61	19.3
Flex-GTR-prot. (SN02), S4	340.1	276.4	228.1	138.4	8.43	6.85	19.6
Flex-GTR-prot. (SN02), S5	339.4	273.5	231.6	147.3	8.08	6.90	18.8
Avg.	342.1	277.9	231.0	145.5	8.28	6.72	19.25
St. Dev.	5.74	5.23	4.08	4.74	0.15	0.18	0.33
CV (%)	1.68	1.88	1.77	3.26	1.77	2.74	1.72
Judgement	Good	Good	Good	Acceptable	Good	Good	Good
t-IARV*	318	318	318	318	12.7	12.7	20.0
St.Dev./t-IARV (%)	1.80	1.64	1.28	1.49	1.15	1.45	1.66
Judgement	Good	Good	Good	Good	Good	Good	Good

* t-IARV: Tentative Injury Assessment Reference Values

** Injury assessment items and monitoring items were evaluated.

Judgements

Good: < 3%
Acceptable: 3% ≤ and < 7%
Marginal: 7% ≤ and < 10%
Not Acceptable: > 10%

Injury
Assessment
Items

Monitoring
Items

E2: Evaluation on the Reproducibility of the Flex-GTR-prototype

E2: Reproducibility of the Flex-GTR-prototype

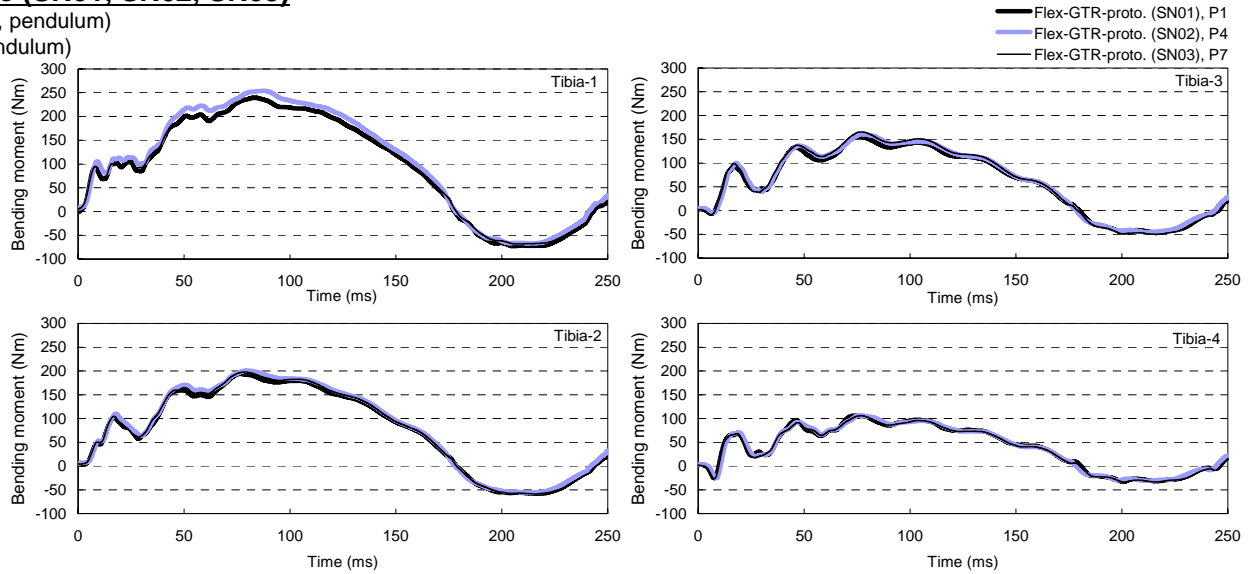
Dynamic Assembly Pendulum Test Series

Impactor: Flex-GTR-prototype (SN01, SN02, SN03)

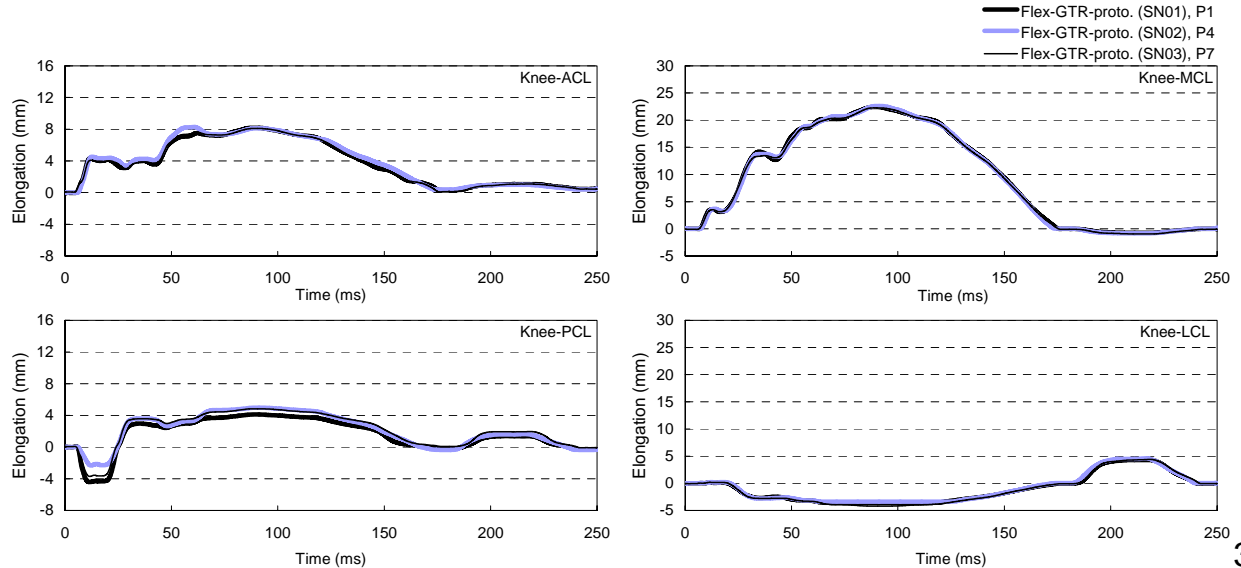
Test Method: Flex-GTR-proto. (assembly, pendulum)

Test Rig: Flex-GTR-proto. (assembly, pendulum)

- Tibia-1
- Tibia-2
- Tibia-3
- Tibia-4



- Knee-ACL
- Knee-PCL
- Knee-MCL
- Knee-LCL



E2: Reproducibility of the Flex-GTR-prototype

Dynamic Assembly Pendulum Test Series

Impactor: Flex-GTR-prototype (SN01, SN02, SN03)

Test Method: Flex-GTR-proto. (assembly, pendulum)

Test Rig: Flex-GTR-proto. (assembly, pendulum)

	Max. values**						
	Tibia-1 (Nm)	Tibia-2 (Nm)	Tibia-3 (Nm)	Tibia-4 (Nm)	Knee-ACL (mm)	Knee-PCL (mm)	Knee-MCL (mm)
Flex-GTR-proto (SN01), Avg.***	240.9	193.7	153.7	105.0	8.05	4.38	22.4
Flex-GTR-proto (SN02), Avg.***	249.3	202.3	158.5	108.9	8.24	4.91	22.5
Flex-GTR-proto (SN03), Avg.***	239.0	201.0	168.4	107.4	7.94	5.12	22.4
Avg.	243.1	199.0	160.2	107.1	8.08	4.80	22.4
St. Dev.	5.48	4.64	7.50	1.97	0.15	0.38	0.06
CV (%)	2.26	2.33	4.68	1.84	1.88	7.94	0.26
Judgement	Good	Good	Acceptable	Good	Good	Marginal	Good
t-IARV*	318	318	318	318	12.7	12.7	20
St.Dev./t-IARV (%)	1.72	1.46	2.36	0.62	1.20	3.00	0.29
Judgement	Good	Good	Good	Good	Good	Acceptable	Good

* t-IARV: Tentative Injury Assessment Reference Values

** Injury assessment items and monitoring items were evaluated.

*** Flex-GTR-proto (SN01), Avg.: Average data of P1-P3

Flex-GTR-proto (SN02), Avg.: Average data of P4-P6

Flex-GTR-proto (SN03), Avg.: Average data of P7-P9

Injury
Assessment
Items

Monitoring
Items

Judgements

Good: < 3%

Acceptable: $3\% \leq$ and $< 7\%$

Marginal: $7\% \leq$ and $< 10\%$

Not Acceptable: $> 10\%$

E2: Reproducibility of the Flex-GTR-prototype

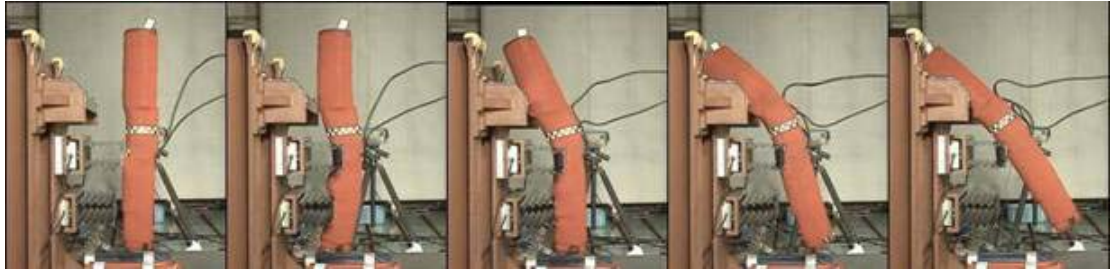
Simplified Car Test Series

Impactor: Flex-GTR-prototype (SN01, SN02, SN03)

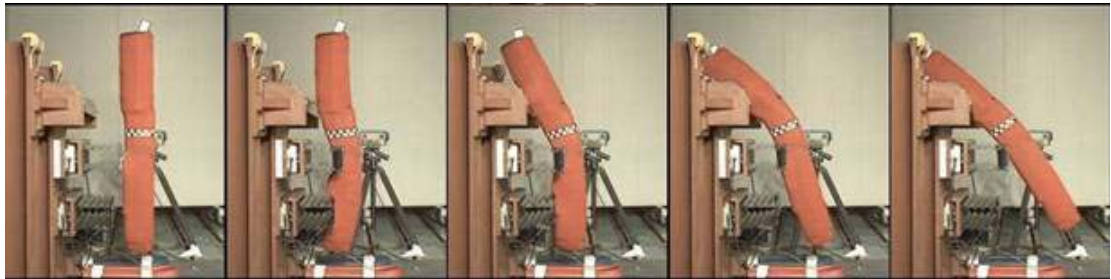
Test Method: Subsystem (Free flight)

Test Rig: Simplified Car (Type 1)

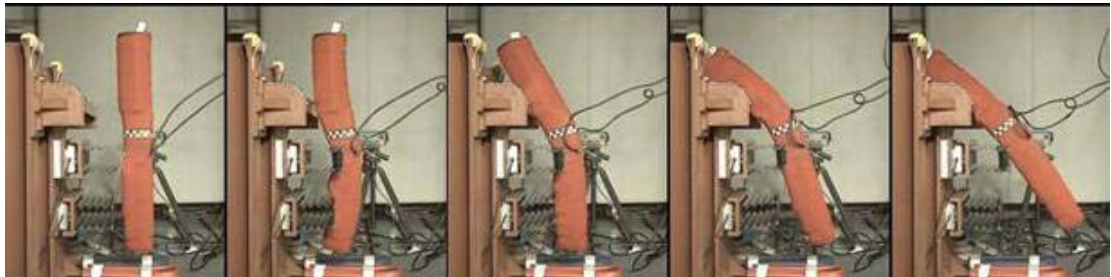
Flex-GTR-proto. (SN01), S1



Flex-GTR-proto. (SN02), S2



Flex-GTR-proto. (SN03), S6



0 ms

10 ms

20 ms

30 ms

40 ms

E2: Reproducibility of the Flex-GTR-prototype

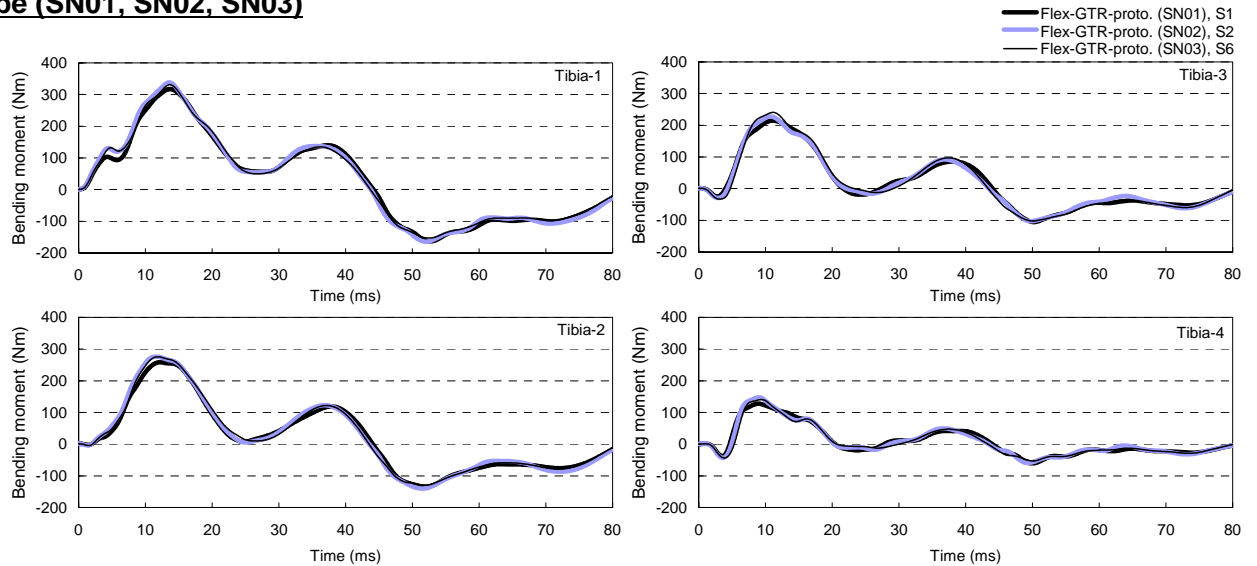
Simplified Car Test Series

Impactor: Flex-GTR-prototype (SN01, SN02, SN03)

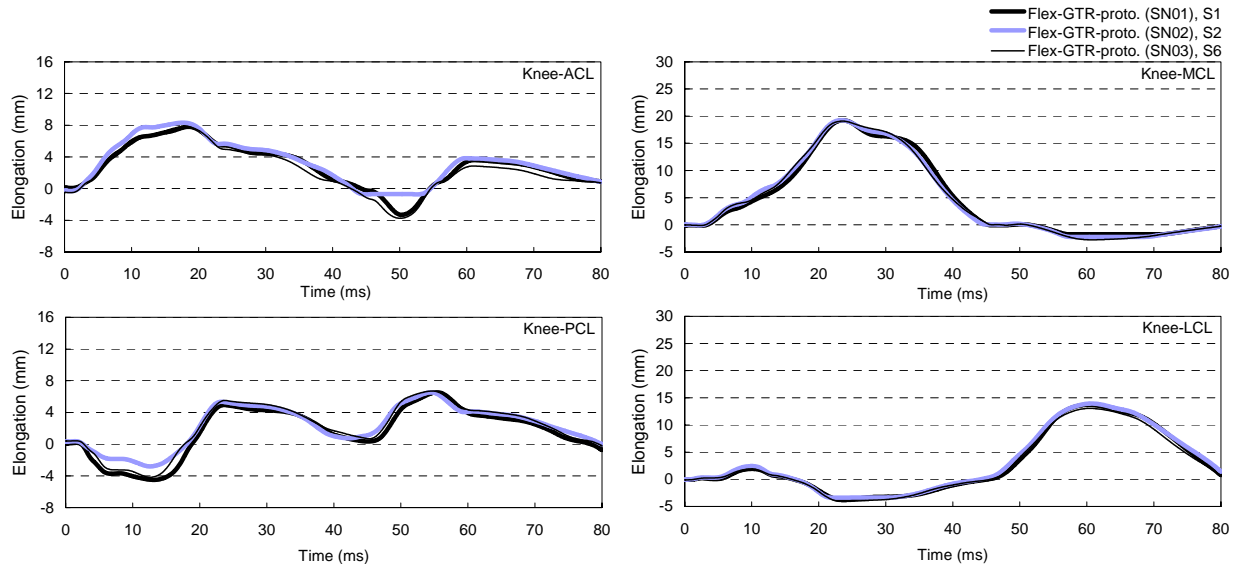
Test Method: Subsystem (Free flight)

Test Rig: Simplified Car (Type 1)

- Tibia-1
- Tibia-2
- Tibia-3
- Tibia-4



- Knee-ACL
- Knee-PCL
- Knee-MCL
- Knee-LCL



E2: Reproducibility of the Flex-GTR-prototype

Simplified Car Test Series

Impactor: Flex-GTR-prototype (SN01, SN02, SN03)

Test Method: Subsystem (Free freight)

Test Rig: Simplified Car (Type 1)

	Max. values**						
	Tibia-1 (Nm)	Tibia-2 (Nm)	Tibia-3 (Nm)	Tibia-4 (Nm)	Knee-ACL (mm)	Knee-PCL (mm)	Knee-MCL (mm)
Flex-GTR-prot (SN01), S1	317.2	258.5	214.7	127.7	7.81	6.54	19.2
Flex-GTR-prot (SN02), Avg.***	342.1	277.9	231.0	145.5	8.28	6.72	19.3
Flex-GTR-prot (SN03), S6	330.9	275.6	240.6	140.8	7.80	6.71	19.1
Avg.	330.1	270.7	228.8	138.0	7.96	6.66	19.2
St. Dev.	12.47	10.60	13.09	9.22	0.27	0.10	0.10
CV (%)	3.78	3.92	5.72	6.68	3.44	1.52	0.52
Judgement	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Good	Good
t-IARV*	318	318	318	318	12.7	12.7	20
St.Dev./t-IARV (%)	3.92	3.33	4.12	2.90	2.16	0.80	0.50
Judgement	Acceptable	Acceptable	Acceptable	Good	Good	Good	Good

* t-IARV: Tentative Injury Assessment Reference Values

** Injury assessment items and monitoring items were evaluated.

*** Flex-GTR-prot (SN02), Avg.: Average data of S2-S5

Judgements

Good: < 3%

Acceptable: 3% ≤ and < 7%

Marginal: 7% ≤ and < 10%

Not Acceptable: > 10%

Injury
Assessment
Items

Monitoring
Items

E3: Evaluation on the Comparability between the Flex-GT
and the Flex-GTR-prototype

E3: Comparability between Flex-GT and Flex-GTR-prototype

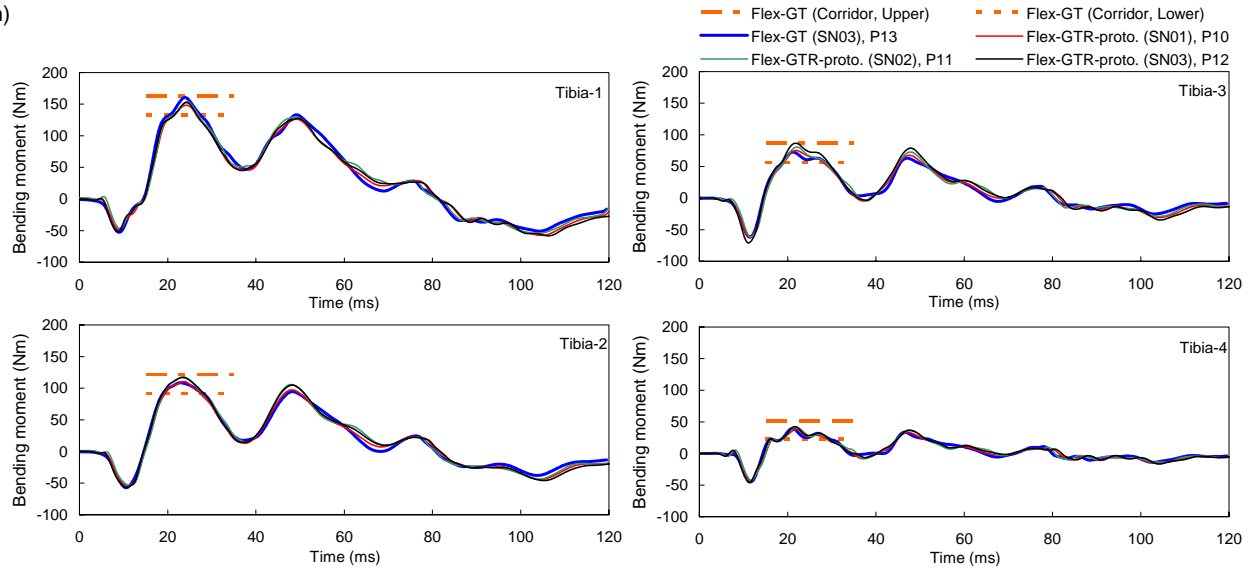
Dynamic Assembly Pendulum Test Series

Impactor: Flex-GTR-prototype (SN01, SN02, SN03) and Flex-GT (SN03)

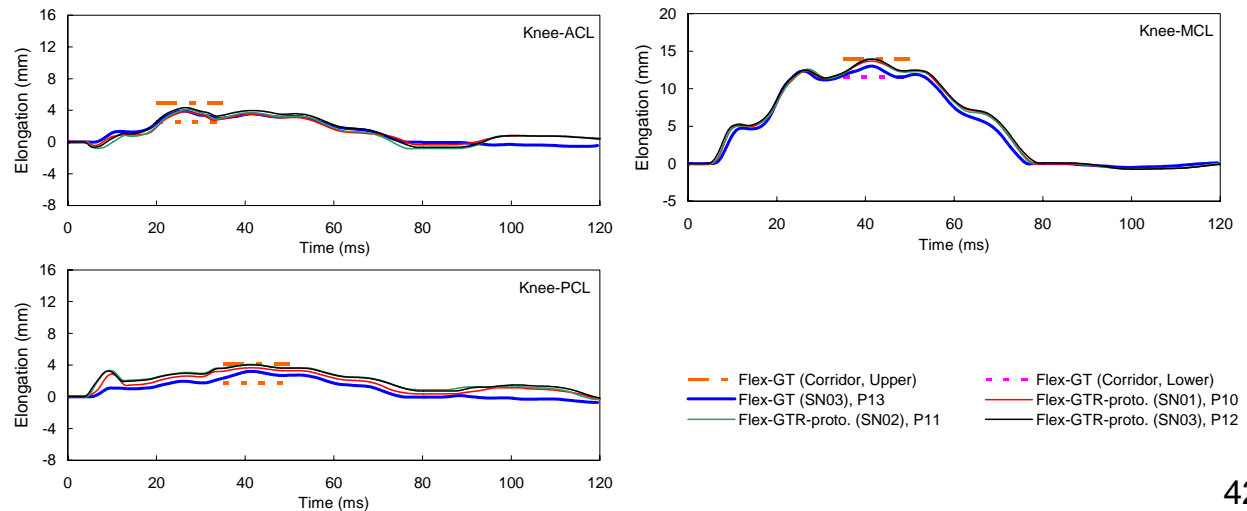
Test Method: Flex-GT (assembly, pendulum)

Test Rig: Flex-GT (assembly, pendulum)

- Tibia-1
- Tibia-2
- Tibia-3
- Tibia-4



- Knee-ACL
- Knee-PCL
- Knee-MCL
- Knee-LCL



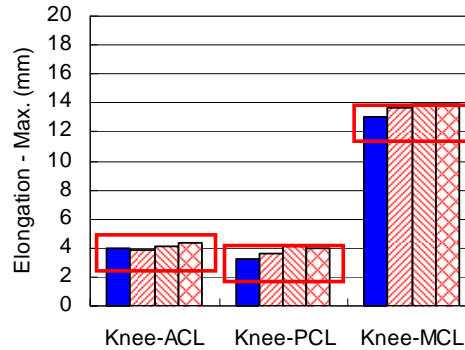
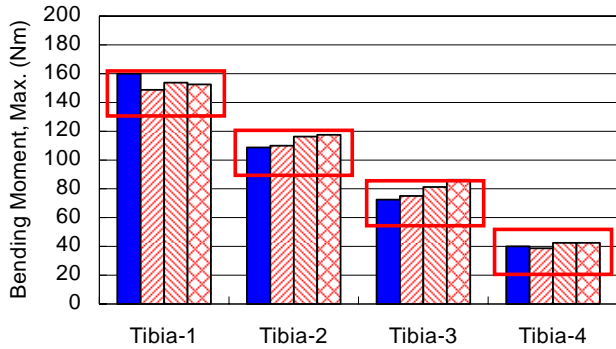
E3: Comparability between Flex-GT and Flex-GTR-prototype

Dynamic Assembly Pendulum Test Series

Impactor: Flex-GTR-prototype (SN01, SN02, SN03) and Flex-GT (SN03)

Test Method: Flex-GT (assembly, pendulum)

Test Rig: Flex-GT (assembly, pendulum)



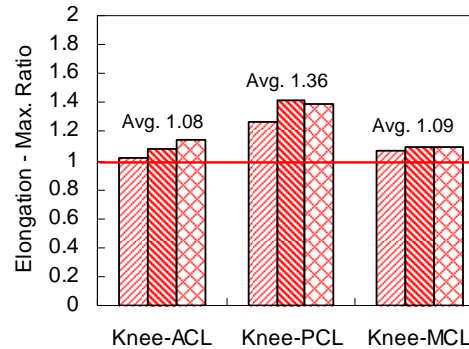
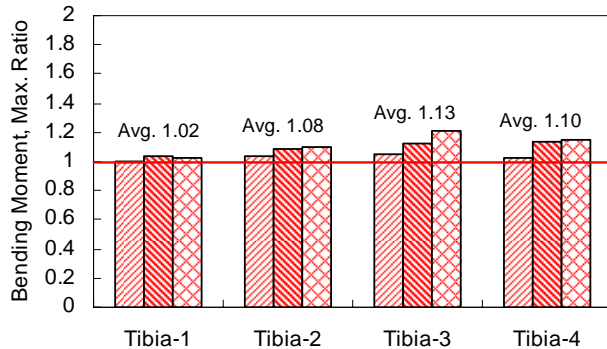
Flex-GT Corridor

Flex-GT (SN03), P13

Flex-GTR-proto. (SN01), P10

Flex-GTR-proto. (SN02), P11

Flex-GTR-proto. (SN03), P12



Flex-GT Corridor (Center)

Flex-GTR-proto. (SN01), P10

Flex-GTR-proto. (SN02), P11

Flex-GTR-proto. (SN03), P12

E3: Comparability between Flex-GT and Flex-GTR-prototype

Simplified Car Test Series

Impactor: Flex-GTR-prototype (SN01, SN02, SN03)

and Flex-GT (SN03)

Test Method: Subsystem (Free flight)

Test Rig: Simplified Car (Type 1)

Flex-GT (SN03), S7



Flex-GTR-proto. (SN01), S1



Flex-GTR-proto. (SN02), S2



Flex-GTR-proto. (SN03), S6



0 ms

10 ms

20 ms

30 ms

40 ms

E3: Comparability between Flex-GT and Flex-GTR-prototype

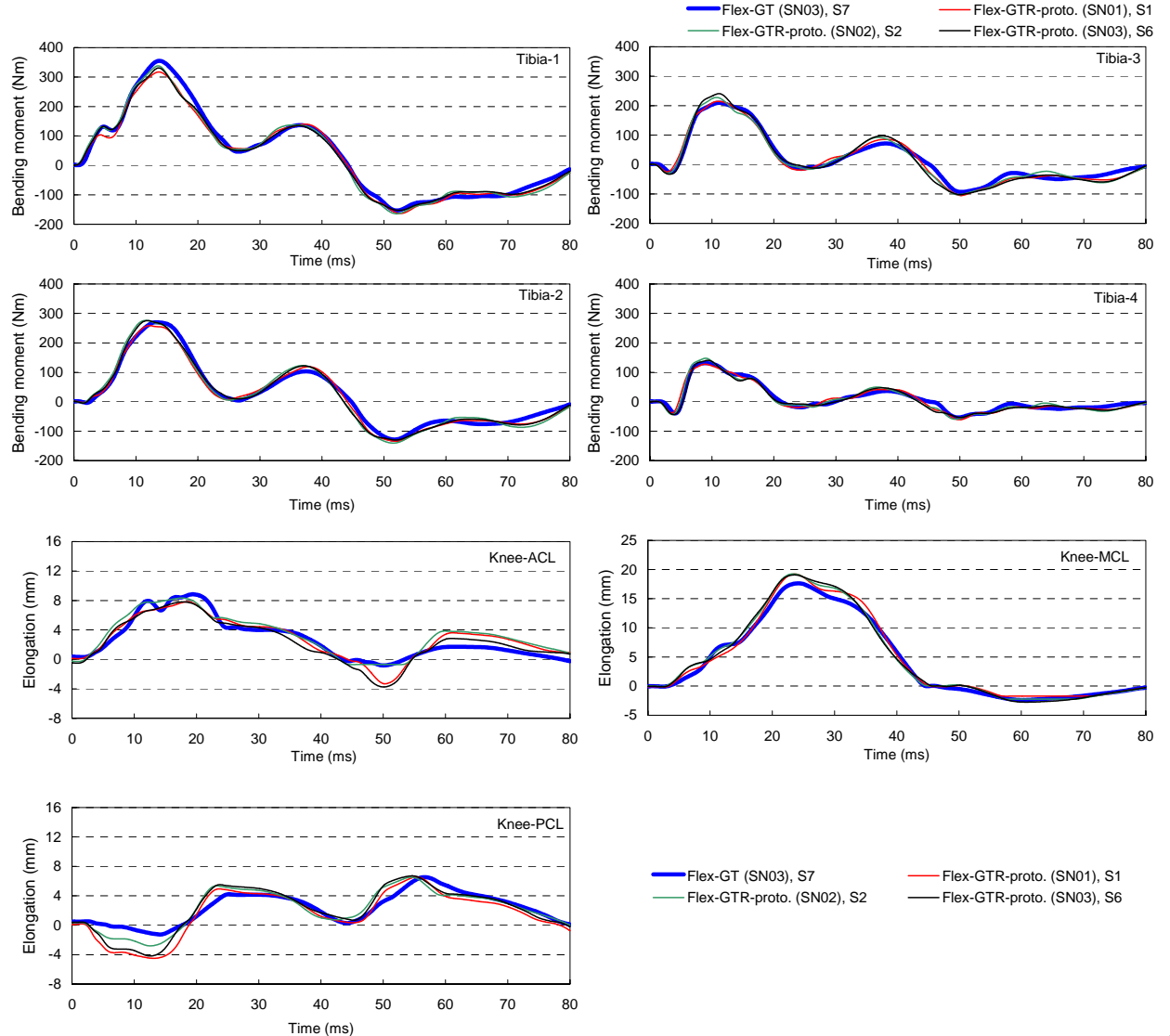
Simplified Car Test Series

Impactor: Flex-GTR-prototype (SN01, SN02, SN03) and Flex-GT (SN03)

Test Method: Subsystem (Free flight)

Test Rig: Simplified Car (Type 1)

- Tibia-1
- Tibia-2
- Tibia-3
- Tibia-4



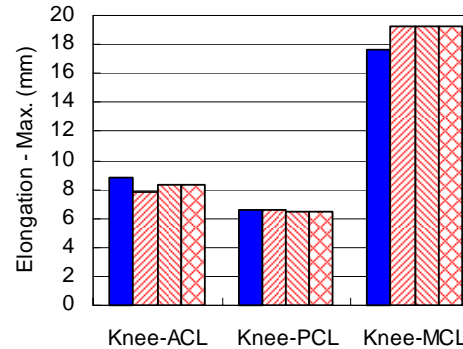
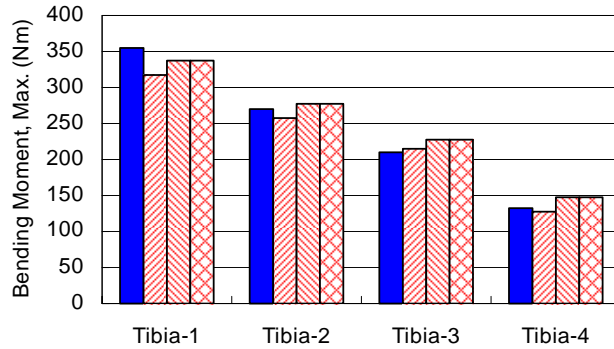
E3: Comparability between Flex-GT and Flex-GTR-prototype

Simplified Car Test Series

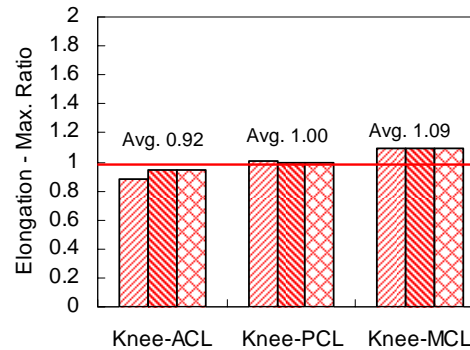
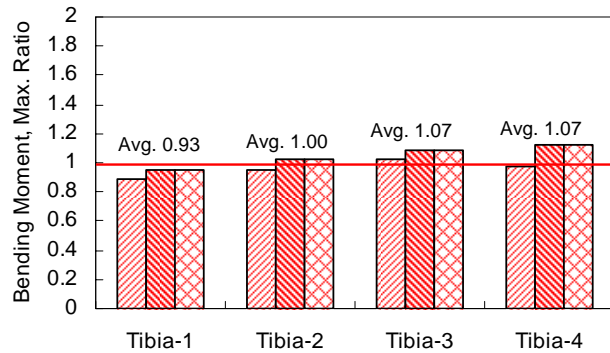
Impactor: Flex-GTR-prototype (SN01, SN02, SN03) and Flex-GT (SN03)

Test Method: Subsystem (Free flight)

Test Rig: Simplified Car (Type 1)



- Flex-GT (SN03), S7
- ▨ Flex-GTR-proto. (SN01), S1
- ▩ Flex-GTR-proto. (SN02), S2
- ▤ Flex-GTR-proto. (SN03), S6



- ▨ Flex-GTR-proto. (SN01), S1
- ▩ Flex-GTR-proto. (SN02), S2
- ▤ Flex-GTR-proto. (SN03), S6
- Flex-GT (SN03), S7

Conclusions

- In this research, the following items were evaluated.
 - ✓ E1: Repeatability of the Flex-GTR-prototype
 - ✓ E2: Reproducibility of the Flex-GTR-prototype
 - ✓ E3: Comparability between the Flex-GT and Flex-GTR-prototype
- As a result, fairly Good Repeatability and Reproducibility of Flex-GTR-prototype were observed (majorities of CV values are less than 3%).
- As for the Comparability between the Flex-GT and Flex-GTR prototype, some differences were observed between them. Most of the maximum value ratios of the Flex-GTR-proto relative to the Flex-GT are less than 1.1.
- The difference between the Flex-GT and Flex-GTR-proto has a chance to affect the injury threshold values
- Therefore correlations between the Flex-GTR-prototype and Human Lower Limbs was analyzed by JAMA-JARI using a computer simulation analysis.