

Informal document No. **GRSP-46-30**
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agenda item 20(a))

NEW JNCAP ITEM

NASVA

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NASVA

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New and next items

- 1. Side Curtain Airbag (FY 2008 -)**
- 2. Rear seat occupant protection with seatbelt usability and remainder (FY 2009 -)**
- 3. Rear-end collision minor neck injury protection (FY 2009 -)**
- 4. Pedestrian Leg Protection (FY 201x -)**

1. Side Curtain Airbag (FY 2008-)

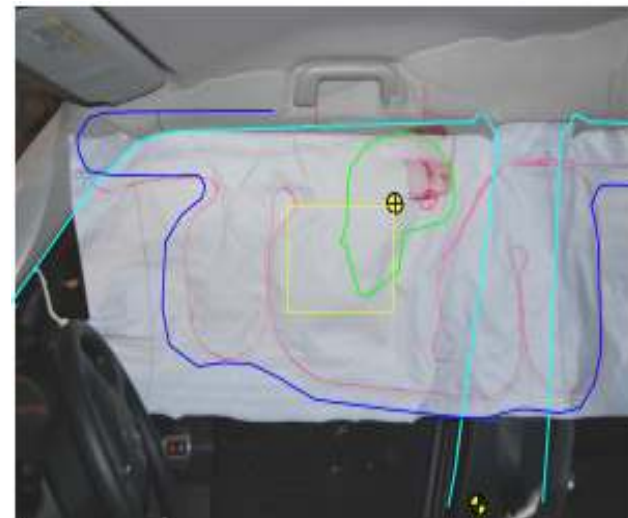
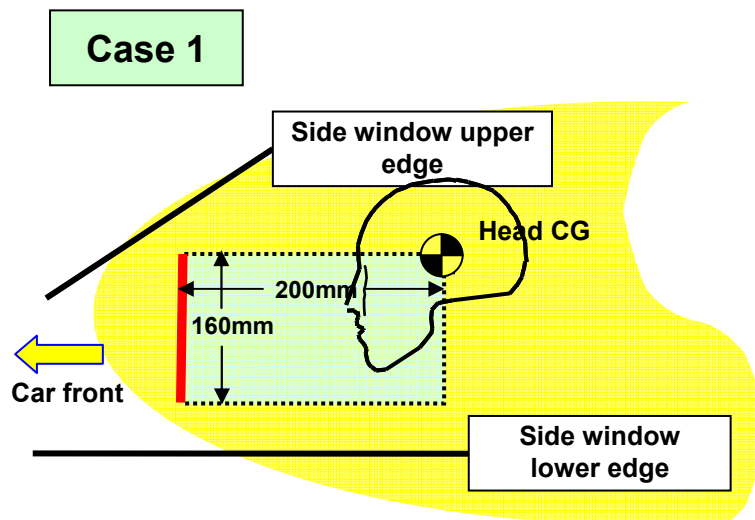
Side Curtain Airbag (SCA)

- Side Curtain Airbag is effective for head protection in side impact
- First priority is to prevail SCA in Japanese car fleet
- Although the pole test was examined, the SCA deployment is evaluated in the MDB side impact test because of cost issue
- Since the performance of SCA is difficult to be evaluated in the MDB test, deployment area is mainly evaluated



SCA Area Evaluation

- Front border of the airbag should be located more than 200 mm in front of the AM50 head center of gravity in sitting position



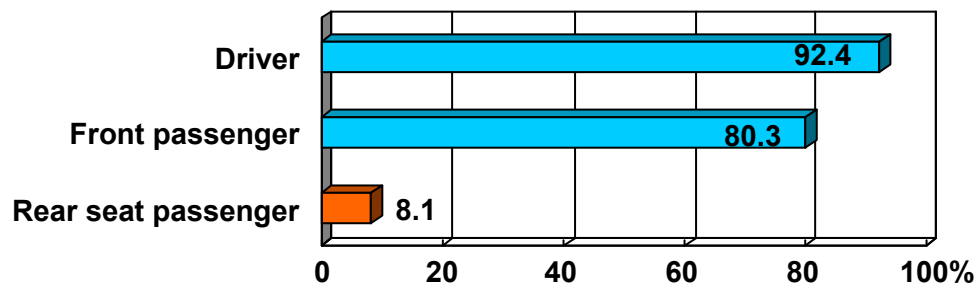
— Drawing before development
— Air cushion area

2. Rear Seat Occupant Protection with seatbelt usability and remainder (FY 2009-)

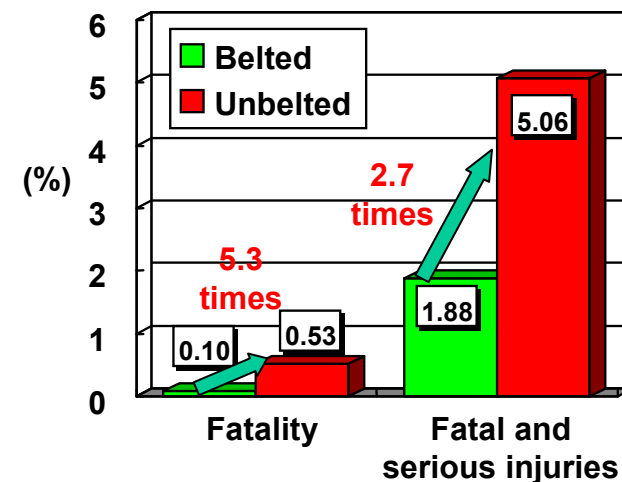
Background

- Wearing seat belt for rear seat occupants was mandatory in Japan as of June 2008
- The rear seat occupant safety will be assessed in JNCAP as of FY2009 to improve the safety performance and to encourage users to wear the seat belt
- Assessment of rear seat occupant safety consists of crash test, usability test and seatbelt reminder evaluation

Seatbelt wearing percentage



Probability of injury to rear seat occupants (National accident data)



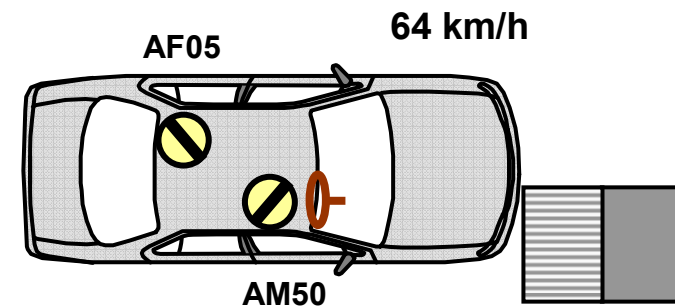
Rear Seat Occupant Test

Test configuration:

Offset frontal test (64 km/h)

Rear seat (behind front passenger seat)

Hybrid III AF05



Injury criteria

Head: HIC15 (only hard contact)

Neck: Neck tensile peak load (without hard contact) / Neck tensile, shearing peak load and Neck flexional peak moment (with hard contact)

Chest: Chest deflection (sliding scale from 23-48 mm)

Abdomen: Lap belt penetration into abdominal cavity (criteria measured by the load cell at iliac)

Lower extremity: Femur force

Weight of body region

Head: Neck: Chest: Abdomen: Lower extremity = 4:1:4:4:2

Rear Seat Occupant Protection Trial TEST



Usability evaluation for rear seat belt

Issues pertaining to rear seat belts are as follows;

a) Rear seat belt buckle is not readily buckled (it is difficult to insert the tang of the belt into the buckle one-handed).

b) Belt buckles for the outer seat and middle seat are not easily identified (the outboard/center passenger may not insert his/her tang into the buckle for center/outboard seat).

c) Tang accessibility may poor.

d) Rear seat arrangements vary widely, and the tang and buckle are sometimes hidden in or behind the seat.



Evaluation by a tester



SEAT BELT REMINDER (SBR) FOR PASSENGERS

- ① Almost 80% of drivers without wearing seat belt put a seat belt when they use vehicles with SBR (Anders Lie, et al; SRA)
- ② Seat belt wearing rate for passenger seat with SBR is 95.7%, which is higher than seat belt wearing rate "84.7%" for passenger seat without SBR (Motoki, et al; JARI)

SBR has clear effect for increasing seat belt wearing rate.

SBR for the front passenger seat is installed in some of car models in Japan, but very few SBR is offered in rear seats.



JNCAP introduces SBR evaluation for all passengers seat. As a result, seat belt wearing rate of passengers will be increased.

3. Rear-end collision minor neck injury protection (FY 2009-)

Test Method

Test configuration: Sled test
Dummy: BioRID II
Injury criteria: NIC, upper neck Fx, Fz, My, lower neck Fx, Fz, My

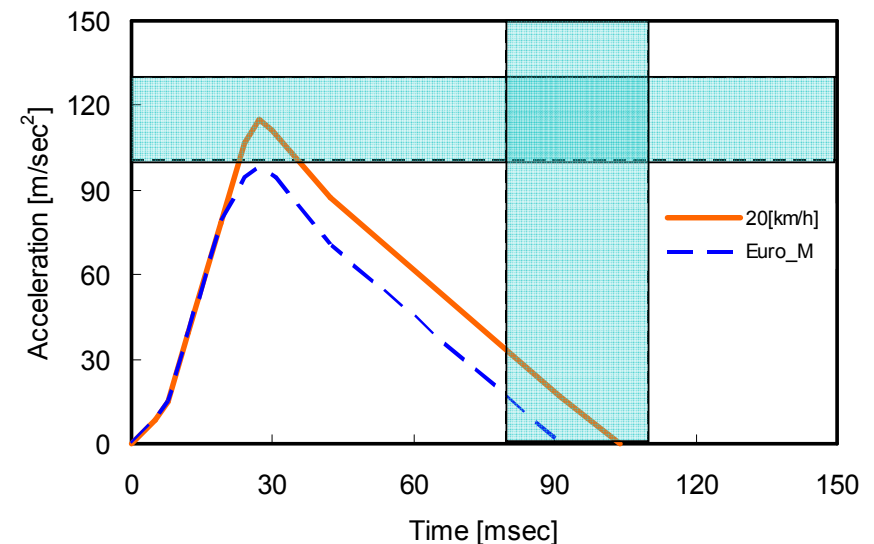
Sled pulse

Delta-V: 20.0 [km/h]

Max. acceleration: 118.7 [m/s²]

Av. Acceleration: 55.5 [m/s²]

Time duration: 100 [ms]



Issue: Because some of the seats on Japanese market might have great plastic deformation under 20 km/h delta-V, delta-V is reduced to 17.6km/h for 3 years.

4. Pedestrian Leg Protection (FY 201x-)

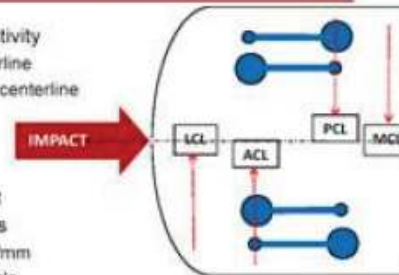
Flex-GTR legform

Flex-GTR (CAD model)



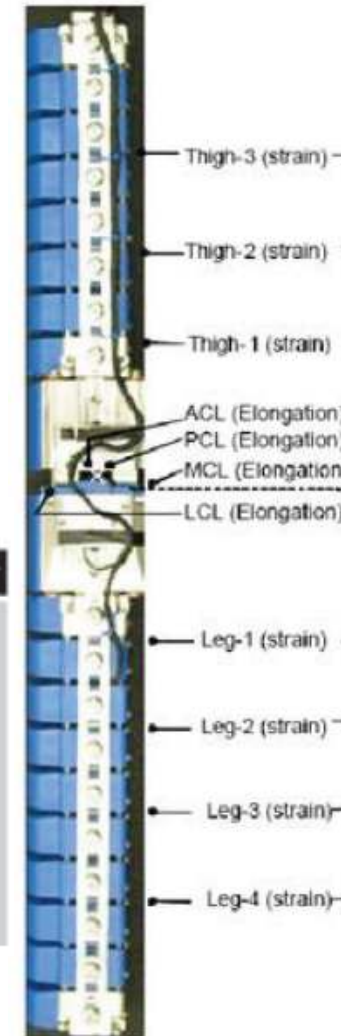
Conceptual Design

- To avoid A-symmetric sensitivity
 - Move MCL & LCL at centerline
 - Move ACL & PCL close to centerline
- To avoid knee twist
 - Use two sets of cruciate ligaments
 - To neutralize twist moment
- Cruciate ligaments 8 springs
 - DBØ12xØ6x40mm; 71.6N/mm
 - May need to go Ø3mm cable
 - Optimized space for DAS & connector
- Lateral ligaments 16 springs same
 - DBØ18xØ9x60mm; 76.7N/mm



Measurement Items (Standard)

Channel	Purpose	Standard	Option	DAS	Priority
Femur moment 1, 2 and 3	Calibration	3	0	Standard option On board DAS	
Tibia moment 1, 2, 3 and 4	Injury	4	0		
Tibia top acceln ax	Calibration	1	-1		
MCL elongation	Injury	1	0		
ACL elongation	Calibration	1	0		
PCL elongation	Calibration	1	0		
LCL elongation	Calibration	1	0		



(Reference: 43rd GRSP informal doc.07)

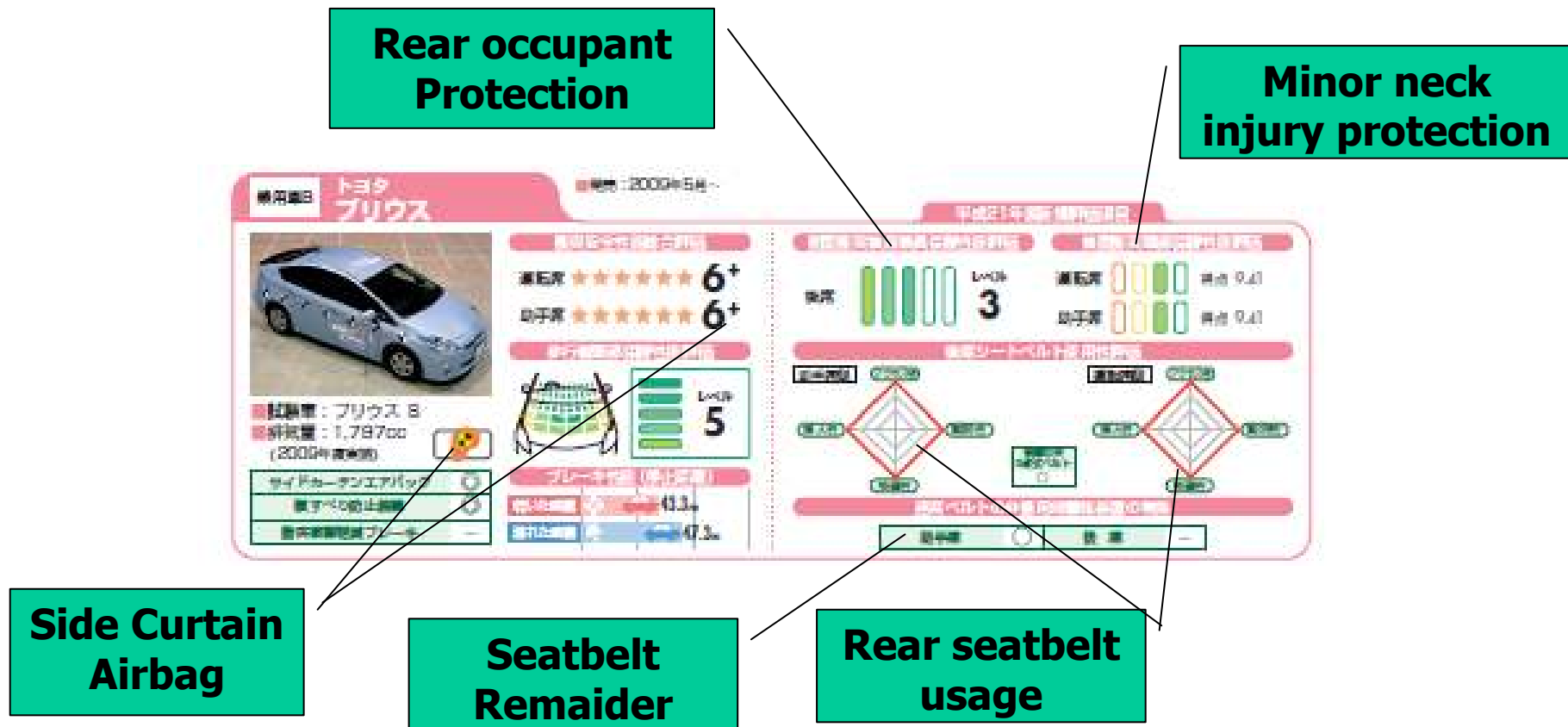
Flex-GTR legform impactor



Test result First half year in 2009

http://www.nasva.go.jp/gaiyou/pdf/2009/091020_01_01.pdf (Japanese)

<http://www.nasva.go.jp/mamoru/indexe.html> (English)





Thank you for your attention