GTR7-06-06

Japan Automobile Standards Internationalization Center

Japan Research Activities in the GTR-7 Phase 2 IWG

Repeatability and Reproducibility study with new Bio RID II calibration method

JASIC/Japan

Rev.2 Feb.28-Mar. 1. 2011

Rev.1 May. 31. 2010

May. 17. 2010

Contents of Study

Dummy Calibration Method Comparison Tests

The current method and newly proposed methods for calibrating BioRIDII dummies were compared and studied using 3 dummies.

<Calibration test>

(a) Current calibration method (calibration method currently used)

(b) New calibration method without dummy head (without headrest)

(c) New calibration method (newly proposed calibration method with headrest)

(d) New calibration method with dummy head (without headrest)

<Sled test>

•Sled Test (ΔV16km/h)

Dummies used: BioRIDII dummies (Ver.G)

(1) 02G dummy (used for about 7 years)
Old damper, new jacket

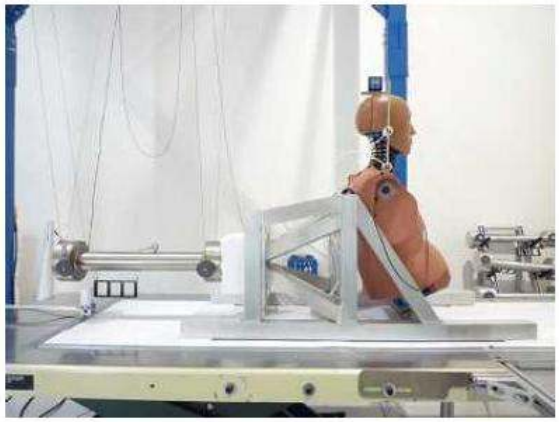
(2) 95G dummy (used for about 1 year)
New damper, new jacket

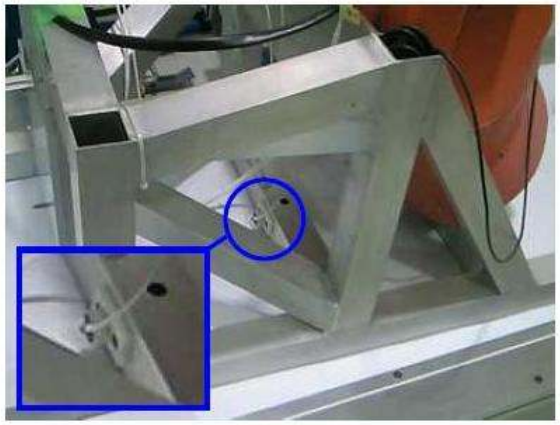
(3) 102G dummy (new)
New damper, new jacket

(4) 115G dummy (new)
All new dummy

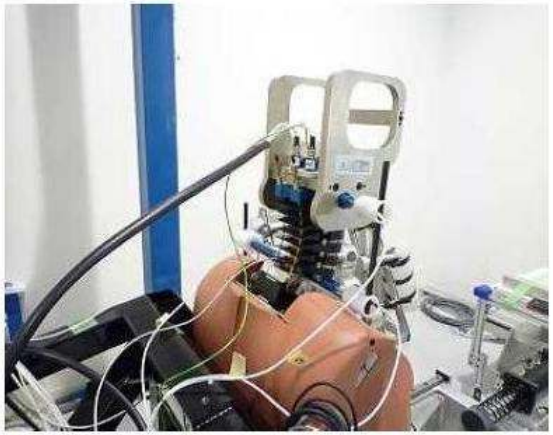
Calibration Method

(a) Old mini Sled





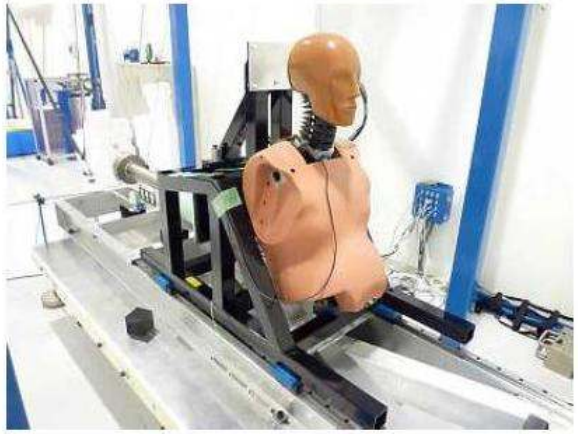
(b) New mini Sled without H/R

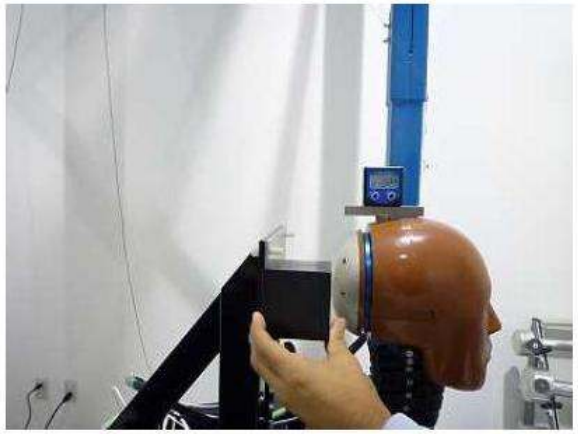


Parameters to measure: Pendulum force, Sled acceleration, T1(first thoracic vertebra) acceleration, Head rotation angle (Pot.A), Neck rotation angle (Pot.B), First thoracic vertebra rotation angle (Pot.C), Upper neck force & moment (UpperNeck-FX, FZ, MY)

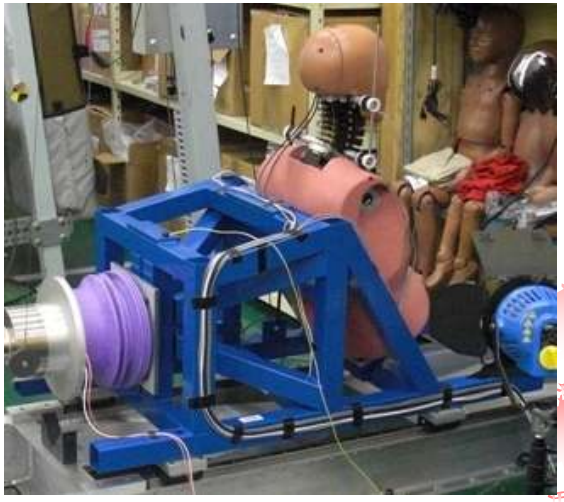
Calibration Method

(c) New mini Sled with H/R





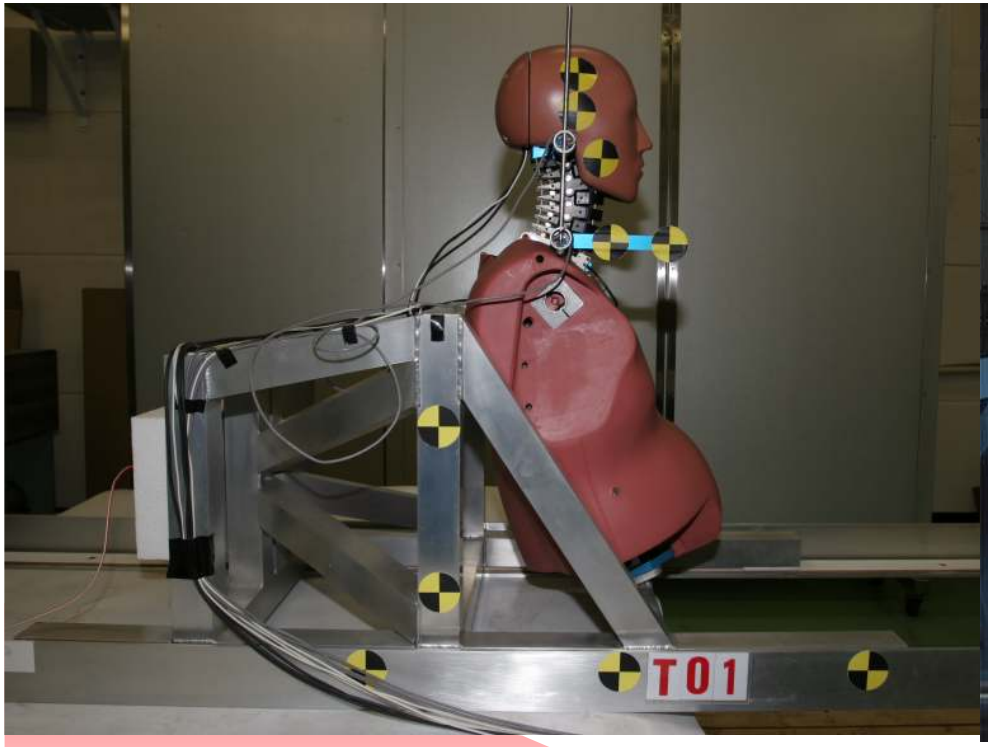
(d) New mini Sled without H/R



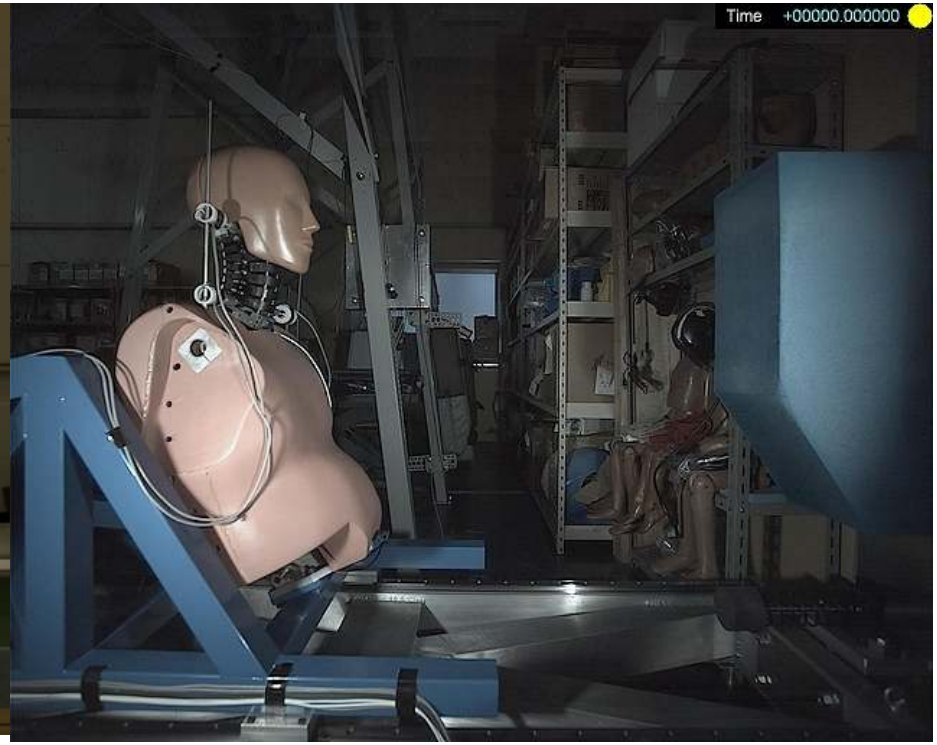
Parameters to measure: Pendulum force, Sled acceleration, Upper neck force & moment (UpperNeck-FX, FZ, MY), Lower neck force & moment (LowerNeck-FX, FZ, MY)

Old Mini Sled & New Mini Sled without H/R

(1) Old mini sled without H/R

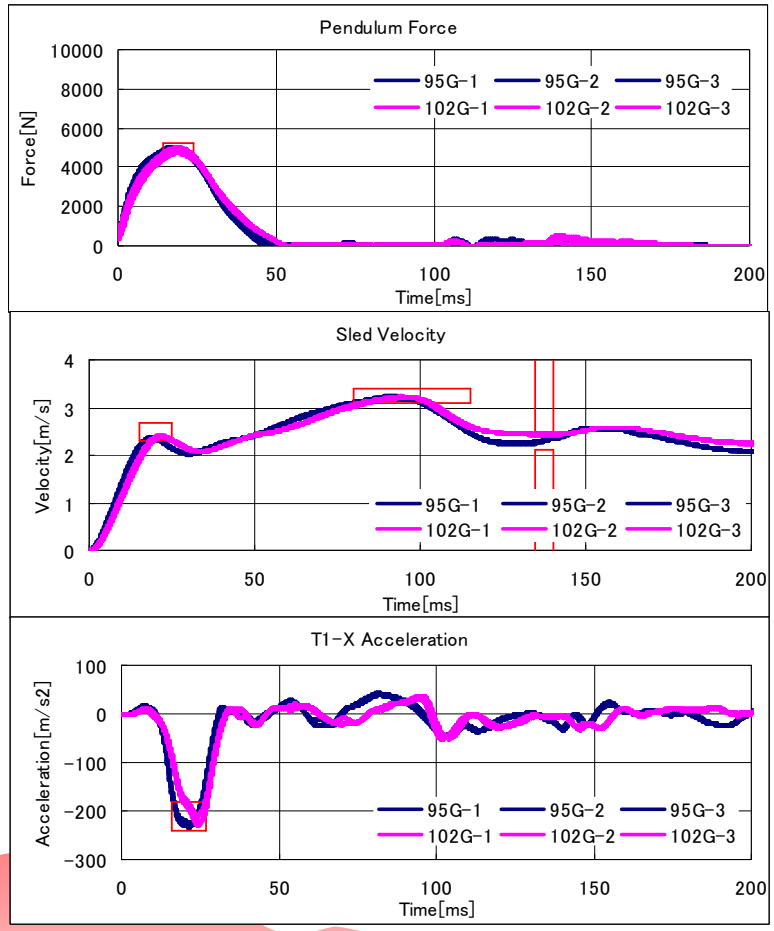


(2) New mini sled without H/R (d)

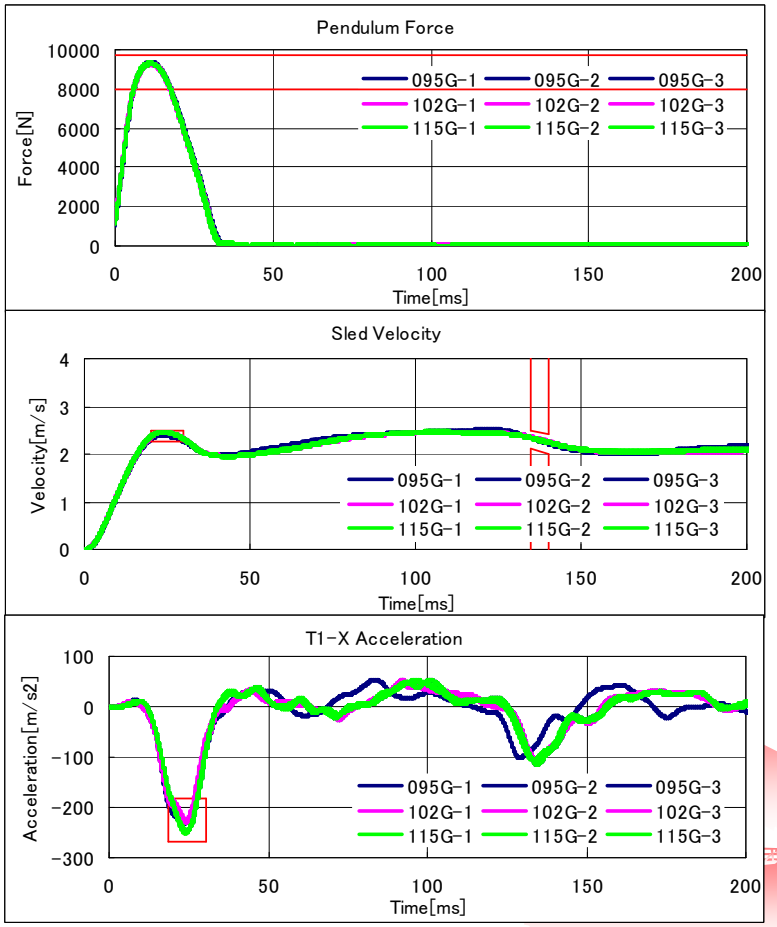


Old Mini Sled & New Mini Sled without H/R

(1) Old mini sled without H/R

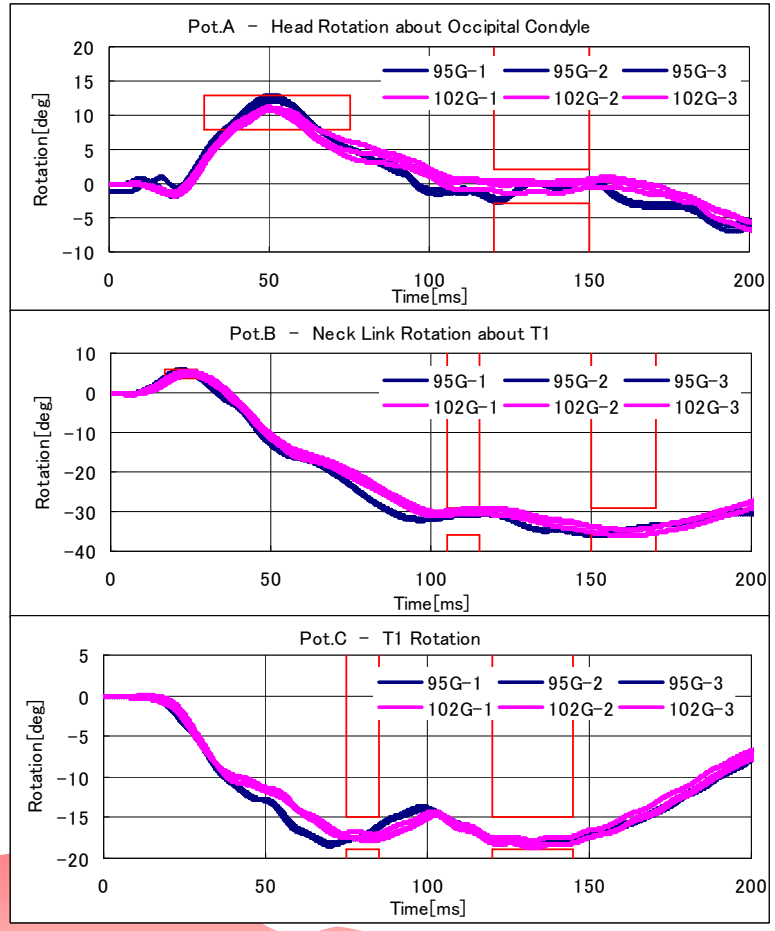


(2) New mini sled without H/R (d)

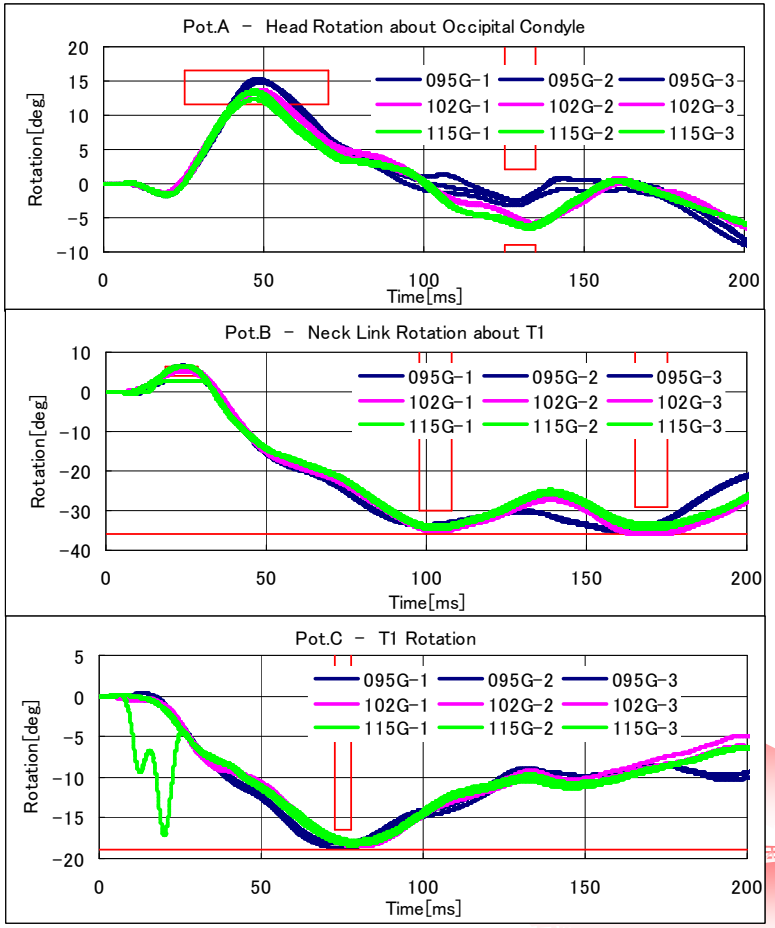


Old Mini Sled & New Mini Sled without H/R

(1) Old mini sled without H/R



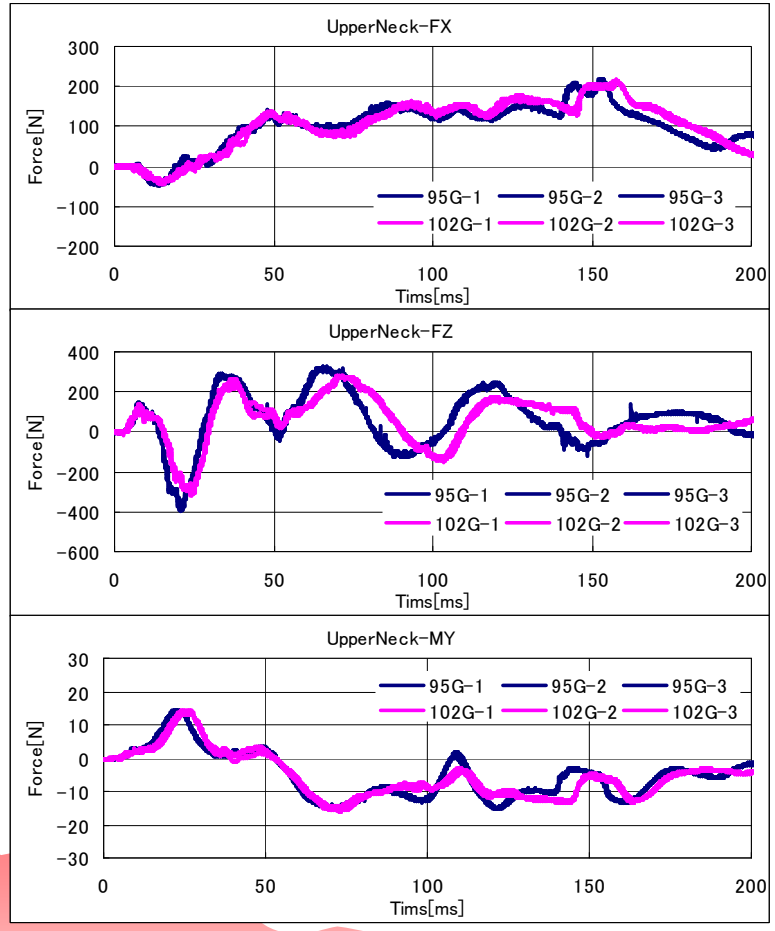
(2) New mini sled without H/R (d)



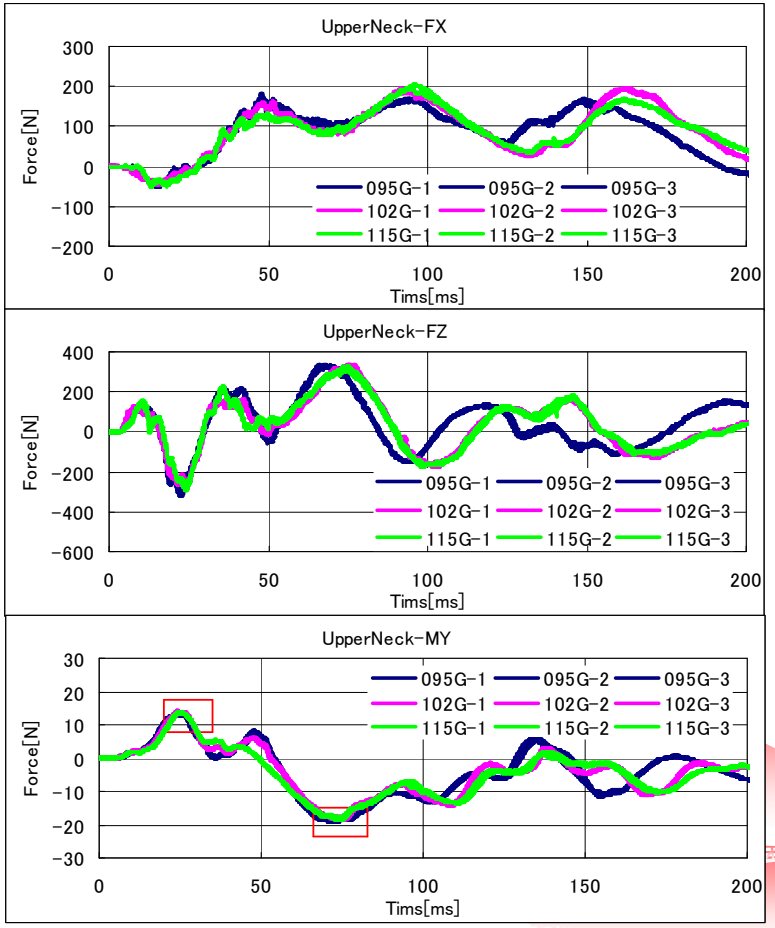
※There was measurement equipment error in case of 115G at 0 to 30ms.

Old Mini Sled & New Mini Sled without H/R

(1) Old mini sled without H/R

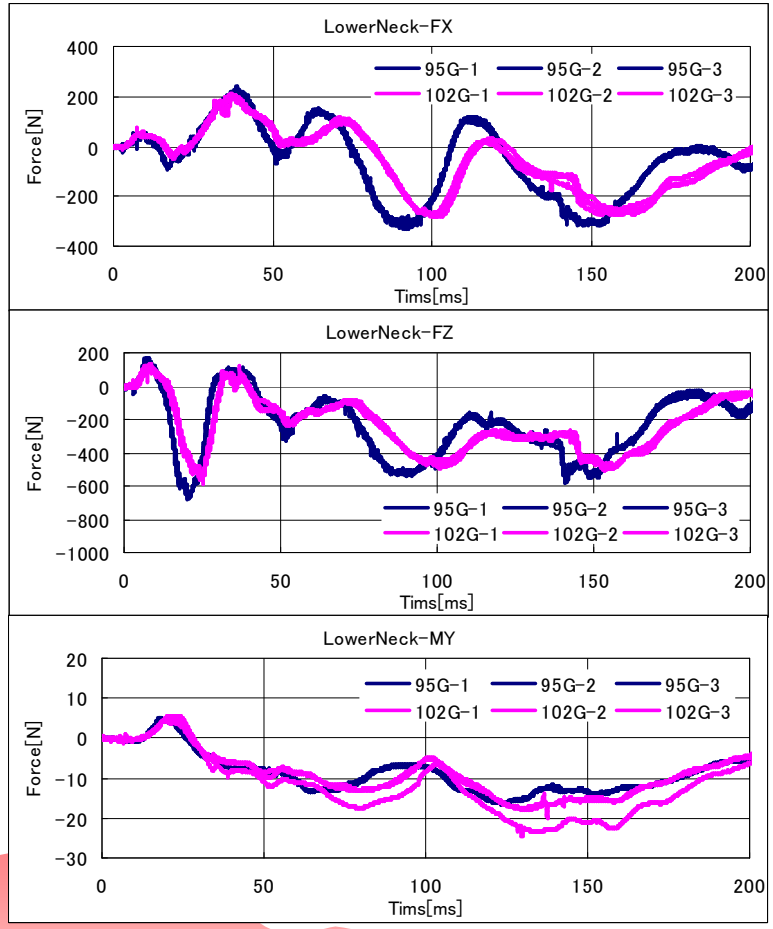


(2) New mini sled without H/R (d)

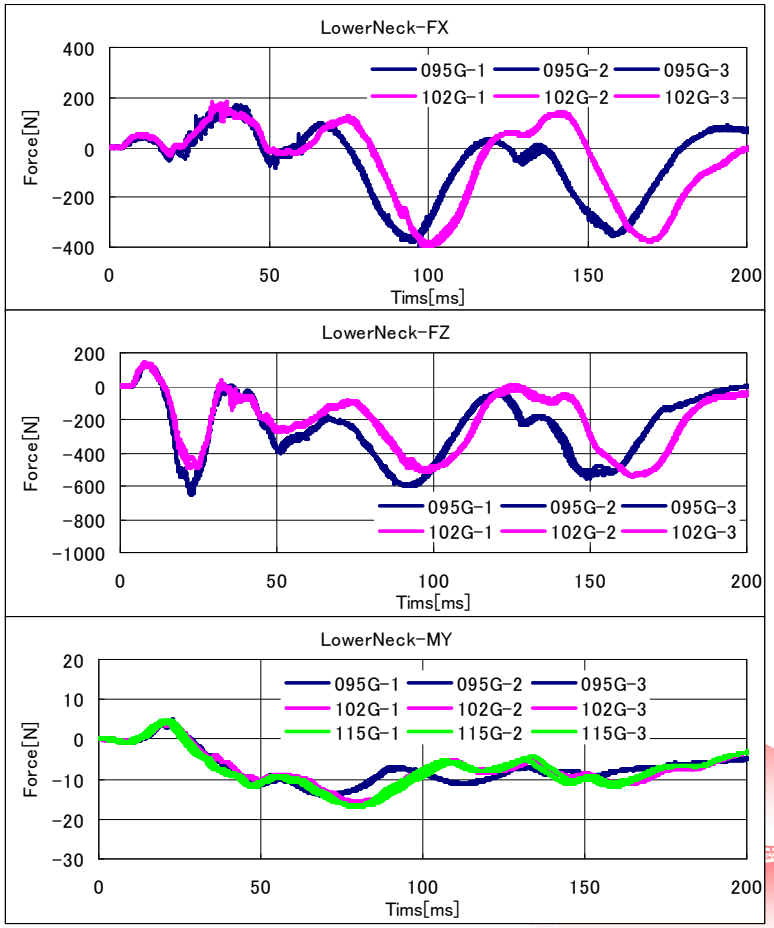


Old Mini Sled & New Mini Sled without H/R

(1) Old sled without H/R



(2) New sled without H/R (d)

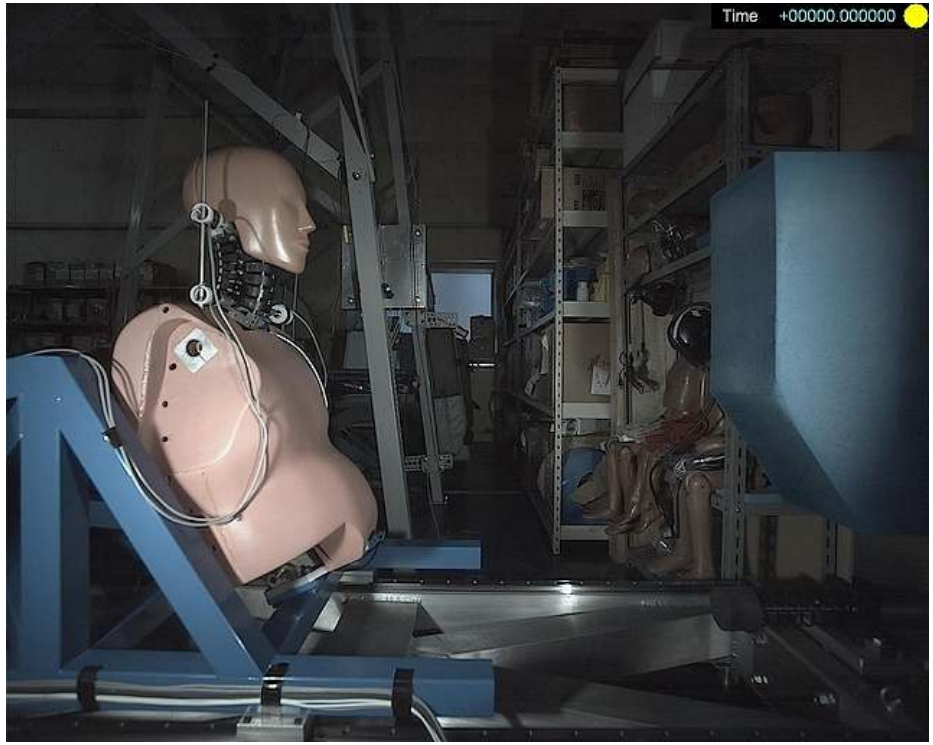


Kinematic Comparison between calibration and Sled test

Japan Automobile Standards Internationalization Center

(1) New calibration without H/R

(2) Sled test with seat

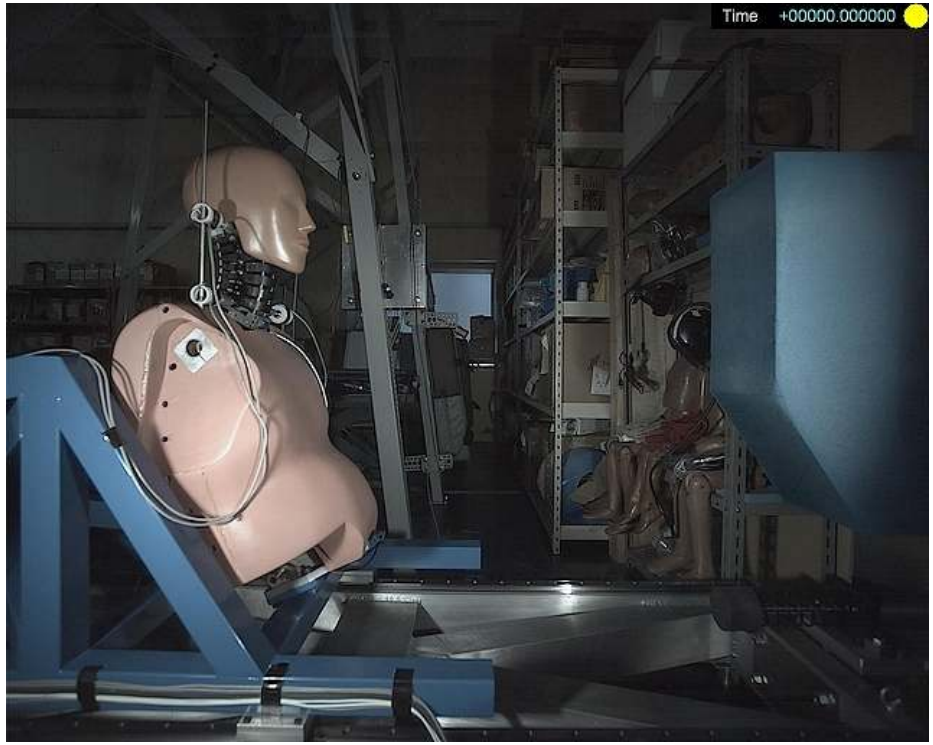


Kinematic Comparison between calibration and Sled test

(1) New calibration without H/R

0ms

(2) Sled test with seat



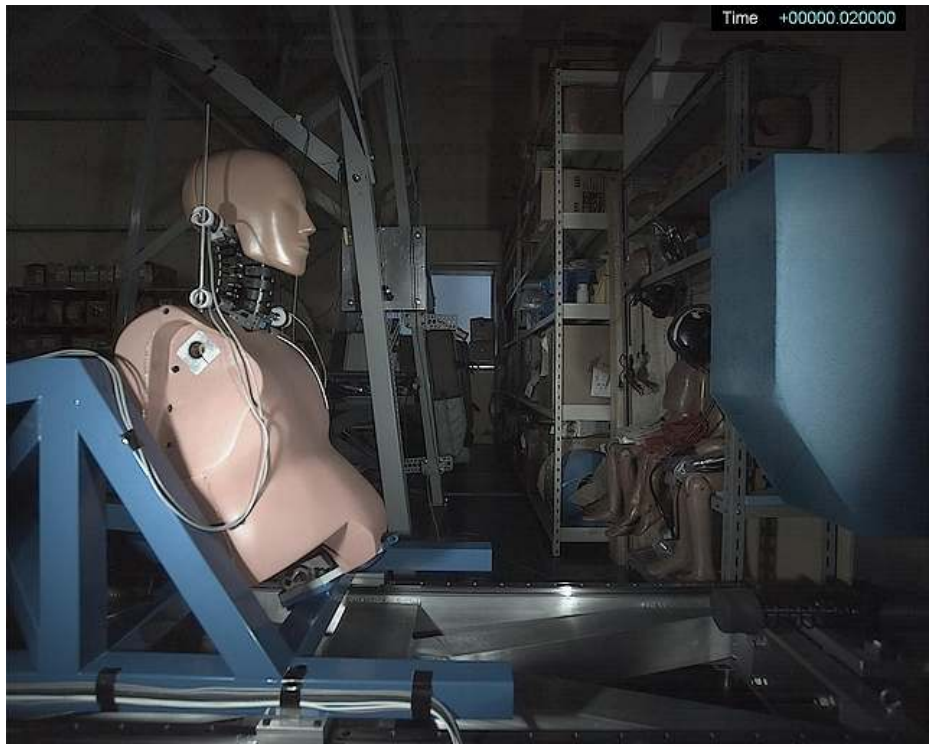
0ms

Kinematic Comparison between calibration and Sled test

(1) New calibration without H/R

40ms

(2) Sled test with seat



20ms

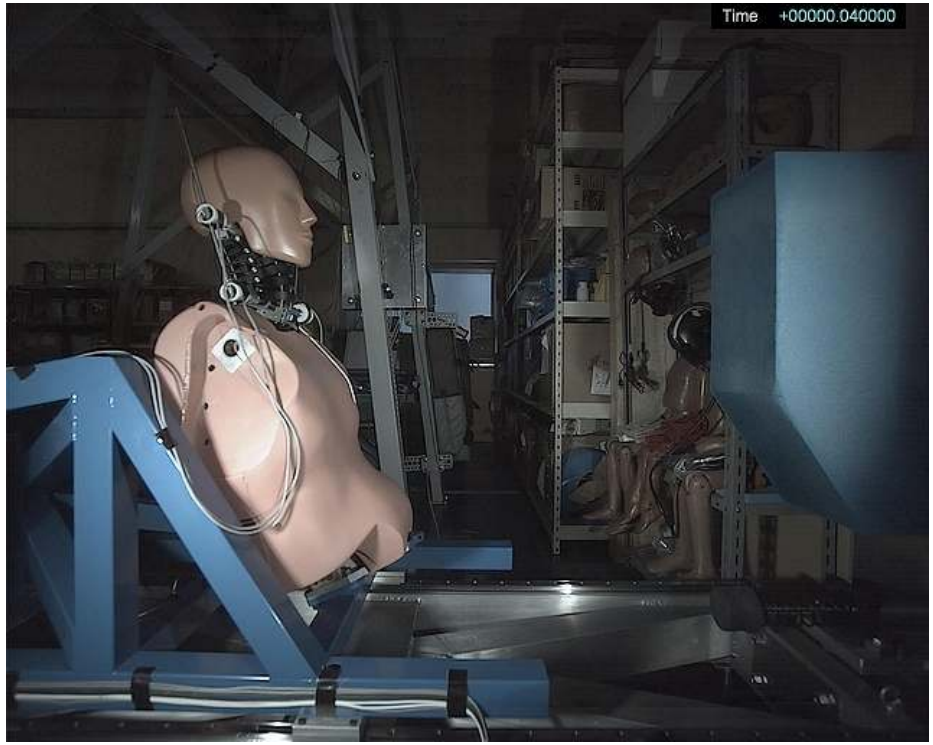
Kinematic Comparison between calibration and Sled test

Japan Automobile Standards Internationalization Center

(1) New calibration without H/R

80ms

(2) Sled test with seat



40ms

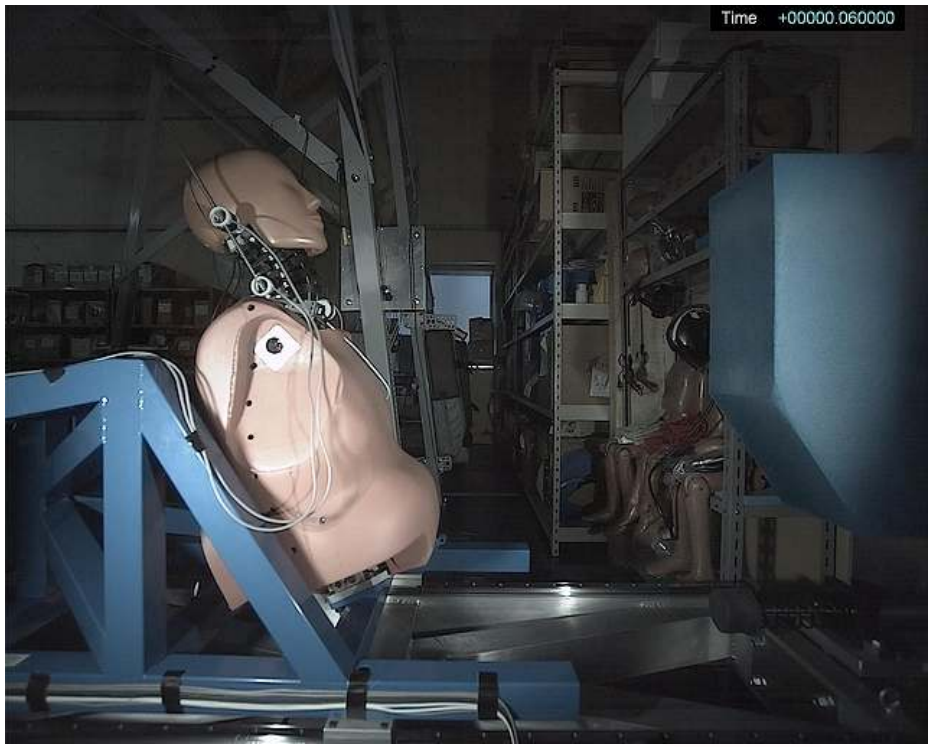
Kinematic Comparison between calibration and Sled test

Japan Automobile Standards Internationalization Center

(1) New calibration without H/R

120ms

(2) Sled test with seat

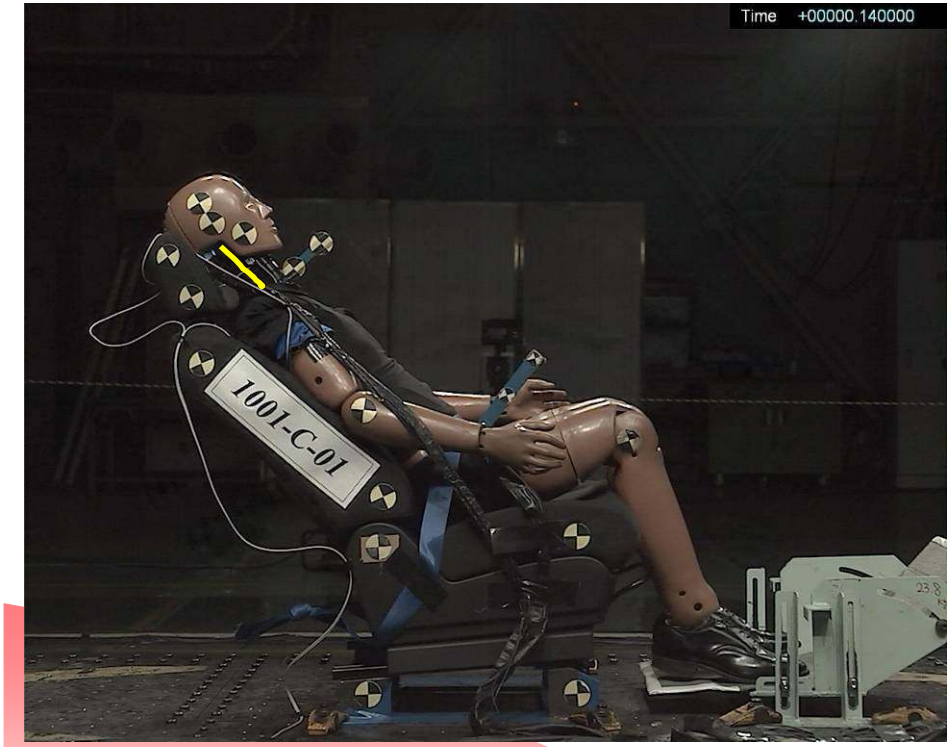


60ms

Kinematic Comparison between calibration and Sled test

Head and neck kinematics are different between calibration and sled due to without head restraint.

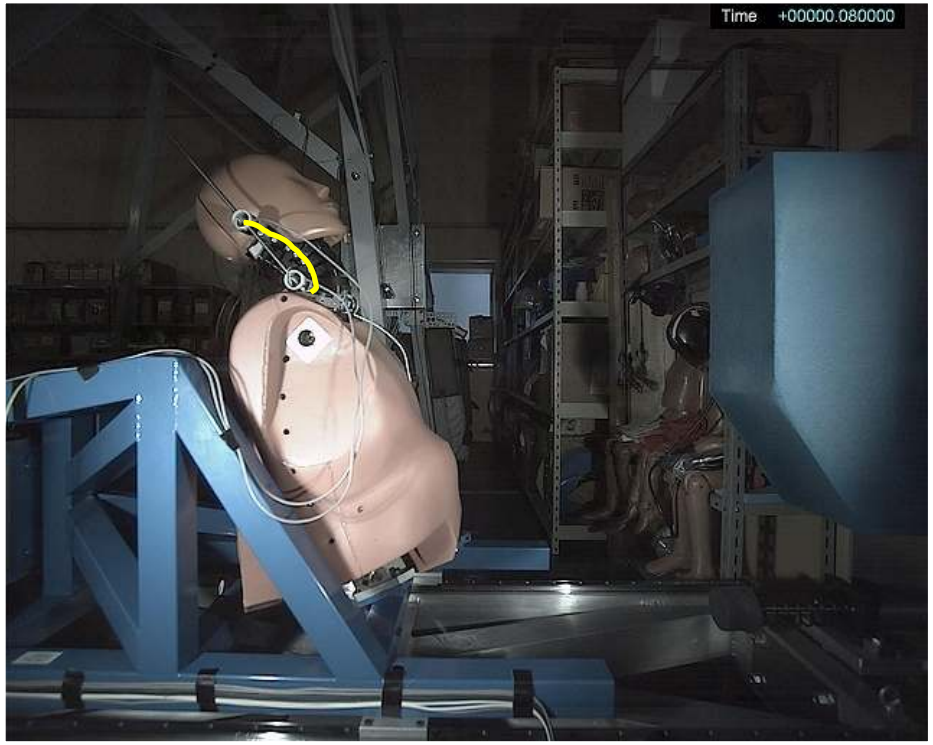
(1) New calibration without H/R



140ms

（at Peak measured value ）

(2) Sled test with seat



80ms

（at Peak measured value ）

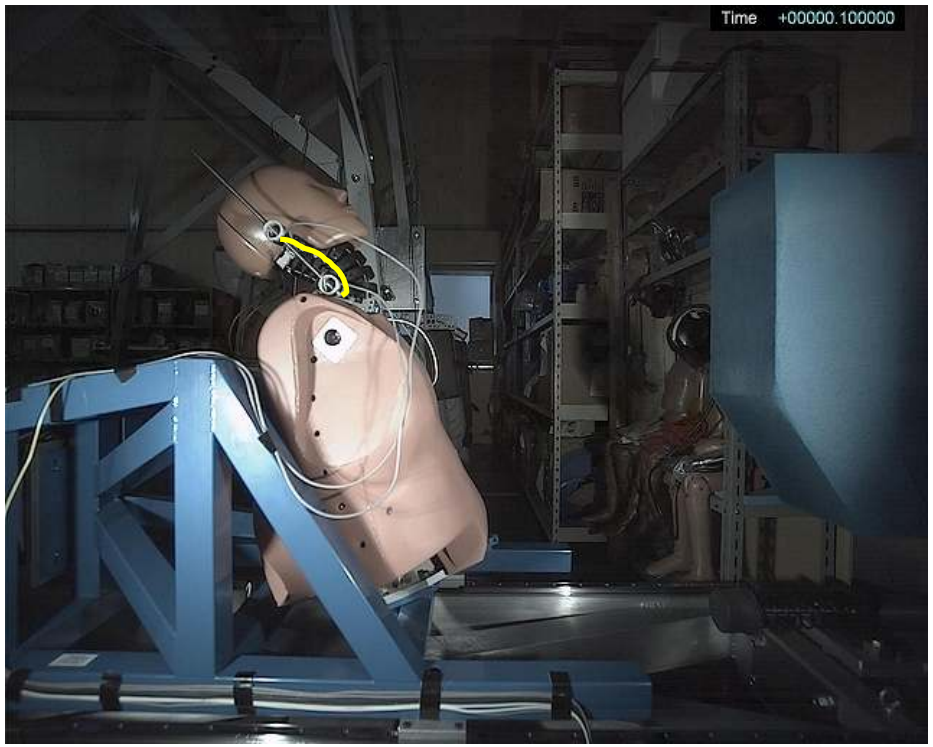
Kinematic Comparison between calibration and Sled test

Head and neck kinematics are different between calibration and sled due to without head restraint.

(1) New calibration without H/R

160ms

(2) Sled test with seat



100ms

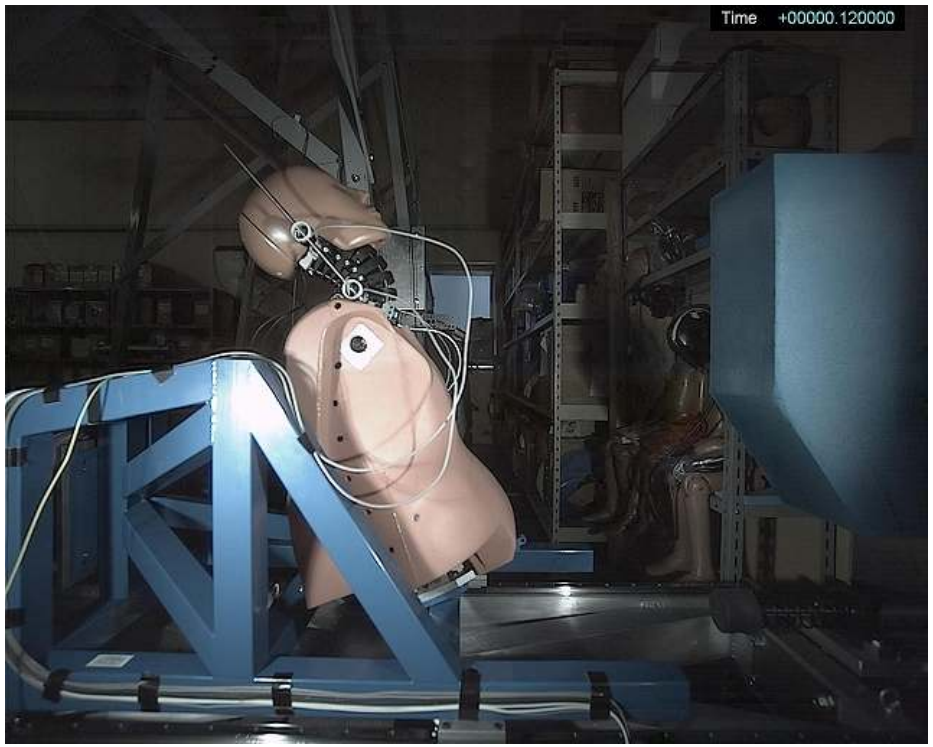
Kinematic Comparison between calibration and Sled test

Head and neck kinematics are different between calibration and sled due to without head restraint.

(1) New calibration without H/R

200ms

(2) Sled test with seat



120ms

Summary of the Results of Three Calibration Tests

- The level of impact was almost the same in all tests.
- The same differences in the peak acceleration, rotation angle, force/moment, etc. among dummies that were seen in the current method were also observed in the new method.
- In the new method with headrest, the same differences in the peak force/moment among dummies except for “ Upper Fz and Lower Fz” that were seen more than current and new methods without headrest.
- The damper damage that had occurred in Korea was not observed in these tests.
- **Head and neck kinematics are different between new calibration without head restraint and sled due to without head restraint.**

Japan Automobile Standards Internationalization Center

Thank you for your attention！