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Working Party on Passive Safety

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Item 12(b) of the provisional agenda

REGULATION No. 17
(Strength of seats)

Alignment to gtr No. 7 head restraints

Submitted by the expert from Japan */

The text reproduced below was prepared by the expert from Japan in order to introduce the use of BioRID II test dummy into the dynamic performance requirements in the proposal of alignment of Regulation No. 17 to gtr No. 7. It refers to ECE/TRANS/WP.29/GRSP/2008/11 and it is based on a document without a symbol (informal document No. GRSP-43-05), distributed during the forty-third session of the Working Party on Passive Safety (GRSP) (see report ECE/TRANS/WP.29/GRSP/43, para. 38). The modifications to ECE/TRANS/WP.29/GRSP/2008/11 are marked in bold or strikethrough characters.

*/ In accordance with the programme of work of the Inland Transport Committee for 2006-2010 (ECE/TRANS/166/Add.1, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance performance of vehicles with respect to passive safety. The present document is submitted in conformity with that mandate.

A. PROPOSAL

Paragraph 5.5.1., amend to read:

"5.5.1. General Requirements

5.5.1.1. Each front outboard head restraint shall conform to either paragraph 5.5.1.1.1. or paragraph 5.5.1.1.2.

5.5.1.1.1. ~~Each front outboard~~ The head restraint shall conform to paragraphs 5.5.2.1. ~~and~~, 5.5.3. through 5.5.7., 5.6., 5.7., and 5.9., of this Regulation.

5.5.1.1.2. The head restraint shall conform to paragraphs 5.5.2.1., 5.5.3. through 5.5.5., 5.5.7., 5.7., 5.8., and 5.9. of this Regulation.

5.5.1.2. For vehicles equipped with front centre head restraints, the head restraint shall conform to either paragraph 5.5.1.2.1. or paragraph 5.5.1.2.2.

5.5.1.2.1. ~~Each front centre~~ The head restraint shall conform to paragraphs 5.5.2.2., 5.5.3. through 5.5.5. ~~and~~, 5.5.7., 5.6., 5.7., and 5.9. of this Regulation.

5.5.1.2.2. The head restraint shall conform to paragraphs 5.5.2.2., 5.5.3. through 5.5.5., 5.5.7., 5.7., 5.8., and 5.9. of this Regulation.

5.5.1.3. For vehicles equipped with rear outboard head restraints, the head restraint shall conform to either paragraph 5.5.1.3.1. or paragraph 5.5.1.3.2.

5.5.1.3.1. ~~Each rear outboard~~ The head restraint shall conform to paragraphs 5.5.2.4., 5.5.3. through 5.5.5. ~~and~~, 5.5.7., 5.6., 5.7., and 5.9. of this Regulation.

5.5.1.3.2. The head restraint shall conform to paragraphs 5.5.2.4., 5.5.3. through 5.5.5., 5.5.7., 5.7., 5.8., and 5.9. of this Regulation.

5.5.1.4. For vehicles equipped with rear centre head restraints, the head restraint shall conform to either paragraph 5.5.1.4.1. or 5.5.1.4.2.

5.5.1.4.1. ~~Each rear centre~~ The head restraint shall conform to paragraphs 5.5.2.6., 5.5.3. through 5.5.5. ~~and~~, 5.5.7., 5.6., 5.7., and 5.9. of this Regulation.

5.5.1.4.2. The head restraint shall conform to paragraphs 5.5.2.6., 5.5.3. through 5.5.5., 5.5.7., 5.7., 5.8., and 5.9. of this Regulation.

5.5.1.5. If it is impossible to seat the test dummy at the designated seating position specified in paragraph 5.8. of this Regulation, the applicable head restraint shall conform to either paragraph 5.5.1.1.1., or 5.5.1.2.1, or 5.5.1.3.1., or 5.5.1.4.1. of this Regulation, as appropriate."

Insert new paragraph 5.5.2.6., to read:

"5.5.2.6. When measured in accordance with Annex 1, the top of any head restraint designed to be provided in rear centre seats or seating positions shall be not less than 700 mm."

Paragraph 5.5.6., amend to read:

"5.5.6. Minimum backset for front outboard designated seating positions

~~5.5.6.1. Active or reactive head restraints which, in the case of a rear impact (actually occurring or about to occur) deploy in such a way that the risk of injury caused by rearward displacement of the head is reduced to a minimum, are not required to comply with the requirements of this paragraph.~~

5.5.6.1. For adjustable head restraints, the requirements of this Regulation shall be met with the top of the head restraint in all height positions of adjustment between 750 mm and 800 mm, inclusive. If the top of the head restraint, in its lowest position of adjustment, is above 800 mm, the requirements of this Regulation shall be met at that position only.

5.5.6.2. At the choice of the manufacturer, the backset shall be measured using either the H-point or the R-point as the backset reference point.

5.5.6.3. The backset, when measured as specified in Annex 4, shall not be more than 45 mm, when using the R-point as the backset reference point, or 55 mm when using the H-point as the backset reference point.

5.5.6.4. If the front outboard head restraint is not attached to the seat back, the head restraint cannot be adjusted such that the backset is more than required in paragraph ~~5.5.6.4~~ **5.5.6.3** when the seat back inclination is positioned closer to vertical than the position specified in Annex 4."

Paragraph 5.6.3., amend to read:

"5.6.3. Head restraint **and its anchorage** strength

When the head restraint **and its anchorage** are tested in accordance with Annex 6, the load applied to the head restraint shall reach 890 N \pm 5 N and remain at this load for a minimum period of 5 seconds unless any breakage of the seat or head restraint occurs."

Paragraph 5.7.4.3. and 5.7.4.4., amend to read:

- "5.7.4.3. When measured in accordance with Annex 10, the height of the lower edge of the head restraint (HLE) shall be not more than **460 400** mm, but not less than 250 mm from the R-Point and the thickness (S) shall not be less than 40 mm.
- 5.7.4.4. When tested in accordance with Annex 10, the head restraint shall cause the torso reference line angle to be at least 10 degrees closer to vertical than when the head restraint is in any position of adjustment in which its height is not less than that specified in paragraph 5.5.2. of this Regulation and its backset is not more than that specified in paragraph ~~5.5.6.4.~~ **5.5.6.3.** of this Regulation."

Paragraph 5.8., amend to read:

"5.8. Dynamic performance requirements:

~~[Reserved for future use when dummy and criteria are agreed.]"~~

When tested during forward acceleration of the dynamic test platform, in accordance with Annex 9, at each designated seating position equipped with a head restraint, the head restraint shall conform to paragraph 5.8.1.

5.8.1. Dynamic backset

Limit the maximum rearward head O.C., occipital condyle, horizontal movement relative to T1, First Thoracic Vertebra, of the 50th percentile male BioRID II test dummy to [xx] mm for the dummy;"

Paragraphs 5.5. to **5.12.** (former), should be deleted

~~Paragraph 5.12. (former), renumber as paragraph 5.9. and amend to read:~~

~~"5.9. load specified in Annex 6, paragraph 4. In the case of"~~

Paragraph 5.13. (former), renumber as **5.9.** and amend to read:

"**5.9.** maximum operational height, or remove it, except by"

Paragraph 5.14. (former), renumber as **5.10.** and amend to read:

"**5.10.**after testing in accordance with Annex 6, paragraph 4., no breakage of..... in paragraph 6.2. below without breakage."

Paragraph 5.15.1. (former), renumber as **5.11.1.** and amend to read:

"**5.11.1.** after the test described in Annex 16, the seat-backs remain in position and"

.....

During the test described in Annex 16, the test blocks shall remain behind the seat-back(s) in question."

Paragraph 5.15.2. (former), renumber as **5.11.2.** and amend to read:

"5.11.2. Partitioning systems

At the request of....described in Annex 16 may be carried

Partitioning systems,..... to paragraph 2.2. of Annex 16.

.....

For integrated....one defined in paragraph **5.11.1.** All measurements"

Paragraph 5.15.3. (former), renumber as **5.11.3.** and amend to read:

"5.11.3. The requirements mentioned in paragraphs **5.11.1.** and **5.11.2.** above shall not apply to.....described in paragraphs **5.11.1.** and **5.11.2.**"

Annex 9, amend to read:

"Annex 9

DYNAMIC PERFORMANCE TEST PROCEDURE

~~{Reserved for future use when specifications will be provided with the development of a suitable dummy}~~

1. PURPOSE

Demonstrate compliance with paragraph 5.8. of this Regulation in accordance with this Annex, using a 50th percentile male BioRID II test dummy.

2. TEST CONDITIONS

The test procedure described in this annex is to be performed using any or all of the following:

- 2.1. A full vehicle including at least the seat to be tested and all necessary seat and head restraint equipment.**
- 2.2. A vehicle body in white including at least the seat to be tested and all necessary seat and head restraint equipment.**

- 2.3. A seat equipped with its head restraint and all necessary attachment hardware, as well as all necessary equipment for the activation of dynamic head restraints.

3. TEST EQUIPMENT

- 3.1. An acceleration or deceleration test sled

- 3.2. 50th percentile male test dummy

- 3.2.1. BioRID II

- 3.2.2. Film targets, as described in Figure 9-1 and Table 9-1, shall be applied on both sides of the head, T1 bracket and seat back.

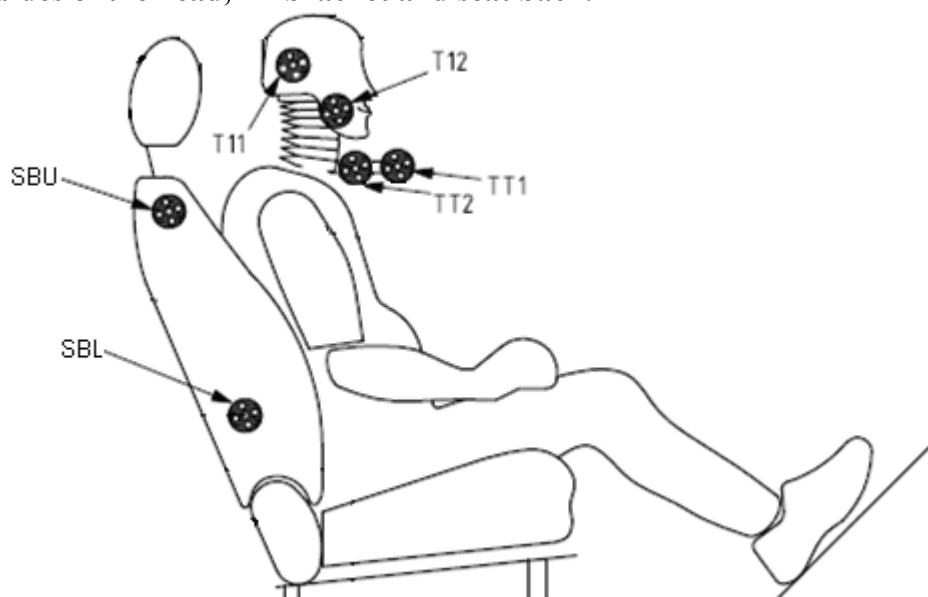


Figure 9-1 Video motion target placements

Table 9-1 Video motion target placement description

Target Number	Target location
T11	Head centre of gravity
T12	Head second target to determine the location of the OC position to take account of the head rotation ((ex.)Cheek).
TT1	T1 bracket distal
TT2	T1 bracket proximal
SBU	Seat back upper
SBL	Seat back lower

- 3.2.3. A camera shall be mounted off-board, perpendicular to the direction of sled travel, on each side of the sled. It shall show a side view of the torso, head, and the complete seat. The seat back, the head restraint, and the upper body parts of the test dummy shall be visible on the film/video during a time interval equal

to or longer than 300 ms after the onset of the sled deceleration/acceleration (t₀). The camera frame rate shall be equal to or greater than 500 frames/sec.

3.2.4. Equipment for measuring and recording sled accelerations.

4. PROCEDURES FOR TEST SET-UP

- 4.1. Mount the seat, vehicle, or vehicle body in white as appropriate according to paragraph 2 of this Annex on a dynamic test platform so that the vertical longitudinal zero plane of the vehicle is parallel to the direction of the test platform travel and so that movement between the base of the vehicle and the test platform is prevented. Instrument the platform with an accelerometer and data processing system. Position the accelerometer sensitive axis parallel to the direction of test platform travel.**
- 4.2. When a full vehicle is used, remove the tires, wheels, fluids, and all unsecured components. Rigidly secure the engine, transmission, axles, exhaust system, vehicle frame and any other vehicle component necessary to assure that all points on the acceleration vs. time plot measured by an accelerometer on the dynamic test platform fall within the corridor described in paragraph 5 of this Annex.**
- 4.3. When a full vehicle is used, place any moveable windows in the fully open position.**
- 4.4. Seat Adjustment**
- 4.4.1. At each designated seating position, if the seat back is adjustable, it shall be set to its design angle.**
- 4.4.2. Using any control that primarily moves the entire seat vertically, place the seat in the lowest position. Using any control that primarily moves the entire seat in the fore and aft directions, place the seat midway between the forwardmost and rearmost position. If an adjustment position does not exist midway between the forwardmost and rearmost positions, the closest adjustment position to the rear of the midpoint shall be used.**
- 4.4.3. If the seat cushion adjusts independently of the seat back, position the seat cushion such that the highest H-point position is achieved with respect to the seat back, as measured by three-dimensional H-point machine as specified in Annex 13. If the specified position of the H-point can be achieved with a range of seat cushion inclination angles, adjust the seat inclination such that the most forward part of the seat cushion is at its lowest position with respect to the most rearward part.**

4.4.4. If the head restraint is adjustable, adjust the top of the head restraint to a position midway between the lowest position of adjustment and the highest position of adjustment. If an adjustment position midway between the lowest and the highest position does not exist, adjust the head restraint to the position determined by the next process. If a hard locking position exists with 10 mm vertically upwards from the geometric mid, this shall be the test position. If no hard locking position exists within 10 mm vertically upwards from the geometric mid then the next hard locking position down shall be the test position.

4.4.5. Adjustable lumbar supports shall be positioned so that the lumbar support is in its lowest retracted or deflated position.

4.5. Seat Belt Adjustment

Prior to placing the seat belt around the test dummy, fully extend the webbing from the seat belt retractor(s) and release it three times to remove slack. If an upper adjustable seat belt turning loop (adjustable seat belt D-ring anchorage) exists, place it in the adjustment position closest to the mid-position. If an adjustment position does not exist midway between the highest and lowest position, the closest adjustment position above the midpoint shall be used.

4.6. Dress and adjust each test dummy as follows:

The dummy shall be dressed with two pairs of close-fitting, knee-length, spandex/lycra pants and two close-fitting, short-sleeved spandex shirts. The under layer of clothes shall be worn with the shiny/smooth side of the fabric facing out and the over-clothes with the shiny/smooth side against the underclothes (i.e. dull side facing out). The dummies feet shall be shod with size 11 (45 European or 279mm) Oxford-style, hard-soled, work shoes (e.g. MIL-S-13192P).

4.7. BioRID II Test dummy positioning procedure.

4.7.1. The seat shall have already been set to give the design torso angle ± 1 degree measured on the H-Point machine fitted with HRMD (see Annex 5). Place a test dummy at each designated seating position equipped with a head restraint after allowing the seat to recover for 15 minutes with nothing in it.

4.7.2. Align the test dummy's midsagittal plane with the centerline of the seat.

4.7.3. Adjust the test dummy's midsagittal plane to be vertical; the instrumentation platform in the head shall be laterally level.

4.7.4. Adjust the pelvis angle to 26.5 degrees from horizontal (± 2.5 degrees)

- 4.7.5. Position the test dummy's H-Point 20 ± 10 mm forward and 0 ± 10 mm vertically of the H-Point location measured under the condition specified in paragraph 2.12. of Annex 4, while keeping the pelvis angle at 26.5 ± 2.5 degrees.
- 4.7.6. Adjust the spacing of the legs so that the centreline of the knees and ankles is 200 mm (± 10 mm) apart and ensure that the knees are level.
- 4.7.7. Adjust the test dummy's feet and/or the horizontal position of the adjustable toe board so that the heel of the test dummy's shoe is resting on the heel surface. The tip of the shoe shall rest on the toe pan between 230 mm and 270 mm from the intersection of the heel surface and toe board, as measured along the surface of the toe board (see Figure 9-2).

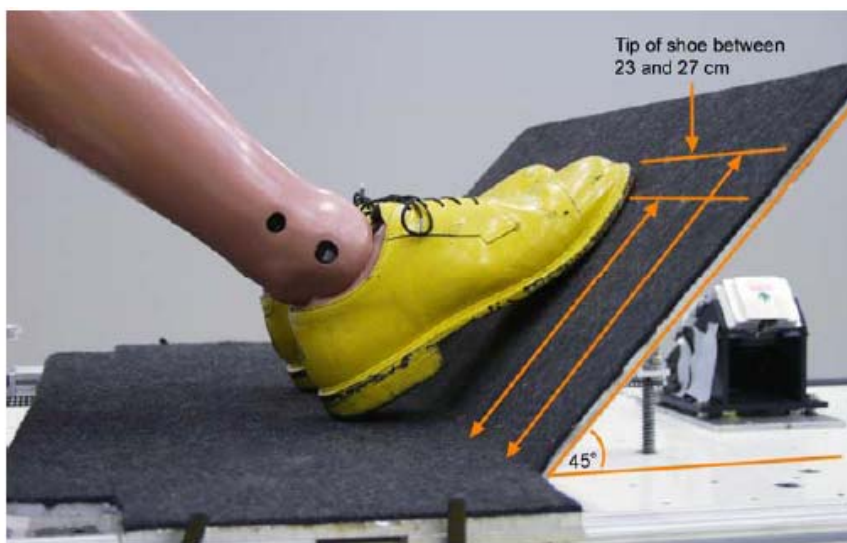


Figure 9-2 Proper positioning of the test dummy's feet.

- 4.7.8. Position the test dummy's arms so that the upper arms are as close to the torso sides as possible. The rear of the upper arms shall contact the seatback, and the elbows shall be bent so that the small fingers of both hands are in contact with the top of the vehicle seat cushion with the palms facing the dummy's thighs.
- 4.7.9. Level the instrumentation plane of the head (front/rear and left/right directions) to within ± 1 degree.
- 4.7.10. Measure the test dummy reference backset, which is the horizontal distance between the rearmost point on the head and the same identifiable location on the head restraint. Compare the test dummy reference backset with the HRMD backset obtained by the procedure specified in paragraph 2.12. of Annex 4.
- 4.7.10.1. If the test dummy reference backset is different from the HRMD backset obtained by the procedure specified in paragraph 2.12. of Annex 4, plus 15 mm (± 2 mm), then do the following:

4.7.10.1.1. Tip the head for/aft no more than ± 1 degree from level in order to meet the backset requirement.

4.7.10.1.2. If the backset cannot be brought closer to the test dummy reference backset plus 15 mm (± 2 mm) by paragraph 4.7.10.1.1. of this Annex, adjust the pelvis angle and H-point position within their respective tolerance bands giving priority to use the pelvis angle tolerance. In this case begin at paragraph 4.7.4 of this Annex and adjust the test dummy position accordingly.

4.7.11. Place the seat belt across the dummy and lock as normal.

4.7.11.1. Remove the slack from the lap section of the webbing until it is resting gently around the pelvis of the dummy. Only minimal force shall be applied to the webbing when removing the slack. The route of the lap belt shall be as natural as possible and shall be above the pelvic angle gauge.

4.8. BioRID II dummy .

The following checks shall be made before putting the dummy in the seat for testing. The tests shall be conducted with a BioRID II dummy built with mould 2 jacket. The dummy shall comply with both spine stature and dynamic response specifications before the test.

4.8.1. Spine Curvature Check.

With the pelvis adapter plate placed on a level surface with the occipital condyle (OC) angle at 29.5 degrees (± 0.5 degrees), the T2 angle at 37 degrees (± 0.5 degrees), and the neck plate laterally level (± 0.5 degrees), the distance in (X) between the H-Point and the OC pin shall be 156 mm (± 3 mm) and the distance in (Z) between the H-Point and the OC pin shall be 609 mm (± 3 mm) (See Figure 9-3). The curvature check shall be performed after every 15 tests and all measurements shall be recorded and fully documented.

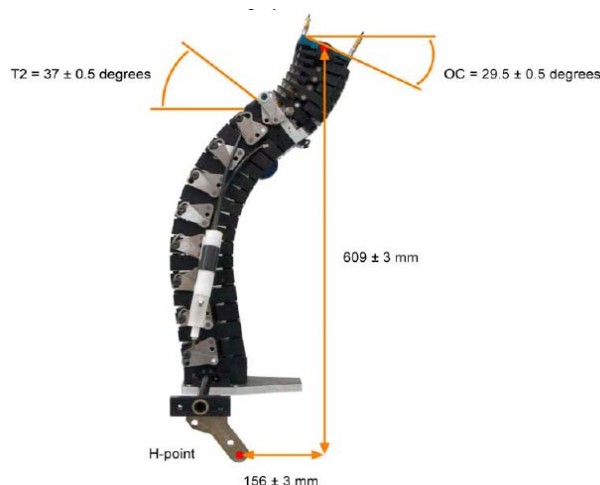


Figure 9-3 Spine curvature check

4.8.2. Adjustment of the dummy extremities

4.8.2.1. Arms

- 4.8.2.1.1. Extend the complete arm laterally outward to a horizontal position. Twist the arm so the elbow cannot rotate downward. Tighten the shoulder yoke clevis bolt so the arm is suspended at 1g.**
- 4.8.2.1.2. Rotate the complete arm assembly so it points forward and is horizontal. Twist the arm so the elbow cannot rotate downward. Adjust the shoulder yoke rotation hexagonal nut so the arm is suspended at 1g.**
- 4.8.2.1.3. Bend the elbow by 90 degrees so the hand moves toward the chest. Adjust the elbow rotation bolt through access in the upper arm to hold the lower arm horizontally suspended at 1g.**
- 4.8.2.1.4. Reposition the arm so it points forward and is horizontal. Twist the lower arm at the elbow, so the lower arm can pivot downward to vertical. Adjust the elbow pivot bolt through access holes in the lower arm flesh at the elbow to hold the lower arm suspended at 1g.**
- 4.8.2.1.5. Extend the arm and twist the palm so it faces down. Adjust the wrist pivot bolt at the base of the hand so it is suspended at 1g.**
- 4.8.2.1.6. Adjust the wrist rotation bolt through access in the wrist flesh to hold it suspended at 1g.**
- 4.8.2.1.7. Repeat the procedure for the other hand and arm.**

4.8.2.2. Legs

- 4.8.2.2.1. Remove the jacket from the dummy.**
- 4.8.2.2.2. With the lower leg at 90 degrees to the upper leg, and the dummy in seated position, lift the upper leg assembly above horizontal. Adjust the femur back set screw so the upper leg is held suspended at 1g.**
- 4.8.2.2.3. Rotate the lower leg assembly so it is horizontal. Adjust the knee clevis bolt so the lower leg is held suspended at 1g.**
- 4.8.2.2.4. Adjust the ankle ball joint screw so the foot is held suspended at 1g. The ankle adjustment is not critical and is determined by individual feet.**
- 4.8.2.2.5. Repeat the procedure on the other leg and foot.**

4.9. All tests specified in this Annex shall be conducted at an ambient temperature of 22 ± 3 °C.

4.10. All tests shall be performed with the ignition "ON".

5. TEST PROCEDURE.

5.1. The sled acceleration shall be adjusted as close as possible to the target curve and within the blue corridors in Figure 9-4 for the complete time interval from 0 to 0.15s. The sled pulse shall fulfill the requirements as specified in Table 9-2.

5.1.1. Data processing and definitions

5.1.1.1. Filter with CFC 60

To ensure that low level noise does not influence the results, the acceleration signal shall be filtered with a CFC60 filter. The CFC60 filter shall be used according to SAE J211, for sled acceleration signals.

5.1.1.2. T₀ definition

For pulse P1, the T₀ (T_{zero}) shall be defined as the time 5.8 ms before the CFC60 filtered sled acceleration reaches a 1.0g level.

5.1.1.3. T_{end} definition

The time when the CFC60 filtered sled acceleration for the first time is < 0g shall be called T_{end}.

5.1.1.4. Time span definition

The time span for sled pulse corridor shall be defined as $dT = T_{end} - T_0$.

5.2. In order to track the trajectories of the test dummy and seat with reference to the sled, the following dimensions shall be recorded at both sides of the test dummy and seat. All measurements shall be taken from the camera film plane to the reference targets and recorded in mm.

All target points used for analysis shall be depth scaled to compensate for any differences in the Y-coordinates. Compensation shall be included in the film analysis to take account of parallax effects due to sled motion relative to the camera.

Using a suitable "target tracking" film analysis technique generates traces at each sides as follows:

- (a) OC target displacement (absolute laboratory reference)**
- (b) T1 target displacement (absolute laboratory reference)**
- (c) SBU target displacement (absolute laboratory reference)**
- (d) SBL target displacement (absolute laboratory reference)**

These traces shall be offset adjusted then filtered at CFC30. OC-T1 relative

displacements at each side shall be then defined as the difference between the OC displacement and the T1 displacement in the seat back coordinate system. OC-T1 relative displacement shall be calculated as following routine, for which measurement data shall be considered for evaluation until the point in time at which the head rebounds from the head restraint or at 300 ms after T-zero, whichever occurs first.

The seat back angle at each time step ($\theta(t)$) shall be produced from SBU and SBL target.

$$\theta(t) = a \tan \frac{\text{SBU}(Z(t)) - \text{SBL}(Z(t))}{\text{SBU}(X(t)) - \text{SBL}(X(t))}$$

Where:

$\text{SBU}(X(t))$ = Instantaneous SBU X position.

$\text{SBU}(Z(t))$ = Instantaneous SBU Z position.

$\text{SBL}(X(t))$ = Instantaneous SBL X position.

$\text{SBL}(Z(t))$ = Instantaneous SBL Z position.

In order to make SBL the origin of the coordinate system, parallel translation of the coordinate system shall be conducted.

$$\begin{aligned}\text{OC}_{\text{SBL}}(X(t), Z(t)) &= \text{OC}(X(t), Z(t) - \text{SBL}(X(t), Zt)) \\ \text{T1}_{\text{SBL}}(X(t), Z(t)) &= \text{T1}(X(t), Z(t) - \text{SBL}(X(t), Zt))\end{aligned}$$

Where:

$\text{OC}_{\text{SBL}}(X(t), Z(t))$ = Instantaneous OC X, Z position from SBL.

$\text{T1}_{\text{SBL}}(X(t), Z(t))$ = Instantaneous T1 X, Z position from SBL.

$\theta'(t)$ shall be generated by subtracting the initial seat back angle (θ_{initial}) from the seat back angle ($\theta(t)$).

$$\theta'(t) = \theta(t) - \theta_{\text{initial}}$$

The coordinate transformation shall be conducted according to change of a seat back angle.

$$\begin{aligned}\text{OC}_{\text{SBL}}X'(t) &= \text{OC}_{\text{SBL}}X \cos \theta'(t) + \text{OC}_{\text{SBL}}Z \sin \theta'(t) \\ \text{T1}_{\text{SBL}}X'(t) &= \text{T1}_{\text{SBL}}X \cos \theta'(t) + \text{T1}_{\text{SBL}}Z \sin \theta'(t)\end{aligned}$$

Where:

$\text{OC}_{\text{SBL}}X'(t)$ = Instantaneous OC X position in the seat back coordinate system.

$\text{T1}_{\text{SBL}}X'(t)$ = Instantaneous T1 X position in the seat back coordinate system.

The relative displacement between OC and T1 in the seat back coordinate system ($D_{\text{OC-T1}}(t)$) shall be derived from the difference between the OC displacement and the T1 displacement.

$$D_{OC-T1}(t) = OC_{SBL}X'(t) - T1_{SBL}X'(t)$$

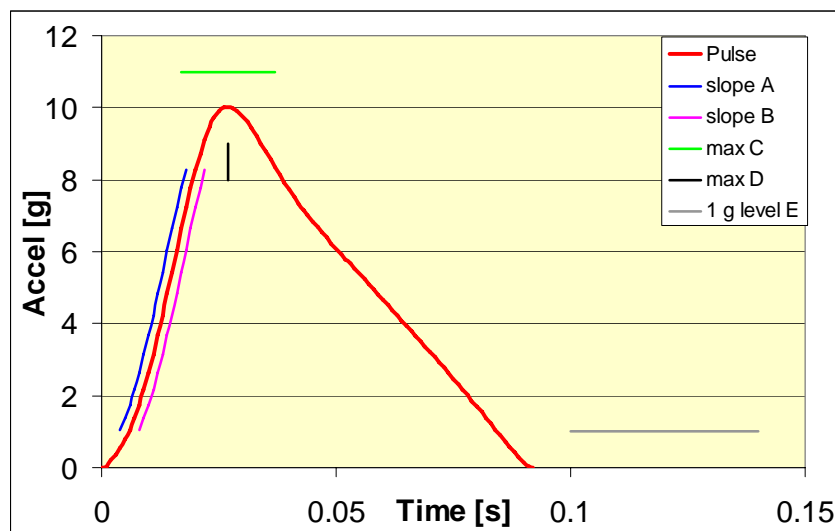
OC-T1 relative displacement at each time step ($D'_{OC-T1}(t)$) shall be generated by subtracting initial $D_{OC-T1}(0)$ from $D_{OC-T1}(t)$.

$$D'_{OC-T1}(t) = D_{OC-T1}(t) - D_{OC-T1}(0)$$

Dynamic backset shall be calculated as the maximum absolute value of $D'_{OC-T1}(t)$, whichever is larger between both sides.

Table 9-2 – Sled pulse corridor reference point locations.

Parameter		Requirement	Limits +/-	Unit
Velocity change	dV	15.65	0.80	km/h
Time span	dT	91.00	3.00	ms
Mean acceleration	A mean	47.85	4.00	m/s ²
Acceleration at T0	A T0	0	2.5	m/s ²



slope A		slope B	
time (ms)	acceleration (m/s ²)	time (ms)	acceleration (m/s ²)
0.004	1.053183	0.008	1.053183
0.005	1.375127	0.009	1.375127
0.006	1.74433	0.01	1.74433
0.007	2.160836	0.011	2.160836
0.008	2.62308	0.012	2.62308
0.009	3.127628	0.013	3.127628
0.01	3.669156	0.014	3.669156
0.011	4.240642	0.015	4.240642
0.012	4.833609	0.016	4.833609
0.013	5.438418	0.017	5.438418
0.014	6.044617	0.018	6.044617
0.015	6.641417	0.019	6.641417
0.016	7.218166	0.02	7.218166
0.017	7.764556	0.021	7.764556
0.018	8.270567	0.022	8.270567

max C		max D	
time (ms)	acceleration (m/s ²)	time (ms)	acceleration (m/s ²)
0.017	11	0.027	8
0.037	11	0.027	9

1g level E	
time (ms)	acceleration (m/s ²)
0.1	1
0.14	1

Figure 9-4 – Sled pulse acceleration corridor."

B. JUSTIFICATION

The global technical regulation (gtr) No. 7 on head restraints was established in the Global Registry on 13 March 2008 (ECE/TRANS/WP.29/2008/54 corrected by WP.29-144-26, as reproduced in Annex III to ECE/TRANS/WP.29/1066).

During the discussion on this gtr, it was agreed to allow Contracting Parties to introduce into their national or regional laws alternative procedures for use in the dynamic assessment of head restraints (paragraph 37).

Based on this agreement, Japan suggests the dynamic performance requirements using the BioRID II test dummy to be introduced into Regulation No. 17.
