Transmitted by the experts from OICA and CLEPA

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agenda item 20)

Proposal for amendments to Draft new Regulation on uniform provisions concerning the approval of enhanced Child Restraint Systems used onboard of motor vehicles

Submitted by the expert from OICA and CLEPA

The text reproduced below was prepared by the expert from OICA and CLEPA. It is based on ECE/TRANS/WP.29/GRSP/2011/15. The modifications to the current text of the new ECE on Child Restraint Systems are marked in bold or strikethrough characters.

I. Proposal

Paragraph 2.15.and its subparagraphs amendments to read:

"2.15. "Support-leg" means an anti–rotation device permanently attached to a Child Restraint System creating a load path between the Child Restraint System and the vehicle structure. A support-leg shall be adjustable in length **(Z direction)** ~~but~~ **and** may be **additionally** adjustable in other **directions** ~~planes~~.

2.15.1. "Support-leg foot ~~[feet]~~" means **one or more** ~~the~~ part[s] of the support-leg of the Child Restraint System intended (by design) to engage with the vehicle **floor** contact **surface** ~~area~~ and designed to transmit the loading from the support-leg to the vehicle structure during a frontal impact.

2.15.2. "Support-leg foot contact surface" means the surface of the support-leg foot physically in contact with the vehicle **floor** contact **surface** ~~area~~ and designed to spread the loads across the vehicle structure.

2.15.3. "Support-leg foot **assessment** ~~contact~~ volume" describes a spatial volume which denotes both the extent and limitations for the movement of the support-leg foot. **It corresponds to the support-leg foot assessment volume for vehicles, as defined in [annex 10 of] Regulation No. 14.**

2.15.4. "Support-leg adjustment capability" means the adjustment of the support-leg foot in dimensions X, Y and Z ~~that a Child Restraint System with support leg must have~~."

Add a new paragraph 2.15.5.:

"**2.15.5. "Support-leg dimension assessment volume" means a volume defining the maximum dimensions of a support-leg, corresponding to the support-leg installation assessment volume for vehicles, as defined in [annex 17 of] Regulation No. 16, ensuring the dimensional installation of a support-leg of an i-Size CRS in an i-Size seating position of a vehicle.**"

Delete paragraphs 2.16. and 2.17.:

"~~2.16. "Vehicle contact volume" means a volume defined in (X, Y, Z) in relation to the ISOFIX anchorage system, in which he vehicle contact area must fully lie.~~

~~2.17. "Vehicle contact area" means the part of the vehicle floor designed to withstand the compression forces transmitted by a Child Restraint System support leg foot during a frontal impact.~~"

Renumber paragraph 2.18. as 2.16.

Renumber paragraph 2.19. as 2.17. and amendment to read:

"2.~~19~~17. "SFAD SL" means the Static Force Application Device as defined in Regulation No. 14, annex 9, to be modified with ~~the inclusion of a~~ **an additional** support-leg **test probe, as exemplarily shown in Regulation No. 14, annex 10**."

Renumber paragraphs 2.20. through 2.58.as 2.18.through 2.56.

Paragraph 4.6.1. amendment to read:

"4.6.1. the ⓘ-Size logo. **The symbol shown below shall have** ~~As a minimum, a symbol consisting of a circle with~~ a **minimum** diameter of ~~minimum~~ 13 mm and ~~containing a pictogram,~~ the pictogram shall contrast with the background of the circle. The pictogram shall be clearly visible either by means of contrasting colors or by adequate relief if it is moulded or embossed;

~~ⓘ-Size~~

"

"

Paragraph 6.3.5. amendment to read:

"6.3.5. Child Restraint System support-leg and support-leg foot requirements

~~In this paragraph and it's subparagraphs, all measurements are given in relation to a coordinate system. The origin of the coordinate system is located centrally between the two ISOFIX attachments and on the centre line of the corresponding ISOFIX anchorage system.~~

[i-Size] Child restraint systems fitted with support-legs have to comply with the geometrical provisions defined in 6.3.5. and its subparagraphs.

For verifying compliance with the requirements specified in 6.3.5.1. and 6.3.5.2. a physical test jig or CAD simulation may be used.

The geometrical requirements in 6.3.5.1. through 6.3.5.4. are referenced to a coordinate system, whose origin is located centrally between the two ISOFIX connectors and on the centreline of the corresponding ISOFIX anchorage system.

The orientation~~s~~ of the **axes** ~~axis~~ **of the coordinate system is referenced to the child restraint fixture(s)** ~~are defined by placing the child restraint system in the jig as defined in 6.3.5.2. with the ISOFIX attachments latched to the ISOFIX anchorage system~~:

- the X **orientation** ~~direction~~ **shall be** ~~being~~ parallel to the Child Restraint Fixture (CRF) [1] bottom surface and **in** ~~to~~ the **median** longitudinal ~~medium~~ plane of the CRF.

- the Y **orientation** ~~direction~~ **shall be perpendicular** ~~being transverse~~ **to the median longitudinal plane** ~~to the centreline~~ of the CRF.

- the Z **orientation** ~~direction~~ **shall be** ~~being~~ perpendicular to the CRF bottom surface.

In fulfilling the requirements of this section, the Child Restraint System shall be installed in accordance with the user manual of the Child Restraint System. The storage position of the support-leg is excluded from these requirements."

Paragraph 6.3.5.1. amendment to read:

"6.3.5.1. **Geometrical** support-leg ~~contact volume~~ **and support-leg foot** requirements

The support leg, incl. its attachment and support-leg foot has to completely lie within a support leg dimension assessment volume (see also figures 1 and 2 of annex 19 of this Regulation), which is defined as follows:

- In width by two planes parallel to and 100mm apart from the X-Z plane of the coordinate system defined in 6.3.5.; and

- In length by two planes perpendicular to the X-Y plane and X-Z plane [median longitudinal plane of the child restraint fixture] of the coordinate system defined above, 585mm and 695mm apart in X direction from the origin; and

- In height above the level of the CRF bottom surface by a plane parallel to and [85]mm above the CRF bottom surface. Below the level of the CRF bottom surface there shall be a limitation for rigid, non-adjustable parts in Z direction defined by a plane parallel to and 270mm below the CRF bottom surface, for parts adjustable in Z direction there shall be no limitation in height below the level of the CRF bottom surface.

[1] Child Restraint Fixture (CRF) as defined in Regulation No. 16 (Safety-belts)

~~Where the Child Restraint System is fitted with a support leg, its support leg foot must meet the following requirements (see figure 0(d)):~~

~~(a) The complete support leg foot must lie fully inside the support leg contact volume in the X and Y directions.~~

~~(b) The support leg must be adjustable, so that the support leg foot contact surface must reach at least from Zlong to Zshort.~~

~~(c) Zshort is [190] mm from the origin as defined in §6.3.5, when measured along the Z axis in a downward direction.~~

~~(d) Zlong is [490] mm from the origin as defined in §6.3.5, when measured along the Z axis in a downward direction.~~

~~(e) The adjustment capability of the support leg must allow the support leg foot to reach multiple positions between Zlong to Zshort with maximum incremental steps of 20 mm between the positions. A support leg which allows continuous adjustment from Zlong to Zshort is also considered to meet this criterion.~~

~~(f) It is permissible for the support leg to be adjustable along the Z axis such that he support leg foot lies above or below the support leg contact volume providing no parts extends beyond the vertical projections of the X and Y limits.~~

~~(g) Xshort must be greater than [620] mm from the origin as defined in §6.3.5, when measured along the X axis and forward of the Child Restraint System with respect to its installation orientation within the vehicle.~~

~~(h) Xlong must be less than [820] mm from the origin as defined in §6.3.5, measured along the X axis, and forward of the Child Restraint System with respect to its installation orientation within the vehicle.~~

~~(i) The support leg foot is not required to be adjustable along the X axis.~~

~~(j) Adjustment of the support leg foot to a position beyond the X and Y limits of the support leg contact volume shall be prohibited (see figure 0(d)).~~

~~(k) The support leg foot contact volume shall be positioned centrally along the Y axis with respect to the origin as defined in 6.3.5, and shall have a maximum width in this direction of 200 mm.~~

~~Figure 0 (d)~~

Delete Figure 0 (d)

Existing paragraph 6.3.5.2. to become new paragraph 6.3.5.4.

Insert new paragraph 6.3.5.2.:

"**6.3.5.2. Support-leg foot adjustability requirements**

The support-leg shall be adjustable in order to ensure that the support-leg foot is able to reach at least any height between the upper and the lower height limit in z-direction of the support leg foot assessment volume as specified below (see also figure 3 and 4 of annex 19 of this Regulation). In case of incremental adjustment there shall be no step between two positions of more than 20mm.

The support leg foot assessment volume is defined:

- In width by two planes parallel to and 100mm apart from the X-Z plane of the coordinate system defined in 6.3.5.; and

- In length by two planes perpendicular to the x-y-plane and X-Y plane [median longitudinal plane of the child restraint fixture] of the coordinate system defined above, 585mm and 695mm apart in X direction from the origin; and

- In height by two planes parallel to the CRF bottom surface, one plane 270mm and a second plane 525mm below the CRF bottom surface.

It shall be permissible for the support-leg to be adjustable beyond the height limits in Z direction given below in order to reach additional positions above the upper and below the lower height limit in Z direction given by the support leg foot assessment volume, providing that no parts extend beyond the limiting planes in X and Y direction."

Paragraph 6.3.5.3. amendment to read:

"6.3.5.3. Support-leg foot dimensions

The dimensions of the support-leg foot **shall** ~~must~~ meet the following requirements:

(a) Minimum support-leg contact surface shall be 2500 mm^2, measured as a projected surface 10 mm above the lower edge of the support-leg foot (see figure 0(**d**~~f~~)).

(b) Minimum outside dimensions shall be 30 mm in the X and Y directions, with maximum dimensions being limited by the **support-leg foot assessment** ~~contact~~ volume.

(c) Minimum radius of the edges of the support-leg foot shall be 3.2 mm.

Figure 0(**d**~~f~~)"

Paragraph 6.3.5.4. (former 6.3.5.2.) amendment to read:

"6.3.5.**4**~~2~~. Support-leg foot ~~(feet)~~ jig

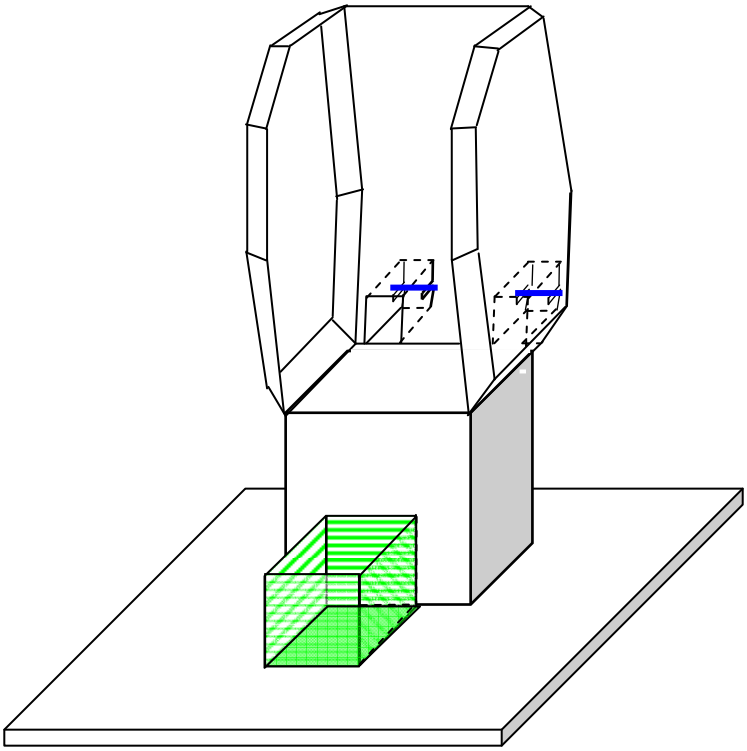
A jig shall be used to check that the support-leg foot meets the requirements defined in paragraph 6.3.5.**2**~~1~~. (See figure 0(e)). As an alternative a computer simulation shall also be considered satisfactory.

The jig is defined as the ISOFIX CRF corresponding to the size class of the child restraint. The jig is expanded with two 6.0 mm diameter ISOFIX low anchorages. The striped box positioned in front of the jig is positioned and sized according paragraph 6.3.5.**2**~~1~~. The CRS shall have its attachments latched when conducting the assessment.

An ⓘ-Size Child Restraint System with a support-leg adjusted at any possible position, as checked by the jig, **shall** ~~must~~ meet the requirements of **paragraph** ~~§~~6.3.5.~~1~~. **and its subparagraphs."**

Figure 0(e) of paragraph 6.3.5.4. (former 6.3.5.2.) insert ISOFIX low anchorage bars (in blue) :

Figure 0(e)

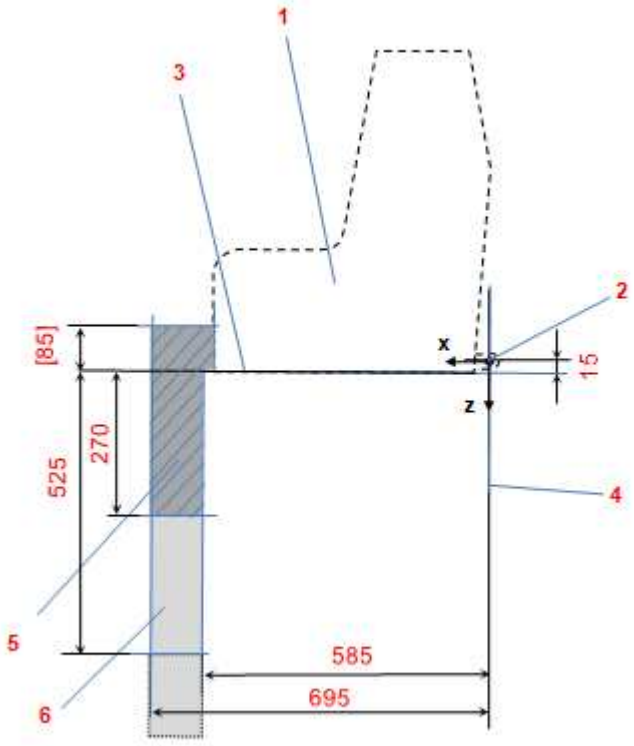


ISOFIX axle
6 mm round

Add a new annex 19:

"Annex 19

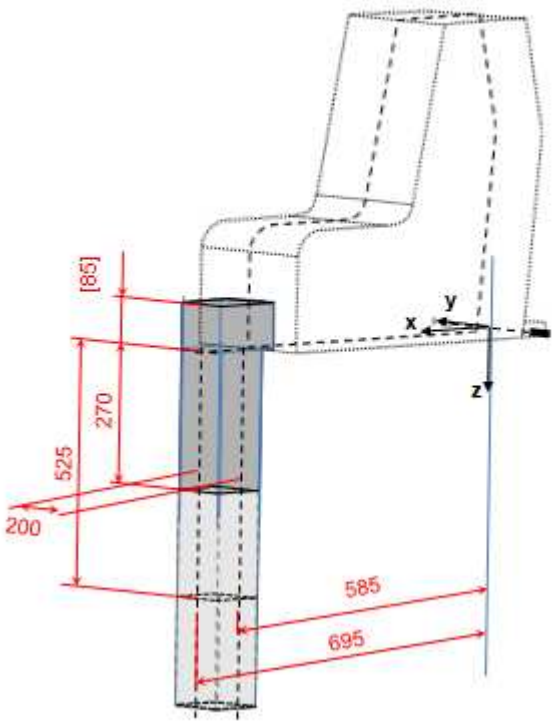
ASSESSMENT VOLUMES FOR [I-SIZE] SUPPORT-LEGS AND SUPPORT-LEG FEET



Key:
1 Child Restraint Fixture (CRF)
2 ISOFIX low anchorages bar
3 Plane formed by the bottom surface of the CRF, which is parallel to and 15mm below the X-Y plane of the coordinate system
4 Z-Y plane of the coordinate system
5 Upper part of the support-leg dimension assessment volume, which shows the dimensional limitations in X and Y direction, the upper height limit in Z direction, as well as the lower height limitation in Z direction for rigid, not in Z direction adjustable support leg components
6 Lower part of the support-leg dimension assessment volume, which shows dimensional limitations in X and Y direction of the support-leg and support leg foot

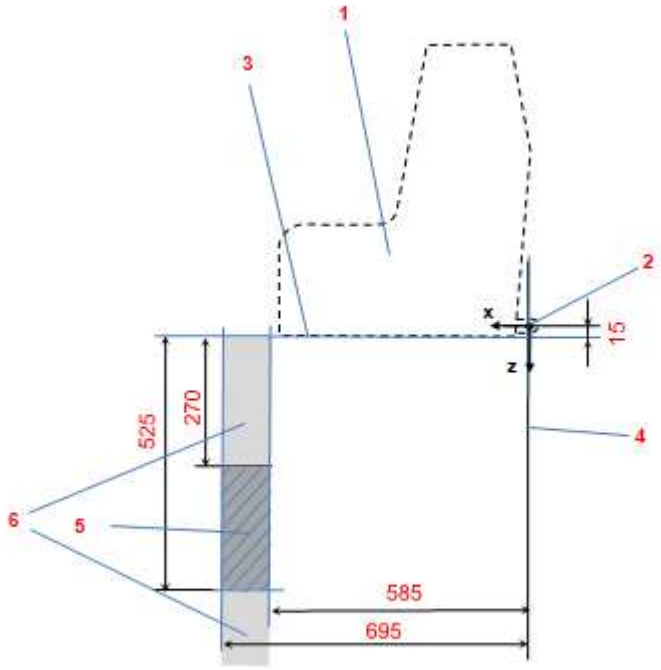
Notes:
1. Drawing not to scale.
2. Volumes (5 and 6) are defining the maximum limits of the support-leg and its foot. No parts of the CRS shall exceed these limits in any position of adjustment when in use configuration.

Figure 1: Side view of the support leg dimension assessment volume



Notes:
1. Drawing not to scale.

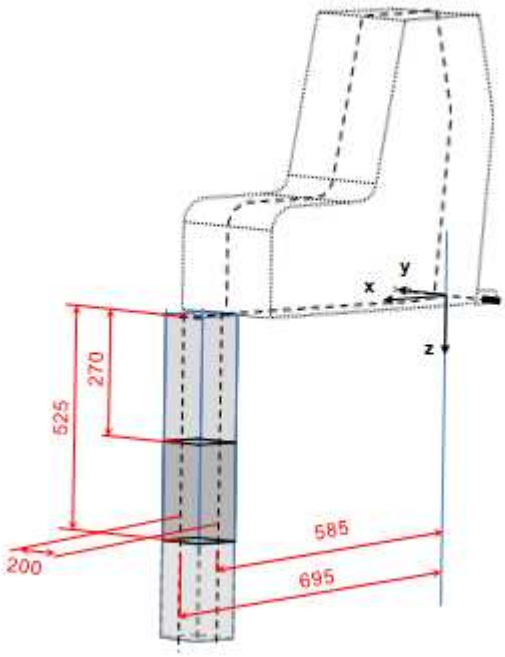
Figure 2: 3D view of the support leg dimension assessment volume



Key:
1 Child Restraint Fixture (CRF)
2 ISOFIX low anchorages bar
3 Plane formed by the bottom surface of the CRF, which is parallel to and 15mm below the X-Y plane of the coordinate system
4 Z-Y plane of the coordinate system
5 Support-leg foot assessment volume, which shows the required adjustment range of the support-leg foot in Z directions [, as well as the dimensional limitations in X and Y direction]
6 Additional volumes shows the additional permissible adjustment range in Z direction for the support-leg foot

Notes:
1. Drawing not to scale.

Figure 3: Side view of the support leg foot assessment volume



Notes:
1. Drawing not to scale.

Figure 4: 3D view of the support leg foot assessment volume

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II. Justification

In general, the proposal developed by OICA and CLEPA shall improve the text in order to clarify the requirements, align the definitions between the new draft CRS Regulation and the vehicle related ECE Regulations (No. 14 and No. 16) and finally ensure by a complete set of geometrical requirements the installation of i-Size CRS in i-Size seating positions of vehicles.
Basis for this draft proposal was the official working document TRANS/WP.29/GRSP/2011/15, additionally informal document GRSP-49-08 had been considered for preparation of this proposal.

Justification details:

2.15.: Wording changed to reference to the coordinate system used and clarification on adjustability

2.15.1.: Wording incorporates draft amendments according to inf. doc. GRSP-49-08 and additionally aligns the name/wording with vehicle related draft amendments for i-size CRS

2.15.2.: Aligns the name/wording with vehicle related draft amendments for i-size CRS

2.15.3.: Aligns the name/wording with vehicle related draft amendments for i-size CRS and corrects inf. doc. GRSP-49-08

2.15.4.: Last part of the sentence deleted in order to avoid confusion

2.15.5.: Definition of new volume, defining the max. dimensions of the support-leg to ensure installation in i-Size seating positions of vehicles

2.16.: Deleted, because not needed in this Regulation

2.17.: Deleted, because not needed in this Regulation

2.19.: Wording aligned with and reference added to vehicle related draft amendments for i-size CRS

4.6.1.: Changes to improve the i-Size logo. New i-Size logo shall be developed for use with i-Size CRS and to mark i-Size seating positions of vehicles.

6.3.5.: Wording improved and requirements clarified

6.3.5.1.: New wording and requirements clarified, reference to new drawings annexed, incorporation of agreed values for assessment volume, definition of the max. dimensions of the support-leg to ensure installation in i-Size seating positions of vehicles

6.3.5.2.: Wording improved and requirements clarified, reference to new drawings annexed, incorporation of agreed values for assessment volume, definition of the required adjustability range to ensure installation in i-Size seating positions of vehicles

6.3.5.3.: Wording improved and reference corrected

6.3.5.4.: Wording improved and reference corrected, missing ISOFIX bars added to figure 0(e)

Annex 19: Annex added to include drawings on the support-leg / support-leg foot assessment volumes