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PROPOSAL FOR DRAFT AMENDMENTS TO REGULATION No. 16  
(Safety-belts)

Transmitted by the Expert from the Russian Federation

Note: The text reproduced below was prepared by the expert from the Russian Federation in order to adapt the text of the Regulation to the possible use of an acceleration test device. It is based on a document distributed without a symbol (informal document No. 2) during the twenty-eighth session (TRANS/WP.29/GRSP/28, para. 40).

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Note: This document is distributed to the Experts on Passive Safety only.

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**A. PROPOSAL**

Paragraphs 7.7.4. and 7.7.5., amend to read:

- "7.7.4. The trolley shall then be so propelled that at the moment of impact with the stopping device (dynamic test with deceleration) and at the moment of the end of the acceleration (dynamic test with acceleration) its free running speed is 50 km/h  $\pm$  1 km/h; during acceleration, in dynamic test conditions with deceleration, the manikin remains stable. The stopping distance of the trolley shall be 40 cm  $\pm$  5 cm. The trolley shall remain horizontal throughout deceleration (acceleration). The deceleration .....
- 7.7.5. The trolley speed immediately before impact with the stopping device (dynamic test with deceleration) and immediately after the end of the acceleration of the trolley, when it reaches its maximum value (dynamic test with acceleration), as well as the maximum forward displacement of the manikin shall be measured."

Annex 8,

The title, amend to read (the curve remains unchanged):

"DESCRIPTION OF CURVE OF TROLLEY'S DECELERATION  
(ACCELERATION) AS A FUNCTION OF TIME

(Curve for testing stopping (accelerating) devices)"

The text after the curve, amend to read:

"The deceleration (acceleration) curve of the trolley weighted with the inert mass to produce a total mass of 455 kg  $\pm$  20 kg ..... During calibration of the stopping (accelerating) device, the speed of the trolley shall be 50 km/h  $\pm$  1 km/h and the stopping (accelerating) distance shall be 40 cm  $\pm$  2 cm. When using the accelerating device, the mass of the trolley can be increased up to 1,500 kg  $\pm$  50 kg. In both the above cases .....

\* \* \*

**B. JUSTIFICATION**

At present, the most complicated and expensive safety-belt tests specified in Regulation No. 16 are dynamic tests to assess operational characteristics and structural strength of belt assembly in impact pulse conditions created by the deceleration of the trolley using a specific stopping device (paragraph 7.7).

In parallel with the method of impact pulse creation specified in Regulation No. 16, it is proposed to permit to use the method of creation of the same impact pulse shape by the acceleration of the trolley.

In the proposed method the speed vector direction is opposite to that used in the deceleration method.

The acceleration trolley is propelled by a controlled automatic pneumatic drive, so that its running speed of 50 km/h  $\pm$  1 km/h at the distance of 40 cm  $\pm$  5 cm from the beginning of the trolley running is achieved. The creation of the pulse specified in Regulation No. 16 pulse is provided as an adjustable acceleration at the same time.

After impact, when the trolley is running at the maximum speed, conditions are reliably provided for its safe stop by means of the specific slippers sliding along the rail track.

The proposed method has the following advantages over the method of impact pulse creation by deceleration specified in Regulation No. 16:

- the possibility of more accurate reproduction of pulse shape;
- the possibility of required impact pulse shape creation for any total trolley mass changes;
- provision for strictly fixed initial conditions connected with the position of the manikin - because before impact the trolley with the manikin is in the state of rest;
- the use of specific disposable polyurethane tubes is not needed;
- the possibility of using a shorter rail track for tests;
- high degree of providing safety during the performance of tests.

It should be noted that the application of the test facilities based on the principles of impact pulse creation both by using trolley deceleration and trolley acceleration is permitted by the USA Federal Aviation Regulations (FAR-25, FAR-23), when conducting dynamic tests of airplane seats with the use of manikins.

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