ECONOMIC COMMISSION FOR EUROPE

INLAND TRANSPORT COMMITTEE

World Forum for Harmonization of Vehicle Regulations (WP.29)

Working Party on Brakes and Running Gear (GRRF)
(Fifty-second session, 16-18 September 2002,
agenda item 4.)

PROPOSAL FOR DRAFT AMENDMENTS TO REGULATION No. 111

(Handling and stability of vehicles)

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 amend the text of the Regulation. It is based on the
text of a document distributed without a symbol (informal document No. 24) at
the fifty-first session (TRANS/WP.29/GRRF/51, para. 31).

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Note: This document is distributed to the Experts on Brakes and Running Gear
only.

Insert new paragraphs 2.7. to 2.8.1., to read:

"2.7.   "Roll angle" means the difference between inclination angle of the
            sprung part of the vehicle to the horizontal surface and
            inclination angle of the tilt table platform. The inclination
            angle of the sprung part of the vehicle to the horizontal surface
            is determined for the cross section lying through the vehicle
            centre of gravity.

2.7.1.   Roll angle is represented by the symbol "φ".

2.8.   "Rollover threshold" means the instant when all the wheels of one
            side of the vehicle have lost contact with the tilt table surface.

2.8.1.   The inclination angle of the tilt table surface is represented by
            the symbol "ε"."

Paragraph 5.3.1.1., amend to read:

            "... a tilt table angle of ε_c = 23° has been reached for all tests
            in both tilt directions and roll angle φ at those conditions shall
            not exceed 8° ($\varphi_c \leq$ 8°)."

Paragraph 5.3.1.2., amend to read:

            "... acceleration of 4 m/s^2 has been reached. Roll angle, φ, at
            those conditions shall not exceed φ_c."

Annex 3,

Paragraph 1., should be deleted.

Paragraphs 2. to 4. (former), renumber as paragraphs 1. to 3.

Paragraphs 5. (former), renumber as paragraph 4. and amend to read:

            "........
            .... cannot be fulfilled with this test load then:

            (a)   a filling factor of the tank between 100 per cent and 70 per
                   cent is acceptable. Loading of the tanks divided in
                   sections shall be made separately, with filling factor of
                   each section between 100 per cent and 70 per cent
                   proportionally to the mass of whole fluid.

                   If, during testing, the tilt table inclination angle, which
                   corresponds to the rollover threshold, is less than value of
                   ε_c or roll angle is more than value of φ_c specified in the
                   paragraph 5.3.1.1., the test shall be repeated with the
                   fully loaded tank.

                   The values of tilt table inclination angle ε_w and roll angle
                   φ_w shall be corrected by using the following formulas:

$$tg\beta_p \;=\; tg\,\varepsilon_w . \frac{A_T}{A_w}\cdot\frac{H_w}{H_g}+\frac{T_T}{2H_g}\left[1-\frac{AT}{A_w}\right]$$

$$\varphi_p \;=\; \varphi_w . \frac{A_T}{A_w}\cdot\frac{H_g}{H_w}$$

The values of ε_p and φ_p shall be compared with the specified valus of ε_c and φ_c respectively.

where,

A_T - vehicle weight in case of loading by normal fluid;

A_w - vehicle weight in case of loading by water;

H_w, H_g - height of the vehicle center-of-gravity in case of loading by water and normal fluid, respectively;

T_T - theoretical wheel track at the vehicle cross section at the center-of-gravity point (see annex 4, paragraph 7.3.)

Annex 4,

Paragraph 3., amend to read:

"3.   SYMBOLS (see also Figure 1)

        I   (-)   =   axle/bogie index
                          (i = l - n, front to - axle/bogie;
                          i = T, all axles/bogies;
                          i = M, stiffest axle/bogie;
                          for semi-trailers only I = K, kingpin); and
                          i = l for axles/bogies of semi-trailers

        m_i (m)   =   nominal suspension roll axis height

        ....
        .... "

Paragraph 7.2., amend to read:

"7.3.   In case of semi-trailers separated from tractors, kipping effects are calculated by using the following formulae:

        track with: ....

        roll stiffness: C_{DRESK} = C_{DRESL} $\Big/$ $\left[\dfrac{AT}{AK}-1\right]$ "

Insert a new paragraph 7.5.5., to read:

"7.5.5.   The vehicle roll angle when tilted on the tilt table in both direction with inclination angle $\varepsilon_c = 23°$, calculated by using the following formula:

$$\varphi_{cc} = A_T \cdot H_g \cdot \sin\left(\varepsilon_c + \varphi_C\right) \cdot \cos\varepsilon_c / C_{DREST}$$

shall be less than φ_c $(\varphi_{cc} \leq \varphi_c)$."

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