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INLAND TRANSPORT COMMITTEE

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

Working Party on Brakes and Running Gear (GRRF)
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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 following the recommendation of GRRF at its fifty-third session. It is based on a document distributed without a symbol (informal document No. 19) during the fifty-third session (TRANS/WP.29/GRRF/53, para. 26). The proposals contained in informal document No. 19 have been divided into two parts. The first part, referring to specifications concerning tilt angle for the tilt-test, is reproduced below.

Note: This document is distributed to the Experts on Brakes and Running Gear only.
Insert new paragraphs 2.7. and 2.7.1., to read:

"2.7. "Rollover threshold" means the instant when all the wheels of one side of a vehicle have lost contact with the supporting surface (tilt table platform).

2.7.1. The inclination angle of the tilt table surface is represented by the symbol "β".

Paragraph 5.3.1.1., amend to read:

" …..a tilt table angle of β_c = 23° has been reached …… "

Annex 1.

Item 3.2., amend to read:

"3.2. tank; make, model, effective volume: ..............................................................."

Item 6.2., amend to read:

"6.2. mass of vehicle in running order: ..............................................................."

Insert a new item 8.1., to read:

"8.1. Centre of gravity height of the vehicle in running order: ......................... "

Insert a new item 11.5., to read:

"11.5. Electronic Stability Programme (ESP) engaged: .......... yes/not/not applicable 2/"

Annex 3.

Paragraph 7., amend to read:

"7 TEST PROCEDURE

7.1. This procedure consists ........

........ of stick-slip and hysteresis."

Insert a new paragraph 7.2., to read:

"7.2. If, during testing of a vehicle, which tank in case of full load (with respect to its mass) is not filled completely (with respect to its volume), the tilt table inclination angle β is less than value of β_c or/and roll angle φ when β = β_c) is more than value of φ_c, the test shall be repeated with the fully filled (with respect to its volume) tank.
The values of the recorded at the test tilt table inclination angle $\beta_w$ and roll angle $\phi_w$ (when $\beta_p = \beta_c$) shall be corrected by using the following formulas:

$$\tan \beta_p = \tan \beta_w \cdot \frac{A_T \cdot H_w}{A_w \cdot H_g} + \frac{T_T}{2H_g} \left(1 - \frac{A_T}{A_w}\right)$$

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

The value of $\beta_p$ shall be higher, and the value of $\phi_w$ shall be lower than the corresponding critical values ($\beta_p \geq \beta_c$ $\varphi_p \leq \varphi_c$). [Note by the secretariat: The text and the formulas are contradictory]

In the formulas:

$A_T$ = vehicle mass in case of loading by normal fluid;

$A_w$ = vehicle mass in case of loading by water.

$$A_w = A_T + V_t \cdot \left(\rho_w - \rho_T\right)$$

$H_g, H_w$ = height of the vehicle centre of gravity in case of loading by normal fluid and water, respectively;

$$H_w = H_g - V_t \cdot \left(\rho_w - \rho_T\right) / C_{ST}$$

$T_T$ = theoretical wheel track at the vehicle cross section at the centre-of-gravity point;

$V_t$ = effective tank volume;

$$C_{ST} = \frac{A_g}{H_g - H_l}$$

$C_{ST}$ = vertical stiffness of suspension at the centre of gravity point;

$A_g$ = mass of payload;

$\rho_T$ = density of normal fluid;

$\rho_w$ = density of water;

$H_l$ = height of the centre of gravity of the vehicle in running order.
Annex 4.

Paragraph 7.2., amend to read:

"7.2. In case of semi-trailers separated from tractors, kingpin effects are calculated by using the following formula:

Kingpin trace width:

\[ T_K = \frac{\sum_{i=1}^{n} T_i}{n} \]

The kingpin roll stiffness, which is the roll stiffness of the tractor at the longitudinal position of the fifth wheel/kingpin, will be calculated by using a reference load dependent roll stiffness factor of 4 [m/rad]:

\[ C_{DRESK} = A_K \cdot 4 \]