Proposal for Revision of the Document TRANS/WP.29/2002/27
With Regard to the Regulations No. 111

Transmitted by the Russian Federation

Within October – December 2002, the experts of the Russian Federation at GRRF considered comments of the experts of Netherlands prepared in response to the document TRANS/WP.29/2002/27.

The major part of the comments was taken into account. Therefore it is proposed to modify the document TRANS WP/29/2002/27.

The revised version of the mentioned document is presented below. The changes proposed by the expert of Netherlands are typed in *Italic*.

❏ The following paragraphs should be added.

2.7. *"Roll angle" means the roll angle of the sprung part of a vehicle with respect to the road surface or the tilt table platform.*

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 a vehicle have lost contact with the road or the tilt table surface.*

2.8.1. The inclination angle of the tilt table surface is represented by the symbol «β».

❏ The following insertions should be added:

- Into the paragraph 5.3.1.1 insert «$\beta_c =$» before «23°».

- In the paragraph 5.3.1.1 after wording «in both tilt direction» insert wording «and roll angle φ at those conditions shall not exceed $\varphi_c = 7°$».

- Into the paragraph 5.3.1.2 add «roll angle, φ, at those conditions shall not exceed φ_c».

Annex 1

❑ The following insertions should be added.

p. 3.2. tank: make, model, effective volume ….

p. 8.1. Center of gravity height of a vehicle in running order …

p. 11.5. ESP device engaged … yes/no/not applicable.

p. 6.1. Instead of parameter "mass of laden tank" insert parameter "mass of vehicle in running order" …

Annex 3

The text of the paragraph «Test procedure» is referred to p. 7.1.

The following p. 7.2 is inserted:

p. 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 $\beta = \beta_c$) 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 β_w and roll angle φ_w (when $\beta_w = \beta_c$) shall be corrected by using the following formulas:

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

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

The value of β_p shall be higher, and the value of φ_p shall be lower the corresponding critical values ($\beta_p \geq \beta_c$ $\varphi_p \leq \varphi_c$).

In the formulas:

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

A_w –   vehicle weight in case of loading by water.

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

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

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

T_T	–	theoretical wheel track at the vehicle cross section at the center-of-gravity point;
V_l	–	effective tank volume;

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

C_{ST}	–	vertical stiffness of suspension at the center of gravity point;
A_g	–	mass of payload;
ρ_T	–	density of normal fluid;
ρ_w	–	density of water;
H_l	–	height of the center-of-gravity of the vehicle in running order.

Annex 4

The p. 7.2 shall be partly modified. The revised text:

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

Kingpin trace width:
$$T_K = \frac{\sum\limits_{i=1}^{n} T_i}{n}$$

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]:

$C_{DRESK} = A_K \cdot 4$

- Insert new paragraph 7.5.5 to read:

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

$\varphi_{cc} = A_T \cdot H_g \cdot \sin(\beta_c + \varphi_c) \cdot \cos\beta_c / C_{DREST}$

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