

**ECONOMIC COMMISSION FOR EUROPE**  
**INLAND TRANSPORT COMMITTEE**  
**World Forum for Harmonization of Vehicle Regulations (WP.29)**  
**Working Party on General Safety Provisions (GRSG)**

PROPOSAL FOR DRAFT AMENDMENTS TO REGULATION No. 66  
(Document TRANS/WP29/GRSG/2003/25)

Transmitted by the Expert from Germany

**1.)**

Two alternative calculation methods are specified in this revision of the draft proposal:

- The **quasi-static calculation method** based on component tests (Annex 8).
- The **computer simulation of the roll-over test** of a complete vehicle (Annex 9).

A comparison of the calculation methods described in the annexes 8 and 9 shows that noticeably different requirements shall be met when creating the model representing the physical behaviour.

The **quasi-static calculation method** is described comparatively detailed and strong simplifications and assumptions that decrease the requirements are made:

- The structure is heavily idealised for simplification and is composed of plastic hinges, linked by rigid or elastic „structural elements“.
- The procedure is considered to be capable of taking into account the non-linear behaviour of the joints as well as large geometrical deformations.
- The quasi-static load is applied through a figurative „tilted pane“, acting on the lateral roof frame.
- The energy which can be absorbed by the structure is computed to  $E_T = 0.75 M * g * \Delta h$ .

On the other hand the **computer simulation of the roll-over test** of a complete vehicle is demanded to copy the real physical behaviour of the test almost exactly. It is required that the mathematical model and the basic assumptions are made in such a way that the calculation leads to conservative results. In order to prove the validity of the computations of the basic model and the assumptions, the technical service may require tests.

It is therefore to be expected that the two procedures for the evaluation of the strength of the superstructure will lead to noticeably different results.

**Proposal:**

Before amending the current regulation the standardisation of the methods equivalent to the full scale test must be the centre of the discussion. Only one calculation method to prove the strength of superstructure according to R 66 should exist. Furthermore all test methods should alternatively be permitted to be substituted by calculation, in the same way as the proposal already allows the calculation for the complete vehicle.

2.)

For the first time the available revision of the draft proposal demands to allow for **the weight of the passengers** in the vehicle. This demand was derived from the mandatory obligation to install seat belts and the obligation to wear these belts. The research about the influence of the passenger weight conducted by the technical services CIC, IDIADA and INSIA which participated in the ad-hoc group, came to very different results and could not undoubtedly prove a significant influence on the deformation of the structure when considering the passenger weight but show a noticeably rising in the unladen weight.

Thus the influence of the passenger weight and the resulting increased safety of the passengers could not be scientifically proven.

The aggravation of the requirements for the strength of superstructure will lead to a considerable weight increase, which figures according to an inquiry of the IRU within the frame of the GRSG meeting with at least 400 kg. This additional weight cannot be compensated by weight reduction measures and, even worse, is located in a position where it increases the inclination of the vehicle to tip over.

**Proposal:**

Before implementing the new requirements new investigations are to be conducted, to decide about the relevant portion of the weight of the passengers and its contribution to the behaviour of the superstructure.