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Item 4.2.27 of the provisional agenda

1958 AGREEMENT

Consideration of draft amendments to existing Regulations

Proposal for Supplement 3 to the 03 Series of Amendments to Regulation No. 107
(M₂ and M₃ vehicles)

Submitted by the Working Party on General Safety Provisions */

The text reproduced below was adopted by the Working Party on General Safety Provisions (GRSG) at its ninety-fourth session (ECE/TRANS/WP.29/GRSG/73, paras. 7, 8, 9, 10 and 16). It is based on ECE/TRANS/WP.29/GRSG/2008/9, as amended by para. 7, ECE/TRANS/WP.29/GRSG/2008/10 and Corr.1 as amended by para. 9 and ECE/TRANS/WP.29/GRSG/2008/8, as amended by para. 16. It is submitted to WP.29 and AC.1 for consideration.

*/ In accordance with the programme of work of the Inland Transport Committee for 2006-2010 (ECE/TRANS/166/Add.1, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance performance of vehicles. The present document is submitted in conformity with that mandate.

The list of contents,

Item 12., amend to read: "(Reserved)"

The text of the Regulation,

Paragraph 12., amend to read:

"12. (Reserved)"

Annex 1, part 1, Appendix 1, Explanatory notes (j), (k) and (l), amend to read:

"(j) Annex 11, paragraph 2.2.1.

(k) Annex 11, paragraph 2.2.2.

(l) Annex 11, paragraph 2.2.3. "

Annex 1, part 2, Appendix 1, paragraph 1.13., should be deleted.

Annex 1, part 2, Appendix 3, paragraph 1.5., should be deleted.

Annex 3,

Paragraph 7.2.2.4., amend to read:

"7.2.2.4. In the case of a vehicle equipped with a variable seating capacity the area available for standing passengers (S_1) and the provisions of paragraph 3.3.1. of Annex 11 shall be determined for each of the following conditions as applicable;"

Paragraph 7.2.3.1., amend to read:

"7.2.3.1. Space shall be provided in the driver's area, in a position clearly visible to the driver in his seating position, for the markings provided for in paragraph 3.3. of Annex 11. "

Paragraph 7.2.3.3., amend to read:

"7.2.3.3. (Reserved)"

Paragraph 7.4.2.1., amend to read:

"7.4.2.1. Loads equal to Q (as defined in paragraph 3.2.3.2.1. of Annex 11) shall be placed on each passenger seat (of the upper deck only in the case of double-deck vehicles).

If a single deck vehicle is intended for standees or with a crew member who is not seated, the centre of gravity of the loads Q or 75kg representing them, shall be uniformly distributed over the standee or crew area respectively, at a height of 875 mm. If a double deck vehicle is intended to be used with a crew member who is not seated, the centre of gravity of the mass of 75 kg representing the crew member shall be placed in the upper deck gangway at a height of 875 mm.

Where a vehicle is equipped to carry luggage on the roof, a uniformly distributed mass (BX) of not less than that declared by the manufacturer in accordance with paragraph 3.2.3.2.1. of Annex 11, representing such baggage shall be secured to the roof. The other baggage compartments shall not contain any baggage."

Paragraph 7.5.2.3., amend to read:

"7.5.2.3. Every electrical circuit feeding an item of equipment other than the starter, the ignition circuit (positive ignition), the glow-plugs, the engine-stopping device, the charging circuit and the battery earth connection shall include a fuse or a circuit breaker. Circuits feeding other equipments may, however, be protected by a common fuse or a common circuit-breaker, provided that their sum rated capacity does not exceed the capacity of a fuse or of a circuit-breaker. In the case of multiplexing, the manufacturer shall give all the relevant technical information at the request of the technical service responsible for conducting the tests."

Paragraph 7.6.7.3., amend to read:

7.6.7.3. Every control or device for opening an emergency door (on the lower deck in the case of a double deck vehicle) from the outside shall be between 1,000 mm and 1,500 mm from the ground and not more than 500 mm from the door. In vehicles of Classes I, II and III every control or device for opening an emergency door from the inside shall be between 1,000 mm and 1,500 mm from the upper surface of the floor or step nearest to the control and be not more than 500 mm from the door. This shall not apply to controls located within the driver's area.

Alternatively, the control referred to in paragraph 7.6.7.2. for opening a power-operated door may be placed according to paragraph 7.6.5.1.2."

Annex 11, amend to read:

"Annex 11

MASSES AND DIMENSIONS

1. This annex applies to the masses and dimensions of vehicles of categories M2 and M3 in so far as they are necessary for the approval of a vehicle in respect of its general construction.

2. DEFINITIONS

For the purposes of this annex:

2.1. "Group of axles" means axles being part of a bogie. A two-axle group is called a tandem and a tri-axle group a tri-axle bogie. By convention, a solo axle is considered as a group of one axle.

2.2. "Vehicle dimensions" means the dimensions of the vehicle based on its construction, as stated by the manufacturer.

2.2.1. "Vehicle length" is a dimension which is measured according to ISO standard 612-1978, term No. 6.1.

In addition to the provisions of that standard, when measuring the vehicle length the following devices shall not be taken into account:

- (a) wiper and washer devices,
- (b) front or rear marking-plates,
- (c) customs sealing devices and their protection,
- (d) devices for securing the tarpaulin and their protection,
- (e) lighting equipment,
- (f) mirrors and other devices for indirect vision,
- (g) watching aids,
- (h) air-intake pipes,
- (i) length stops for demountable bodies,
- (j) access steps and hand-holds,
- (k) ram rubbers and similar equipment,
- (l) lifting platforms, access ramps and similar equipment in running order, not exceeding 300 mm, provided that the loading capacity of the vehicle is not increased,
- (m) coupling devices for motor vehicles,
- (n) trolley booms of electrically-propelled vehicles,
- (o) external sun visors.

2.2.2. "Vehicle width" is a dimension which is measured according to ISO standard 612-1978, term No. 6.2.

In addition to the provisions of that standard, when measuring the vehicle width the following devices shall not be taken into account:

- (a) customs sealing devices and their protection,
- (b) devices for securing the tarpaulin and their protection,
- (c) tyre failure tell-tale devices,
- (d) protruding flexible parts of a spray-suppression,
- (e) lighting equipment,
- (f) access ramps in running order, lifting platforms and similar equipment in running order provided that they do not exceed 10 mm from the side of the vehicle and the corners of the ramps facing forwards or rearwards are rounded to a radius of not less than 5 mm; the edges shall be rounded to a radius of not less than 2.5 mm,
- (g) mirrors and other devices for indirect vision,
- (h) tyre-pressure indicators,
- (i) retractable steps,
- (j) the deflected part of the tyre walls immediately above the point of contact with the ground,
- (k) watching aids,
- (l) retractable lateral guidance devices on buses and coaches intended for use on guided bus systems, if not retracted,
- (m) service door lighting devices

- 2.2.3. "Vehicle height" is a dimension which is measured according to ISO standards 612-1978, term No. 6.3.

In addition to the provisions of that standard, when measuring the vehicle height the following devices shall not be taken into account:

- (a) aerials,
- (b) pantographs or trolley booms in their elevated position.

For vehicles with an axle-lift device, the effect of this device shall be taken into account.

- 2.3. "Technically permissible maximum mass on the axle (m)" means the mass corresponding to the maximum permissible static vertical load exerted by the axle on the road surface, based on the construction of the vehicle and of the axle and as stated by the vehicle manufacturer.
- 2.4. "Technically permissible maximum mass on a group of axles (μ)" means the mass corresponding to the maximum permissible static vertical load exerted by the group of axles on the road surface, based on both the construction of the vehicle and of the group of axles and as stated by the vehicle manufacturer.
- 2.5. "Towable mass" means the total load exerted on the road surface by the axle(s) of the towed vehicle(s).

- 2.6. "Technically permissible maximum towable mass (TM)" means the maximum towable mass stated by the manufacturer.
- 2.7. "Technically permissible maximum mass on the coupling point of a vehicle" means the mass corresponding to the maximum permissible static vertical load on the coupling point based on the construction of the vehicle and/or coupling device and as stated by the manufacturer. By definition, this mass does not include the mass of the coupling device of the vehicle.
- 2.8. "Technically permissible maximum laden mass of the combination (MC)" means the total mass of a combination of vehicle and trailer(s) as stated by the manufacturer.
- 2.9. "Axle-lift device" means a device permanently fitted to a vehicle for the purpose of reducing or increasing the load on the axle(s), according to the loading conditions of the vehicle:
- (a) either by raising the wheels clear off the ground/lowering them to the ground,
 - (b) or without raising the wheels off the ground, (e.g. in the case of air suspension systems, or other systems),
- in order to reduce the wear on the tyres when the vehicle is not fully laden, and/or make starting (moving off) on slippery ground easier for vehicles or vehicle combinations, by increasing the load on the driving axle.

3. REQUIREMENTS

3.1. Measurement of the mass of the vehicle in running order and of its distribution among the axles

The mass of the vehicle in running order and its distribution on the axles are measured on the vehicle(s) submitted in accordance with paragraph 3.4. of this Regulation placed in a stationary position with their wheels set straight ahead. If the measured masses differ by no more than 3 per cent from the masses stated by the manufacturer for the corresponding technical configurations within the type, or by no more than 5 per cent if the vehicle is of category M2 not exceeding 3500 kg, the masses in running order and their distribution among the axles as stated by the manufacturer are used for the purpose of the requirements below. Otherwise the measured masses shall be used and the technical service may then, if necessary, carry out additional measurements on vehicle(s) other than those submitted in accordance with paragraph 3.4. of this Regulation.

3.2. Mass distribution calculations

3.2.1. Calculation procedure

3.2.1.1. For the purpose of the mass distribution calculations hereafter laid down, the manufacturer shall provide the technical service in charge of the tests, with the information (in tabular or any other appropriate form) necessary to identify for each technical configuration within the vehicle type the corresponding technically permissible maximum laden mass of the vehicle, the technically permissible maximum masses on the axles and groups of axles, the technically permissible maximum towable mass, and the technically permissible maximum laden mass of the combination.

3.2.1.2. Suitable calculations shall be carried out in order to make sure that the following requirements are fulfilled for each technical configuration within the type. For this purpose, the calculations may be limited to the worst cases.

3.2.1.3. In the following requirements, the notations M , m_i , μ_j , TM , and MC respectively designate the following parameters, for which the requirements of paragraph 3.2. shall be fulfilled:

M = the technically permissible maximum laden mass of the vehicle,

m_i = the technically permissible maximum mass on the axle designated 'i', where 'i' varies from 1 to the total number of axles of the vehicle,

μ_j = the technically permissible maximum mass on the solo axle or group of axles designated 'j', where 'j' varies from 1 to the total number of solo axles and groups of axles,

TM = the technically permissible maximum towable mass, and

MC = the technically permissible maximum laden mass of the combination.

3.2.1.4. In the case of a solo axle, designated 'i' as an axle and 'j' as a group of axles, $m_i = \mu_j$ by definition.

3.2.1.5. In the case of vehicles fitted with loadable axles, the calculations required by paragraph 3.2.1.2. shall be carried out with the suspension of the axles loaded in the normal running configuration. In the case of vehicles fitted with retractable axles, the calculations required by paragraph 3.2.1.2. shall be carried out with the axles lowered.

3.2.1.6. For groups of axles, the manufacturer shall indicate the laws of distribution among the axles of the total mass applied to the group (for instance by stating the distribution formulae or producing distribution graphs).

3.2.2. Loading limitations

3.2.2.1. The sum of the masses m_i shall not be less than the mass M .

3.2.2.2. For each group of axles designated 'j', the sum of the masses m_i on its axles shall not be less than the mass μ_j . In addition, each of the masses m_i shall not be less than the part of μ_j applying on the axle 'i' as determined by the mass distribution laws for that group of axles.

3.2.2.3. The sum of the masses μ_j shall not be less than the mass M .

3.2.2.4. MC shall not exceed $M + TM$.

3.2.3. Loading conditions

3.2.3.1. The mass of the vehicle in running order, plus the mass Q multiplied by the number of seated and standing passengers, plus the masses WP , B and BX as defined in paragraph 3.2.3.2.1., plus the technical permissible maximum mass on the coupling point, if a coupling is fitted by the manufacturer, shall not exceed the mass M .

3.2.3.2. When the vehicle in running order is laden as described in paragraph 3.2.3.2.1., the mass corresponding to the load on each axle shall not exceed the mass m_i on each axle, and the mass corresponding to the load on each solo axle or group of axles shall not exceed the mass μ_j on that group of axles. Moreover, the mass corresponding to the load on the driving axle or the sum of masses, corresponding to the loads on the driving axles shall be at least 25 per cent of M .

3.2.3.2.1. The vehicle in running order is loaded with: a mass corresponding to the number P of seated passengers, of mass Q ; a mass corresponding to the number SP of standing passengers, of mass Q uniformly distributed over the surface available for standing passengers S_1 ; where appropriate, a mass WP uniformly distributed over each wheelchair space; a mass equal to B (kg) uniformly distributed in the baggage compartments; a mass equal to BX (kg) uniformly distributed over the surface area of the roof equipped for the carriage of baggage, where:

P is the number of seated passengers.

S_1 is the area for standing passengers. In the case of vehicles of classes III or B, $S_1 = 0$.

SP , declared by the manufacturer, shall not exceed the value S_1/S_{Sp} , where S_{Sp} is the conventional space provided for one standing passenger specified in the table below.

WP (kg), is the number of wheelchair spaces multiplied by 250 kg representing the mass of a wheelchair and user.

B (kg), declared by the manufacturer, shall have a numeric value not less than $100 \times V$. This shall include baggage compartments or racks that may be attached to the outside of the vehicle.

V is the total volume of baggage compartments in m^3 . When approving a vehicle of Class I or A, the volume of baggage compartments accessible only from the outside of the vehicle shall be disregarded.

BX, declared by the manufacturer, shall have a numeric value not less than 75 kg/m^2 .

Double deck vehicles shall not be equipped for the carriage of baggage on the roof and therefore BX for double deck vehicles shall be zero.

Q and S_{Sp} have values laid down in the following table:

Vehicle class	Q (kg) mass of one passenger	S_{Sp} (m^2 /passenger) conventional space for one standing passenger
Class I and A	68	0.125
Class II	71 (*)	0.15
Class III and B	71 (*)	None

(*) Including 3 kg for hand baggage.

- 3.2.3.2.2. In the case of a vehicle equipped with a variable seating capacity, area available for standing passengers (S_1) and/or equipped for the carriage of wheelchairs, the requirements of paragraphs 3.2.3.1. and 3.2.3.2. shall be determined for each of the following conditions as applicable:
- 3.2.3.2.2.1. With all possible seats occupied followed by the remaining area for standing passengers (up to the standing capacity limit declared by the manufacturer, if reached, excluding areas designated for use exclusively by wheelchair users) and, if space remains, any wheelchair spaces occupied;
- 3.2.3.2.2.2. With all possible standing areas occupied (up to the standing capacity limit declared by the manufacturer excluding areas designated for use exclusively by wheelchair users), followed by the remaining seats available for seated passengers and, if space remains, any wheelchair spaces occupied;
- 3.2.3.2.2.3. With all possible wheelchair spaces occupied followed by the remaining area for standing passengers (up to the standing capacity limit declared by the manufacturer, if reached) and then the remaining seats available for use occupied.

- 3.2.3.3. When the vehicle is in running order or laden as specified in paragraph 3.2.3.2.1., the mass corresponding to the load on the front axle or group of axles shall not be less than the percentage of the mass of the vehicle in running order or of the technically permissible maximum laden mass 'M' laid down in the following table:

Classes I and A		Class II		Classes III and B	
Rigid	Articulated	Rigid	Articulated	Rigid	Articulated
20	20	25 (1)	20	25 (1)	20

(1) This figure is reduced to 20% for 3 axle vehicles of classes II and III having two steered axles.

- 3.2.3.4. Where a vehicle is to be approved to more than one Class, paragraphs 3.2.3.1. and 3.2.3.2. shall apply to each Class.

3.3. Marking of vehicles

- 3.3.1. The vehicle shall be clearly marked on the inside in a position visible to the driver in his seating position:

3.3.1.1. in letters or pictograms not less than 10 mm high and numbers not less than 12 mm high, with:

3.3.1.1.1. the maximum number of seating places the vehicle is designed to carry;

3.3.1.1.2. the maximum number of standing places, if any, the vehicle is designed to carry;

3.3.1.1.3. the maximum number of wheelchairs which the vehicle is designed to carry, if any.

3.3.1.2. in letters or pictograms not less than 10 mm high and numbers not less than 12 mm high, with:

3.3.1.2.1. the mass of baggage which may be carried when the vehicle is fully loaded according to paragraph 3.2.3.

3.3.1.2.2. as appropriate this shall include the mass of baggage:

3.3.1.2.2.1. in baggage compartments (mass B, paragraph 3.2.3.2.1.);

3.3.1.2.2.2. on the roof if equipped for the carriage of baggage (mass BX, paragraph 3.2.3.2.1.).

3.3.2. Space shall be provided adjacent to the above markings allowing the vehicle to be marked, in letters or pictograms not less than 10 mm high and numbers not less than 12 mm high, with the mass of baggage B and BX which may be carried when the vehicle is loaded with the maximum number of passengers and crew and the vehicle is not exceeding the maximum laden mass, or the maximum mass of any axle or group of axles at which the vehicle can be put into service in the Contracting Party where it is to be registered. Contracting Parties that require the marking of this mass shall, in agreement with the manufacturer, determine the mass of baggage to be marked and take the necessary measures to ensure that vehicles are so marked prior to their registration.

3.4. Manoeuvrability

3.4.1. Any vehicle must be able to manoeuvre on either side for a complete circular trajectory of 360° inside an area defined by two concentric circles, the outer circle having a radius of 12.50 m and the inner circle having a radius of 5.30 m, without any of the vehicle's outermost points (with the exception of the protruding parts excluded from the measurement of the vehicle width) projecting outside the circumferences of the circles. For vehicles with axle-lift devices, this requirement also applies with the retractable axle(s) in the lifted position or loadable axle(s) in the unladen condition.

3.4.1.1. The requirements of paragraph 3.4.1. shall be verified with the outermost front point of the vehicle guided along the contour of the outer circle (see figure A).

3.4.2. With the vehicle stationary, a vertical plane tangential to the side of the vehicle and facing outwards from the circle shall be established by marking a line on the ground. In the case of an articulated vehicle, the two rigid portions shall be aligned with the plane. When the vehicle moves from a straight line approach into the circular area described in paragraph 3.4.1., no part of it shall move outside of that vertical plane by more than 0,60 m (see figures B and C).

Figure A

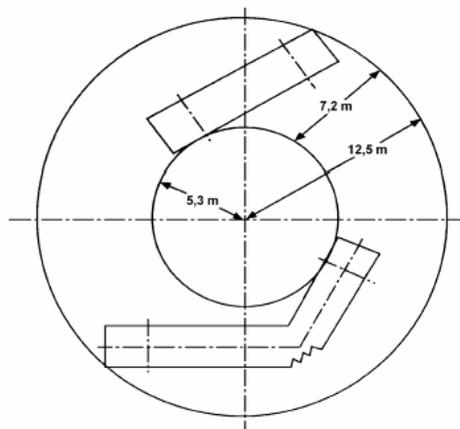
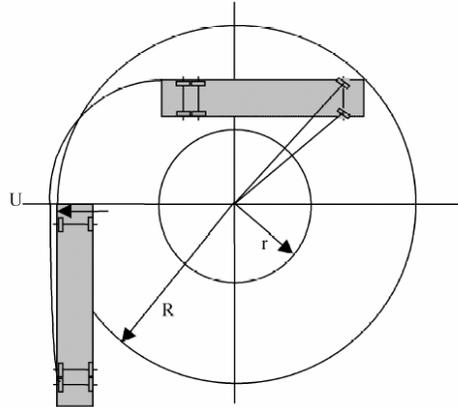
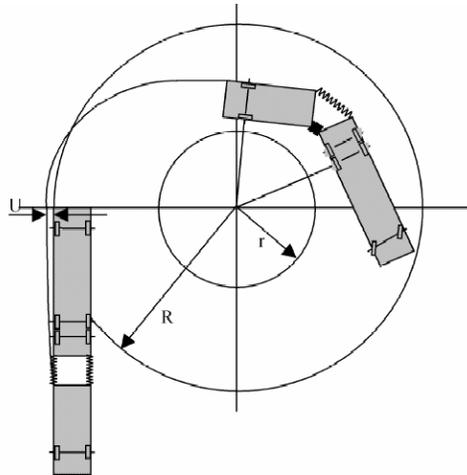


Figure B



$R = 12.5 \text{ m}$
 $r = 5.3 \text{ m}$
 $U = \text{maximum } 0.6 \text{ m}$

Figure C



$R = 12.5 \text{ m}$
 $r = 5.3 \text{ m}$
 $U = \text{maximum } 0.6 \text{ m}$

- 3.4.3. The requirements of paragraphs 3.4.1. and 3.4.2. may also be verified, at the request of the manufacturer, with an appropriate equivalent calculation or geometric demonstration.
- 3.4.4. In the case of incomplete vehicles, the manufacturer shall declare the maximum permissible dimensions for which the vehicle is to be checked against the requirements of paragraphs 3.4.1. and 3.4.2."
