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Regulations Nos. 13 and 13-H (Braking) – Clarifications

Proposal for amendments to Regulation No. 13 (Heavy vehicle braking) and 13-H (Brakes of M₁ and N₁ vehicles)

Submitted by the experts from Germany*

The text reproduced below was prepared by the experts from Germany to clarify that beside an electromechanical transmission device also an electrical or a hydraulic transmission device is allowed within such a system. The modifications to the existing text of the Regulation are marked in bold for new or strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2010–2014 (ECE/TRANS/208, para. 106 and ECE/TRANS/2010/8, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

I. Proposal

Proposal for Supplement 11 to the 11 series of amendments to Regulation No. 13

Paragraph 5.2.1.19.1, amend to read:

"5.2.1.19.1. The power supply (generator and battery) of the power-driven vehicle shall have a sufficient capacity to provide the current for an electrical braking system. With the engine running at the idling speed recommended by the manufacturer and all electrical devices supplied by the manufacturer as standard equipment of the vehicle switched on, the voltage in the electrical **energy supply line lines for the electrical braking system of the trailer** shall at maximum current consumption of the electrical braking system (15 A) not fall below the value of **[11.1] 9.6** V measured at the connection. The electrical lines shall not be capable of short circuiting even when overloaded;"

Annex 14 Title, amend to read:

"Test conditions for trailers **of categories O₁ and O₂** with electrical braking systems."

Annex 14, Paragraph 1.1., amend to read:

"1.1. For the purposes of the following provisions electrical braking systems are service braking systems consisting of a control device, an electromechanical **or electrohydraulic** transmission device, and friction brakes. The electrical control device regulating the ~~voltage~~ **braking force** for the trailer shall be situated on the trailer."

Annex 14, insert new paragraph 1.4.1., to read:

"1.4.1. **During the tests of para. 3., the electrical braking system shall be supplied with a test voltage of maximum 13 V, measured at the energy supply connector. This voltage shall not be exceeded anywhere in the electrical trailer braking system.**"

Annex 14, Paragraph 1.5, amend to read:

"1.5. The maximum current consumption, **measured anyplace in the system including the supply line between the towing vehicle and the trailer**, shall not exceed 15 A. **During the measurement of the current an inrush peak current with duration of less than 0.2 seconds shall not be taken into account.**"

Annex 14, Paragraph 1.6, amend to read:

"1.6. The electrical connection of the electrical braking system to the towing vehicle shall be effected by means of a special plug and socket connection corresponding to 1/, the plug of which shall not be compatible with the sockets of the lighting equipment of the vehicle. **In the case of articulated vehicle combinations, the plug together with the cable shall be situated on the trailer a part of the power-driven vehicle. In all other cases, the plug together with the cable shall be a part of the trailer.**

1/ Under study. The chosen plug/socket combination shall have the same reliability and functional safety as the well-known plug/socket combination according ISO7638."

Annex 14, Paragraph 2.1, amend to read:

- "2.1. If, **for the purpose of exclusively auxiliary equipment or exclusively automatic braking**, there is a battery on the trailer fed by the power supply unit of the towing vehicle, it shall be separated from its supply line during service braking of the trailer."

Annex 14, Paragraph 2.3, amend to read:

- "2.3. Electrical braking systems shall be such that even when the voltage in the **energy supply line connection lines between the towing vehicle and the trailer or the voltage of the battery on the trailer for the energy supply to the trailer brakes** is reduced to a value of 7 V, a braking effect of 20 per cent of the (sum of the) maximum stationary axle load(s) is maintained."

Annex 14, Paragraph 2.5, amend to read:

- "2.5. The relay for actuating the ~~braking current~~ **trailer brakes in accordance with paragraph 5.2.1.19.2. of this Regulation**, which is connected to the-actuating line, shall be situated on the trailer."

Annex 14, Paragraph 2.7, amend to read:

- "2.7. A tell-tale shall be provided ~~at the control device~~ **within the driver's direct or indirect field of vision**, lighting up at any brake application and indicating the proper functioning of the trailer electrical braking system."

Annex 14, Paragraph 3.4, amend to read:

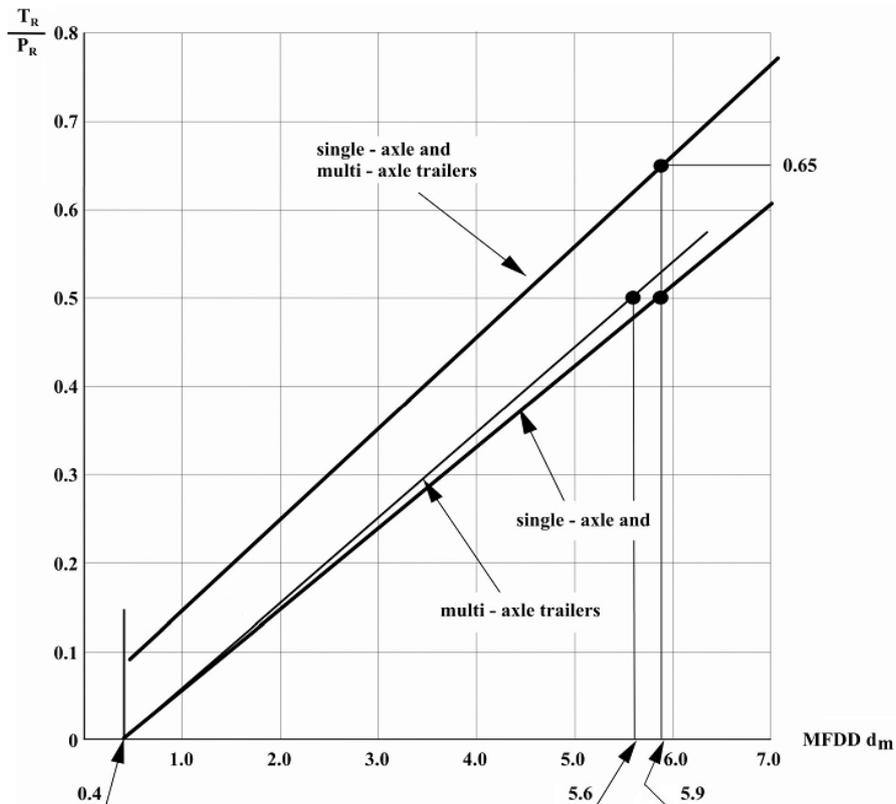
- "3.4. The prescribed braking force of the trailer of at least 50 per cent of the maximum total axle load shall be attained - with maximum mass - in the case of a mean fully developed deceleration of the tractor/trailer combination of not more than 5.9 m/s² with ~~single-axle~~ **centre-axle trailers and semi-trailers** and of not more than 5.6 m/s² with ~~multi-axle~~ **full trailers**. ~~Trailers with close-coupled axles where the axle spread is less than 1 m are also considered as single-axle trailers within the meaning of this provision.~~ Moreover, the limits as defined in the appendix to this annex shall be observed. If the braking force is regulated in steps, they shall lie within the range shown in the appendix to this annex."

Annex 14-Appendix, amend to read:

Annex 14 - Appendix

Compatibility of the braking rate of the trailer and the mean fully developed deceleration of the tractor/trailer combination (trailer laden and unladen)

In the diagram the terms "centre-axle trailer" and "semi-trailer" shall be used in stead of "single-axle trailer". The term "full trailer" shall be used in stead of "multi-axle trailer".



Notes:

1. Limits indicated in the diagram refer to laden and unladen trailers. When the trailer unladen mass exceeds 75 per cent of its maximum mass, limits shall be applied only to "laden" conditions.

2. Limits indicated in the diagram do not affect the provisions of this annex regarding the minimum braking performances required. However, if braking performances obtained during test – in accordance with provisions indicated in paragraph 3.4. of this annex - are greater than those required, said performances shall not exceed the limits indicated in the above diagram.

T_R = sum of braking forces at periphery of all wheels of trailer.

P_R = total normal static reaction of road surface on wheels of trailer.

d_m = mean fully developed deceleration of tractor/trailer combination.

Proposal for Supplement 16 to the 00 series of amendments to Regulation No. 13

Paragraph 5.2.1.17.1, amend to read:

"5.2.17.1. The power supply (generator and battery) of the motor vehicle shall have a sufficient capacity to provide the current for an electric braking system. With the engine running at the idling speed recommended by the manufacturer and all electrical devices supplied by the manufacturer as standard equipment of the vehicle switched on, the voltage in the electrical **energy supply line lines for the electrical braking system of the trailer** shall at maximum current consumption of the electrical braking system (15 A) not fall below the value of **11.1** ~~9.6~~ V measured at the connection. The electrical lines shall not be capable of short circuiting even when overloaded..."

II. Justification

UN Regulation No. 13, Paragraph 5.2.1.19.1., and UN Regulation No 13-H, Paragraph 5.2.1.17.1,

1. For clarification, the current text: "*the voltage in the electrical lines shall at maximum current consumption of the electrical braking system (15 A) not fall below the value of 9.6 V*" is not clear. What is meant by "*the voltage in the electrical lines*"? It must be the supply line for the electrical braking system of the trailer. The proposed text makes that clear.

2. A voltage of 9.6 V at the end of the energy supply line is unnecessary low and such a low value may have a negative effect on the braking energy of the trailer and may lead to a lower safety level. The proposed value of a voltage loss of 0.9 V is a value mentioned in literature for the lead from the light switch to lamps > 15W.

UN Regulation No. 13, Annex 14, Title, amend to read:

3. "categories O₁ and O₂" are added for clarification.

UN Regulation No. 13, Annex Paragraph 1.1.,

4. "Nominal" 12 V (par. 1.4.) is in practice a higher voltage. However it differs from vehicle to vehicle. Therefore it is more objective and clear to prescribe the voltage during the test and the place where it should be measured. This requirement is analogous to UN Regulation No. 28 (Audible warning), paras. 6.2.3. and 14.4.

5. The restriction to 12- c.q. 13 V is necessary to prevent e.g. 24 V systems on the trailer. E.g., the capacity of the battery on the trailer would be relevant in that case. The current proposed rules do not provide requirements for the capacity of the battery on the trailer, other than para. 2.3 (brake force with 7V).

UN Regulation No. 13, Annex 14, Paragraph 1.4.1.,

6. Justification, "nominal" 12 V (para. 1.4.) is in practice a higher voltage. However it differs from vehicle to vehicle. Therefore it is more objective and clear to prescribe the voltage during the test and the place where it should be measured. This requirement is analogous to UN Regulation No. 28 (Audible warning) paras. 6.2.3. and 14.4.

7. The restriction to 12 - c.q. 13 V is necessary to prevent e.g. 24 V systems on the trailer. E.g., the capacity of the battery on the trailer would be relevant in that case. The proposed rules don't provide requirements for the capacity of the battery on the trailer, other than para. 2.3 (brake force with 7 V).

UN Regulation No. 13, Annex 14, Paragraph 1.5.,

8. The proposed text clarifies where the maximum current of 15 A has to be measured, not only between the towing vehicle and the trailer, but also between an optional battery (for the energy supply of the electric brakes) and the brakes. When the brakes are applied there is often a peak current. It should be clear that such a peak current can be permitted when the duration is less than 0.2 seconds. The base of this value is in UN Regulation No. 79 (steering equipment) par. 6.2.3 (measurement of the steering effort).

UN Regulation No. 13, Annex 14, Paragraph 1.6 and deletion of footnote 1,

9. Nowadays many semitrailers are equipped with electrical braking systems. When separated from the towing vehicle the cable and connector are easily damaged. And to bring the requirements for the electric braking system in line with the requirements for air braking systems, UN Regulation No. 13 para. 5.1.3.8.

UN Regulation No. 13, Annex 14, Paragraph 2.1.,

10. It does not make sense to apply this requirement to a battery on the trailer which supplies the energy for the electric braking system. The term "exclusively" is used to take into account systems which use the battery for both the brakes and the auxiliary or automatic braking.

UN Regulation No. 13, Annex 14, Paragraph 2.3.,

11. For clarification, the current text does not make clear where the voltage has to be measured. The text mentions the battery on the trailer (for the energy supply of the trailer brakes) to make this possibility clear. For safety reasons this requirement shall also apply to a battery on the trailer.

UN Regulation No. 13, Annex 14, Paragraph 2.5.,

12. For clarification and to allow systems, which use a battery on the trailer for the energy supply to the trailer brakes.

UN Regulation No. 13, Annex 14, Paragraph 2.7.,

13. A tell-tale at the control device is sometimes not visible for the driver.

14. Similar to UN Regulation No. 55, Annex 5, para. 12.2.9.

UN Regulation No. 13, Annex 14, Paragraph 3.4 and Appendix (diagram),

15. It is not clear which requirements should be applied to semi-trailers. The current requirements apply to single axle trailers and multi axle trailers. That could be interpreted as centre axle trailers and full trailers.

16. The prescriptions regarding the axle spread are not relevant if the terms "centre-axle trailer", "semitrailer" and "full trailer" are used.

17. Therefore the diagram in the appendix to Annex 14 also has to be amended accordingly.