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UN Regulations Nos. 13, 13-H, 139, 140 and UN GTR No. 8: Clarifications

Proposal for amendments to UN Regulation No. 13 (Heavy Vehicle Braking)

Submitted by the experts from the International Association of the Body and Trailer Building Industry, CLEPA and OICA*

The text reproduced below was prepared by the experts from the International Association of the Body and Trailer Building Industry (CLCCR), the European Association of Automotive Suppliers (CLEPA) and International Organization of Motor Vehicle Manufacturers (OICA). It proposes to insert provisions for the approval braking systems for e-trailers and Electric Regenerative Braking (ERB) in towed vehicles of Category O. The modifications to the existing text of the Regulation are marked in bold for new characters and in bold strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2025 as outlined in proposed programme budget for 2025 (A/79/6 (Sect. 20), table 20.6), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

Proposal

Paragraph 2.2.2.4., amend to read:

2.2.2.4. A different type of braking equipment [or any presence of an electric regenerative braking system and/or any presence of an electric propulsion system.

Paragraph 2.21., amend to read:

2.21. *"Electric **R**egenerative **B**raking **(ERB)"*** means a braking system which, during deceleration, **and/or while being towed, in case of vehicles of Category O,** provides for the conversion of vehicle kinetic energy into electrical energy.

Add a new Paragraph 2.56., to read:

2.56. ***"e-trailer"*** **means a trailer that is able to contribute to the propulsion of the vehicle combination by using its own electric powertrain.**

Paragraph 5.2.2.7., amend to read:

5.2.2.7. The braking surfaces required to attain the prescribed degree of effectiveness shall be in constant connection with the wheels, either rigidly or through components not liable to failure. **Where braking torque for a particular axle or axles is provided by both a friction braking system and an electrical regenerative braking system of Category B, disconnection of the latter source is permitted, providing that the friction braking source remains permanently connected.**

Insert new paragraph 5.2.2.26., to read:

5**.2.2.26. Special additional requirements for trailers of Category O_3 or O_4 equipped with electric regenerative braking system**

The requirements in the following sub-paragraphs apply to trailers with or without propulsion capabilities. However, trailers without propulsion capabilities, equipped with an ERB system able to provide a retardation power of not more than 20kW are exempted from:

(a) All the following sub-paragraphs if the generated brake rate never exceeds 0.04 (for each axle);

(b) All the following sub-paragraphs except 5.2.2.26.1.2. if the generated brake rate can exceed 0.04 (for each axle).

5.2.2.26.1. General requirements

5.2.2.26.1.1. In the case of trailers equipped with an electric regenerative braking system this system shall distribute its action appropriately among each side of the same axle where such a system is active.

5.2.2.26.1.2. The brake forces generated by the ERB of the trailer shall be controlled such that the wheel(s) braked by the ERB system are prevented from locking by that system at speeds above 15 km/h.

The vehicle manufacturer shall demonstrate during the Annex 18 assessment that the ERB system has no critical influence on the operation of the anti-lock system.

5.2.2.26.1.3. The brake forces generated by the ERB of the trailer, and the propulsion forces generated by an e-trailer, shall not impair the operation of Vehicle Stability Function (VSF) of the trailer. This shall be demonstrated during the Annex 18 assessment.

5.2.2.26.1.4. When the motor vehicle transmits the following messages via the data communication part of the electric control line, the e-trailer shall switch off the propulsion forces:

(a) "VDC active" EBS11 Byte 2, Bits 5-6 set to "active"

(b) A service/secondary braking demand value EBS11 Bytes 3-4

(c) A retarder demand value EBS11 Byte 6

(d) Vehicle retarder control active/passive EBS11 Byte 1 Bits 5 – 6

(e) Brake light switch EBS11 Byte 2 Bits 1 – 2

The propulsion forces shall also be switched off when a braking demand is present on the pneumatic control line and/or when the stop lamp electric signal is received.

5.2.2.26.1.5. Trailers shall be equipped with an electric control line conforming to ISO 11992-2:[2023/202x]. Additionally, they shall be able to identify whether the motor vehicle is equipped with an electric control line conforming to ISO 11992-2:[2023/202x], and implement the "handshake procedure between towing and towed vehicle" procedure as specified in ISO 11992-2:[2023/202x].

Additionally,

(a) The trailer shall support the relevant messages specified in Annex 16, providing information to the motor vehicle on the actual configuration and status of the trailer (with regard to the ERB and to the propelling function),

(b) The trailer shall execute the commands received from the motor vehicle (e.g. the "retarder demand value"),

(c) The retarder and the propulsion demand received from the motor vehicle (via message "retarder demand value") shall have priority on the demands elaborated within the trailer. A retarder demand value equal to "0" shall be interpreted by the trailer as a demand to cut-off both retardation and propulsion.

5.2.2.26.1.6. When the speed is higher than 15 km/h, the propulsion forces shall never exceed the overall driving resistance forces of the trailer.*

***footnote: this restriction will be reconsidered once technical progress will have ensured the stability of combination in those cases.**

5.2.2.26.1.7. The strategies implemented in the trailer to control the ERB system and the propulsion forces shall be described in the type approval documentation and be a part of the Annex 18 assessment.

5.2.2.26.2. Requirements applicable to the case where the trailer cannot communicate with the motor vehicle via the electric control line:

(a) The ERB system shall not provide a retardation power exceeding 20kW for the complete trailer.

(b) An e-trailer shall not provide any propulsion force.

5.2.2.26.3. Requirements applicable to the case where the communication between the trailer and the motor vehicle (via the electric control line) is operational:

5.2.2.26.3.1. In the case where the handshake procedure (specified in 5.2.2.26.1.5.) is not performed successfully:

(a) The ERB system may provide a retardation power exceeding 20kW for the complete trailer provided

(i) The motor vehicle is not in a traction phase, and

(ii) To be defined.

(b) An e-trailer may provide a propulsion force provided

(i) The motor vehicle is in a traction phase, and

(ii) To be defined.

The method by which the trailer fulfils the requirements above shall be described in the type approval documentation and be a part of the Annex 18 assessment.

5.2.2.26.3.2. In the case the case where the handshake procedure (specified in 5.2.2.26.1.5.) is performed successfully:

The trailer shall adapt the control strategy of the ERB and of the propulsion system to the value of the motor vehicle parameter "truck drive system control support:

0 - no drive system control support by truck,

1 - truck supports only negative torque to control drive systems in the trailer,

2 - truck supports only positive torque to control drive systems in the trailer,

3 - truck supports negative and positive torque to control drive systems in the trailer.

The influence of the value of motor vehicle parameter "truck drive system control support" on the trailer control strategies shall be described in the type approval documentation.

Annex 4, insert new paragraph 1.7.1.3. to read:

"1.7.1.3. In case of trailers equipped with an electric regenerative braking system the regenerative braking system shall be switched off during the brake applications."

Annex 4, insert new paragraph 3.1.2.6. to read:

"3.1.2.6. In case of trailers equipped with an electric regenerative braking system the regenerative braking system shall be switched off during the brake test."

Annex 4, insert new paragraph 3.1.3.5. to read:

"3.1.3.5. If the trailer is equipped with an electric regenerative braking system the regenerative braking system shall be switched off during the brake test."

Annex 13, Insert new paragraph 4.7. to read:

"4.7. Vehicles equipped with an electric regenerative braking system shall also be equipped with an anti-lock braking system acting at least on the service brakes of the electric regenerative braking system´s controlled axle and on the electric regenerative braking system itself, and shall fulfil the relevant requirements of this annex."

Annex 16, paragraph 2.4.1., amend table to read:

Function / Parameter	*ISO 11992-2:2003 Reference*
Vehicle type	EBS11 Byte 2, Bit 3-4
VDC (Vehicle Dynamic Control) Active / passive[1]	EBS11 Byte 2, Bit 5-6
Brake demand value for front or left side of vehicle	EBS11 Byte 7
…	
Trailer regenerative system demand value	…

Annex 16, paragraph 2.4.2., amend table to read:

Function / Parameter	*ISO 11992-2:2003 Reference*
Support of side or axle wise brake force distribution	EBS21 Byte 2, Bit 3-4
Wheel based vehicle speed	EBS21 Byte 3-4
Lateral acceleration	EBS21 Byte 8
…	
Actual trailer regenerative braking system torque	…