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 The text highlighted in green was accepted by the group and validated during this session.

The text highlighted in yellowis awaiting further contributions which could either leave the text as it stands, modify it or withdraw it from the proposal.

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 Proposal for amendments to the 14 series of amendments to UN Regulation No. 13 (Heavy vehicle braking)

The text reproduced below was prepared by the experts from the Task Force on Fitness for Automated Driving Systems (TF on FADS). The proposed amendments aim to adapt the regulation to allow for the approval of vehicles equipped with an Automated Driving System but without any manual driving mode, or with a manual driving mode only intended for use in limited circumstances.

The modifications to the exiting text of the Regulation are marked in **red bold** for new characters and ~~red strikethrough~~ for deleted characters. Items for which TF-FADS requires further discussion to reach consensus are highlighted in yellow. In particular, footnotes indicate items that FADS agrees should be tackled but has not determined yet whether they should be solved *via* amendments to this Regulation.

1. Proposal

*Delete paragraph 1.2.5.*:

1.2. This Regulation does not cover:

…

* + 1. ~~Vehicles of Categories M2, M3 and N, which are not equipped with manual braking controls intended for use during normal operation.~~

*Paragraph 2.3.,* amend to read:

2.3. "*Braking system*" means the combination of parts whose function is progressively to reduce the speed of a moving vehicle or bring it to a halt, or to keep it stationary if it is already halted; these functions are specified in paragraph 5.1.2. The system consists of the control **(if any),** the transmission, and the brake proper;

*Paragraph 2.34.2.1.,* amend to read:

2.34.2. Control functions within a vehicle stability function:

2.34.2.1. "*Directional control*" means a function within a vehicle stability function that assists the driver **or the ADS**, in the event of under steer and over steer conditions, within the physical limits of the vehicle in maintaining the direction intended by the driver **or the ADS** in the case of a power-driven vehicle and assists in maintaining the direction of the trailer with that of the towing vehicle in the case of a trailer.

*Paragraph 5.1.2.1.,* amend to read:

5.1.2.1. Service braking system

 The service braking system shall make it possible to control the movement of the vehicle and to halt it safely, speedily and effectively, whatever its speed and load, on any up or down gradient. It shall be possible to graduate this braking action. ~~The~~ **A** driver**, if any,** shall be able to achieve this braking action from his driving seat without removing his hands from the steering control.

*Paragraph 5.1.2.2.,* amend to read:

5.1.2.2. Secondary braking system

 The secondary braking system shall make it possible to halt the vehicle within a reasonable distance in the event of failure of the service braking system. It shall be possible to graduate this braking action. ~~The~~ **A** driver**, if any,** shall be able to obtain this braking action from his driving seat while keeping at least one hand on the steering control. For the purposes of these provisions it is assumed that not more than one failure of the service braking system can occur at one time.

*Paragraph 5.1.2.3.,* amend to read:

5.1.2.3. Parking braking system

 The parking braking system shall make it possible to hold the vehicle stationary on an up or down gradient even in the absence of the driver, the working parts being then held in the locked position by a purely mechanical device. ~~The~~ **A driver, if any,** shall be able to achieve this braking action from his driving seat, subject, in the case of a trailer, to the provisions of paragraph 5.2.2.10. of this Regulation. The trailer air brake and the parking braking system of the towing vehicle may be operated simultaneously provided that the driver **or the ADS (as appropriate)** is able to check, at any time, that the parking brake performance of the vehicle combination, obtained by the purely mechanical action of the parking braking system, is sufficient.

*Paragraph 5.1.4.7,* amend to read:

5.1.4.7. It shall be possible to verify, in a frequent and simple way, the correct operational status of those ~~complex~~ electronic systems which have control over braking. If special information is needed, this shall be made freely available.

*Paragraph 5.2.1.2.1., amend to read*:

5.2.1.2. The systems providing service, secondary and parking braking may have common components so long as they fulfil the following conditions:

5.2.1.2.1. **Except for vehicles of categories X and Y,** there shall be at least two controls, independent of each other and readily accessible to the driver from his normal driving position.**[[1]](#footnote-2)**

 For all categories of vehicles, except M2, ~~and~~ M3, X and Y, every brake control (excluding an endurance braking system control) shall be designed such that it returns to the fully off position when released. This requirement shall not apply to a parking brake control (or that part of a combined control) when it is mechanically locked in an applied position;

*Paragraph 5.2.1.2.7.2. amend to read*:

5.2.1.2.7.2. If the service braking force and transmission depend exclusively on the use, controlled by the driver or the ADS, of an energy reserve, there shall be at least two completely independent energy reserves, each provided with its own transmission likewise independent; each of them may act on the brakes of only two or more wheels so selected as to be capable of ensuring by themselves the prescribed degree of secondary braking without endangering the stability of the vehicle during braking; in addition, each of the aforesaid energy reserves shall *be equipped with a warning device as defined in paragraph 5.2.1.13. below****[[2]](#footnote-3)[[3]](#footnote-4)***;. In case of compressed-air braking systems, in each service braking circuit in at least one of the air reservoirs a device for draining and exhausting is required in an adequate and easily accessible position;

*~~Focus on paragraph 5.2.1.11.2.1.~~*~~:~~

~~5.2.1.11.2. Checking the wear of the service brake friction components~~

~~5.2.1.11.2.1. It shall be possible to easily assess this wear on service brake linings from the outside or underside of the vehicle, without the removal of the wheels, by the provision of appropriate inspection holes or by some other means. This may be achieved by utilizing simple standard workshop tools or common inspection equipment for vehicles.~~

 ~~Alternatively, a sensing device per wheel (twin wheels are considered as a single wheel), which~~ *~~will warn the driver at his driving position when lining replacement is necessary, is acceptable. In the case of an optical warning, the yellow warning signal specified in paragraph 5.2.1.29.1.2. below may be used~~*~~.~~**~~[[4]](#footnote-5)~~**

*~~Focus on paragraph 5.2.1.12.~~*~~:~~

~~5.2.1.12. In hydraulic-transmission braking systems, the filling ports of the fluid reservoirs shall be readily accessible; in addition, the receptacles containing the reserve fluid shall be so designed and constructed that the level of the reserve fluid can be easily checked without the receptacles having to be opened. If this latter condition is not fulfilled, the red warning signal specified in paragraph 5.2.1.29.1.1.~~ *~~shall draw the driver's attention to any fall in the level of reserve fluid liable to cause a failure of the braking system~~*~~.~~**~~[[5]](#footnote-6)[[6]](#footnote-7)~~** ~~The type of fluid to be used in the hydraulic transmission braking systems shall be identified by the symbol in accordance with figure 1 or 2 of Standard ISO 9128:2006. The symbol shall be affixed in a visible position in indelible form within 100 mm of the filling ports of the fluid reservoirs; additional information may be provided by the manufacturer.~~

*Paragraph 5.2.1.26.4.,* amend to read:

5.2.1.26.4. ~~After the ignition/start switch which controls the electrical energy for the braking equipment has been switched off and/or the key removed,~~ [**If the braking system is no longer energized,]** it shall remain possible to apply the parking braking system, whereas releasing by using the parking brake control shall be prevented.

However, the parking braking system may also be released when this action is part of an operation of a remote-control system fulfilling the technical requirements of an ACSF of Category A as specified in the 02 series of amendments to UN Regulation No. 79 or later series of amendments.

Furthermore, the parking brake shall be automatically applied, at least when the vehicle is detected to be stationary and additionally any of the following conditions is fulfilled:

(a) The ignition/start switch which controls the electrical energy for the braking equipment has been switched off and/or the key removed;

(b) The driver is deemed to leave the driving seat (e.g. via a detection of door opening, unfastening of seat belt). Alternatively, for vehicles of category M, the parking brake shall be automatically applied if no input to any control by the driver **[or an ADS]** nor any brakes application are detected for a time greater than 30 seconds.

However, the automatic application of the parking braking system may be suppressed by the driver (e.g. during maintenance operation, manoeuvring situations, to avoid park brake freezing in winter conditions) with a dedicated action (e.g. by pedal actuation, a switch).

*Paragraph 5.2.1.26.5.,* amend to read:

5.2.1.26.5. If the parking braking system detects a request (generated automatically or by the driver **or the ADS**):

 (a) To fully apply the parking brake (i.e. to reach the mechanically locked position of the parking brake), or

 (b) To gradually control the parking brake action,

The actuation of the warning as required in paragraph 2.6. of Annex 8 may be delayed until the parking brake system has detected the correct clamping of the parking brake. The yellow warning signal specified in paragraph 5.2.1.29.1.2. shall be displayed at the latest 10s rafter the request for a full parking brake application, in the case the stable state is not reached.

*~~Focus on paragraph 5.2.2.8.2.1.~~*~~:~~

~~5.2.2.8.2.1.~~ *~~It shall be possible to easily assess this wear on service brake linings from the outside or underside of the vehicle, without the removal of the wheels, by the provision of appropriate inspection holes or by some other means. This may be achieved by utilizing simple standard workshop tools or common inspection equipment for vehicles.~~* **~~[[7]](#footnote-8) [[8]](#footnote-9)~~**

 ~~Alternatively, a trailer mounted display providing information when lining replacement is necessary or a sensing device per wheel (twin wheels are considered as a single wheel), which will warn the driver at his driving position when lining replacement is necessary, is acceptable. In the case of an optical warning, the yellow warning signal specified in paragraph 5.2.1.29.2. above may be used provided that the signal complies with the requirements of paragraph 5.2.1.29.6. above.~~

*Paragraph 5.2.2.24.6.3.,* amend to read:

5.2.2.24.6.3. A towing trailer may only be operated in conjunction with a power-driven vehicle which is equipped with at least a pneumatic and an electric control line, as per 5.1.3.1.2. In the event of such a trailer being connected to a power-driven vehicle equipped with only an electric control line according to paragraph 5.1.3.1.3. it is considered that this combination is not compatible. In this case the towing trailer, when electrically connected to the power-driven vehicle, shall automatically apply the brakes of the trailer or remain braked. The driver shall be warned by the separate yellow warning signal **specified** in paragraph 5.2.1.29.2.

*Paragraph 5.3.3.,* amend to read:

5.3.3. Whilst ~~the~~ **an** ADS **feature** is active, ~~detected faults~~ **warnings (e.g. defect warning signals, [signals from a warning device]) and other information intended for the driver** as specified in this UN Regulation **(including those received from a trailer)** shall be transmitted to the ADS. **~~[Warning signals related to faults detected while the ADS is not active shall either be transmitted to the ADS or shall be stored and transmitted to the ADS the next time it is activated, as appropriate.]~~ [The means by which it is ensured that existing detected faults are transmitted to the ADS before an ADS feature becomes active (e.g. previously detected faults which remain present) shall be documented by the manufacturer and demonstrated in accordance with Annex 18.]**

*Insert 5.3.4.,* to read:

**5.3.4. ~~[Where ADS is acknowledged as an alternative to the driver in the current regulation, it shall be understood that the responsibility for the vehicle control is delegated to the ADS in the absence of a human driver, specifically for maintaining [stability], braking, and parking functions as defined in the present regulation in paragraph 5.1.2. and sub-paragraphs.]~~**

[~~It shall be ensured through technical means that the speed of vehicles of category X or Y cannot exceed 6 km/h whilst the vehicle is being manually driven.]~~

1. Justification

1. At its 190th session in June 2023, WP.29 endorsed the report (ECE/TRANS/WP.29/2023/86) transmitted by the expert groups on regulatory fitness for automated vehicles and invited the GRs to start the work on amending the regulations identified by the expert groups in the report.

2. At its seventeenth session in September 2023, the Working Party on Automated/Autonomous and Connected Vehicles (GRVA) agreed that the TF on FADS, which was tasked by GRVA to amend the UN Regulations and Global Technical Regulations under its purview to accommodate automated vehicles, should first submit amendments for automated vehicles, which are also equipped with controls for manual driving. This significantly reduces the number of changes needed regarding testing provisions, which can be carried out under manual driving, as well as those regarding definitions and requirements directly or indirectly related to the presence of a driver.

3. A detailed informal document, explaining the changes and gathering questions and answers regarding this proposal, has been transmitted to GRVA by the TF on FADS as document GRVA-18-33.

4. Where in the current vehicles categories, a driver-oriented warning strategy is essential, in a vehicle of categories X or Y, it might not be the case anymore. FADS has therefore tried to determine what should be the strategy to be expected from an ADS where no human driver is available to observe and respond to optical or acoustic signals. It is to be expected from an ADS to autonomously monitor, interpret, and address braking performance indicators thus ensuring that the system can promptly detect and respond to potential issues without relying on human intervention. [As of the 21st session of GRVA, this topic is still open (see WP29-194-16, horizontal topic Nos. 2 and 3)]

5. By transmitting all fault and warning signals to the ADS, the system can log, monitor, and use these inputs to interpret the same information that a human driver would receive, ensuring consistency in reactions, such as triggering emergency procedures or adaptive braking responses when faults are detected. [As of the 21st session of GRVA, this topic is still open (see WP29-194-16, horizontal topic Nos. 2 and 3)]

6. The proposed amendment to the existing paragraph 5.3.3. aim to ensure that the ADS, when active, can appropriately receive and process critical vehicle information, specifically warnings and fault signals that would otherwise be directed to the human driver. [As of the 21st session of GRVA, this topic is still open (see WP29-194-16, horizontal topic Nos. 2 and 3)]

7. Where the trailer is requested to the transmit an information to the towing vehicle it should be understood that the information shall be transmitted and therefore routed by the ADS.

1. **~~. It should be ensured through technical means that vehicles of category X or Y cannot exceed 6 km/h whilst the vehicle is being manually driven.~~**  [↑](#footnote-ref-2)
2. **~~[See horizontal topic 2 of WP29-194-16] For vehicles of categories X and Y, it should be ensured that the vehicle is capable of continuously monitoring the status of each energy reserve, that the vehicle is capable of detecting any potential failures or drops in energy levels, and that a proper warning strategy is in place.~~** [↑](#footnote-ref-3)
3. **~~[See horizontal topics 2 and 3 of WP29-194-16] When a remote operator is an essential requirement for the specific type of Automated Driving System (ADS), it shall be ensured that the vehicle has the capability to transmit maintenance alerts to a remote operator.~~** [↑](#footnote-ref-4)
4. **~~[See horizontal topics 2 and 3 of WP29-194-16] When a remote operator is an essential requirement for the specific type of Automated Driving System (ADS), it shall be ensured that the vehicle has the capability to transmit maintenance alerts to a remote operator.~~** [↑](#footnote-ref-5)
5. **[See horizontal topic 2 of WP29-194-16] For vehicles of categories X and Y, the management of information related to the fluid level in the reservoirs should be ensured, facilitating an appropriate response to warning signals indicating a drop in fluid levels that could impact braking performance.** [↑](#footnote-ref-6)
6. **[See horizontal topics 2 and 3 of WP29-194-16] When a remote operator is an essential requirement for the specific type of Automated Driving System (ADS), it shall be ensured that the vehicle has the capability to transmit alerts regarding a drop in fluid levels to a remote operator.** [↑](#footnote-ref-7)
7. **[See horizontal topic 2 of WP29-194-16] For vehicles of categories X and Y, it shall be made possible for the vehicle to forecast maintenance operations for braking system components, including but not limited to the service brake linings.**  [↑](#footnote-ref-8)
8. **[See horizontal topics 2 and 3 of WP29-194-16] When a remote operator is an essential requirement for the specific type of Automated Driving System (ADS), it shall be ensured that the vehicle has the capability to relay maintenance alerts to the remote operator** [↑](#footnote-ref-9)