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World Forum for Harmonization of Vehicle Regulations**Working Party on Automated/Autonomous and Connected Vehicles****Eighteenth session**

Geneva, 22-26 January 2024

Item 4(f) (i) of the provisional agenda

Automated/autonomous and connected vehicles:**Coordination of work on automation between working parties (GRs)****Fitness of UN GTRs and UN Regulations for ADS****Proposal for a supplement to the 13 series of amendments to
UN Regulation No. 13 (Heavy Vehicle Braking)****Submitted by the experts from the Task Force on Fitness for
Automated Driving Systems***

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 both an Automated Driving System and a manual driving mode. The modifications to the existing text of the Regulation are marked in bold for new characters and strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2024 as outlined in proposed programme budget for 2024 (A/78/6 (Sect. 20), table 20.5), 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.



I. Proposal

Insert a new paragraph 1.2.5.:

- “1.1. This Regulation applies to vehicles of categories M₂, M₃, N and O ⁽¹⁾ with regard to braking ⁽²⁾.
- 1.2. This Regulation does not cover:
 - 1.2.1. Vehicles with a design speed not exceeding 25 km/h;
 - 1.2.2. Trailers which may not be coupled to power-driven vehicles with a design speed exceeding 25 km/h;
 - 1.2.3. Vehicles fitted for invalid drivers;
 - 1.2.4. Hinged drawbar dolly, as defined in paragraph 2.43.1.;
- 1.2.5. Vehicles which are not equipped with manual braking controls intended for use during normal operation.**
- 1.3. Subject to the applicable provisions of this Regulation, the equipment, devices, methods and conditions enumerated in Annex 1 are not covered by this Regulation.”

Paragraphs 2.40. to 2.44., amend to read:

- “2.40. *"Brake electric/electronic interface"* means the part of a separable electrical/electronic connection between the towing vehicle and the towed vehicle which is dedicated to the braking system.
- 2.41. *"Automated connector"* means a system through which the electric and pneumatic connection, between the towing vehicle and towed vehicle is made automatically without direct intervention of a human operator.
- 2.42. *"Brake performance Estimator"* means a function estimating the available friction brake performance taking into account the effect of brake heat, operating by models considering inputs such as for example type and position of the brakes, number and intensity of brake applications, vehicle speed or ambient temperature.
- 2.43. A *"Towing trailer"* is a trailer which is equipped to tow another trailer.
- 2.43.1. A *"Dolly"* means a towing trailer designed for the sole purpose to tow a semi-trailer. A dolly may have a rigid or a hinged drawbar.
- 2.43.2. A *"Link-trailer"* is a semi-trailer equipped with a fifth wheel in its rear end enabling a second semi-trailer to be towed.
- 2.44. **“Automated Driving System (ADS)” means the vehicle hardware and software that are collectively capable of performing the entire Dynamic Driving Task (DDT) on a sustained basis.**
- 2.44.1. **“Dynamic Driving Task (DDT)” means the real-time operational and tactical functions required to operate the vehicle in on-road traffic.”**

Paragraph 5.2.1.9., amend to read:

- “5.2.1.9. Malfunctions of the electric control transmission shall not apply the brakes contrary to the ~~driver's~~ intentions **of the driver or ADS.**”

Paragraph 5.2.1.10., amend to read:

- “5.2.1.10. The service, secondary and parking braking systems shall act on braking surfaces connected to the wheels through components of adequate strength.

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 and able to provide the compensation referred to in paragraph 5.2.1.7.2.1.

However in the case of short disconnection transients, incomplete compensation is accepted, but within one second, this compensation shall have attained at least 75 per cent of its final value. Nevertheless, in all cases the permanently connected friction braking source shall ensure that both the service and secondary braking systems continue to operate with the prescribed degree of effectiveness.

Disconnection of the braking surfaces of the parking braking system shall be permitted only on condition that the disconnection is controlled by the driver from his driving seat or from a remote control device, **or by an ADS**, by a system incapable of being brought into action by a leak.

The remote control device mentioned above shall be part of a system fulfilling the technical requirements of an ACSF of Category A in the 02 series of amendments to UN Regulation No. 79 or later series of amendments.”

Paragraph 5.2.1.24.1., amend to read:

“5.2.1.24.1. The electric regenerative braking shall only be actuated by the **reduction of the ~~accelerator control~~ acceleration demand** and/or the gear selector neutral position for vehicles of Category N₁.”

Paragraph 5.2.1.25.3., amend to read:

“5.2.1.25.3. For vehicles fitted with electric regenerative braking systems of both categories, all the relevant prescriptions shall apply except paragraph 5.2.1.24.1.

In this case, the electric regenerative braking may be actuated by **reduction of the ~~accelerator control~~ acceleration demand** and/or the gear selector neutral position for vehicles of Category N₁.

Additionally, the action on the service braking control shall not reduce the above braking effect generated by **release reduction of the ~~accelerator control~~ acceleration demand.**”

Paragraph 5.2.1.26.2.1., amend to read:

“5.2.1.26.2.1. Vehicles of categories M₂, M₃, N₂ and N₃:

In the case of an electrical failure in the control or a break in the wiring within the electric control transmission external to the electronic control unit(s), excluding the energy supply, it shall remain possible to apply the parking braking system from the driver's seat and thereby be capable of holding the laden vehicle stationary on an 8 per cent up or down gradient. Alternatively, in this case, an automatic actuation of the parking brake is allowed when the vehicle is stationary, provided that the above performance is achieved and, once applied, the parking brake remains engaged independently of the status of the ignition (start) switch. In this alternative, the parking brake shall be automatically released as soon as the driver **or ADS** starts to set the vehicle in motion again. It shall also be possible to release the parking braking system, if necessary by the use of tools and/or an auxiliary device carried/fitted on the vehicle.”

Paragraph 5.2.1.26.2.2., amend to read:

“5.2.1.26.2.2. Vehicles of category N₁:

In the case of an electrical failure in the control or a break in the wiring within the electric control transmission between the control and the ECU directly connected with it, excluding the energy supply, it shall remain possible to apply the parking braking system from the driver's seat and thereby be capable of holding the laden vehicle stationary on an 8 per cent up or down gradient. Alternatively, in this case, an automatic actuation of the parking brake is allowed when the vehicle is stationary, provided that the above performance is achieved and, once applied, the parking brake remains engaged independently of the status of the ignition (start) switch. In this alternative, the parking brake shall be automatically released as soon as the driver **or ADS** starts to set the

vehicle in motion again. The engine/manual transmission or the automatic transmission (park position) may be used to achieve or assist in achieving the above performance.”

Paragraph 5.2.1.30.1., amend to read:

“5.2.1.30.1. Activation of the service braking system by the driver **or ADS** shall generate a signal that will be used to illuminate the stop lamps.”

Insert new paragraphs 5.3, 5.3.1., 5.3.2., 5.3.2.1. and 5.3.3.:

“5.3. Special provisions for vehicles equipped with an Automated Driving System

The braking system of any vehicle equipped with an Automated Driving System, other than Automated Lane Keeping Systems as defined in UN Regulation No. 157, shall fulfil the following requirements.

5.3.1. An ADS may control the vehicle’s braking system providing that the ADS is designed to comply with relevant national and/or international technical regulations and relevant national legislation governing operation, and providing that its activation is restricted by technical means to the jurisdiction(s) where these apply. Compliance with this requirement shall be declared by the manufacturer at the time of the application for approval.

5.3.2. Compliance with the applicable performance requirements of this UN Regulation whilst the ADS is active shall be demonstrated in accordance with Annex 18.

5.3.2.1. The transmission links between the ADS and the braking system (excluding the ADS itself), are subject to the requirements of Annex 18.

5.3.3. Whilst the ADS is active, detected faults as specified in this UN Regulation shall be transmitted to the ADS.”

II. 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, will be transmitted to GRVA by the TF on FADS.