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

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Item 6 (b) of the provisional agenda

UN Regulations No. 79 (Steering equipment):**Steering equipment****Proposal for a Supplement to the 03 series of amendments to
UN Regulation No. 79 (Steering equipment)****Submitted by the experts from the International Organization of Motor
Vehicle Manufacturers and the European Association of Automotive
Suppliers****

The text reproduced below was prepared by the experts from the International Organization of Motor Vehicle Manufacturers (OICA) and the European Association of Automotive Suppliers (CLEPA), proposing amendments to UN Regulation No. 79. The modifications to the existing text of the Regulation are marked in bold for new or strikethrough for deleted characters.

* Formerly: **Working Party on Brakes and Running Gear (GRRF)**.

** In accordance with the programme of work of the Inland Transport Committee for 2020 as outlined in proposed programme budget for 2020 (A/74/6 (part V sect. 20) para 20.37), 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

Paragraph 2.3.4.3., amend to read (including insertion of a new sub-paragraph):

“2.3.4.3. *“Emergency Steering Function (ESF)”* means a control function which can automatically detect a potential collision and automatically activate the vehicle steering system for a limited duration, to steer the vehicle with the purpose of avoiding or mitigating a collision ~~with~~

- (a) **with** another vehicle driving² in an adjacent lane:
 - (i) Drifting towards the path of the subject vehicle and/or;
 - (ii) Into which path the subject vehicle is drifting and/or;
 - (iii) Into which lane the driver initiates a lane change manoeuvre.
- (b) **with** an obstacle obstructing the path of the subject vehicle or when the obstruction of the subject vehicle’s path is deemed imminent;
- (c) **in case of confirmed inability of the driver to operate the vehicle, generally deemed as a potential collision scenario, by bringing the vehicle to a safe stop.**

ESF shall cover one or more use cases from the list above.”

Insert a new paragraph 2.4.18., to read:

“2.4.18. *“Target stop area”* means an area (e.g. emergency lane, hard shoulder, beside the road, slowest lane of traffic) where an ESF function of subcategory c aims to stop the vehicle.”

Paragraph 5.1.6.2.3., re-structure and amend to read (including the insertion of paragraphs 5.1.6.2.3.2. to 5.1.6.2.3.2.2.)

“5.1.6.2.3. **Special provisions for different ESF types**

5.1.6.2.3.1. Special provisions for ESF of types (a) and (b)

An automatic avoidance manoeuvre initiated by an ESF shall not lead the vehicle to leave the road.

5.1.6.2.3.1.1. In the case of an ESF intervention on a road or a lane delimited with lane markings on one or both side(s), an automatic avoidance manoeuvre initiated by an ESF shall not lead the vehicle to cross a lane marking. However, if the intervention starts during a lane change performed by the driver or during an unintentional drift into the adjacent lane, the system may steer the vehicle back into its original lane of travel.

5.1.6.2.3.1.2. In the absence of a lane marking on one or on both side(s) of the vehicle, a single ESF intervention is permitted, provided that it does not produce a lateral offset of the vehicle greater than 0.75 m in a direction where the lane marking is absent. The lateral offset during the automatic avoidance manoeuvre shall be determined using a fixed point on the front of the vehicle at the start and at the conclusion of the ESF intervention.

5.1.6.2.3.2. Special provisions for ESF type (c)

5.1.6.2.3.2.1. General

ESF of type (c) may be initiated / activated manually or automatically when the system activation conditions are met (e.g. inability of the driver is confirmed, activation control, driver monitoring, other assistance functions etc.).

² The vehicle may be driving in the same or the opposite direction as the subject vehicle.

The system shall aim to bring the vehicle to a safe halt within the target stop area. In case the system cannot assess the criticality as described in paragraph 5.6.2.3.2.2. or the necessary lane changes cannot be performed in an uncritical way, ESF of type (c) or an appropriate CSF (c) shall aim to keep the vehicle within its own lane of travel while the vehicle is stopping.

It shall be possible to override the function at any time by a single action of the driver.

On activation of the system, the hazard warning lamps shall be activated, during a lane change the appropriate direction indicator lamps may be activated instead[, optionally both alternately].

5.1.6.2.3.2.2. Changing lanes

The ESF (c) shall perform lane change (s) to the target stop area only if the situation(s) is (are) not critical. A situation is deemed critical either if there is a risk of a collision with another vehicle in the predicted path, or if a vehicle approaching from the rear in the adjacent target lane would be forced to decelerate with more than [4] m/s² in order to avoid a collision. If no approaching vehicle is detected, the minimal gap to the rear shall be calculated under the assumption of an approaching vehicle travelling with the allowed or advised maximum speed, whatever is lower.”

Paragraph 5.1.6.2.10., amend to read:

“5.1.6.2.10. System information data

The following data shall be provided, together with the documentation package required in Annex 6 of this Regulation, to the Technical Service at the time of type approval:

(a) Use case(s) where ESF is designed to operate (among the use cases a i, a ii, a iii, ~~and b~~ **and c**. specified in the ESF definition in paragraph 2.3.4.3.),

(b) ...

...

(f) ... does not exceed the limit of 50 N

The following additional data shall be provided for ESF of type (c):

(g) Information about how the system detects the inability of the driver

(h) The means to activate, override, suppress or cancel the system.

(i) The nominal functional conditions.”

Annex 8, paragraph 3.3.4., amend to read:

“3.3.4. Tests for systems **of ESF types a and b** able to operate in the absence of lane markings

In case any system ...”

Annex 8, insert a new paragraph 3.3.6., to read:

“3.3.6. Tests for ESF of type (c)

ESF of type (c) shall be tested under the nominal functional conditions according to the system information data.

The vehicle with an ESF of type (c) shall be driven on a test track with multiple lanes per direction on the fastest lane. ESF (c) function shall be activated as described in the documentation.

The test requirements are deemed to be met, if both following test cases are fulfilled:

- 3.3.6.1. No critical situation as described in paragraph 5.1.6.2.3.2.2. is detected:**
- (a) The hazard warning lights / direction indicator are activated and**
 - (b) The warnings specified in paragraph 5.1.6.2.6. of this Regulation, are provided no later than the ESF intervention starts and**
 - (c) The lane changes into the direction of the target stop area are performed and the vehicle is brought to a standstill within the described target stop area.**
- 3.3.6.2. A critical situation as described in paragraph 5.1.6.2.3.2.2. is detected:**
- (a) The hazard warning lights are activated and**
 - (b) The warnings specified in paragraph 5.1.6.2.6. of this Regulation are provided no later than the ESF intervention starts, and**
 - (c) The vehicle is brought to a standstill within its lane of travel.”**

II. Justification

1. Functions to cope with temporary driver inability to control the vehicle (e.g. caused by a health problem) are currently not considered in UN Regulation No. 79. The proposed ESF of type (c) would warn and possibly reactivate the driver while automatically performing emergency lane change(s), if possible (depending on traffic, etc.) with the aim to bring the vehicle to a standstill in an area with a low risk of collision (“target stop area” e.g. hard shoulder), because it is the safest area to stop (improving the access of emergency vehicles, normally low collision risk at the emergency lane). The function may be activated manually or automatically.
 2. The amendment seeks to permit such a function, aimed at reducing risks in traffic, which is currently not approvable.
 3. Uncontrolled vehicle movement could be avoided or mitigated by an ESF of type (c).
 4. ESF of type (c) will only perform lane changes where the traffic is expected at equal speed or slower. Other traffic participants are made aware of the criticality of the situation through the hazard warning lamps or the appropriate direction indicator. Since it is a last resort function and the result of another car in the same situation not equipped with an ESF of type (c) would be worse, shorter gaps and harsher braking of approaching vehicles are justifiable.
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