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Inland Transport Committee

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

Item 6 (a) of the provisional agenda

UN Regulation No. 79 (Steering equipment):**Automatically Commanded Steering Function****Proposal for a supplement to the 03 series of amendments to
UN Regulation No. 79 (Steering equipment)****Submitted by the expert from European Association for
Electromobility***

The text below was prepared by the expert from the European Association for Electromobility (AVERE). It is based on ECE/TRANS/WP.29/GRVA/2020/7 and incorporates feedback received during the previous of the Working Party on Automated/Autonomous and Connected Vehicles sessions (GRVA). The modifications of the existing 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 2021 as outlined in proposed programme budget for 2021 (A/75/6 (Sect.20), para 20.51), 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

Add below amendments to other listed amendment proposals.

Paragraph 5.6.4.6.4 and subparargaphs, amend to read:

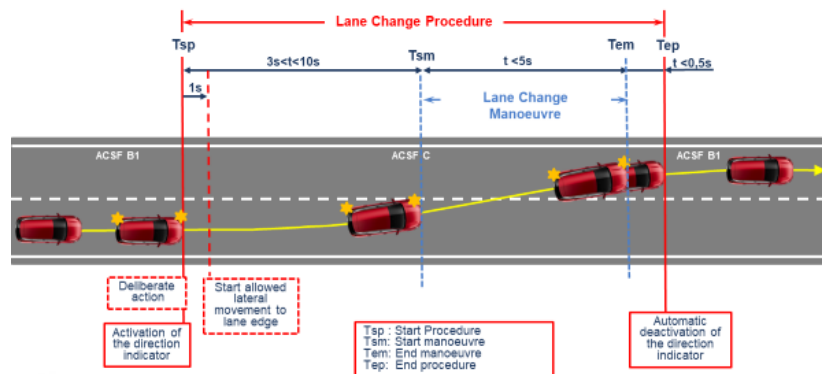
5.6.4.6.4. The lateral movement of the vehicle towards the intended lane shall not start earlier than 1 second after the start of the lane change procedure. Additionally, the lateral movement to approach the lane marking and the lateral movement necessary to complete the lane change manoeuvre, shall be completed as one continuous movement.

The lane change manoeuvre shall be initiated either automatically or by a second deliberate action of the driver. A vehicle shall not be equipped with both these means of initiation.

5.6.4.6.4.1. Automatic initiation of the lane change manoeuvre

In case of an automatic initiation the lane change manoeuvre shall commence between 3.0 seconds and 7.0 5.0 seconds after the manual activation of the procedure as described in paragraph 5.6.4.6.2. and shown in the Figure below. **The manoeuvre shall commence at the earliest opportunity when the situation is not deemed critical as defined in 5.6.4.7.**

ACSF C – Case where the lateral movement is initiated automatically (1 Step HMI)

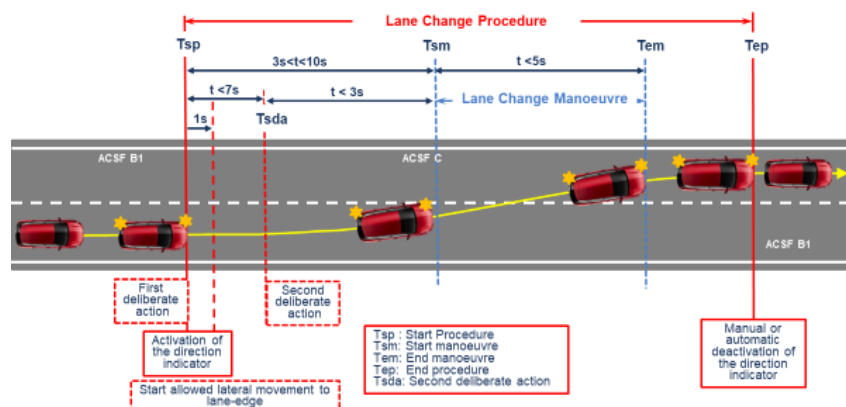


5.6.4.6.4.2. Initiation of the lane change manoeuvre by a second deliberate action

In case of an initiation by a second deliberate action the lane change manoeuvre shall commence between 3.0 and 7.0 7.0 seconds after the manual activation of the procedure as described in paragraph 5.6.4.6.2.

Additionally, the lane change manoeuvre shall commence at the latest 3.0 seconds after the second deliberate action as shown in the Figure below.

ACSF C – Case where the lateral movement is initiated by a second deliberate action by the driver (2 Step HMI)



The control to operate the second deliberate action shall be located in the steering control area.

Annex 8, paragraph 3.5.1.2., amend to read:

- 3.5.1.2. The requirements of the test are fulfilled if:
- (a) The lateral movement towards the marking does not start earlier than 1 second after the lane change procedure was initiated,
 - (b) The lateral movement to approach the lane marking and the lateral movement necessary to complete the lane change manoeuvre are completed as one continuous movement,
 - (c) The recorded lateral acceleration does not exceed 1 m/s²,
 - (d) The moving average over half a second of the lateral jerk does not exceed 5 m/s³,
 - (e) The measured time between the start of the lane change procedure and the start of the lane change manoeuvre is not less than 3.0 seconds and not more than **7.0 seconds**:
 - ~~(i) 5.0 seconds in the case of an automatic initiation,~~
 - ~~(ii) 7.0 seconds in the case of an initiation by a second deliberate action~~

~~whatever is appropriate.~~
 - (f) For systems with an initiation of the lane change manoeuvre by a second deliberate action,
 - (i) The measured time between the start of the lane change procedure and the second deliberate action is not more than **7.0** ~~5.0~~ seconds, and
 - (ii) The measured time between the second deliberate action and the start of the lane change manoeuvre is not more than 3.0 seconds.
 - (g) The system provides information to the driver to indicate that the lane change procedure is ongoing,
 - (h) The lane change manoeuvre is completed in less than 5 seconds for M₁, N₁ vehicle categories and less than 10 s for M₂, M₃, N₂, N₃ vehicle categories,
 - (i) ACSF of Category B1 automatically resumes after the lane change manoeuvre is completed, and
 - (j) The direction indicator is deactivated not before the end of the lane change manoeuvre and no later than 0.5 seconds after ACSF of Category B1 has resumed.

Paragraph 5.6.4.6.8.1, amend to read:

- 5.6.4.6.8.1. The lane change procedure shall be suppressed automatically by the system when at least one of the following situations occurs before the lane change manoeuvre has started:
- (a) The system detects a critical situation (as defined in paragraph 5.6.4.7.);
 - (b) The system is overridden or switched off by the driver;
 - (c) The system reaches its boundaries (e.g. lane markings are no longer detected);
 - (d) The system has detected that the driver is not holding the steering control at the start of the lane change manoeuvre;
 - (e) The direction indicator lamps are manually deactivated by the driver;

(f) Following the deliberate action of the driver to start the procedure described in paragraph 5.6.4.6.2., the lane change manoeuvre has not commenced:

(i) At the latest after ~~7.0~~ 5.0 seconds, in the case of an automatic initiation,

(ii) ~~At the latest after 7.0 seconds, in the case of an initiation by a second deliberate action,~~

(iii) At the latest after 3.0 seconds after the second deliberate action, in the case of an initiation by a second deliberate action,

whatever is appropriate

(g) The system, with an initiation of the lane change manoeuvre by a second deliberate action, has not detected the second deliberate action at the latest ~~7.0~~ 5.0 seconds after the start of the lane change procedure.

(h) The lateral movement described in paragraph 5.6.4.6.4. is not continuous.

II. Justification

1. This revised proposal which aimed to combine the proposed amendments in ECE/TRANS/WP29/GRVA/2020/8 with those in ECE/TRANS/WP.29/GRVA/2019/24 agreed by GRVA at its September 2019 session, to provide an overview of the final intended text in the Regulation. This document is based on ECE/TRANS/WP29/GRVA/2020/22.

2. This proposal aligns with the general discussions held in the February and March 2020 sessions GRVA to align the “1-step” and the “2-step” Human Machine Interface for the Automatically Commanded Steering Function of Category C.

3. Previously shared data has presented clear evidence that human drivers may require up to seven seconds of time in order to start and perform a lane change. In addition, evidence was presented that these systems are able to safely to complete lane changes with these increased thresholds. Such systems are also in place elsewhere in the world and show safe and comfortable behaviour.
