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

Geneva, 10-14 February 2020

Item 8 (a) of the provisional agenda

UN Regulations Nos. 13, 13-H, 139 and 140:**Electronic Stability Control****Proposal for a supplement to UN Regulation No. 140
(Electronic Stability Control)****Submitted by the expert from the International Automotive
Manufacturers Association****

The text reproduced below was prepared by the experts from the International Automotive Manufacturers Association (OICA) in response to the proposal made by the expert from the Republic of Korea. It is based on the informal document GRVA-04-44. 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 9.9.4., amend to read:

“9.9.4. The steering amplitude of the final run in each series is the greater of 6.5 A or 270 degrees, provided the calculated magnitude of 6.5 A is less than or equal to 300 degrees. If any 0.5 A increment, up to 6.5 A, is greater than 300 degrees, the steering amplitude of the final run shall be 300 degrees.

If the above calculated steering amplitude of the final run is greater than the maximum operable steering wheel angle determined by design of the steering system, the final angle amplitude for the series test shall be greater than 98 per cent of the maximum operable angle.”

II. Justification

1. UN Regulation No. 140 (ESC) prescribes that the “Sine with Dwell” series test of vehicle directional stability performance shall be conducted with:

- (a) The initial steering wheel angle amplitude of 1.5A (as defined in paragraph 9.9.2.);
- (b) The steering wheel angle amplitude is increased by 0.5A from a test run to next run (paragraph 9.9.3.);
- (c) The final steering wheel angle amplitude of the greater of 6.5A or 270 degrees. If any 0.5 A increment, up to 6.5 A, is greater than 300 degrees, the steering amplitude of the final run shall be 300 degrees (paragraph 9.9.4.), where "A" is the steering wheel angle that produces a steady state lateral acceleration of 0.3 g for the test vehicle, which is determined from the “Slowly Increasing Steer” test (paragraph 9.6.).

2. In these test conditions, the normalized angle “A” evacuates the influence of the steering gear ratio in relation to the steering wheel angle and vehicle behavior. The lower the steering gear ratio is (i.e. the quicker the steering characteristic is), the smaller the angle “A” and steering angle amplitude for each test run are, to provide constant steered wheel angle implying constant lateral movement of vehicle, regardless of the steering gear ratio, for reasonable testing of ESC.

3. However, the final steering wheel angle amplitude is fixed between 270 and 300 degrees, which are absolute values, not the normalized angles that exclude the influence of the steering gear ratio of each vehicle.

4. There might appear in the future some vehicles which have significantly low steering gear ratio (i.e. quick steering characteristics) and which may not be able to achieve the specified final absolute angle amplitude in the ESC test, then jeopardizing future beneficial improvement of steering equipment e.g. steering-by-wire system.

5. The amendments to para. 9.9.4. above were drafted during the fourth session of the Working Party on Automated/Autonomous and Connected Vehicles (GRVA) by the experts from the International Automotive Manufacturers Association (OICA), taking into account the proposal made by the expert from the Republic of Korea.

6. GRVA also discussed the need to amend para 7.9.4. in Annex 1 of UN Global Technical Regulation (GTR) No. 8.