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Proposal for amendments to a UN GTR, if any

Proposal for Amendment 3 to UN Global Technical Regulation No. 3 (Motorcycle braking)

Submitted by the representative of Italy*

The text reproduced below was prepared by the representative of Italy. It was recommended by the Working Party on Automated/Autonomous and Connected Vehicles (GRVA) at its fourth session (ECE/TRANS/WP.29/GRVA/4, para. 63). It is based on ECE/TRANS/WP.29/GRVA/2019/23 as amended. It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Executive Committee (AC.3) of the 1998 Agreement for consideration at their March 2020 sessions.

* 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.

Amendment 3 to UN Global Technical Regulation No. 3 (Motorcycle braking)

I. Statement of technical rationale and justification

A. Introduction

1. One of the main purposes of UN Global Technical Regulation (GTR) No. 3 is to reduce the injuries and fatalities associated with motorcycle accidents by addressing the braking performance of motorcycles as a means of improving road safety.

2. UN GTR No. 3 provides clear and objective test procedures and requirements that can be easily followed and addresses the development of current Combined Braking Systems (CBS) and Anti-lock Braking System (ABS) technologies.

3. The objective of this amendment is to amend the current UN GTR No. 3 to technical progress addressing: electromagnetic immunity of ABS-systems, introducing ABS performance requirements for category[1] 3-5 vehicles (three-wheelers), ensuring uniform requirements for equipment such as Emergency Stop Signal (ESS) system and the means to disable the ABS, if equipped.

B. Justification of changes

4. The amendments aim to harmonise the UN GTR with the Supplement 3 to the 03 series of amendments to UN Regulation No. 78 as adopted at June 169th session of WP.29 and the 04 series of amendments as adopted during the 170th session of WP.29.

5. The development of draft language for updating the GTR involved consideration of the differences between the respective 1998 Agreement and 1958 Agreement. As the various amendments to UN Regulation No. 78 caused dis-harmonization with UN GTR No. 3, various proposals have been considered between the seventy-eight and the eighty-sixth GRRF sessions, including the first three GRVA sessions to incorporate the harmonisation, collecting support and commitment of the Contracting Parties under the 1998 agreement. The main technical issues, including their justification for updating the global technical regulation are:

1. Electromagnetic immunity of ABS systems, paragraph 3.1.14.

6. With the increasing number and complexity of electronic braking devices, it is important to ensure that the braking performance is not affected by electromagnetic perturbations by verifying the electromagnetic immunity. This UN GTR No. 3 amendment is harmonised with UN Regulation No. 78, Supplement 3 to the 03 series (ECE/TRANS/WP.29/2016/56), amended by WP29-169-03. The specificities of self-certification have been considered, by providing for Contracting Parties to this UN GTR, to refer to national standards or to national regulations, in the case Electromagnetic Compatibility (EMC) Regulations if applicable in their national or regional situation.

2. Apply existing Anti-Lock Braking Systems (ABS) requirements to all vehicles of category 3, paragraph 4.9.1.

7. To apply the existing ABS requirements to all vehicles of Category 3, if fitted, based on ECE/TRANS/WP.29/GRRF/2015/42. If such vehicles were equipped with ABS, without the amendment, there would be no specific requirements for the ABS braking performance in the GTR. This UN GTR No. 3 amendment is harmonised and maintains technical compatibility with UN Regulation No. 78, Supplement 3 to the 03 series of amendments

[1] As defined in the Special Resolution No. 1 concerning the common definitions of vehicle categories, masses and dimensions (S.R.1), document ECE/TRANS/WP.29/1045, Amend 1 and 2, Annex 2 - www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html

(ECE/TRANS/WP.29/2016/56, amended by WP29-169-03). The specificities of the 1998 Agreement have been taken into account as the scope extension of the ABS requirements is not extended to quadricycles (L_6 and L_7) vehicles[2] as due to the absence of definitions for this type of vehicles in Special Resolution adopted by the Executive Committee (AC.3) of the 1998 Agreement (S.R.1) relevant for the 1998 Agreement.

3. Emergency Stop Signal, paragraph 2.22. and 3.1.15. to 3.1.15.3.

8. The paragraphs 2.22. and 3.1.15. to 3.1.15.3. aim to introduce the installation of ESS on motorcycles, if fitted. This proposed amendment involves only the condition of activating an ESS, not the lighting requirements. ESS is available on the market for motor vehicles. As motorcycles are used in the same traffic conditions, the option was considered to be beneficial also on motorcycles. The benefit of defining ESS provisions for vehicles of category 3 is to ensure similar behaviour as other road vehicles by harmonising the activation and deactivation criteria of ESS as applied to cars.

9. This UN GTR No. 3 amendment is harmonised with UN Regulation No. 78, Supplement 3 to the 03 series (ECE/TRANS/WP.29/2016/56, amended by WP29-169-03). The associated amendment of UN Regulation No. 53 (lighting installation for L_3 vehicles) was adopted at 168th session of WP.29 (ECE/TRANS/WP.29/2016/22)

10. The paragraph 5.1.15.3. aims to clarify that the Emergency Stop Signal could be generated through a method that predicts the deceleration of the actual vehicle using various parameters, in line with the state of the art as specified in UN Regulation No. 13 and UN Regulation No. 13H and to allow harmonisation.

4. Means to disable the ABS function, paragraph 3.1.16.

11. This amendment is aimed at specifying the provisions for how to disable ABS and when this may be appropriate. Providing riders the ability to disable ABS function completely is an important feature for some use situations: there are riding conditions where locking the rear wheel is appropriate, such as riding on deformable surfaces. Providing riders a means to reduce or turn off ABS may limit the customers desire to tamper with the system and disable or disconnect ABS in a permanent way with unintended consequences.

12. The purpose of a two-step means disabling ABS is intended to ensure an intentional choice of the rider and providing reasonable provisions to ensure ABS is not inadvertently disabled. Conversely specifying a "simple" means of re-enabling ABS is intended to ensure the rider can at any time bring ABS back to full function. In the case of disabling of ABS-performance, the re-enabling at after each vehicle start-up is intended to prevent riders from inadvertently leaving ABS disabled when coming back to the bike.

13. The restriction of this feature to certain type of vehicles, as initially specified in the 04 series of amendments to UN Regulation No. 78 was not taken across to the GTR as the interpretation of 'off road' capability is to be determined in national or regional legislation or by the manufacturer, based on the product design and testing for expected customer usage. This is in line with the consensus at the eighty-first session of GRRF, where delegates agreed '*to not unnecessarily restrict the kind of vehicle that could be equipped with the off switch function, by softening the wording of these provisions'*.

14. The new paragraph 3.1.16. clarifies the requirements of a means to disable the ABS function, if fitted, ("ABS Switch") for vehicles of Category 3. With this amendment, it is ensured that the implementation of an "ABS switch" is clear and uniform across different markets: *i.e.,* to disable the ABS, the vehicle requires a ride mode selector, the ABS operation status should be clearly visible when disabled, and when the vehicle is in motion. In addition, disabling the ABS performance should not be possible inadvertently.

[2] As defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3.), document ECE/TRANS/WP.29/78/Rev.6, para. 2 - https://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29resolutions/ECE-TRANS-WP.29-78r6e.pdf

15. The amendment is based on informal document GRRF-83-09 submitted by the representative of Italy and subsequent discussions in GRRF. The suggestions made by the representative of Canada (see GRRF-83-10) to include language about switching 'modes' to eliminate confusion with inconsistent use of terms 'deactivate' and 'disable' have been incorporated. It was advised to have the benefit of harmonized language similar to UN GTR No. 8, for ESC for vehicles of Category 1-1, 1-2 and 2. Situations described in the UN GTR No. 8, rationale (paragraph 83) for why different modes are needed did not seem applicable to motorcycle ABS. Simple ON/OFF functionality is considered sufficient. To address comments of inconsistencies of word use, the text was updated to refer simply to 'disable' or 'enable'.

16. As there are multiple indicators currently defined by International Standardization Organization (ISO), or other Standard Developing Organizations, they were also specified as acceptable in this amendment. This includes the use of text to label the indicator as allowed by the Federal Motor Vehicle Safety Standard (FMVSS) 122, consistent with the approach of UN GTR No. 8 and ISO 2575:2010. The ability to use the ABS malfunction indicator to also indicate "ABS disabled"-condition was retained in recognition of the limited space on a motorcycle as compared to a car and recognizing that tell-tale unequivocally indicates ABS is not available to the rider. It was considered necessary to keep the references to ISO 2575:2010 in line with the text in UN Regulation No. 78. The reference to ISO allows minor changes to the pictograms due to limitations in reproduction and display technologies and ensuring appearance and perceptibility of graphical symbols and information or to coordinate with the design of the equipment. For the purpose of self-certification, in paragraph 3.16.3 (e) (ii), the term 'adjacent' is used to clarify that no other symbol shall be positioned between the relevant tell tales or symbols.

17. Following discussion at eighty-fourth session of GRRF, as suggested by Canada in GRRF-84-10, paragraph 5.1.15.3. in UN Regulation No. 78 that reads *'The method of determining deceleration is the responsibility of the manufacturer as long as the vehicle meets the technical requirements of this section. (ex. a prediction of deceleration from wheel rotation).'* was not taken across to the GTR as it was considered unnecessary in a self-certification system and keep the text certification neutral.

18. Paragraph 3.1.16. (g) in this GTR amendment, which makes it more explicit that manufacturers cannot provide additional means of disabling ABS, is included as a means of preventing defeat devices to be introduced. This supports the direction requested by the Contracting Parties at eighty-fourth session of GRRF who felt this prohibition needed to be explicit and allowed a provision that is acceptable in self-certifying markets.

19. The reactivation of the ABS under paragraph 3.1.16. (f), during standstill or while driving, will start the initiation of the ABS system start-up procedure which will lead without delay to the functional stage of the ABS complying with the system specification in paragraph 4.9. A time related delay cannot be specified due to technical issues regarding ABS system start-up procedure that include, but not limited to:

- When activating the system in a stationary condition, the system calibration/verification can only take place after motion of the wheel and can't determine how long the bike will be on before the rider chooses to start riding.
- The ABS system needs the opportunity to determine if the vehicle may be in a condition where it could be detrimental to the rider to activate ABS immediately. One example is a vehicle with a rear wheel locked and sliding sideways; activating the ABS and releasing the rear wheel lock could cause the rider to lose control of the vehicle.
- Level of technology/equipment and features may require different amount of times to complete start-up procedure.
- The language should be such that the improvement of safety technologies is not limited by the regulation.

20. In paragraph 2.23. it is clarified that the switching from dual-channel ABS function to single-channel ABS function is considered as switching from one ABS functional stage to

another ABS functional stage, and therefore the requirements of point 3.1.16. do not apply, as long as the system complies with the requirements of section 4.9. Vehicles with the ability to disable ABS on one axle shall be tested as fitted with ABS on both wheels in dual-channel ABS mode, and tested as fitted with ABS on only one axle in single-channel ABS mode.

21. The paragraph 3.1.16. (d) clarifies when the ABS system must be automatically enabled. No exemption has been listed. Conditions as specified in the 04 series of amendments to UN Regulation No. 78, such as restarts after unintentional stalling of the engine, use of the supplemental engine stop control, etc., should not be considered as a start-up of the vehicle as long as the other functions remain in their current state (e.g. lights). Hence, they are not taken over in the GTR. The disablement of the ABS should then be kept under the driver's operation as stated in Revision 6 of R.E.3 Annex 5 para 4.2.

22. Following discussions at various GRRF and GRVA sessions by several Contracting Parties, efforts have been made to match the wording of the GTR amendment to the extent possible with the latest language in UN Regulation No 78. Where GTR wording required adaptation, these modifications were also proposed for updating. An associated proposal to amend UN Regulation No 78 was developed to update and clarify the language, while not changing the requirements, to ensure consistency with the GTR.

C. Countries that have incorporated UN GTR No. 3 into their regulations

Canada
European Union
Japan
Republic of India
Republic of Korea
Russian Federation
United States of America

II. Amendments

Insert new paragraphs 2.22. and 2.23., to read:

"2.22. "*Emergency braking signal*" means logic signal indicating emergency braking specified in paragraphs 3.1.15. to 3.1.15.2. of this UN GTR.

2.23. "*Disable the antilock brake system*" means to put the system into a state where it will no longer fulfil the technical requirements in paragraph 4.9. of this Regulation."

Insert new paragraphs 3.1.14. to 3.1.16., to read:

"3.1.14. The effectiveness of the braking systems, including the anti-lock system, shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by fulfilling the technical requirements in national standards or regulations, if applicable.

3.1.15. If a vehicle is equipped with the means to indicate emergency braking, activation and de-activation of the emergency braking signal shall only be generated by the application of any service braking system when the conditions in paragraphs 3.1.15.1. through 3.1.15.2. are fulfilled:

3.1.15.1. The signal shall not be activated when the vehicle deceleration is below 6 m/s^2 but it may be generated at any deceleration at or above this value, the actual value being defined by the vehicle manufacturer.

The signal shall be de-activated at the latest when the deceleration has fallen below 2.5 m/s^2;

3.1.15.2. The signal may be activated at a speed above 50 km/h when the antilock system is fully cycling (as defined in paragraph 4.9.1.) and deceleration is at least

2.5 m/s^2. The signal shall be deactivated when the antilock system is no longer fully cycling;

3.1.15.3. The signal may be generated from a prediction of the vehicle deceleration resulting from the braking demand respecting the activation and de-activation thresholds defined in paragraph 3.1.15.1. above;

3.1.16. A means to disable the antilock brake system is allowed, if vehicles are fitted with a riding mode selector allowing an "off-road" or "all terrain" mode, and the following provisions are met:

(a) Disabling of the antilock brake system function shall only be allowed when the riding mode selector is in the "off-road" or "all terrain" mode; and

(b) The vehicle is stationary; and

(c) The disablement of the antilock brake system function shall be the result of a deliberate action by the rider according to one of the following methods:

(i) Simultaneous actuation of the antilock braking system disable-switch and a service brake system control (i.e. brake lever or pedal); or

(ii) The actuation of the antilock brake system disable-switch for a minimum of two seconds; or

(iii) The progression through at least two successive steps or levels of actuation of a control (e.g. rotating knob, a touch panel or a menu option selector).

(d) The antilock brake system function shall be automatically enabled when exiting from the "off-road" or "all-terrain" ride mode, or after each start-up of the vehicle.

(e) When disabled, the antilock brake system function shall be indicated by the activation of a yellow or amber tell-tale according to one of the following methods until the ABS is fully functional or operating again:

(i) The following symbol as specified in B.18 in ISO 2575:2010:

Or

(ii) The following symbol as specified in B.05 of ISO 2575:2010:

With the word "OFF" as follows, according to Y.01 in ISO 2575:2010, whereby the tell tales are adjacent to each other:

Or;

(iii) The text "ABS OFF", or "ABS not available", or,

(iv) The warning lamp referred to in paragraph 3.1.13., continuously activated (i.e. lit or flashing).

(f) Enabling of a functional stage which complies with anti-lock brake system requirements in paragraph 4.9 shall be possible through the single actuation of a control (e.g. simple press of a button or switch) initiating ABS system start-up procedure.

(g) The manufacturer shall not make available to consumers additional means of disabling ABS other than in compliance with the requirements set out in points (a) to (f).

This provision does not apply to what is required to service the ABS (e.g. electrical connectors).

3.1.17. A vehicle fitted with an ABS system active on both axles may be fitted with a rider selectable mode to deactivate the ABS function on the rear axle. When the ABS function is deactivated on the rear axle this shall be indicated by a yellow or amber tell-tale or check control messages* according to one of the following methods until the ABS is fully functional or operating on both axles again:

(i) The following symbol as specified in B.18 in ISO 2575:2010:

With the word "REAR" adjacent to it; or

(ii) The following symbol as specified in B.18 in ISO 2575:2010:

with a symbol of the vehicle adjacent to it with an arrow pointing to the rear axle; or

(iii) The following symbol as specified in B.05 of ISO 2575:2010:

With the word "REAR OFF" adjacent to it; or

(iv) The text " REAR ABS OFF", or "REAR ABS not available"; or

(v) The warning lamp referred to in paragraph 3.1.13., continuously flashing. If the disablement of the ABS system is also indicated by a flashing of this warning lamp as specified in 3.1.16 e-iv, the frequency of the flashing for indicating the deactivation of the ABS system on one axle shall be different from the frequency of flashing to indicate the disablement of the ABS system.

* Pop up messages in the instrument panel"

Paragraph 4.9.1., amend to read:

"4.9.1. General:

(a) The tests are only applicable to the ABS if fitted and enabled.

…

(e) Vehicles with driver selectable ABS modes (e.g. a dual channel ABS system whereby the ABS on the rear axle can be disabled) shall comply with the technical requirements of this paragraph in all modes where ABS is enabled."