Proposal for amendments to GRRF-84-36 draft consolidated amendments to Regulation No 79 discussed during the eighty-fourth session of GRRF

JAPAN proposal in Red
Paragraph 3.5. in Annex 8 of this document is based on ACSF-14-04(Blue)

I. Proposal

Amendment of paragraph 5.6.4.8.1., to read:

[**5.6.4.8.**   **Minimum distance and minimum operation speed**

5.6.4.8.1.   **The ACSF of Category [C1] shall be able to detect vehicles approaching from the rear in an adjacent lane up to a distance S_{rear} as specified below:**

The minimum distance S_{rear} shall be declared by the vehicle manufacturer. The declared value shall not be less than 55m.

The declared distance shall be tested according to the relevant test in Annex 8 using a two-wheeled motor vehicle of Category L3 as the approaching vehicle. */

The minimum operation speed V_{smin} , down to which the ACSF C is permitted to perform a lane change manoeuvre, shall be calculated with minimum distance S_{rear} using the following formula:

$$V_{Smin} = a * (t_B - t_G) + v_{app} - \sqrt{a^2 * (t_B - t_G)^2 - 2 * a * (v_{app} * t_G - S_{rear})}$$

Where:

S_{rear}   =   **Minimum distance declared by the manufacturer in [m]**

v_{app} =   **36.1 m/s**   **(Speed of the approaching vehicle = 130 km/h)***

a   =   **3 m/s²**   **(Deceleration of the approaching vehicle)**

t_B   =   **[0.0 or 1.2]s (Time after the start of the manoeuvre at which the deceleration of the approaching vehicle starts)**

t_G   =   **[1]s**   **(Remaining gap of the vehicles after the deceleration of the approaching vehicle)**

V_{smin}   =   **x [m/s]**   **Resulting minimum activation speed of the ACSF of Category C1**

Notwithstanding the requirements above, the system may become active also at speeds lower than the calculated V_{smin} provided that the following conditions are met:

(a)   **The system has detected another vehicle in the adjacent lane into which the lane change is planned at a distance lower than S_{rear} and**

(b)　The situation is not deemed to be critical according to paragraph 5.6.5.7 (e.g. at low speed differences and V_{app}< 130 km/h)

(c)　$[S_{rear} = (v_{app} - v_{Smin}) * t_B + (v_{rear} - v_{Smin})^2 / (2 * a) + v_{Smin} * t_G$]　]

~~[~~ Footnote:

* This speed can be the maximum allowed speed of each Contracting Party. In case of utilizing V_{app} other than 130km/h, the system shall recognize the maximum speed limit of each Contracting Party, and shall adjust the maximum speed of V_{app} for each Contracting Party accordingly. It shall be technically ensured that the initiation of the lane change is only possible when recognizing the speed limit of Contracting Party.

~~* Until a uniform test target, having the radar cross section (rcs) characteristics of an appropriate L3 vehicle have been agreed, the motorcycle used for type approval shall have an engine capacity greater than 500cm³. The choice of the motorcycle shall be agreed with the Technical Service and the details recorded in the Test Report.]~~

Insert a new paragraph 3.5 in Annex 8, to read:

"[3.5.　　Tests for ACSF of Category [C1] Systems

3.5.x.　　Test target of Category [C1] Systems

The target used for the tests shall be a two-wheeled motor vehicle of Category L3 as the approaching vehicle. */

[Footnote:

* Until a uniform test target, having the radar cross section (rcs) characteristics of an appropriate L3 vehicle have been agreed, the motorcycle used for type approval shall have an engine capacity greater than 500cm³. The choice of the motorcycle shall be agreed with the Technical Service and the details recorded in the Test Report.]

3.5.1.　　Lane change functional test

3.5.1.1.　　The test vehicle shall be driven with an activated ACSF C1 (stand-by mode) within the left lane of a straight track that has at least two lanes with road markings on each side of the lane.

A lane change to the adjacent lane shall then be commanded by the driver (as defined in 5.6.5.6.2. of this Regulation).

The lateral acceleration and the lateral jerk shall be recorded during the test.

3.5.1.2.　　The requirements of the test are fulfilled if:

- the lane change manoeuvre is completed,
- the recorded lateral acceleration does not exceed 1m/s²,
- the moving average over half a second of the lateral jerk does not exceed 5 m/s³,
- the measured time between the start of the first flashing and the start of the lane change manoeuvre is not less than 3s,
- The system provides an information to the driver to indicate the lane change procedure is on-going,
- the lane change manoeuver is completed in less than 5s for M1 N1 vehicle categories and less than 10s for M2 M3 N2 N3 vehicle categories,

- ACSF B1 automatically resumes after the lane change procedure is completed, and
- The direction indicator is deactivated not before the end of the Lane Change Manoeuvre and no later than 0.5s after B1 has resumed.

3.5.1.3 The test specified in 3.5.1.1 shall be repeated with a lane change to the right lane.

3.5.1.4. If the system is capable to utilize Vapp other than 130 km/h, the test specified in 3.5.1.1. shall be repeated with the test vehicle speed determined as Vapp = 100 km/h, 110 km/h and 120 km/h.

3.5.2. Suppression of lane change procedure test

3.5.2. Abort of lane change procedure test (similar FU2?)

3.5.2.1. The test vehicle shall be driven with an activated ACSF C1 (stand-by mode) within either of the lanes of a straight track that has at least two lanes with road markings on each side of the lane.

Another vehicle shall be driven in the adjacent lane, with same speed, within the critical distance defined in paragraph 5.6.5.7. of this regulation. A regular high volume series production passenger car of category M1 AA saloon shall be used.

A lane change shall then be commanded by the driver.

3.5.2.2. The requirements of the test are fulfilled if:

The lane change procedure does not start, or

The lane change procedure starts, the lane change manoeuver is not performed and the lane change procedure is cancelled no later than [10s] after the deliberate action of the driver, as specified in paragraph 5.6.5.6.5. of this Regulation. The system informs the driver that the lane change manoeuver is delayed, as specified in 5.6.5.5.4.

3.5.2.3. If the system is capable to utilize Vapp other than 130 km/h, the test specified in 3.5.2.1. shall be repeated with the test vehicle speed determined as Vapp = 100 km/h, 110 km/h and 120 km/h.

3.5.3. Overriding test

3.5.4. Deactivation test

3.5.5. Sensor performance test

3.5.6. Sensor blindness test

3.5.7. "Engine start/run cycle test"]''

Remark: Details of the tests will be defined in 15th ACSF session (November 2017)

II. Justification

1. For some Contracting Parties, 130km/h as the speed of the approaching vehicle is not appropriate, because it is much higher than the maximum allowed speed in their traffic rules. For these Contracting Parties, operating speed range of Category C1 becomes narrow, and

the situations in which the system cannot be used will prevail. Therefore another option of Vapp should also be taken into account.

2.   The footnote means the requirement of the test target for Category C1 used in Annex 8. Therefore the footnote should be specified in Annex 8 in order to interpret appropriately its subject for Technical Services.

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