Transmitted by the expert from Japan

Informal Document No. **GRRF-58-23**
(58th GRRF, 20-23 September 2005
agenda item 2.1.)

PROPOSAL FOR DRAFT AMENDMENTS TO
GLOBAL TECHNICAL REGULATION ON MOTORCYCLE BRAKE SYSTEMS

A. Proposal

Paragraph 1., amend to read:

"1. SCOPE

…

Category	Description
3-1	2 wheels, engine ≤ 50 cc and max speed ≤ 50km/h
3-2	3 wheels, engine ≤ 50 cc and max speed ≤ 50km/h
…	…

…"

Paragraph 2.2. ("Baseline" test means …), amend to read:

"2.2. "Baseline **test**" means …"

Paragraph 2.4., amend to read:

"2.4. "Combined brakes system (CBS)" means:

For categories 3-1 and **3-3**: a brake system where at least …"

Paragraph 2.8., amend to read:

"2.8. "Initial brake temperature" means the temperature of the hottest brake ~~**0.32 km**~~ before any brake application."

Paragraph 2.13. to 2.20., renumber as Paragraph 2.15. to 2.22.

Insert new paragraph:

"**2.14. "Servo" means … [definition is needed]**"

Paragraph 2.3. to 2.12., renumber as Paragraph 2.4. to 2.13.

Paragraph 2.2. ("Brake" means …), renumber as Paragraph 2.3.

Paragraph 3.1.8., renumber as Paragraph 3.1.9.

Insert new paragraph:

"3.1.8. Vehicles that are equipped with an servo … [warning requirement is needed]"

Paragraph 4.1.1.1., amend to read:

"4.1.1.1. Dynamic brake tests (excluding low friction ABS tests):

…

The surface shall have a nominal peak friction coefficient (PFC) of ~~[~~0.9 ~~or less]~~, unless otherwise specified."

Delete Paragraph 4.1.4.:

"~~4.1.4. Tolerances~~

~~Unless otherwise specified, a general tolerance of ±10 per cent shall be applied to all test parameters.~~"

Paragraph 4.4.3., amend to read:

"4.4.3. Performance requirements

When the brakes have been tested in accordance with the test procedure in paragraph 4.4.2., the stopping distance (S) shall be ~~[≤ 0.1 V + 0.0051V²]; (where V is the specified test speed in km/h and S is the required stopping distance in metres).~~ **equal to or less than the value given in the following table:**

Test Speed (km/h)	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**	**95**	**100**
Stopping Distance (m)	**11.5**	**14.1**	**16.9**	**20.1**	**23.3**	**27.1**	**32.2**	**38.5**	**43.7**	**49.0**	**54.6**	**60.6**

"

Paragraph 4.5.2., amend to read:

"4.5.2. Test conditions and procedure

…

- Test speed: 0.8 Vmax for vehicles with …
160 km/h for vehicles with Vmax ≥ 200 km/h ~~Vmax~~.

…"

Paragraph 4.9.5.1, amend to read:

"4.9.5.1. Test conditions and procedure:

…

- Test speed: 80 km/h or 0.8 Vmax, whichever is lower. **In case of test on low adhesion surface (≤ 0.35), the initial speed may be reduced for safety reasons.**

…"

Paragraph 4.9.6.1., amend to read:

"4.9.6.1. Test conditions and procedure:

- Test surfaces:
A length of high friction surface immediately followed by a length of low friction surface. **The high friction surface shall have a peak friction coefficient of ≥ 0.8.**

…"

Paragraph 4.9.7.1., amend to read:

"4.9.7.1. Test conditions and procedure:

- Test surfaces:
  A length of low friction surface immediately followed by a length of high friction surface. **The high friction surface shall have a peak friction coefficient of ≥ 0.8.**

..."

Paragraph 4.9.8.2., amend to read:

"4.9.8.2. Performance requirements

When the brakes have been tested in accordance with test procedure specified in paragraph 4.9.8.1.:

- the system shall comply with the failure warning requirements of paragraph 3.1.7. and;
- the minimum requirements for stopping distance or MFDD shall be as specified in the single rear brakes only section of the table in paragraph 4.3.3."

Paragraph 4.11.3., amend to read:

"4.11.3. Performance requirements

When the brakes have been tested in accordance with test procedure specified in paragraph 4.11.2.:

- the system shall comply with the failure warning requirements of paratraph 3.1.8. and;
- stopping distance (S) shall be $\leq 0.1V+V^2/65$
…"

B. Justification

Paragraph 1.
Vehicles with engine = 50 cc and Vmax = 50km/h are needed to be considered. The proposal is aligned with definitions for categories 3-1 and 3-2 in S.R.1.

Paragraph 2.2.,
There are two "Paragraph 2.2."s.

Paragraph 2.4.
Category 3-2 in this sentence seems to be 3-3.

Paragraph 2.8.
For cold stops, temperature does not have much influence on braking performance, and it is not necessary to specify the distance prior to brake application in this way. Moreover, it is difficult and not practical to measure the temperature at this specific point especially for high speed test.

Paragraph 2.14.
The term "servo" might need definition.

Paragraph 3.1.8.
Warning requirement might need for servo failure.

Paragraph 4.1.1.1.
The words "or less" may lead to misunderstanding.

Paragraph 4.1.4.
Confusing and needed to be deleted.

Paragraph 4.4.3.

The formula is an approximate expression of its original requirement in FMVSS and only valid at the test speed of 100km/h. A correlation table of FMVSS 122 (Table 1) and the formula is indicated below. As the correlation table shows, two values are only consistent at the speed of 100km/h. This may cause a problem when the vehicle is tested at a speed of 0.9Vmax. Therefore, Table 1 in FMVSS 122 with proper modification (such as extracting unnecessary values and converting units) is considered reasonable and appropriate.

V(km/h)	S(m)	
	Value from FMVSS Table 1 (converted to metric)	Value Calculated from Draft GTR Formula
48.3	13.1	16.7
56.3	17.7	21.8
64.4	22.9	27.6
72.4	29.0	34.0
80.5	39.0	41.1
88.5	47.2	48.8
96.5	56.4	57.2
100.0	60.6	61.0

Paragraph 4.5.2.
The last "Vmax" is not necessary.

Paragraph 4.9.5.1
For safety reasons in testing under serious conditions, especially at 80 km/h.

Paragraph 4.9.6.1. and 4.9.7.1.
The specific PFC is needed for the friction surface transition test due to the wet condition on high friction surfaces.

Paragraph 4.9.8.2.
Warning illumination for ABS electrical failure is needed to be checked.

Paragraph 4.11.3.
Warning illumination for servo failure is needed to be checked.

C. Comment

Paragraph 4.7.5.
The process how the formula for stopping distance was derived needs clarification.

Paragraphs 4.9.3.1., 4.9.4.1., 4.9.5.1., 4.9.6.1. and 4.9.7.1.

When the ABS is activated, the pulsation reaction force from the brake fluid pressure control is directly transmitted to the brake lever and pedal. This causes fluctuations in the input value even if the activation position (stroke) is fixed. When there is a large fluctuation in the input value, it is difficult to maintain the value in the specified range (i.e., ±10%).

For this reason, a certain exemption provision should be laid out in the gtr, for example, "when the pulsation reaction force from ABS is too large to maintain brake actuation forces in the specified range, the forces of peak of pulses can be over the upper limit and/or the forces of bottom of pulses can be below the lower limit of the range during ABS cycling."

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