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**ECONOMIC COMMISSION FOR EUROPE**

INLAND TRANSPORT COMMITTEE

World Forum for Harmonization of Vehicle Regulations

Working Party on Brakes and Running Gear

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Item 5 of the provisional agenda

MOTORCYCLE BRAKING

Harmonization of motorcycle braking requirements

Proposal for amendments to Regulation No. 78

Submitted by the expert from the International Motorcycle Manufacturer Association \*/

The text reproduced below was prepared by the expert from the International Motorcycle Manufacturer Association (IMMA) in order to amend the Regulation with regard to the peak braking coefficient. It is based on informal documents Nos. GRRF-65-33 and GRRF-64-15, both not amended. The modifications to the existing text of the Regulation are marked in bold characters.

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\*/ In accordance with the programme of work of the Inland Transport Committee for 2006-2010 (ECE/TRANS/166/Add.1, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance performance of vehicles. The present document is submitted in conformity with that mandate.

A. PROPOSAL

Annex 3,

Paragraph 1.1.1.(c), amend to read (including a new footnote 1/):

- "(c) The surface has a nominal peak braking coefficient (PBC) of  $\geq 0.9$  unless otherwise specified. 1/

**If rear wheel lift occurs, a surface with a peak braking coefficient (PBC) lower than 0.9 may be used in that case.**

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1/ The term "nominal" means the target value for the surface when it is certified."

Add a new paragraph 9.3.1.(h), to read:

- "(h) If the rear wheel lifts from the ground during a test, the control for the service brake on the front wheel may be actuated with a force that is lower than the force that will cause the wheel to lift. In this case, the front wheel ABS need not cycle fully."

Appendix 1 to Annex 3,

Paragraph 1.2.(b), amend to read:

- "(b) The anti-lock system shall be disconnected"

B. JUSTIFICATION

1. The measurement of PBC (Annex 3, paragraphs 1.1.1.(c) and 9.3.1.(h))

1.1. The issue under discussion

At its 145th session in June 2008, WP.29 considered draft Supplement 1 to the 03 series of amendments to Regulation No. 78 on the basis of document ECE/TRANS/WP.29/2008/64. Following the discussion, WP.29 agreed to remove the proposed amendment to Annex 3, paragraph 1.1.1.(c), in order to maintain the alignment with gtr No. 3.

Thus, WP.29 adopted ECE/TRANS/WP.29/2008/64 as Supplement 1 to the 03 series of amendments to Regulation No. 78, but without the amendment to paragraph 1.1.1.(c) which is reproduced below:

Annex 3, paragraph 1.1.1.(c), amend to read (inserting a new footnote \*):

- "(c) The surface has a nominal peak braking coefficient (PBC) of  $\geq 0.9$  unless otherwise specified. \*

If rear wheel lift occurs, a surface with a peak braking coefficient (PBC) lower than 0.9 may be used in that case.

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\*/ The term "nominal" means the target value for the surface when it is certified."

WP.29 requested GRRF to reconsider the relevant paragraph 1.1.1.(c) including footnote \*/, and to submit a further proposal, if necessary (see WP.29 report ECE/TRANS/WP.29/1068, para. 38).

## 1.2. Germany's arguments

Germany's argument is that surfaces with a 0.9 K value are hard to find and that there is a possibility of the rear wheel lifting under heavy braking.

## 1.3. IMMA points on the proposal

### 1.3.1. Surfaces

- (a) The NHTSA tests had surfaces of more than 0.9 (See Annex 1 of informal document GRRF-65-33) and 0.9 is considered normal in the industry
- (b) The text would allow testing on any surface, so the surface would not be harmonized.
- (c) Regulation No. 78 would no longer be harmonized with the GTR;
- (d) Allowing a lower PBC surface would require a discussion of the performance requirements, as these are linked to the surface value. For example, the requirement is, "MFDD shall be  $6.17 \text{ m/s}^2$ ". If the surface PBC is (for example) 0.62, to prevent rear-wheel lift with ABS fully cycling the ABS effectiveness would have to be 100 per cent. If a wider range of PBC surfaces can be used it is necessary to review/change the performance requirements;
- (e) It is impractical to repeat tests on a new track if rear-wheel lift occurs.

### 1.3.2. Rear-wheel lift (not defined)

- (a) This was not a problem for the test work in the United States of America for developing the new ABS method;
- (b) An ABS system is for preventing wheel lock-up, not for preventing the rear-wheel leaving the ground. (Regulation No. 78-03 definitions states that: ""ABS" means a system which senses wheel slip and automatically modulates the pressure producing the braking forces at the wheel(s) to limit the degree of wheel slip.");
- (c) If rear wheel lift is a problem, IMMA proposes that the front wheel brake actuation force be reduced, even if it means that the front wheel ABS might not cycle fully. Of course, in such a case, it is necessary to meet the performance requirement and the ABS on the rear brake has to cycle fully;  
A reduced actuation force is already allowed in the gtr and Regulation No. 78 in relation to wheels without ABS. e.g. Regulation No. 78-03 Annex 3, paragraph 9.3.1.(e) states:  
"If one wheel is not equipped with ABS, the control for the service brake on that wheel shall be actuated with a force that is lower than the force that will cause the wheel to lock."

(e) The proposed text would become Regulation No. 78-03 Annex 3, new paragraph 9.3.1.(h), as follows:

"(h) If the rear wheel lifts from the ground during a test, the control for the service brake on the front wheel may be actuated with a force that is lower than the force that will cause the wheel to lift. In this case, the front wheel ABS need not cycle fully."

## 2. The vehicle condition for the K method for determining PBC

### 2.1. The issue under discussion

At sixty-third session of GRRF, in February 2008, the following text was agreed as an amendment (Appendix 1 to Annex 3):

"1.2. Vehicle condition:

.....

(b) The anti-lock system shall be either disconnected or inoperative, between 40 km/h and 20 km/h  
....."

### 2.2. The original argument in favour of the amendment

The original argument in favour of allowing the option of an "inoperative" brake system was that it could produce a better K value.

### 2.3. IMMA points

IMMA discussions on this have led to the following points:

- (a) Although this may be true for other vehicles e.g. trucks, it is not true for motorcycles. The ABS system cycles too frequently for this to work (example traces of a truck and a motorcycle are shown in Annex 2 of informal document GRRF-65-33);
- (b) In the "inoperative ABS" method, the setting value of the limiting valve when carrying out the k measurement is set "slightly above ABS operative pressure". It is therefore likely that the ABS will influence the result if it cycles.

The industry considers that this text may lead to confusion and incorrect test results. IMMA therefore requests that this text be returned to the original:

"(b) The anti-lock system shall be disconnected"

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