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

Geneva, 25 June 2024

Item 9(b) of the provisional agenda

Motorcycle braking:**UN Regulation No. 78****Proposal for a supplement to the 06 series of amendments to
UN Regulation No. 78 (Braking of category L vehicles)****Submitted by the expert from World Bicycle Industry
Association (WBIA)***

The text reproduced below was prepared by the expert from the World Bicycle Industry Association (WBIA), proposing amendments to UN Regulation No. 78, aimed at introducing specific deceleration requirements for the Speed Electronically Power Assisted Cycles were belonging to the Category L in UN Regulation No. 78. It is based on informal document GRVA-18-38. The modifications to the existing text of the Regulation are marked in bold for new or strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2024 as outlined in proposed programme budget for 2024 (A/78/6 (Sect. 20), table 20.5), 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

Insert new paragraphs 2.34. [and 2.35.], to read:

- "2.34. "Pedal-driven vehicle" means any vehicle which:
- (a) Has at least two wheels, and
 - (b) Is propelled by the muscular energy of the persons on that vehicle, in particular by means of pedals or hand-cranks, and
 - (c) Is equipped with an auxiliary electric motor, which:
 - (i) Provides propulsion assistance while pedalling, and
 - (ii) Has a maximum cut-off speed at 45 km/h.

This auxiliary electric motor cannot self-propel the vehicle except in the start-up assistance mode.

- [2.35. "Start-up assistance mode" means a function by which the user can activate the auxiliary electric motor to propel the vehicle up to a maximum speed of 6 km/h without pedalling.]"

Paragraph 9.3.2., amend to read:

- "9.3.2. Performance requirements
- When the brakes are tested in accordance with the test procedures referred to in paragraph 9.3.1.:
- (a) The stopping distance (S) shall be:
 - (i) In general, $S \leq 0.0063V^2$ (where V is the specified test speed in km/h and S is the required stopping distance in metres) or the MFDD shall be $\geq 6,17 \text{ m/s}^2$; or
 - (ii) In case of pedal-driven vehicles of Category L₁ with auxiliary electric propulsion, $S \leq 0.0056V^2/P$ (where V is the specified test speed in km/h, P is the peak braking coefficient and S is the required stopping distance in metres) or the MFDD shall be $\geq 6.87 \times P$, in m/s^2 ; [and]
 - (b) There shall be no wheel lock and the vehicle wheels shall stay within the test lane."

II. Justification

A. Background

1. In certain conditions, Antilock Braking System (ABS) can offer benefit in terms of cycling safety as it optimizes the trade-off between bicycle stability and deceleration.
2. ABS can work only within the physical limits of the bicycle (friction of tire and road, center of gravity of rider and bicycle, etc.).
3. ABS has, as all technical systems, a level of efficiency compared to rider's best performance (professional rider who knows when and how to brake).

B. Applicable standards

4. ABS is optionally available for both type-approved and non-type-approved e-bikes (such as the S-EPAC, which is a vehicle of subcategory L1e-B according (EU) 168/2013)), hence UN Regulation No. 78 is applicable to S-EPAC.
5. Current design of the UN Regulation No. 78 targets ABS technology on Powered Two Wheelers (PTWs) such as mopeds and motorcycles, which have different physical limits (see slide 2 in informal document GRVA-18-39).

C. Issue

6. The Center of Gravity (CoG) of S-EPACs combined with the level of efficiency of every ABS does not fit to the braking test “Stops on high friction surface” (paragraph 9.3.), which includes a vehicle independent deceleration threshold of 6.17 m/s² (see slide 2 in informal document GRVA-18-39).

D. Proposal

7. Changing the deceleration threshold definition from a vehicle independent one to a vehicle dependent one as in braking test “Stops on low friction surface” (paragraph 9.4) enables a better fit of UN Regulation No. 78 to S-EPACs (see slide 3 in informal document GRVA-18-39).

8. The definition introduced in paragraph 9.3.2. (a) (ii) is based on the definition used in UN Regulation No. 63 (Noise), paragraph 1, reading:

“1. *This Regulation applies to vehicles of Category L₁¹ with regards to sound emissions. Pure electric vehicles, including vehicles with auxiliary electric propulsion, are not in the scope of this Regulation.*”

E. Proposal to add new definitions

9. Following up on the request raised by the experts of Italy at the January 2024 session of GRVA, a proposal for a specific definition of “pedal-driven vehicles” has been added to the main content of the informal document GRVA-18-38 (January 2024). Such proposal is based on the latest status of the definitions being prepared by the Group of Experts on cycling infrastructure module under the Working Party on Transport Trends and Economics; status of March 2024.
