

**Proposal for amendments to the 01 series of amendments to UN Regulation No. 13-H**

**This document is based on document GRRF-86-16rev1 whereby those parts adopted at GRRF-86 are removed**

**Relevant definitions:**

- 2.17. "Electric regenerative braking" means a braking system which, during deceleration, provides for the conversion of vehicle kinetic energy into electrical energy.
- 2.17.1. "Electric regenerative braking control" means a device which modulates the action of the electric regenerative braking system;
- 2.17.2. "Electric regenerative braking system of Category A" means an electric regenerative braking system which is not part of the service braking system;
- 2.17.3. "Electric regenerative braking system of Category B" means an electric regenerative braking system which is part of the service braking system;
- 2.20. "Automatically commanded braking" means a function within a complex electronic control system where actuation of the braking system(s) or brakes of certain axles is made for the purpose of generating vehicle retardation with or without a direct action of the driver, resulting from the automatic evaluation of on-board initiated information.
- 2.21. "Selective braking" means a function within a complex electronic control system where actuation of individual brakes is made by automatic means in which vehicle retardation is secondary to vehicle behaviour modification.

**1. Proposal**

- 5.2.22. Generation of a braking signal to illuminate the stop lamps.
- 5.2.22.1. Activation of the service braking system by the driver shall generate a signal that will be used to illuminate the stop lamps.

Paragraph 5.2.22., amend to read

- 5.2.22.2. ~~Activation of the service braking system by "automatically commanded braking" shall generate the signal mentioned above. However, when the retardation generated is less than 0,7 m/s<sup>2</sup>, the signal may be suppressed<sup>(6)</sup>~~

**Deceleration demands generated by the activation of**

- the service braking system due to automatically commanded braking or
- electric regenerative braking which produce a retarding force upon release of the accelerator control

shall generate the signal to illuminate the stop lamps according to the following provisions:

<i>Vehicle deceleration demands</i>	<i>Signal generation</i>
$\leq 1.3 \text{ m/s}^2$	The signal may be generated
$>1.3\text{m/s}^2$	The signal shall be generated

**Once generated the signal shall be kept as long as a deceleration demand persists and may be kept at standstill or until the vehicle accelerates.**

**The signal shall not be generated as long as vehicle retardation is not primarily intended e.g. due to a slight actuation of the friction brakes to clean the discs or due to a slight release of the accelerator pedal of an electric vehicle. <sup>(6)</sup>**

Footnote (6): At the time of type approval, compliance with ~~this~~ **these** requirements shall be confirmed by the vehicle manufacturer."

*Paragraph 5.2.22.3.:* remains unchanged

5.2.22.3. Activation of part of the service braking system by "selective braking" shall not generate the signal mentioned above <sup>(7)</sup>

Footnote (7): During a "selective braking" event, the function may change to "automatically commanded braking".

*Paragraph 5.2.22.4.,* delete, together with the reference to the footnote:

~~5.2.22.4. Electric regenerative braking systems as defined in Paragraph 2.17., of this Regulation, which produce a retarding force upon release of the accelerator control, shall generate the signal mentioned above according to the following provisions.~~

<i>Vehicle decelerations</i>	<i>Signal generation</i>
$\leq 0.7 \text{ m/s}^2$	The signal shall not be generated
$> 0.7 \text{ m/s}^2$ and $\leq 1.3 \text{ m/s}^2$	The signal may be generated
$> 1.3 \text{ m/s}^2$	The signal shall be generated

~~In all cases the signal shall be de activated at the latest when the deceleration has fallen below  $0.7 \text{ m/s}^2$  <sup>(8)</sup>.~~

## 2. Justifications

### a. General comment

With the current wording of the subparagraphs under 5.2.22, the stop lamp illumination for vehicle decelerations below  $0,7 \text{ m/s}^2$  is either

- **required**, if the driver presses the brake pedal (see Paragraph 5.2.22.1)
- **permitted**, due to automatically commanded braking (see Paragraph 5.2.22.2) or
- **forbidden**, in case of an RBS (see Paragraph 5.2.22.4).

OICA believe that the requirements to illuminate the stop lamps at low decelerations should better depend on the intention to decelerate rather than on the type of the braking system. The intention to decelerate can be linked to a deceleration demand of an automatic braking system or to the driver's action.

OICA sees  $1,3 \text{ m/s}^2$  as the right value from which onwards an illumination of the stop lamps shall always be ensured. In parallel the illumination of the stop lamps should not be prohibited for intentional decelerations below  $1,3 \text{ m/s}^2$  but only when retardation is not primarily intended.

## **b. Full electric vehicles**

With full electric vehicles smooth deceleration may be ensured via an RBS by the release of the accelerator pedal alone whilst the service braking system (friction brake) is needed to generate higher decelerations. Such implementation would provide more driving comfort and maximize the number and duration of regeneration phases.

In such cases the illumination of the stop lamps should not be prohibited for decelerations below  $0.7 \text{ m/s}^2$ . For example, switching off the stop lamps towards the end of a full stop may be misinterpreted by the driver of a following vehicle as an intention to accelerate.

## **c. Further considerations**

- The resulting deceleration cannot be directly controlled by any braking system (service brake or RBS). It is dependent on various factors like vehicle speed, road surface and inclination, tyre condition, weather condition and various others.
- As for every measurement also the measurement of an acceleration /deceleration is combined with some tolerance.  $0.3 \text{ m/s}^2$  are a typical tolerance for current accelerometers.

To ensure that no produced (electric) vehicle, using a RBS with retarding force upon accelerator control release, will under the threshold of  $0,7 \text{ m/s}^2$  illuminate the stop lamps, the manufacturer must tune the system in a way that the illumination of the stop lamps is deactivated at a significantly higher level than  $0.7 \text{ m/s}^2$ .

This, on the other hand, would make it difficult (if not impossible) to ensure that each (electric) vehicle will, under each condition after the release of the throttle, illuminate the stop lamps above a deceleration of  $1,3 \text{ m/s}^2$  as requested in parallel in the same paragraph 5.2.22.4..

## **d. Conclusion**

The suggested modifications to Paragraph 5.2.22. would enable a vehicle design with a uniform behaviour of the stop lamp illumination with regard to low decelerations, including that of electric vehicles.