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World Forum for Harmonization of Vehicle Regulations**Working Party on Lighting and Light-Signalling****Seventy-first session**

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Item 12(d) of the provisional agenda

Other Business – Any other business**Proposal for Supplement 15 to the 01 series of amendments
to Regulation No. 53 (Lighting Installation Motorcycles)****Submitted by the expert from the International Motorcycle
Manufacturers Association ***

The text reproduced below was prepared by the expert from the International Motorcycle Manufacturers Association (IMMA), introducing the possibility of installing interdependent lamps for L₃ category vehicles. Also, the amendment reflects the recent amendments to Regulation No. 48, Supplement 2 to its 06 series of amendments and further includes some editorial corrections of current Regulation No. 53 texts. 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 2012–2016 (ECE/TRANS/224, para. 94 and ECE/TRANS/2012/12, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

I. Proposal

Paragraphs 2.5.2 to 2.5.5., amend to read:

- 2.5.2. "Independent lamps" means devices having separate ~~illuminating~~ **apparent** surfaces, separate light sources and separate lamp bodies;
- 2.5.3. "Grouped lamps" means devices having separate ~~illuminating~~ **apparent** surfaces and separate light sources, but a common lamp body;
- 2.5.4. "Combined" means devices having separate ~~illuminating~~ **apparent** surfaces, but a common light source and a common lamp body;
- 2.5.5. "Reciprocally incorporated" means devices having separate light sources or a single light source operating under different conditions (for example, optical, mechanical, electrical differences), totally or partially common ~~illuminating~~ **apparent** surfaces and a common lamp body;"

Insert new paragraphs 2.5.6. to 2.5.6.1., to read:

- 2.5.6. "Interdependent lamp system" means an assembly of two or three interdependent lamps providing the same function.**
- 2.5.6.1. "Interdependent lamp" means a device operating as part of an interdependent lamp system. Interdependent lamps operate together when activated, have separate apparent surfaces in the direction of the reference axis and separate lamp bodies, and may have separate light source(s)."**

Paragraphs 2.5.6. to 2.5.17., renumber as paragraphs 2.5.7. to 2.5.18.:

- ~~2.5.67.~~ "Driving beam (main-beam) headlamp" means the lamp used to illuminate the road over a long distance ahead of the vehicle;
- ~~2.5.78.~~ "Passing beam (dipped-beam) headlamp" means the lamp used to illuminate the road ahead of the vehicle without dazzling or causing undue discomfort to oncoming drivers and other road users;
- ~~2.5.78.1.~~ "Principal passing beam (principal dipped beam)" means the dipped beam produced without the contribution of infrared (IR) emitters and/or additional light sources for bend lighting.
- ~~2.5.89.~~ "Direction-indicator lamp" means the lamp used to indicate to other road-users that the driver intends to change direction to the right or to the left;
A direction-indicator lamp or lamps may also be used according to provisions of Regulation No. 97.
- ~~2.5.910.~~ "Stop lamp" means the lamp used to indicate to other road-users to the rear of the vehicle that its driver is applying the service brake;
- ~~2.5.1011.~~ "Rear-registration-plate illuminating device" means the device used to illuminate the space reserved for the rear registration plate; such a device may consist of several optical components;
- ~~2.5.1112.~~ "Front position lamp" means the lamp used to indicate the presence of the vehicle when viewed from the front;

- 2.5.~~42~~13. "*Rear position lamp*" means the lamp used to indicate the presence of the vehicle when viewed from the rear;
- 2.5.~~43~~14. "*Retro-reflector*" means a device used to indicate the presence of a vehicle by the reflection of light emanating from a light source not connected to the vehicle, the observer being situated near the source;
- For the purpose of this Regulation, retro-reflecting number plates are not considered as retro-reflectors;
- 2.5.~~44~~15. "*Hazard warning signal*" means the simultaneous operation of all of a vehicle's direction-indicator lamps to show that the vehicle temporarily constitutes a special danger to other road users;
- 2.5.~~45~~16. "*Front fog lamp*" means the lamp used to improve the illumination of the road in case of fog, snowfall, rainstorms or dust clouds;
- 2.5.~~46~~17. "*Rear fog lamp*" means the lamp used to make the vehicle more easily visible from the rear in dense fog;
- 2.5.~~47~~18. "*Daytime running lamp*" means a lamp facing in a forward direction used to make the vehicle more easily visible when driving during daytime."

Paragraph 2.7.1., amend to read:

- "2.7.1. "*Illuminating surface of a lighting device*" (paragraphs. 2.5.~~67~~., 2.5.~~78~~. and 2.5.~~45~~16.) means the orthogonal projection of the full aperture of the reflector, or in the case of headlamps with an ellipsoidal reflector of the "projection lens", on a transverse plane. If the lighting device has no reflector, the definition of paragraph 2.7.2. shall be applied. If the light emitting surface of the lamp extends over part only of the full aperture of the reflector, then the projection of that part only is taken into account.

In the case of a passing beam headlamp, the illuminating surface is limited by the apparent trace of the cut-off on to the lens. If the reflector and lens are adjustable relative to one another, the mean adjustment should be used;

In the case where any combination of a headlamp producing the principal passing beam and additional lighting units or light sources designed to produce bend lighting are operated together, the individual illuminating surfaces, taken together, constitute the illuminating surface."

Paragraph 2.7.2., amend to read:

- "2.7.2. "*Illuminating surface of a light-signalling device other than a retro-reflector*" (paragraphs 2.5.~~89~~., 2.5.~~910~~., 2.5.~~44~~12., 2.5.~~42~~13., 2.5.~~44~~15. and 2.5.~~46~~17.) means the orthogonal projection of the lamp in a plane perpendicular to its axis of reference and in contact with the exterior light-emitting surface of the lamp, this projection being bounded by the edges of screens situated in this plane, each allowing only 98 per cent of the total luminous intensity of the light to persist in the direction of the axis of reference. To determine the lower, upper and lateral limits of the illuminating surface, only screens with horizontal or vertical edges shall be used;"

Paragraph 2.7.3., amend to read:

- "2.7.3. "*Illuminating surface of a retro-reflector*" (para. 2.5.~~43~~14.) means the orthogonal projection of a retro-reflector in a plane perpendicular to its axis of reference and delimited by planes continuous to the outermost parts of the retro-reflector's optical system and parallel to that axis. For the purposes of

determining the lower, upper and lateral edges of the device, only horizontal and vertical planes shall be considered;"

Paragraph 2.11., amend to read:

"2.11. "Angles of geometric visibility" means the angles which determine the field of the minimum solid angle in which the apparent surface of the lamp must be visible. That field of the solid angle is determined by the segments of the sphere of which the centre coincides with the centre of reference of the lamp and the equator is parallel with the ground. These segments are determined in relation to the axis of reference. The horizontal angles β , correspond to the longitude and the vertical angles α to the latitude. ~~There must be no obstacle on the inside of the angles of geometric visibility to the propagation of light from any part of the apparent surface of the lamp observed from infinity. If measurements are taken closer to the lamp, the direction of observation must be shifted parallel to achieve the same accuracy.~~

~~On the inside of the angles of geometric visibility no account is taken of obstacles, if they were already presented when the lamp was type approved.~~

~~If, when the lamp is installed, any part of the apparent surface of the lamp is hidden by any further parts of the vehicle, proof shall be furnished that the part of the lamp not hidden by obstacles still conforms to the photometric values prescribed for the approval of the device as an optical unit (see Annex 3 of this Regulation). Nevertheless, when the vertical angle of geometric visibility below the horizontal may be reduced to 5° (lamp at less than 750 mm above the ground) the photometric field of measurements of the installed optical unit may be reduced to 5° below the horizontal;"~~

Paragraphs 2.14. to 2.14.2., amend to read:

"2.14. "Single and multiple lamps"

2.14.1. "A single lamp" means:

- (a) **A device or part of a device having one lighting or light-signalling function, one or more light source(s) and one apparent surface in the direction of the reference axis, which may be a continuous surface or composed of two or more distinct parts; or**
- (b) **Any assembly of two independent lamps, whether identical or not, having the same function, both approved as type "D" lamp and installed so that:**
 - (i) **The projection of their apparent surfaces in the direction of the reference axis occupies not less than 60 per cent of the smallest quadrilateral circumscribing the projections of the said apparent surfaces in the direction of the reference axis; or**
 - (ii) **The distance between two adjacent/tangential distinct parts does not exceed 15 mm when measured perpendicularly to the reference axis; or**
- (c) **Any assembly of two independent retro-reflectors, whether identical or not, that have been approved separately and are installed in such a way that:**
 - (i) **The projection of their apparent surfaces in the direction of the reference axis occupies not less 60 per cent of the**

smallest quadrilateral circumscribing the projections of the said apparent surfaces in the direction of the reference axis; or

- (ii) The distance between two adjacent/tangential distinct parts does not exceed 15 mm when measured perpendicularly to the reference axis.

or

- (d) Any interdependent lamp system composed of two or three interdependent lamps providing the same function, approved together as type "Y" and installed so that the distance between adjacent apparent surfaces in the direction of the reference axis does not exceed 75 mm when measured perpendicularly to the reference axis.

2.14.2. "Two lamps" or "an even number of lamps", means a single light-emitting surface in the shape of a band or strip if such band or strip is placed symmetrically in relation to the median longitudinal plane of the vehicle, extends on both sides to within at least 0.4 m of the extreme outer edge of the vehicle, and is not less than 0.8 m long; the illumination of such surface shall be provided by not less than two light sources placed as close as possible to its ends; the light-emitting surface may be constituted by a number of juxtaposed elements on condition that the projections of the several individual light-emitting surfaces on a transverse plane occupy not less than 60 per cent of the area of the smallest rectangle circumscribing the projections of the said individual light-emitting surfaces."

Insert a new paragraph 2.31., to read:

"2.31. "H plane" means the horizontal plane containing the centre of reference of the lamp."

Paragraph 3.2.4., amend to read:

"3.2.4. If necessary, in order to verify the conformity to the prescriptions of the present regulation, a layout drawing or drawings of each lamp showing the illuminating surface, as defined in paragraph 2.7.1. above, the light-emitting surface as defined in paragraph 2.6., the axis of reference as defined in paragraph 2.9. and the centre of reference as defined in paragraph 2.10. This information is not necessary in the case of the rear registration plate lamp (paragraph 2.5.4~~011~~).")"

Paragraph 5.6.2.1., amend to read:

"5.6.2.1. Either the total area of the projection of the distinct parts on a plane tangent to the exterior surface of the outer lens and perpendicular to the reference axis shall occupy not less than 60 per cent of the smallest quadrilateral circumscribing the said projection, or the distance between two adjacent/tangential distinct parts shall not exceed 15 mm when measured perpendicularly to the reference axis. **This requirement shall not apply to a retro-reflector.**"

Insert new paragraph 5.6.2.2., to read:

"5.6.2.2. Or, in the case of interdependent lamps, the distance between adjacent apparent surfaces in the direction of the reference axis does not exceed 75 mm when measured perpendicularly to the reference axis."

Paragraph 5.7., amend to read:

"5.7. The maximum height above ground shall be measured from the highest point and the minimum height from the lowest point of the apparent surface in the direction of the reference axis. For passing beam headlamps, the minimum height from the ground shall be measured from the lowest point of the effective outlet of the optical system (e.g. reflector, lens, projection lens) independent of its utilization.

Where the (maximum and minimum) height above the ground clearly meets the requirements of the Regulation, the exact edges of any surface need not be determined.

When referring to the distance between lamps, the position, as regards width, shall be determined from the inner edges of the apparent surface in the direction of the reference axis.

Where the position, as regards width, clearly meets the requirements of the Regulation, the exact edges of any surface need not be determined.

For the purposes of reducing the geometric visibility angles, the position of a lamp with regard to height above the ground, shall be measured from the H plane."

Insert new paragraph 5.10.1., to read:

"5.10.1. In the case of an interdependent lamp system, all light sources shall be switched on and off simultaneously."

Insert new paragraphs 5.19. to 5.20.5., to read:

"5.19. Rear position lamps, rear direction-indicators and rear retro-reflectors, may be installed on movable components only:

5.19.1. If at all fixed positions of the movable components the lamps on the movable components meet all the position, geometric visibility, colorimetric and photometric requirements for those lamps.

5.19.2. In the case where the functions referred to in paragraph 5.19. are obtained by an assembly of two lamps marked "D" (see paragraph 2.14.), only one of the lamps needs to meet the position, geometric visibility and photometric requirements for those lamps at all fixed positions of the movable components.

5.19.3. Where additional lamps for the above functions are fitted and are activated, when the movable component is in any fixed open position, provided that these additional lamps satisfy all the position, geometric visibility and photometric requirements applicable to the lamps installed on the movable component.

5.19.4. In the case where the functions referred to in paragraph 5.19. are obtained by an interdependent lamp system either of the following conditions shall apply:

(a) Should the complete interdependent lamp system be mounted on the moving component(s), the requirements of paragraph 5.19.1. shall be satisfied. However, additional lamps for the above functions may be activated, when the movable component is in any fixed open position, provided that these additional lamps satisfy all the position, geometric visibility, colorimetric and photometric requirements applicable to the lamps installed on the movable component.

or

(b) Should the interdependent lamp system be partly mounted on the fixed component and partly mounted on a movable component, the interdependent lamp(s) specified by the Applicant during the device approval procedure shall meet all the position, outwards geometric visibility, colorimetric and photometric requirements for those lamps, at all fixed positions of the movable component(s). The inwards geometric visibility requirement(s) is(are) deemed to be satisfied if this(these) interdependent lamp(s) still conform(s) to the photometric values prescribed in the field of light distribution for the approval of the device, at all fixed positions of the movable component(s).

5.20. General provisions relating to geometric visibility

5.20.1. There shall be no obstacle on the inside of the angles of geometric visibility to the propagation of light from any part of the apparent surface of the lamp observed from infinity. However, no account is taken of obstacles, if they were already presented when the lamp was type-approved.

5.20.2. If measurements are taken closer to the lamp, the direction of observation shall be shifted parallel to achieve the same accuracy.

5.20.3. If, when the lamp is installed, any part of the apparent surface of the lamp is hidden by any further parts of the vehicle, proof shall be furnished that the part of the lamp not hidden by obstacles still conforms to the photometric values prescribed for the approval of the device.

5.20.4. When the vertical angle of geometric visibility below the horizontal may be reduced to 5 degrees (lamp at less than 750 mm above the ground, measured according to the provisions of paragraph 5.7.) the photometric field of measurements of the installed optical unit may be reduced to 5 degrees below the horizontal.

5.20.5. In the case of an interdependent lamp system the geometric visibility requirements shall be fulfilled when all its interdependent lamps are operated together."

Paragraph 6.3.4., amend to read:

"6.3.4. Geometric visibility

Horizontal angles: 20 degrees inwards, 80 degrees outwards

Vertical angles: 15 degrees above and below the horizontal.

~~The vertical angle below the horizontal may be reduced to 5 degrees, however, if the height of the lamps is less than 750 mm. However, where a lamp is mounted below 750 mm (measured according to the provisions of~~

paragraph 5.7.), the downward angle of 15° may be reduced to 5°."

Paragraph 6.4.4., amend to read:

"6.4.4. Geometric visibility

Horizontal angle:

45 degrees to left and to right for a single lamp;

45 degrees outwards and 10 degrees inwards for each pair of lamps;

Vertical angle: 15 degrees above and below the horizontal.

~~The vertical angle below the horizontal may be reduced to 5 degrees, however, if the height of the lamp is less than 750 mm.~~ **However, where a lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.7.), the downward angle of 15° may be reduced to 5°."**

Paragraph 6.6.4., amend to read:

"6.6.4. Geometric visibility

Horizontal angle:

80 degrees to the left and to the right for a single lamp:
the horizontal angle may be 80 degrees outwards and 20 degrees inwards for each pair of lamps.

Vertical angle: 15 degrees above and below the horizontal.

~~The vertical angle below the horizontal may be reduced to 5 degrees, however, if the height of the lamp is less than 750 mm.~~ **However, where a lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.7.), the downward angle of 15° may be reduced to 5°."**

Paragraph 6.7.4., amend to read:

"6.7.4. Geometric visibility

Horizontal angle:

80 degrees to left and to right for a single lamp:
the horizontal angle may be 80 degrees outwards and 45 degrees inwards for each pair of lamps.

Vertical angle: 15 degrees above and below the horizontal.

~~The vertical angle below the horizontal may be reduced to 5 degrees, however, if the height of the lamp is less than 750 mm.~~ **However, where a lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.7.), the downward angle of 15° may be reduced to 5°."**

Paragraph 6.8.4., amend to read:

"6.8.4. Geometric visibility

Horizontal angle:

30 degrees to left and to right for a single reflector;

30 degrees outwards and 10 degrees inwards for each pair of reflectors;

Vertical angle: 15 degrees above and below the horizontal.

~~The vertical angle below the horizontal may be reduced to 5 degrees, however, if the height of the lamp is less than 750 mm.~~ **However, where a lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.7.), the downward angle of 15° may be reduced to 5°."**

Paragraph 6.9.3., amend to read:

"6.9.3. "Circuit-closed" tell-tale

Mandatory. Flashing red signal lamp or, in the case of separate tell-tales, the simultaneous operation of the tell-tale prescribed in paragraph ~~6.3.10~~ **6.3.8.**"

Paragraph 6.12.4., amend to read:

"6.12.4. Geometric visibility

Horizontal angles $\beta = 30$ degrees to the front and to the rear.

Vertical angles $\alpha = 15$ degrees above and below the horizontal.

~~The vertical angle below the horizontal may be reduced to 5 degrees, however, if the height of the retro reflector is less than 750 mm. However,~~
where a lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.7.), the downward angle of 15° may be reduced to 5°."

II. Justification

1. The rear trunk lid that is commonly used for four-wheeled vehicles may be adopted for future scooter type motorcycles to secure the storage space for helmet, etc. and improve the appearance marketability. In such case, a negative impact on sales is expected due to motorcycle design constraints because of the regulatory requirements for the lamp system.
2. Meanwhile, interdependent lamp system is approved by the UN Regulations Nos. 7 and 48 and it is already on the market. This provides increased design freedom and balances the modern appearance and functionality that makes it easier to load/unload the cargo.
3. L category is also included in the scope of the UN Regulation No. 7, and the UN-certified stop lamp, front position lamp, and rear position lamp can be applied to motorcycles as well. Therefore, interdependent lamp system should also be approved for motorcycles.
4. This proposal is to increase the design freedom of motorcycle lamp system and improve the vehicle functionality without jeopardizing the safety of road users.
5. Also, the amendment reflects the recent amendments of the Supplement 2 to the 06 series of amendments to Regulation No. 48, where measurement of 750 mm height is changed to be taken at the H-plane, with some editorial corrections to current UN Regulation No. 53 text.