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Proposal for amendments to ECE/TRANS/WP.29/GRE/2008/58 (Regulation No. 53)

The text reproduced below was prepared by the expert from Germany in order to amend the Justification of the Proposal for draft Supplement 11 to the 01 series of amendments to Regulation No. 53 (ECE/TRANS/WP.29/GRE/2008/58). The modifications to this text are marked in bold characters.

B. JUSTIFICATION:

In accordance with the enforcement legislation of many countries, vehicles of category L must drive with the passing beam headlamps switched on. Germany sees an improvement for road safety by replacing the passing beam function by daytime running lamps. This will increase the vehicle visibility and will be favourable for the lifetime of the light sources used in passing beam headlamps. Latest research into conspicuity of motorcycles has shown that under daytime conditions an improved perception of such vehicles equipped with daytime running lamps will also be provided. An abstract of the latest research results **on the Frontal Signal Pattern of Motorcycles during Daytime is following:**

1. Introduction

This executive summary contains the essential results of the research project ‚Daytime Running Light on Powered Two Wheelers – Continuative Research‘ carried out by the German Federal Highway Research Institute (BASt).

2. Test design and realisation

The above-mentioned research project was a continuative study to the research project ‚Signal Pattern of Powered Two Wheelers during Daytime at Introduction of a Mandatory Use of Daytime Running Light in Germany‘. BASt performed a second test series with seven different signal patterns (all with dedicated daytime running light (DRL)) at the front of two different motorcycles. As in the first project, test persons assessed the conspicuity of the different signal patterns in a direct paired comparison. The test persons assessed the conspicuity of the motorcycles from a distance of 50 m and 100 m in a static traffic situation. Following the seven assessed signal patterns are listed:

- **Signal pattern A: One DRL (white light, max. 500 cd in HV, filament lamp, oval design)**
- **Signal pattern B: Two DRLs (white light, max. 500 cd/DRL in HV, filament lamp, oval design, distance of the DRLs 200 mm)**
- **Signal pattern C: Two DRLs (white light, max. 650 cd/DRL in HV, LED light source, round design, distance of the DRLs 200 mm)**

- **Signal pattern D:** Two DRLs (white light, max. 1000 cd/DRL in HV, filament lamp, round design (small), distance of the DRLs 200 mm)
- **Signal pattern E:** One DRL (white light, max. 650 cd in HV, LED light source, round design)
- **Signal pattern F:** One DRL (white light, max. 1000 cd in HV, filament lamp, round design (small))
- **Signal pattern G:** One DRL (white light, max. 800 cd in HV, LED light source, elongate LED-string design)

3. Results

The major result of the first study , *Signal Pattern of Powered Two Wheelers during Daytime at Introduction of a Mandatory Use of Daytime Running Light in Germany* was:

- A signal pattern on the motorcycle consisting of one DRL was better conspicuous for the test persons than the standard signal pattern of a motorcycle with activated passing beam

The analysis of the paired comparisons of the conspicuity of the motorcycle in the static experiment of the second study resulted in the following conclusions:

- All signal patterns with two DRLs on the motorcycle (signal patterns B, C, and D) were statistically significantly better rated related to their conspicuity than the signal patterns with only one DRL (signal patterns A, E, F and G).
- From a distance of 50 m the signal pattern C was rated as significantly better conspicuous than the signal pattern B, even though the luminous intensity of the two signal patterns was almost equal (500 cd to 650 cd). The light of the LED-DRL with its white colour is spectrally nearer to daylight and was therefore rated more brightly by the test persons. However, from a distance of 100 m this ,colour effect‘ nearly disappeared and the signal patterns B und C were assessed to be equally conspicuous.
- From a distance of 50 m the signal pattern C also was rated as significantly better conspicuous than the signal pattern D, even though the luminous intensity of the signal pattern D was much bigger. Also in this comparison the light of the LED-DRL with its white, daylight-like colour was recognised and assessed brighter by the test persons than the signal pattern D with the much higher luminous intensity. However, from a distance of 100 m this ,colour effect‘ also disappeared and the signal patterns C und D were assessed to be equally conspicuous.

Additional to the pair comparison the conspicuity of the motorcycle with its different signal patterns was assessed by the test persons subjectively. The following additional conclusions can be drawn from this evaluation:

- The ,colour effect‘ of signal pattern C was also observed at the signal pattern G. The elongate, string-shape LED-DRL appeared very bright, glaring and conspicuous from a short distance whereas signal pattern D did not look very conspicuous. But already from a distance of 50 m and clearly at a distance of 100 m the real luminous intensity of the DRL is crucial and the signal pattern D was much better conspicuous.
- The distance of the test persons to the motorcycle for the assessment of the conspicuity had the largest effect on the conspicuity of signal pattern G. With the elongate, string-shape form of the DRL the luminous area became ‘diffuse’ with increasing distance and was nearly not recognisable in front of the background any more at large distances. This was not the case to the same degree with a more compact (e.g. round) luminous area of another DRL (e.g. signal pattern E).

4. Conclusions

The results of the research projects , Signal Pattern of Powered Two Wheelers during Daytime at Introduction of a Mandatory Use of Daytime Running Light in Germany‘ and ,Daytime Running Light on Powered Two Wheelers – Continuative Research‘ can be summarised as follows:

- One DRL according to Regulation No. 87 is better conspicuous than the normal passing beam.
- Two DRLs are better conspicuous than a single DRL.
- DRLs with a luminous intensity at the upper limit of the range allowed in Regulation No. 87 (400 cd - 1200 cd) are better conspicuous at greater distances than DRLs with a low luminous intensity, whereas the differences in the conspicuity caused by different colours respectively colour regions fade with greater distances.
- On a greater distance (100 m) DRLs with a filament lamp as light source are equally conspicuous to DRLs with LEDs as light source.

The results of the research projects did show that under daytime conditions an improved perception of motorcycles equipped with daytime running lamps can be observed so that there is an improvement for road safety if replacing the passing beam function by dedicated daytime running lamps. These results lead to proposals for amendments to Regulations Nos. 53 and 87.

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