

Improvement of Daytime Conspicuity of Motorcycles

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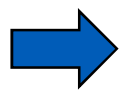
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Federal

Highway Research Institute



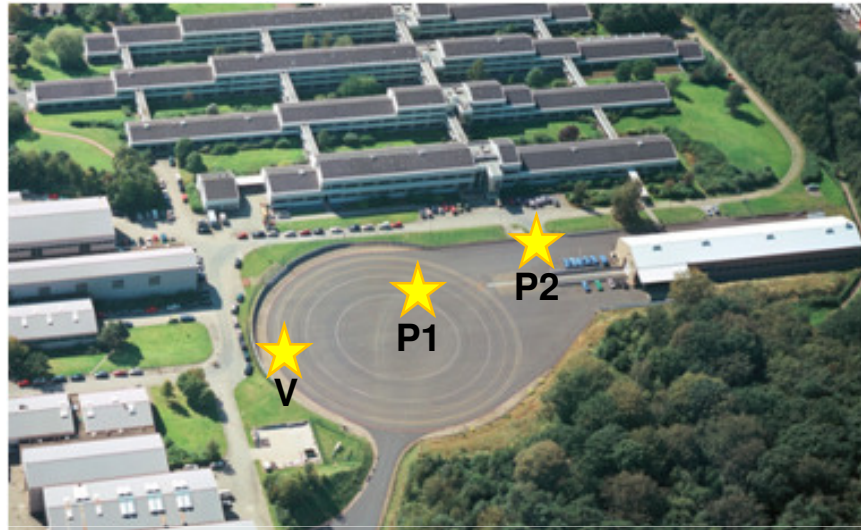
- With an implementation of a mandatory use of the vehicle illumination at daylight for all vehicles the consequences for conspicuity of motorcycles are unclear.
- Special Daytime Running Lamps (DRL) as used for cars are not allowed yet for motorcycles.



Investigation of the BASt to optimise the frontal signal pattern of motorcycles



- Questioning of test persons (n = 39, age: 25 – 65) to assess static traffic situations
- Test persons were asked to assess the recognisability of a motorcycle from two different observation points at distances of 50m and 100m
- The observation points were equivalent to the position of an oncoming driver on the road (point B50L from ECE-Regulation)
- Test and weather conditions should be comparable (dry, sunny : > 50.000lx, position of the sun)
- 2 test series were planned with 5 respectively 6 signal patterns
- Paired comparisons of all combinations of 2 different signal patterns were performed



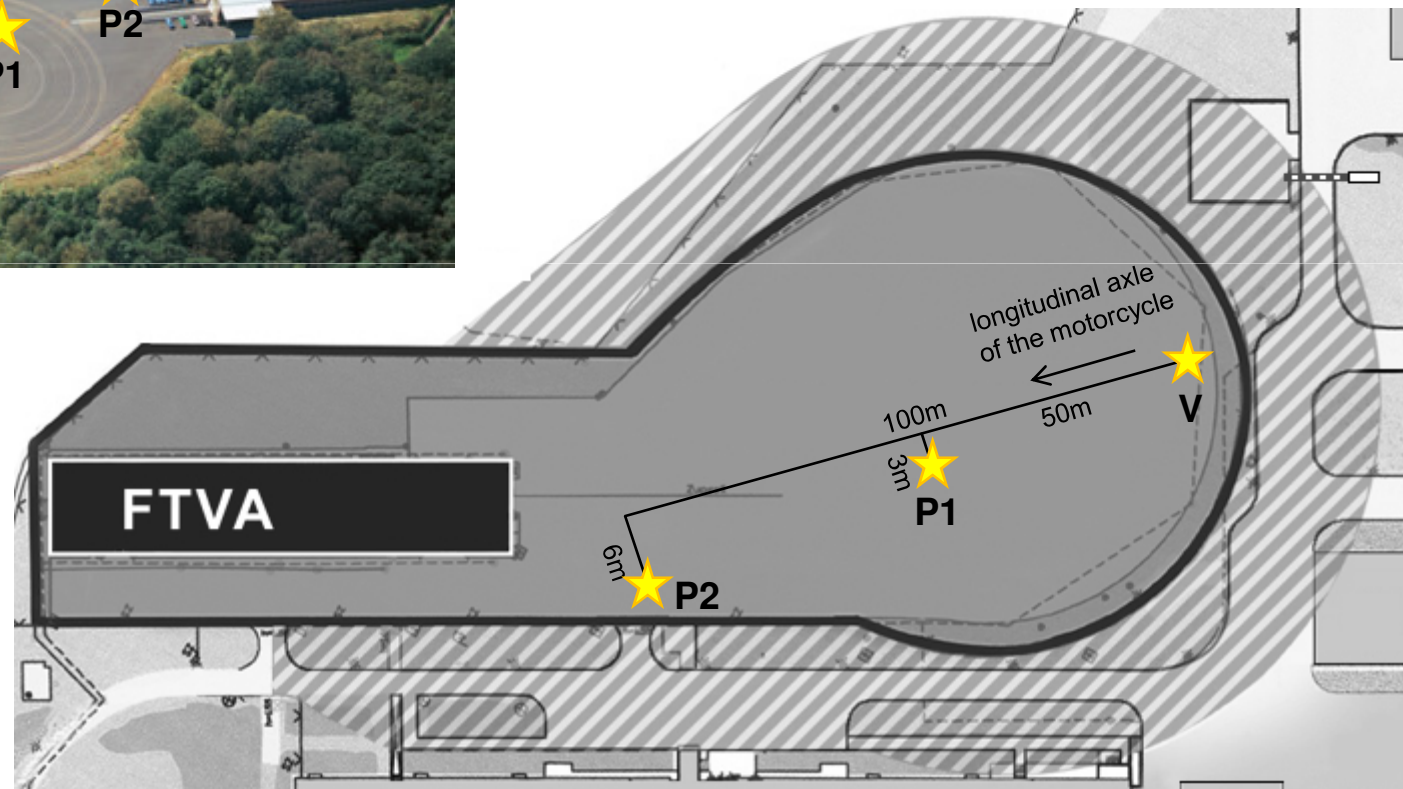
Vehicle Dynamics Testing Ground at BAST:

Positions:

V: Vehicles

P1: Test persons in 50m distance (in B50L)

P2: Test persons in 100m distance (in B50L)





Car (VW Passat) and the two static traffic situations



- 2 passing beam headlamps (H4, 55W)
- 2 DRL (each 500cd, 50cm², white)

(DRL = Daytime Running Lamp(s) acc. to ECE-R87)



The 5 different signal patterns of the motorcycle (1st test series):



(A)
Passing beam
(H4, 55W)



(B)
Passing beam with
permanently
activated direction-
indicators
(P21W)



(C)
DRL (white)



(D)
DRL (selective yellow)



(E)
DRL (amber)

DRL acc. to ECE-R87 (except the colour of the light) with 500cd and 50cm² each



Motorcycle: Honda CBF 600 & N.N.

(2nd test series):

- 1 DRL (500cd, 50cm², white)
- 1 DRL (650cd, 40cm², white, LED)
- 1 DRL (1000cd, 25cm², white)
- 2 DRL (each 500cd, 50cm², white)
- 2 DRL (each 650cd, 40cm², white, LED)
- 2 DRL (each 1000cd, 25cm², white)
- 1 DRL (800cd, 80cm², white, LED-band)



The 7 different signal patterns of the motorcycles (2nd test series):



(A_{TFL}) 1 x 500cd



(E_{TFL}) 1 x 650cd



(F_{TFL}) 1 x 1000cd



(B_{TFL}) 2 x 500cd



(C_{TFL}) 2 x 650cd



(D_{TFL}) 2 x 1000cd

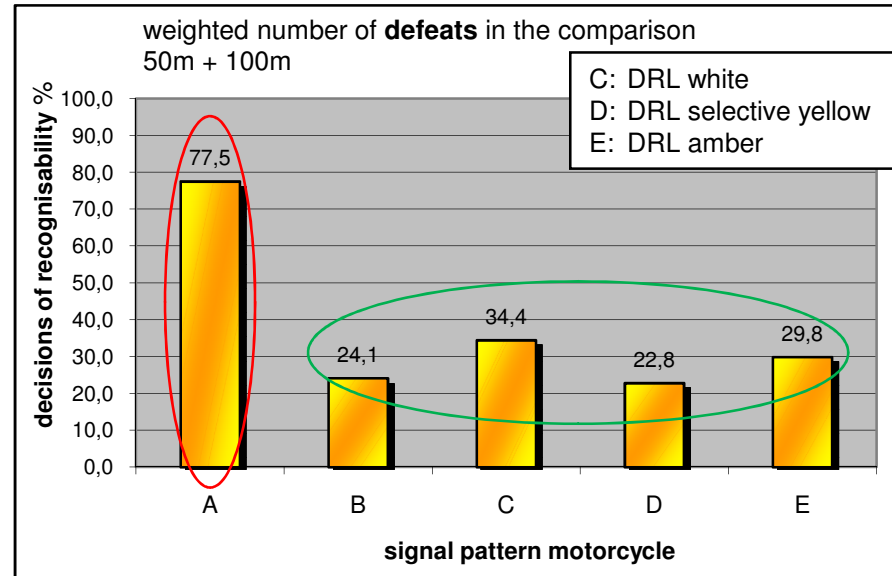
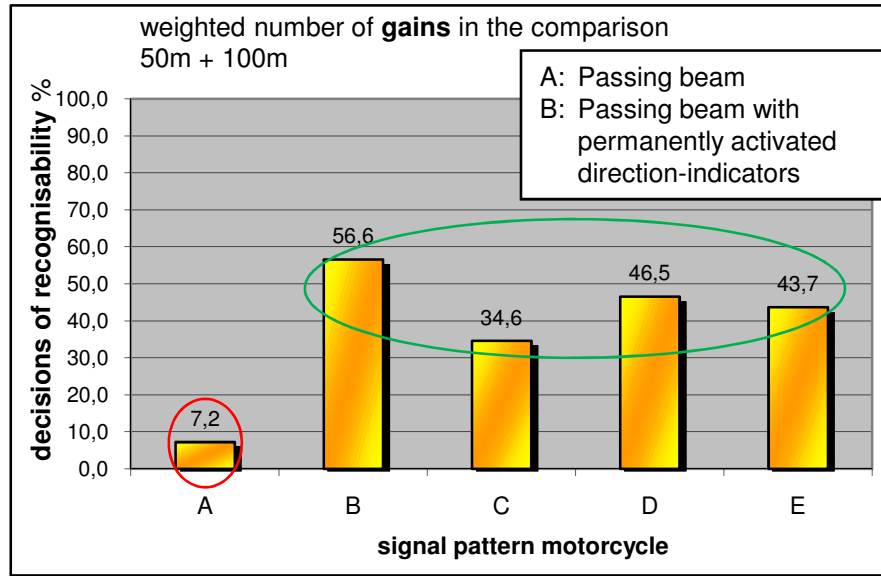
All DRL meet the
ECE-R87



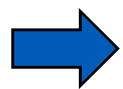
(G_{TFL}) 1 x 800cd



Results (1st Test Series)



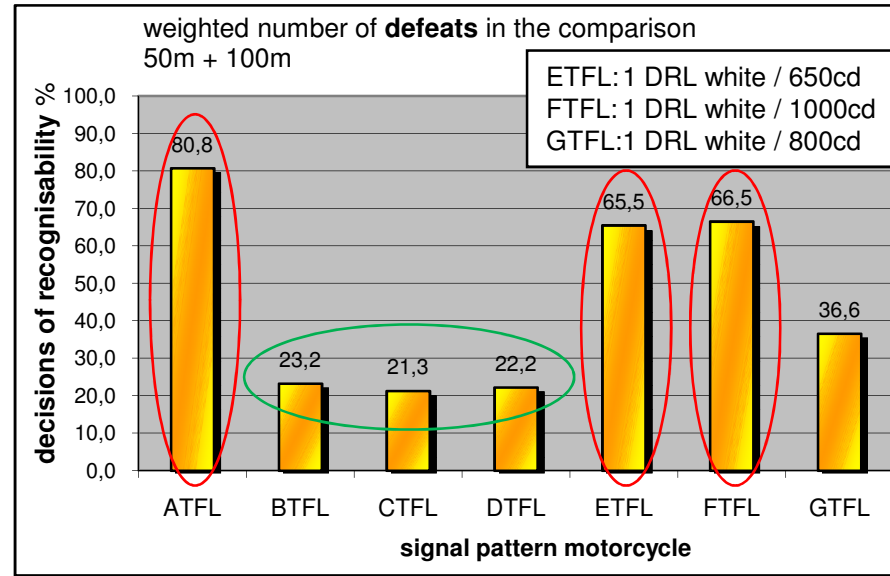
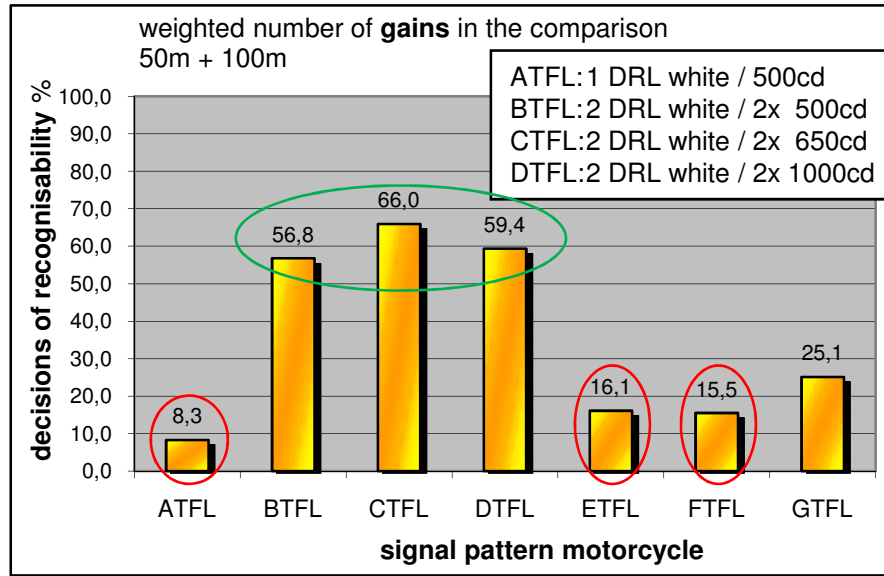
- Passing beam (A) is rated as significantly worse than all the other signal patterns (B-E).
- Passing beam with permanently activated direction-indicators (B) and the DRL in amber (E) might be misinterpreted by other road users (possible conflicts with indication of the driving direction or warning signals).
Selective yellow (D) is a little-known colour in road traffic.
- Passing beam with permanently activated direction-indicators (B) and the DRL (C-E) have no significant differences in the ratings.



Results of the 1st test series recommend a white DRL (C) as signal pattern



Results (2nd Test Series)



- Two DRL (B_{TFL} - D_{TFL}) are rated as significantly better recognisable than one DRL (A_{TFL} , E_{TFL} and F_{TFL}).
- Differences in recognisability of the DRL caused by spectral differences in the colour scale of 'White' are relevant only for shorter observation distance (50m). The effect declines with increasing observation distance.

Results of the 2nd test series recommend one or two white DRL as signal pattern



- The car and its illumination had no influence for the test persons on the rating of recognisability of the motorcycle.
- The recognisability of the motorcycle equipped with one DRL was rated better than with passing beam.
- Two DRL are better recognisable than one DRL.
- The brighter the DRL (between 400cd - 1200cd) the better their recognisability on greater distances.
- The colour of the DRL had no significant influence on recognisability of the motorcycle.
- On greater distance (100m) there was no difference in recognisability of DRL based on filament lamps or based on LED light sources.



- With the application of DRL on the motorcycle for the frontal signal pattern an improvement of daytime conspicuity is possible.
- The results of the study lead to proposals for amendments for the ECE-R53 and ECE-R87 to enable the legal possibility to install optionally one or two white DRL on motorcycles.
- It was decided in the WP.29 that ECE-R53 and ECE-R87 will be changed according to the proposals.
- Next amendment of the StVO:
The possibility for drivers to use DRL as an alternative to the mandatory passing beam on the motorcycle will be introduced in Germany.





Thank you for your attention!