Contribution of the Dipped Beam to Night-time Road Safety

The GTB / CIE Approach to Encouraging Improved Performance

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An explanatory brochure and a full presentation of GTB are available on the GTB website:

http://www.ass-cuna.org/GTB.htm
COMMISSION INTERNATIONALE DE L'ECLAIRAGE
(INTERNATIONAL COMMISSION ON ILLUMINATION)

40 National Committees (country members)
7 Technical Divisions
135 Technical Committees
120 Standards, Guides and Technical Reports
> 1000 Expert volunteers

More information at: http://www.cie.co.at
The SAE Pedestrian Visibility taskforce reviewed the recent research concerning pedestrian fatalities and investigated possible approaches to define the minimum requirements, both in terms of visibility and glare, of a headlighting system operating under actual vehicle conditions.

More information at: http://www.sae.org
Accident Data

- Extremely large numbers of pedestrians are killed in collisions with vehicles because of darkness.
  (2,300 fatalities in USA, 150,000 worldwide)

- The risk of having a road accident at night is 3-7 times higher than in the daytime

- Night-Time Accidents are more severe in terms of critical injuries

- In Germany the number of accidents at night declined more strongly in the last decade compared to daytime
The risk of having a road accident at night is 3x higher

Night-Time Accidents are more severe

Proportion of night-time injuries on all injuries:
27.4% for slightly injured but 42.2% for fatalities (in 2002)

BASSt report, „Das Unfallgeschehen bei Nacht“ (187), 1988
The number of accidents at night declined stronger in the last decade compared to daytime.

BASl report, „Das Unfallgeschehen bei Nacht“ (M172), 2005
Extremely large numbers of pedestrians are killed in collisions with vehicles because of darkness.

(2,300 fatalities in USA, 150,000 worldwide)

In the US, the risk of a pedestrian fatal crash in darkness is on average almost seven times greater than in daylight

90% of information is perceived by the visual channel

Improving Night-Time Road Safety

M. Eckert, "Lichttechnik u. optische Wahrnehmungssicherheit im Strassenverkehr"; Verlag Technik GmbH, Germany, 1993
Basic Performance Halogen Headlamp
Improved Night-Time Road Safety

- Light Source developments
- Headlamp Development
- Vehicle System Development
- Regulatory Developments
- User Awareness
Minimum requirements for road safety

- Based upon type approval of components

- Do not address performance of the complete vehicle system

- Strict control on Glare

- Maximum freedom for improvements of forward illumination

- Revisions to enable new technologies
Distance along the road - metres

Road width = 6m (3m per lane)

3 Lux on road surface

500m Radius Curve

10
30
50
125
75
0
15
15
0
30
50
75
125

Distance from Car C/L - metres

Basic Performance Halogen Headlamp
Distance from Car C/L - metres

Distance along the road - metres

Road width = 6m (3m per lane)

500m Radius Curve

3 Lux on road surface

High Performance HID Headlamp
Nightime Minor Injuries
Nightime Critical Injuries

Improved Night-Time Road Safety

Headlighting innovations (e.g. complex-shape reflectors, Gas Discharge Light Sources)

BASr report, „Das Unfallgeschehen bei Nacht“ (M172), 2005
Car buyers not so willing to invest in optional safety devices

Gas Discharge Headlamp “take up rate” less than 10% in Europe
Vehicle manufacturers working closely with suppliers to define performance objectives according to market segment

Suppliers investing in new technologies

Motoring Press reporting on comparisons of vehicle lighting performance

New Car Assessment Programmes (NCAP)
2003 EuroNCAP announced intention to rate headlamp performance.

GTB Established a Taskforce to support EuroNCAP and produced an initial recommendation for an assessment system.

2005 EuroNCAP concluded that more research would be required to define the relative priorities of glare and visibility before a rating system could be introduced.

GTB decided to continue working to define a standard assessment method and transferred the activity to CIE TC4-45.

2009 CIE TC4-45 has produced a Technical Report and a Standard to be published by end 2009.
52 Organisations

Including
18 Car Manufacturers
16 Lighting Suppliers
3 Government Organisations
5 Test Laboratories
3 Universities

32 meetings
between August 2003 and March 2009

5 Validation Testing Events

1st Validation (2004)
- 16 Pairs of Headlamps – Motor Transport Institute - Poland

2nd Validation (May 2005 IDIADA Spain)
- 16 pairs of Headlamps – Renault / IDIADA / LTIK

3rd Validation (March 2006 Hella Germany)
– Re-evaluation of a Selection of Headlamps from 2nd Event

4th Validation (February 2007 – Koito Belgium)
- Validation of Revised Method to Calculate Glare

5th Validation (May 2007 – Fiat Balocco)
- Validation of Revised Method to Calculate Range

More than 6000 man-hours
Objective Method

Validated against observation data

Repeatable results based upon laboratory procedure and standardised software routines

Can accept photometric simulation data to enable assessment at vehicle concept stage

Globally accepted method independent of regulatory requirements
No Significant differences between US and ECE dipped beams!!
Develop a standard CIE Performance Scoring System
(Could be an ISO Standard)

Target Groups

- New Car Assessment Programmes (Europe / USA / Japan)
- Vehicle and Equipment Manufacturers
- Consumer Groups
- Motoring Press
- End Users
Joint GTB / CIE Technical Committee TC4-45

- Starting to develop a Standardised Scoring System
- Comments and suggestions will be appreciated
- Participation / Research data / Funding welcomed

Thank you for your attention