



**Automotive Lighting  
and Light Signalling Expert Group**  
GROUPE DE TRAVAIL "BRUXELLES 1952" (GTB)

Informal document No. WP.29-148-27  
(148th WP.29, 23-26 June 2009,  
agenda item 8.7)

# Contribution of the Dipped Beam to Night-time Road Safety

The GTB / CIE Approach  
to Encouraging Improved Performance

Presentation to WP29 -148<sup>th</sup> session – 24 June 2009



# Automotive Lighting and Light Signalling Expert Group

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## Automotive Lighting and Light Signalling Expert Group

GRUPE DE TRAVAIL "BRUXELLES 1952" (GTB)

Since 1952 the GTB has been recognised as the global group of vehicle manufacturers, system suppliers, light source manufacturers, testing laboratories and academia working to assure regulation and safety of automotive lighting systems and their installation.



### Foreword from the chairman

I am honoured and delighted to have recently been elected as the 5<sup>th</sup> GTB chairman at a time when both regulators and industry are facing huge economic and technical challenges.

In the field of automotive lighting, technology is developing rapidly with regard to light sources, optical systems and electronic control and this means that the regulations must be maintained in line with this progress while ensuring that safety considerations are not compromised.

The automotive lighting world is truly global and this is clearly evident from the recent signatories to the 1958 and 1998 UNECE agreements and also from the widening membership of GTB. It is my objective to develop GTB to ensure that it remains able to represent the interests of system suppliers, light source manufacturers, vehicle manufacturers, testing laboratories and research organisations of all national delegations wishing to be involved.

In parallel with global regulatory development demanding increasing involvement of the GTB experts, there are economic challenges that threaten our ability to work on the proposals for new regulations, standards and their amendments. The GTB is totally funded by its membership and of course this is dependent upon the prosperity of the industry that has generously provided support throughout our 56 year history.

This leaflet is intended to provide an insight into our activities, objectives, values and operating structure and it complements a more comprehensive brochure that is available on the GTB website. If you require more information or wish to discuss a particular question please do not hesitate to contact us.

Together with our vice-president, Bart Terburg and our executive secretary, Davide Puglisi I am looking forward to maintaining the success and international respect for GTB that has been established by our previous presidents. We can only achieve success with your support so if you are not already a member, please consider joining the experts of the world's most influential vehicle lighting group.

Geoffrey R. Draper  
January 2009

A full GTB presentation can be downloaded from: <http://www.ass-cuna.org/GTB.htm>

### Our Evolution

ational /regional to a global economy, in particular in production and marketing, has had far-reaching at standardisation and rulemaking.

29 is the World Forum for Harmonization of Vehicle attended by more than 40 government delegations from tralasia, Asia and South Africa.

3 Contracting Parties, and 126 UN Regulations have uch 39 are in the area of lighting, covering all aspects of allation on the vehicle and their light sources.

ures and operation to this development and is an t organization.

8 delegations from countries, including Europe, USA, epresentation in national delegations comes from oratories, regulatory agencies and academia.

is the preparation of proposals for new and amended t account technical development, actual testing and economic implications with a view to practical

### operation with:



### membership

Delegations and 98 Experts  
Members Expected in 2009)

lands	Experts from
ia	Vehicle Manufacturers
frica	Lighting System Manufacturers
	Light Source Manufacturers
	Test Laboratories
	Regulatory Agencies
	Academia

### Our Organisational Structure



need of six working groups specialising in front lighting, signal retro-reflectors, LED front lighting and light sources. These are led by a scientific group working on safety and visual performance entry group dealing with testing and type approval issues. As subcommittees are established to deeply study specific issues.

### Structure

objective of GTB is to support the UNECE regulatory process by report to the expert working group on Vehicle Lighting (GRE) in

ed through its steering group comprised of the president, vice-president, executive secretary and the head delegates. The committee of experts work on the detailed proposals formulated by the expert groups. When finally approved by the committee of experts the proposals are submitted to GRE.



### Some of our Achievements

from the routine work of adapting the UNECE Lighting Regulations to national programs, GTB has been active in a number of new developments, a number are set out below.

- roduction of Halogen and High Efficiency Incandescent Light Sources as-discharge light sources and headlamps for these light sources
- ordwide harmonized driving beam and passing beam pattern
- ght-emitting diodes (LED) as light source for light-signalling devices
- nterfaced lighting systems
- entral vehicle network and power supply at different voltages
- retro-reflecting lamps
- aytime running lamps
- ew Front Fog Lamps
- aptive Frontlighting System (AFS)
- aptive Signal Lighting
- utomatic activation of lighting devices
- ID Module in Front Lighting Applications
- river Assistance Systems such as Adaptive Driving Beam
- adiating Performance Assessment Procedures

on a request by GRE, GTB has also prepared Guidelines for the Design and Evaluation of Petitions Concerning International Automotive Regulations, which can be used as tool by regulatory agencies when taking new ideas for road vehicle lighting.

### Values

is based on teamwork, communication, excellent human and professional skills and an extensive social network.

working language is English but, understanding that the majority of members will not be working in their native language, we endeavour to ensure everyone is able to fully follow and to contribute in the proceedings.



These photos were taken at the first formal session of GTB held in Brussels from 05 to 10 May, 1952. The photo above shows the founding president, Pierre Durieux on the right who continued in the post for 32 years.

### The Priorities for our Management Group

(President, Vice President and Secretary)

that GTB remains "in-Tune" with new lighting and vehicle lights. This is particularly important as the UNECE Lighting and Light Signalling Regulatory system will evolve and GTB will be expected to be a stabilizer in this process.

to economic pressures and their impact on the need to continue to make all of our experts to ensure the quality of our input to the regulatory process.

effective management in conjunction with Head Delegates and Group Chairpersons

time as necessary in response to anticipated future pressures

adequate funding with the emphasis on cost effectiveness

communication technologies to increase our effectiveness

get and maintain the excellent collaboration and social networking of our members

### GTB Membership

a unique global group of vehicle lighting experts supporting the UNECE regulatory process through the combination of their experience and skills as manufacturers, lighting systems manufacturers, light source manufacturers, test laboratories, regulators and academia. This provides a unique input for members to be involved in the UNECE regulatory process.

is a truly global group, the sharing of local knowledge and experience that all members are able to keep up-to-date with regulatory progress / / / type approval issues / interpretational issues etc. etc.

rough cooperation with other standardisation bodies, provide up-to-date input concerning development of regulations and standards in other regions such as USA, Canada, China, India etc.

a non profit organisation that is funded and managed by its members. The input costs are shared by the members and this provides a unique service at the best of all members.

in 2009, GTB will provide a new service that will allow access to draft versions of the UNECE lighting regulations. The consolidated / will include proposals that GTB will refer to GRE, proposals from WP29 and proposals that have been approved by WP29 but which have entered into force. Access to this information will only be available to GTB members and, even when consent to initiation, this service endorses the good of the annual GTB membership fee.

### Working Group!

is already a member ensure that you derive full benefit of being part of an active international group. If you are not a member, consider joining us!

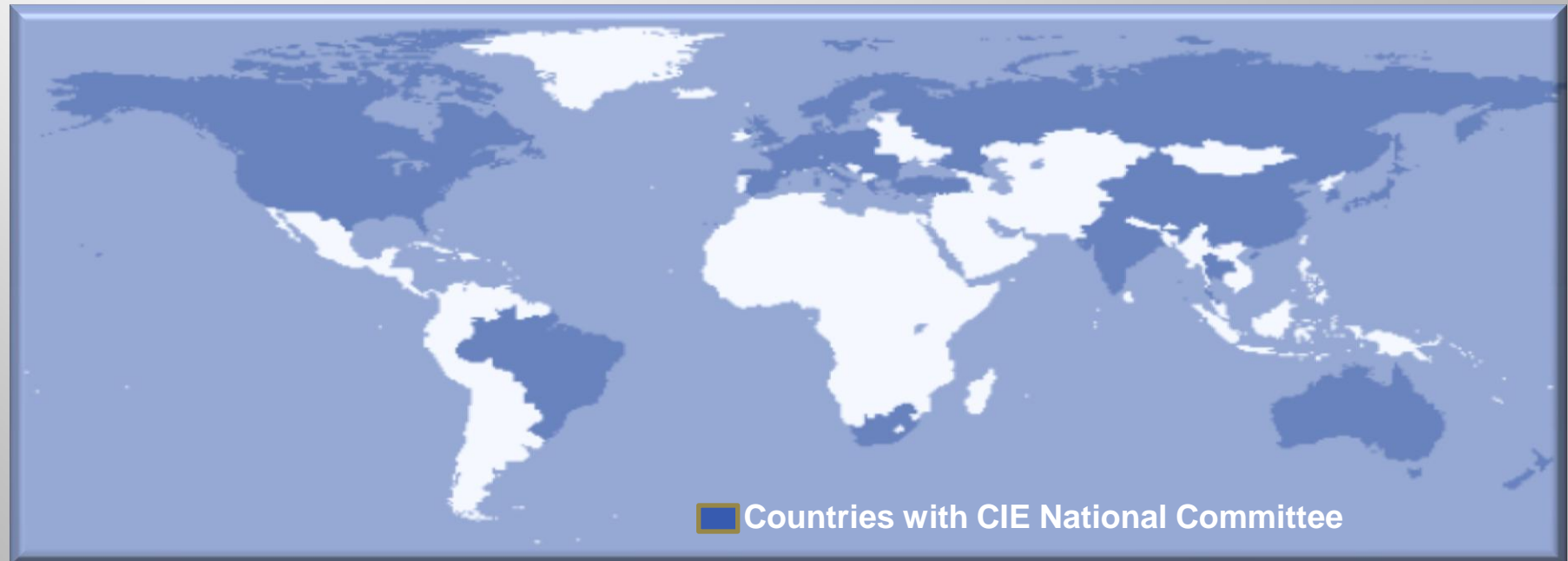
An explanatory brochure and a full presentation of GTB are available on the GTB website:

<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

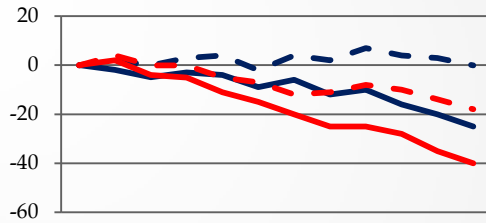


More information at: <http://www.cie.co.at>

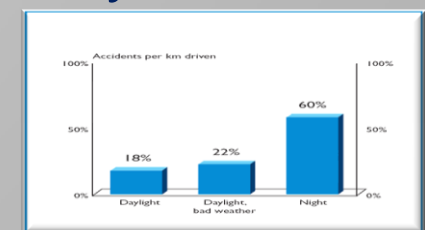
<b>SAE</b> <i>International</i> <sup>™</sup>	<b>SURFACE VEHICLE INFORMATION REPORT</b>	<b>SAE</b> J2829 FEB 2009
		Issued 2009-02
PEDESTRIAN VISIBILITY – LOW BEAM OPTIMISATION TO REDUCE NIGHT-TIME FATALITIES		

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.

## Accident Data



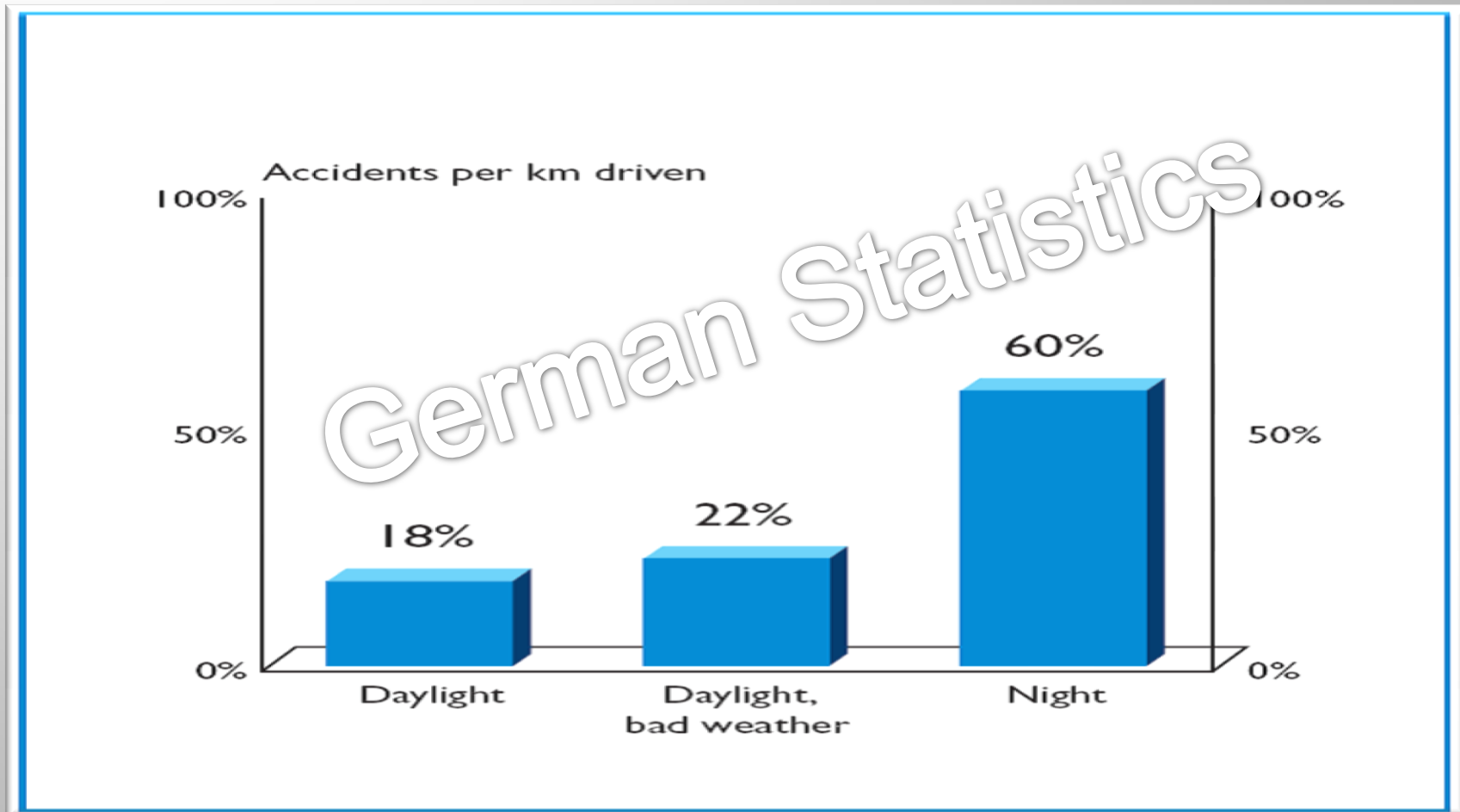
- Extremely large numbers of pedestrians are killed in collisions with vehicles because of darkness.  
(2,300 fatalities in USA, 150,000 worldwide)
- The risk of having a road accident at night is 3-7 times higher than in the daytime
- Night-Time Accidents are more severe in terms of critical injuries
- In Germany the number of accidents at night declined more strongly in the last decade compared to daytime



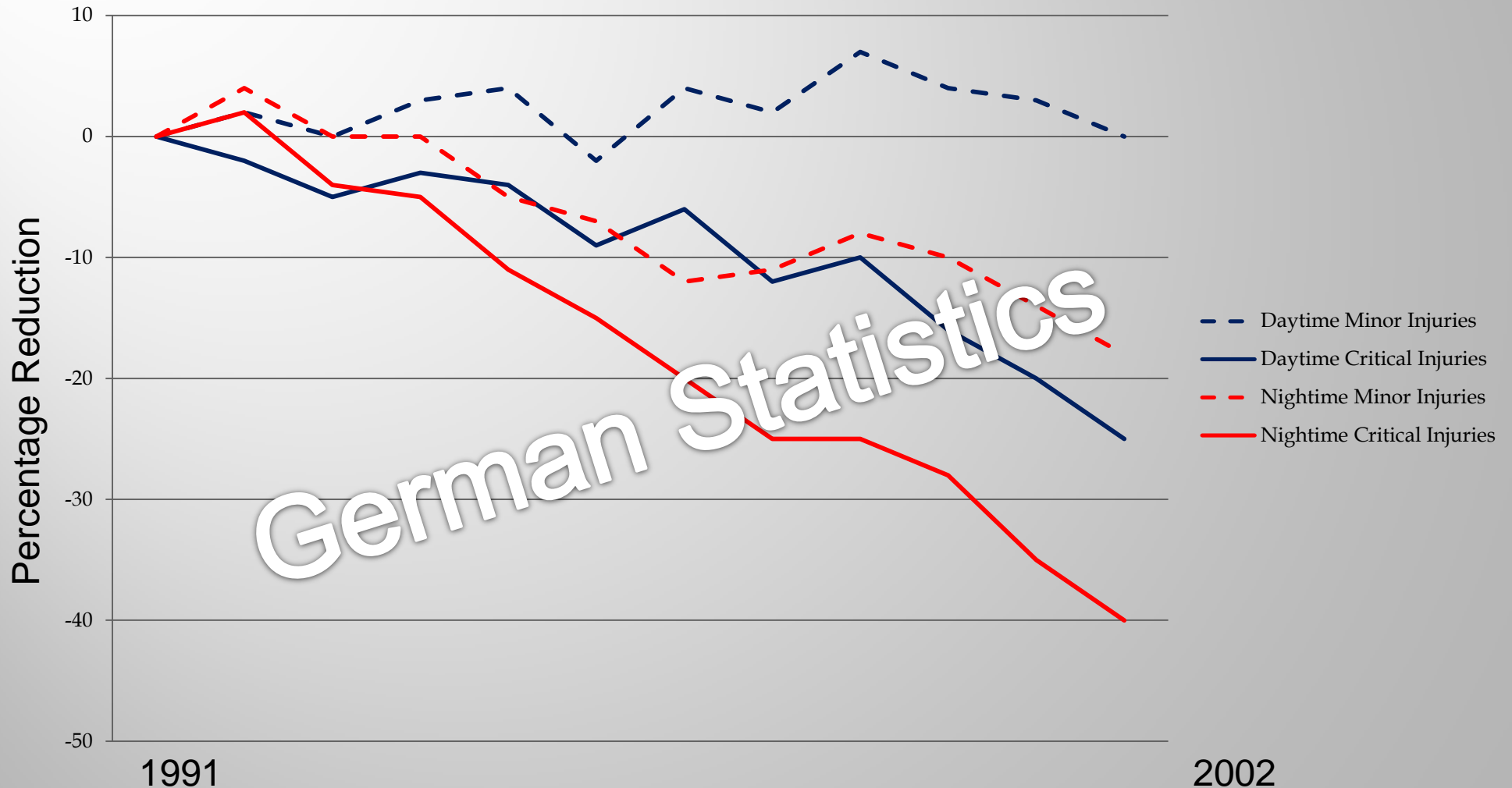
# The risk of having a road accident at night is 3x higher

## 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)



The number of accidents at night declined stronger in the last decade compared to daytime.



Extremely large numbers of pedestrians are killed in collisions with vehicles because of darkness.

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

## USA Statistics

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



# Improving Night-Time Road Safety



90% of information  
is perceived by the  
visual channel



# Basic Performance Halogen Headlamp



# High Performance HID Headlamp



Light Source developments

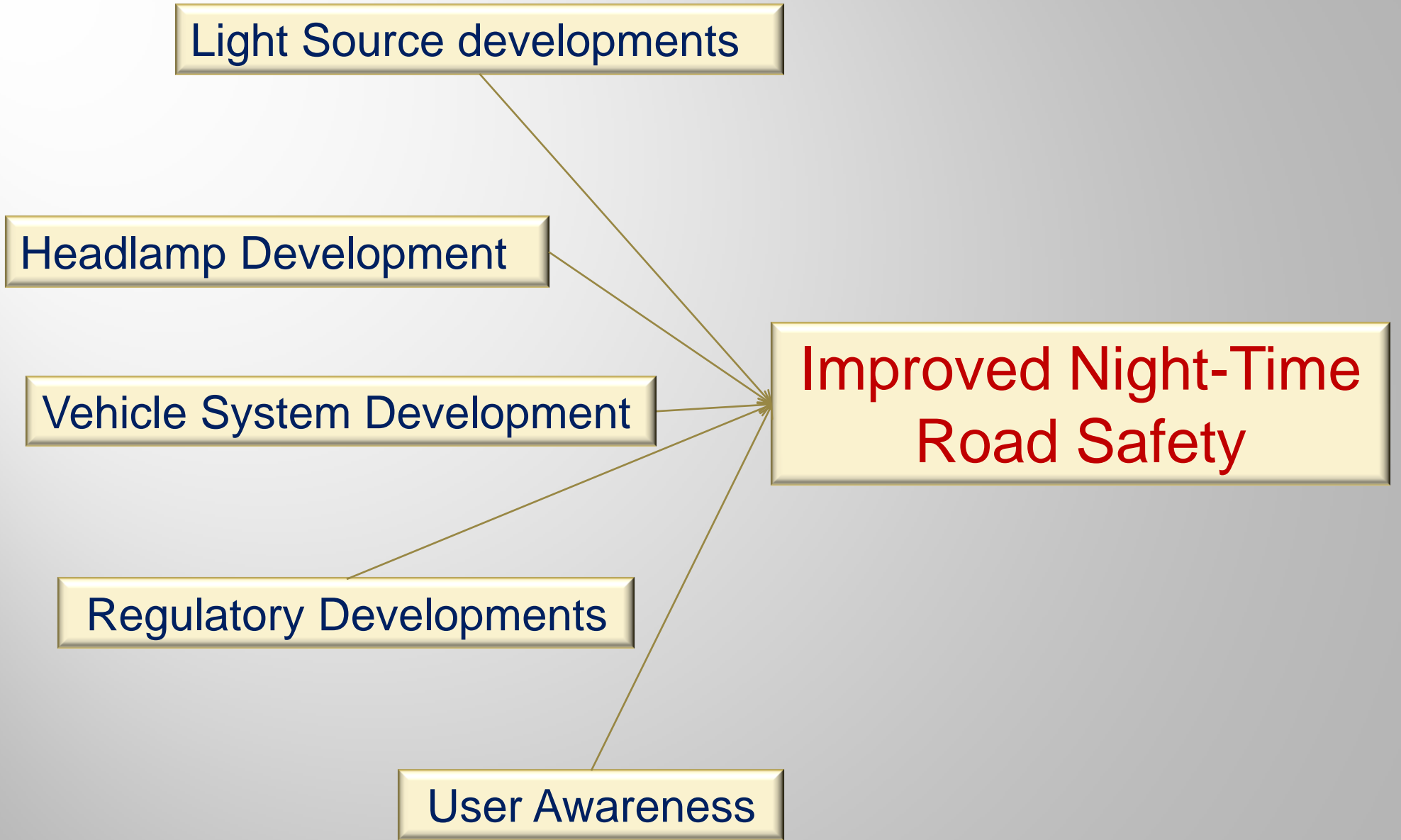
Headlamp Development

Vehicle System Development

Regulatory Developments

User Awareness

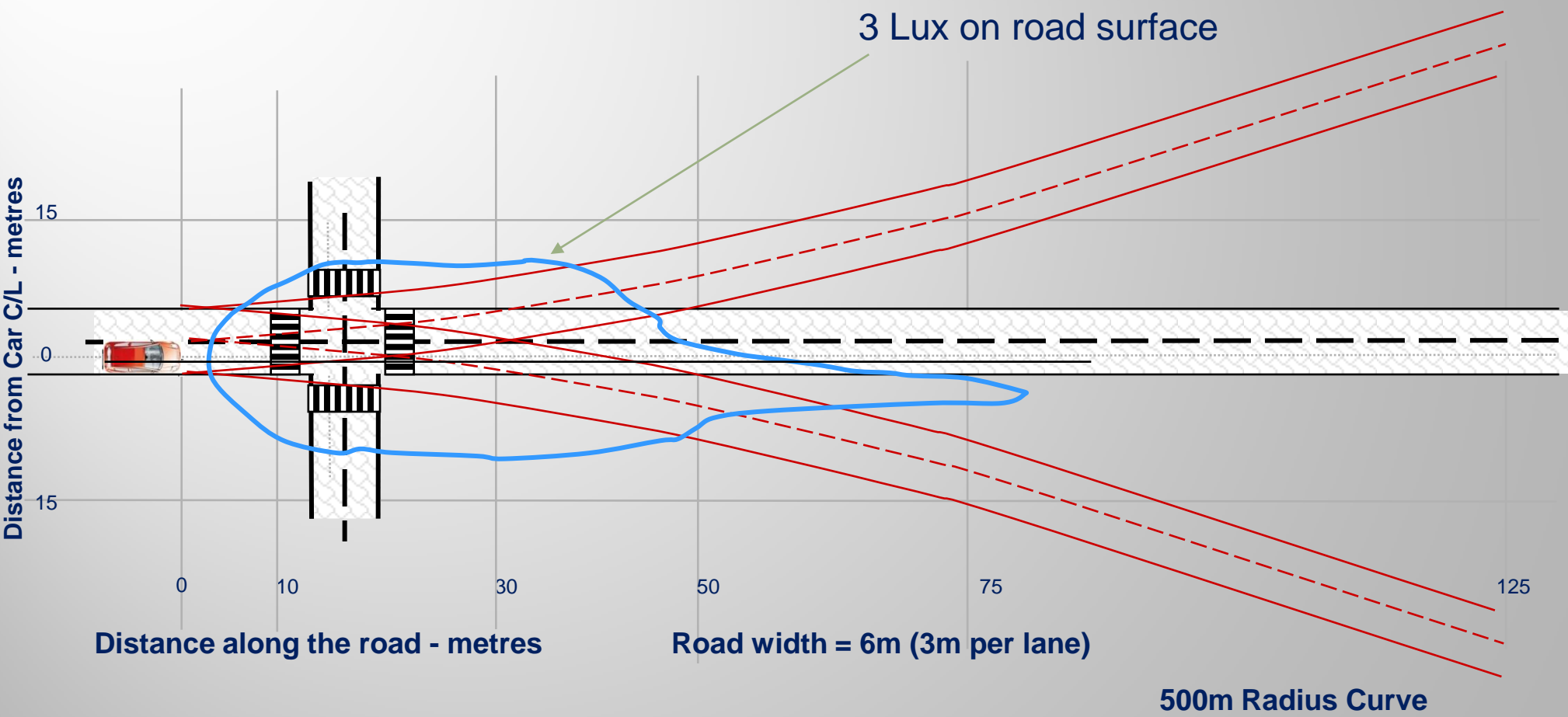
Improved Night-Time  
Road Safety





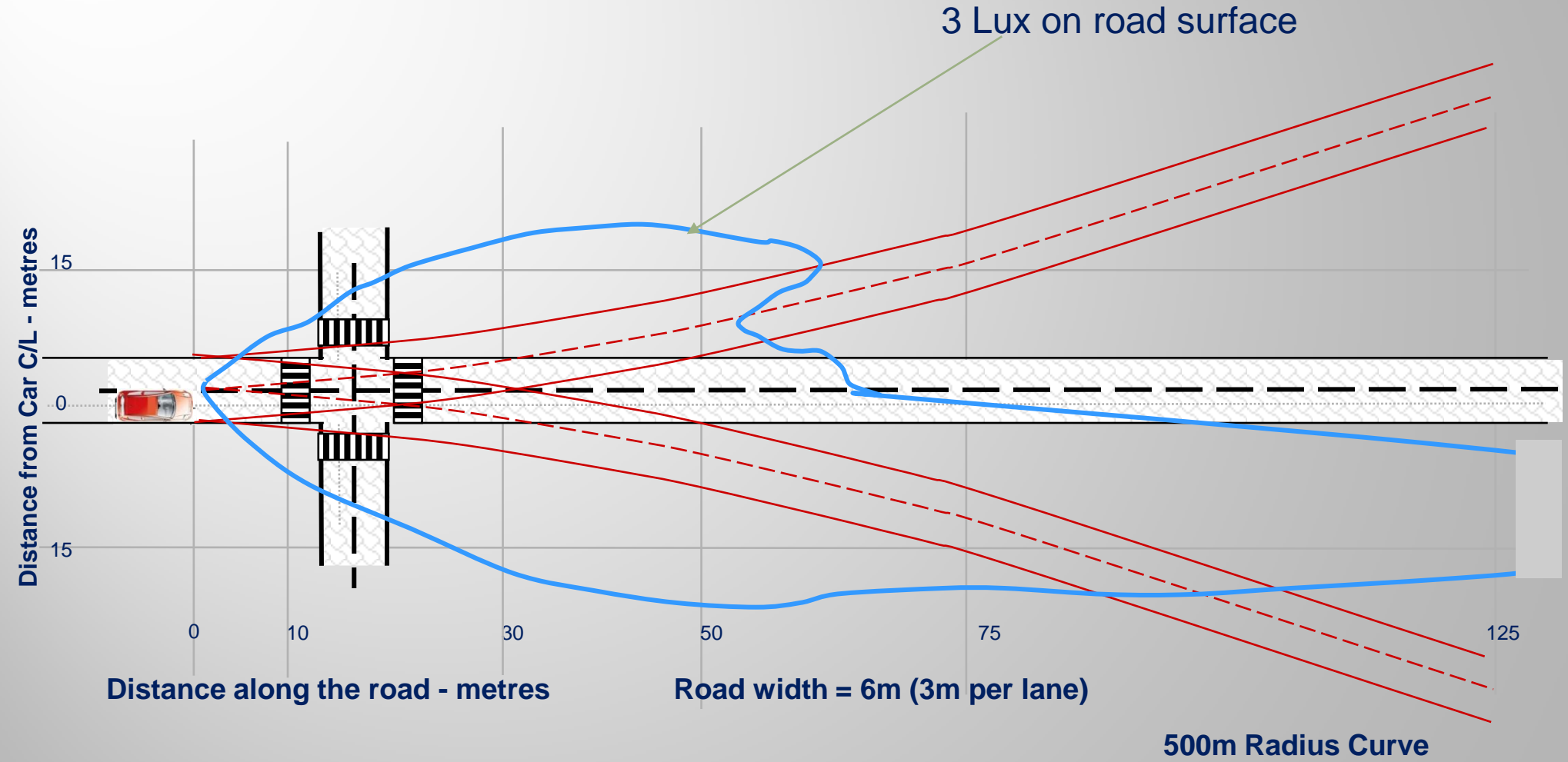
- Minimum requirements for road safety
- Based upon type approval of components
- Do not address performance of the complete vehicle system
- Strict control on Glare
- Maximum freedom for improvements of forward illumination
- Revisions to enable new technologies

# Basic Performance Halogen Headlamp



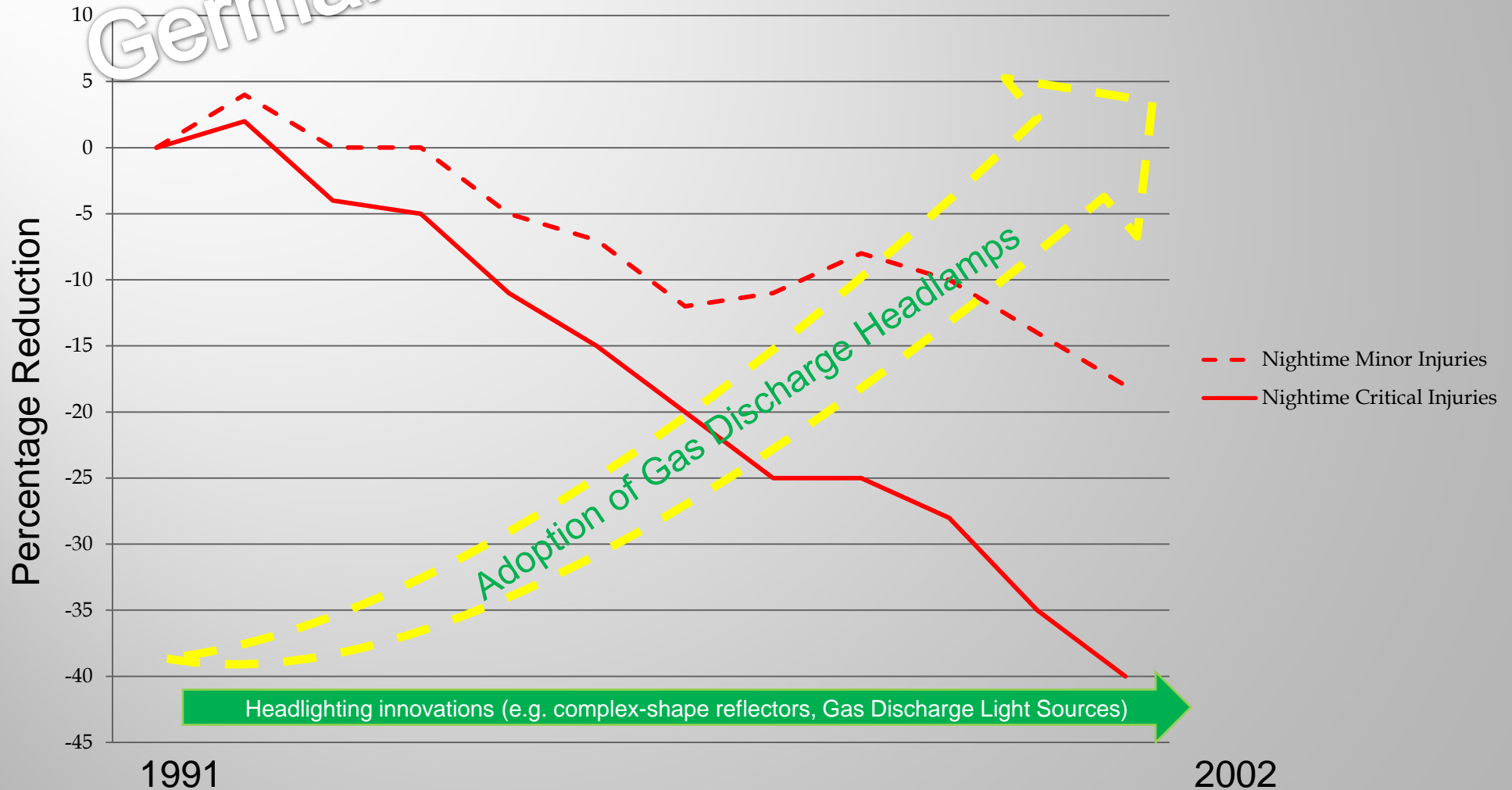
# High Performance HID Headlamp

3 Lux on road surface



# Improved Night-Time Road Safety

German Statistics





## Improved Night-Time Road Safety

Car buyers not so willing to invest in  
optional safety devices

Gas Discharge Headlamp “take up  
rate” less than 10% in Europe

## Encouraging Improvement of Passing Beam Performance

- 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

More than 6000 man-hours

### 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)

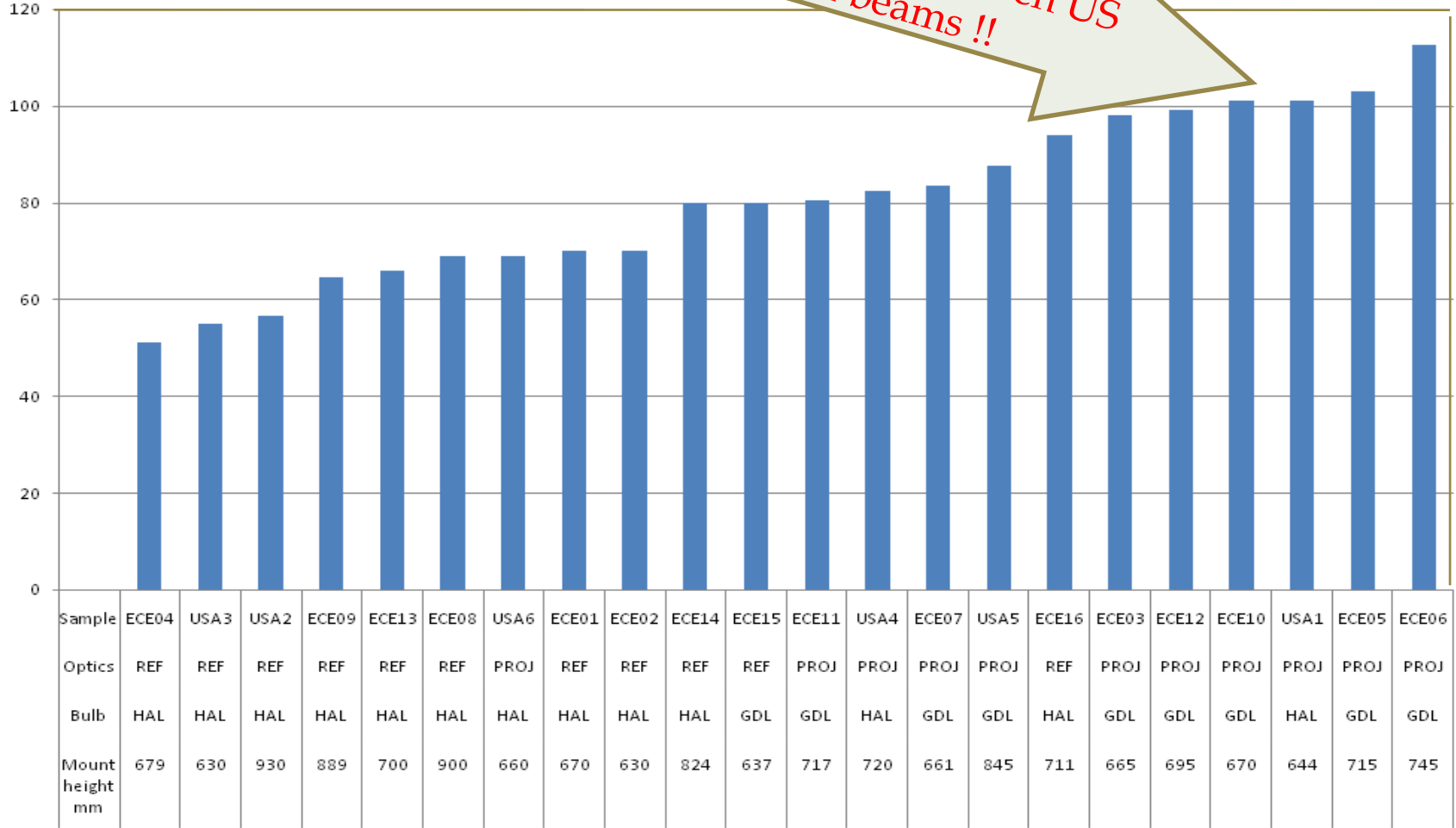
- Validation of Revised Method to Calculate Glare

5th Validation (May 2007 – Fiat Balocco)

-Validation of Revised Method to Calculate Range

- 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