GTB Field Test

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Geneva , 1.4.2014

Agenda

Introduction: Glare and Visibility
Klettwitz Field Test 2012
Discomfort Glare
Disability Glare
Special WGFL Meetings in Darmstadt (9/2013), Vienna (11/2013), and Torino (2/2014)
Summary

Introduction

- Influencing Parameters for discomfort glare in Night Time Driving * :

- - Initial aiming of the headlamps
- - geometry of the road
- - weather conditions
- - dynamic behaviour of vehicle

* : GTB Lighting ForumTorino 1/2011

Introduction

- and loading condition of vehicles

- Report of statistical analysis of cars involved in accidents (France) :
-
  - **<u>Accidental data : EACS + EDA</u>**
  - ✓ **74% of cars involved in an accident have an empty trunk**
  - ✓ **21% of cars involved in an accident contain 0 - 40kg in the trunk**
  - ✓ **4% of cars involved in an accident contain 40 - 100kg in the trunk**
  - ✓ **0,5% of cars contain 100 - 190kg in the trunk**

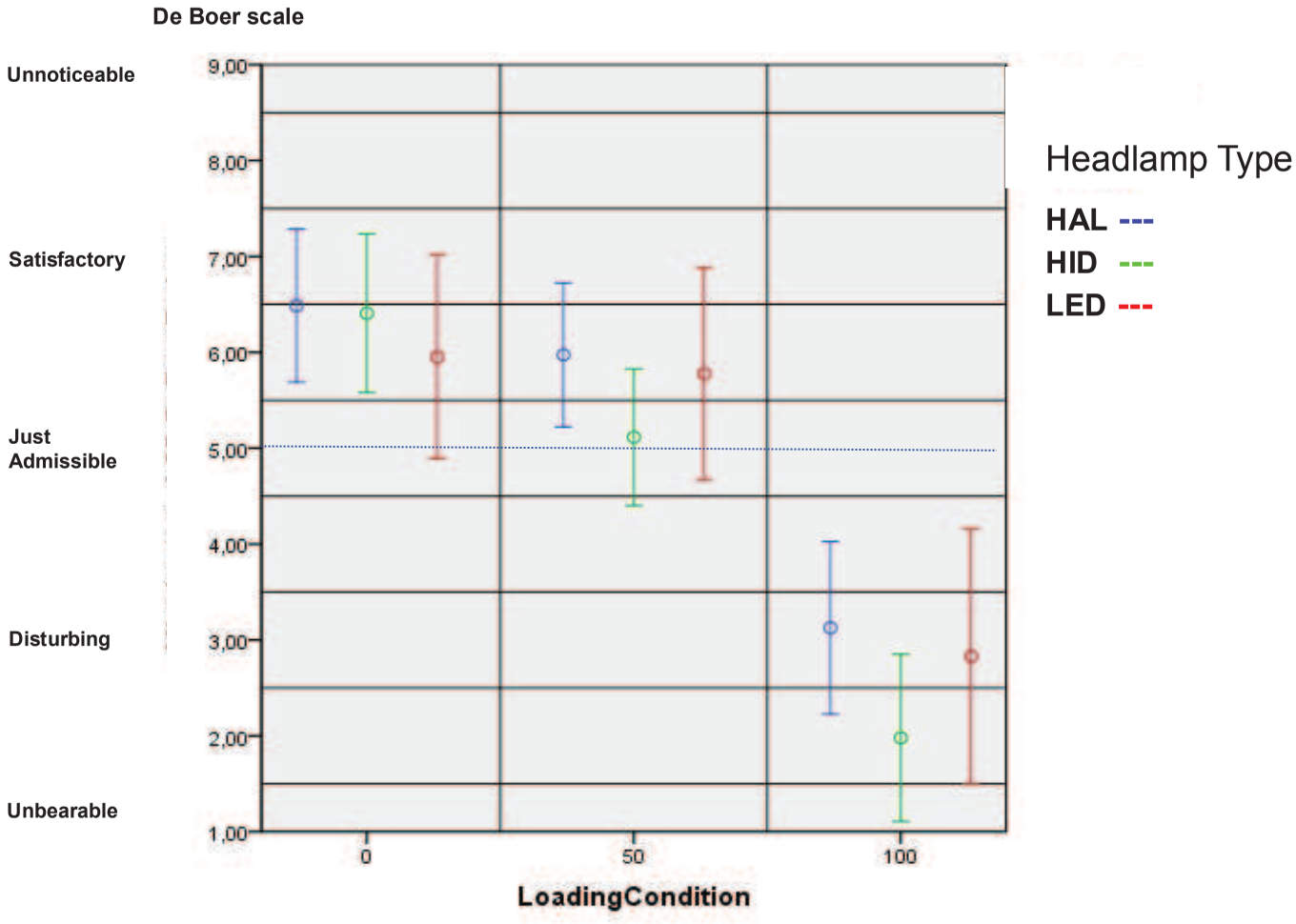
Questionaire - de Boer Scale

Discomfort Glare Rating – (Please perform rating from top to bottom)

	Unnoticeable		Satisfactory		Just Admissible		Disturbing		Unbearable
1	9	8	7	6	5	4	3	2	1
2	9	8	7	6	5	4	3	2	1
3	9	8	7	6	5	4	3	2	1
4	9	8	7	6	5	4	3	2	1
5	9	8	7	6	5	4	3	2	1

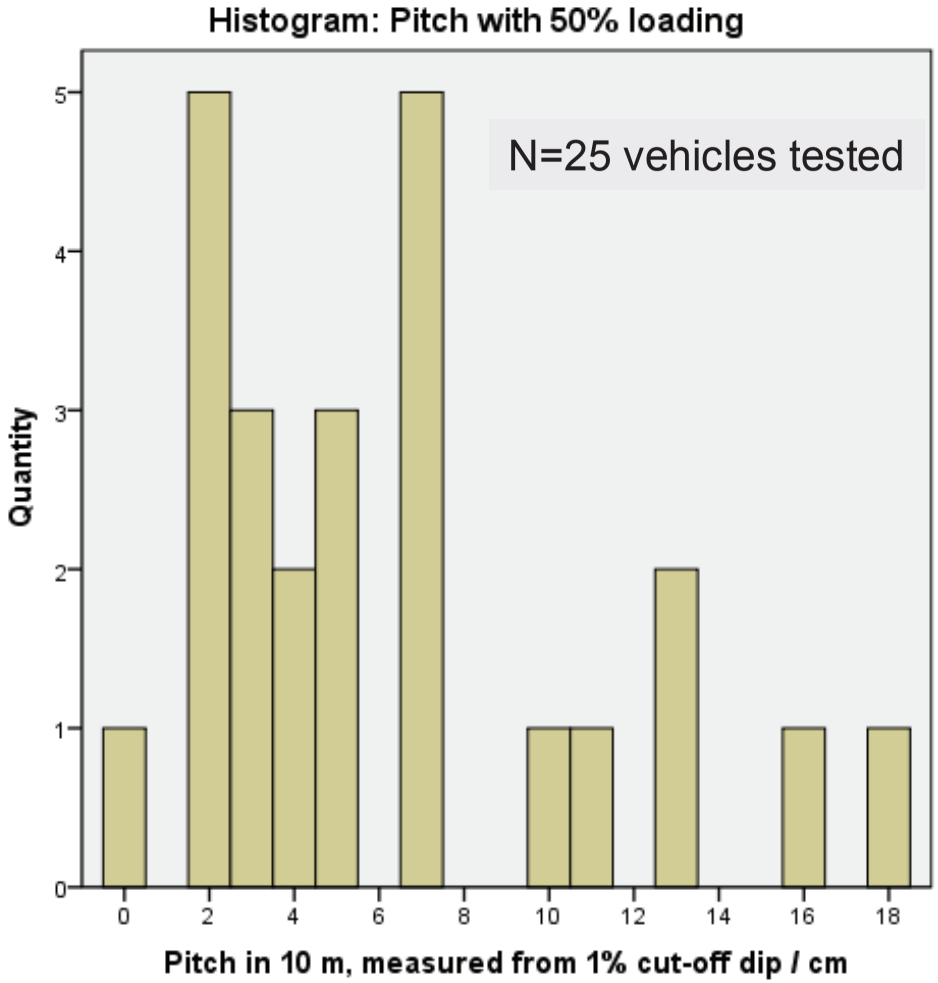
	Unnoticeable		Satisfactory		Just Admissible		Disturbing		Unbearable
6	9	8	7	6	5	4	3	2	1
7	9	8	7	6	5	4	3	2	1

Results for Halogen, Xenon, LED

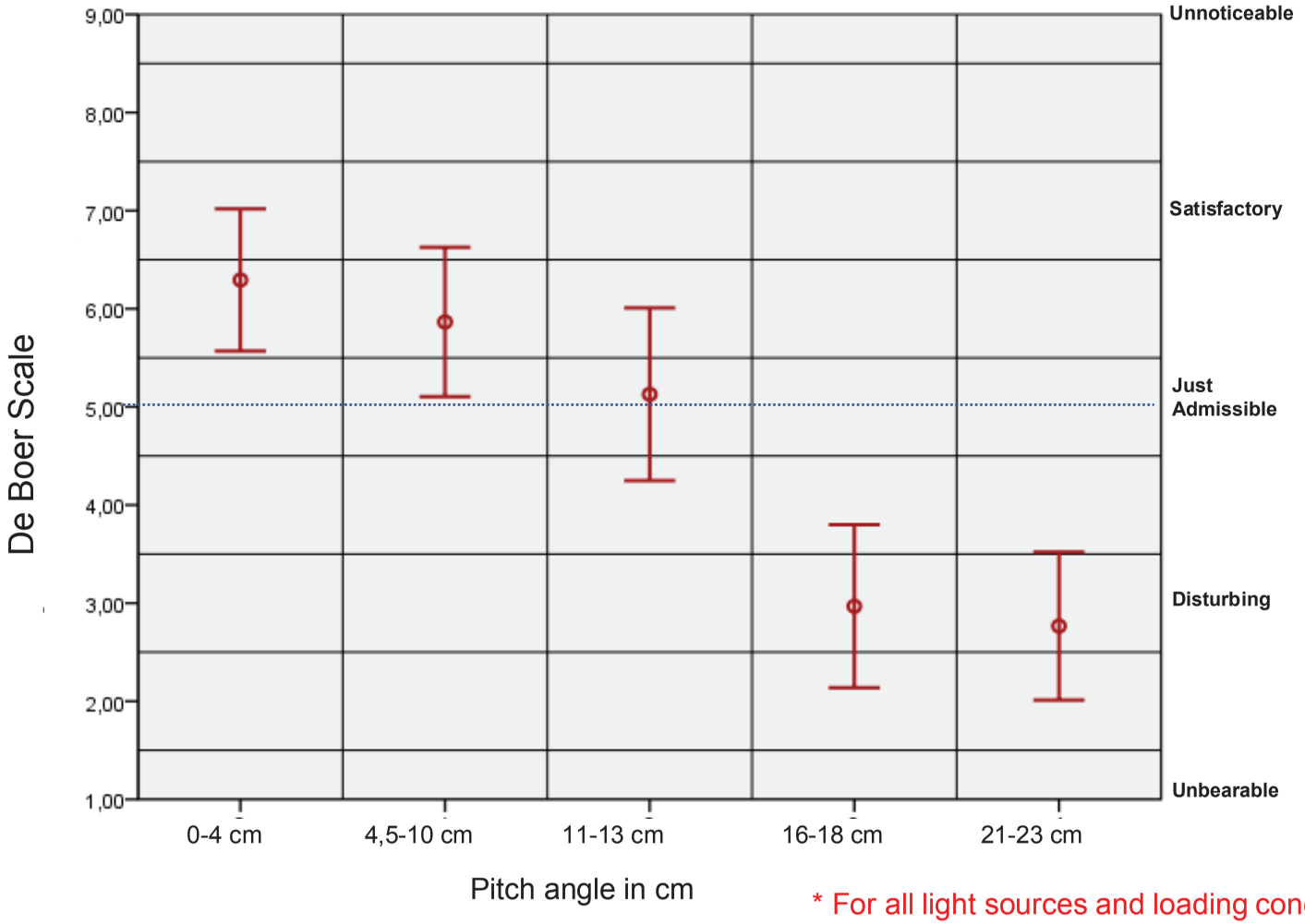


* Width of the bars covers app. 70% of all ratings

Results for all Light Sources



Pitch Angle Results



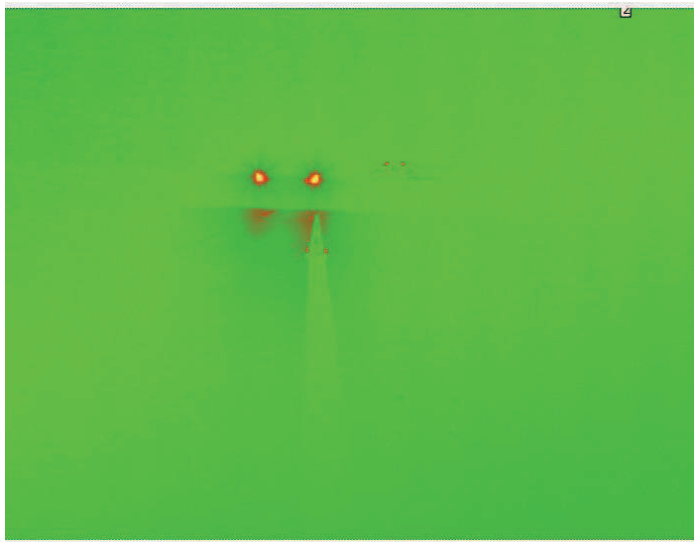
* For all light sources and loading conditions

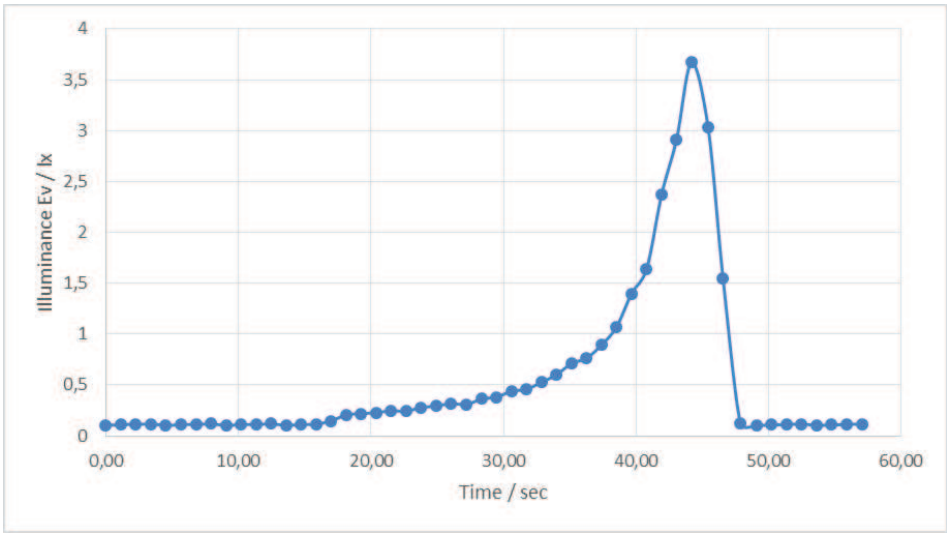
Disability Glare

- Findings from Discomfort Glare based on de Boer rating have been verified by studying the results on luminance and illuminance values of the tested vehicles

Measured Quantities

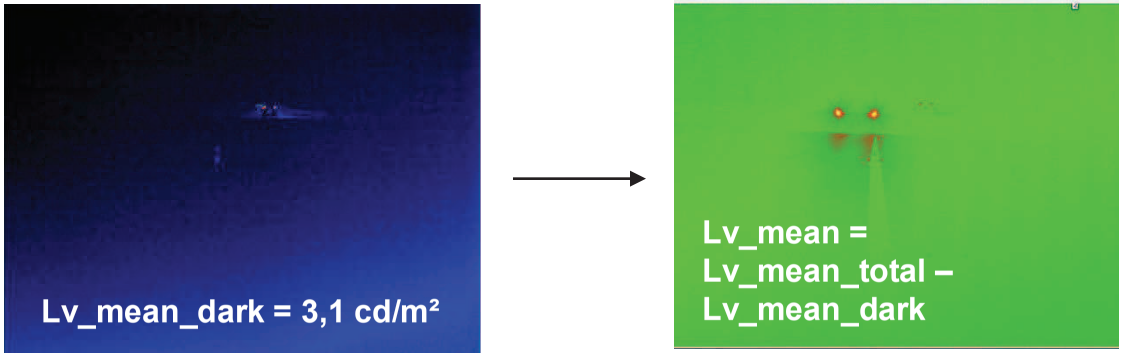
- Luminance Lv
  - Lv @ 25 m and 50 m, driver position
- Illuminance Ev
  - Ev (t), driver- and co-driver position





Luminance

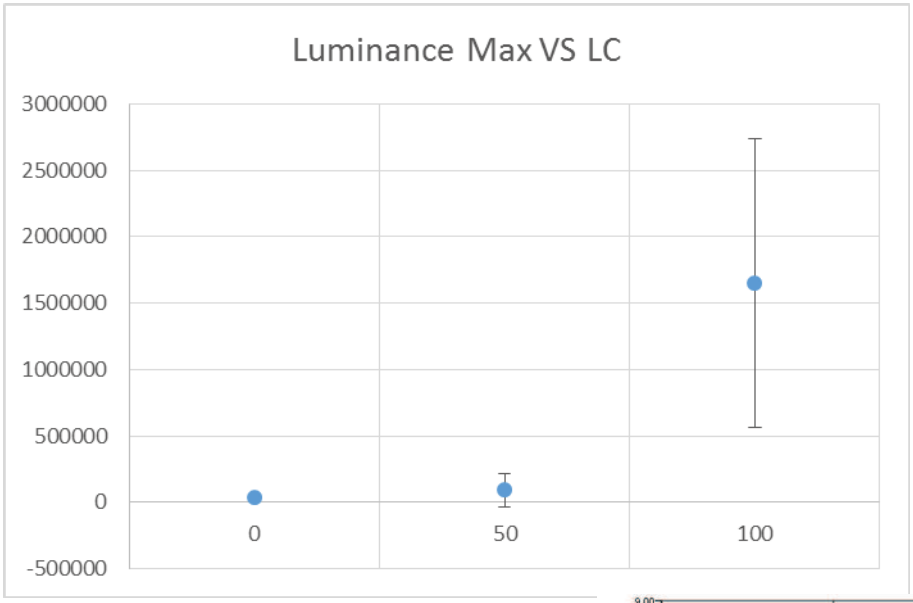
- Total luminance
  - Lv_mean, Lv_max

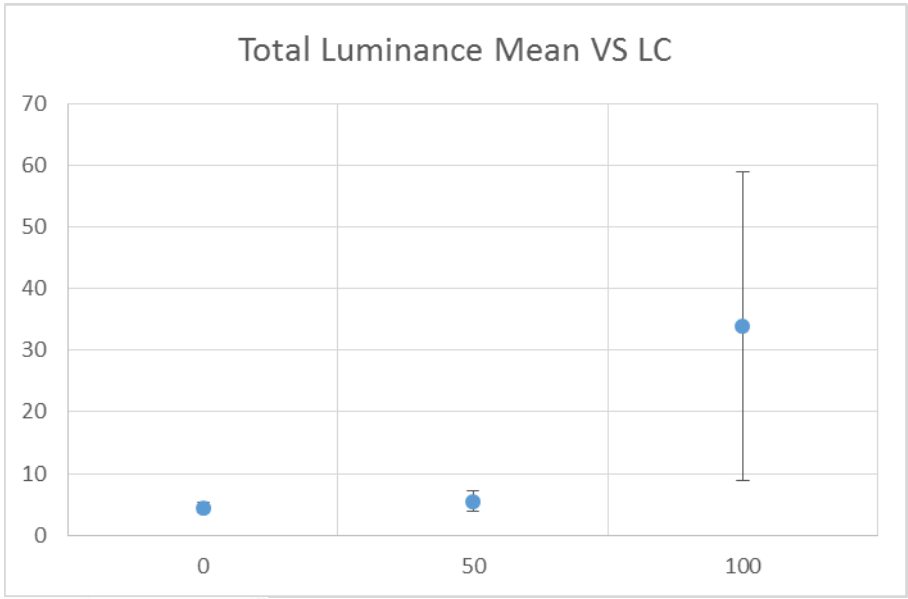


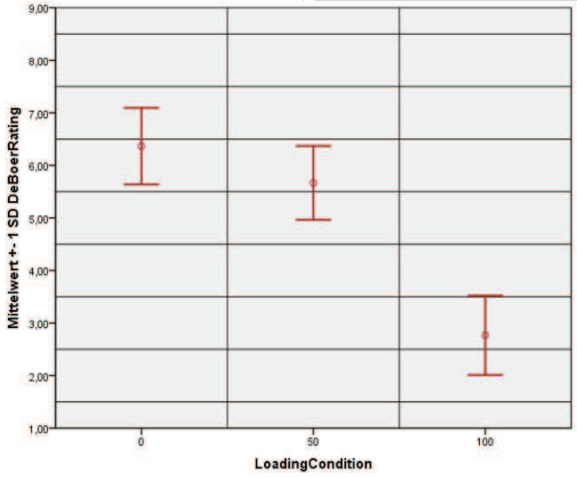
- Area with Lv > 310 cd/m², adaptation was 3,1 cd/m²:
  - In this area: Lv_mean, Lv_max, Size

Stat.Nr.	Parameter	Bild	Region	Klasse	Fläche	Min	Max	Mittelwert	Streuung
1	Lum Gr[1]	Leuchtdichtebild	2	Hell	402	326,6	41000	5121	7509

Luminance VS Loading Condition



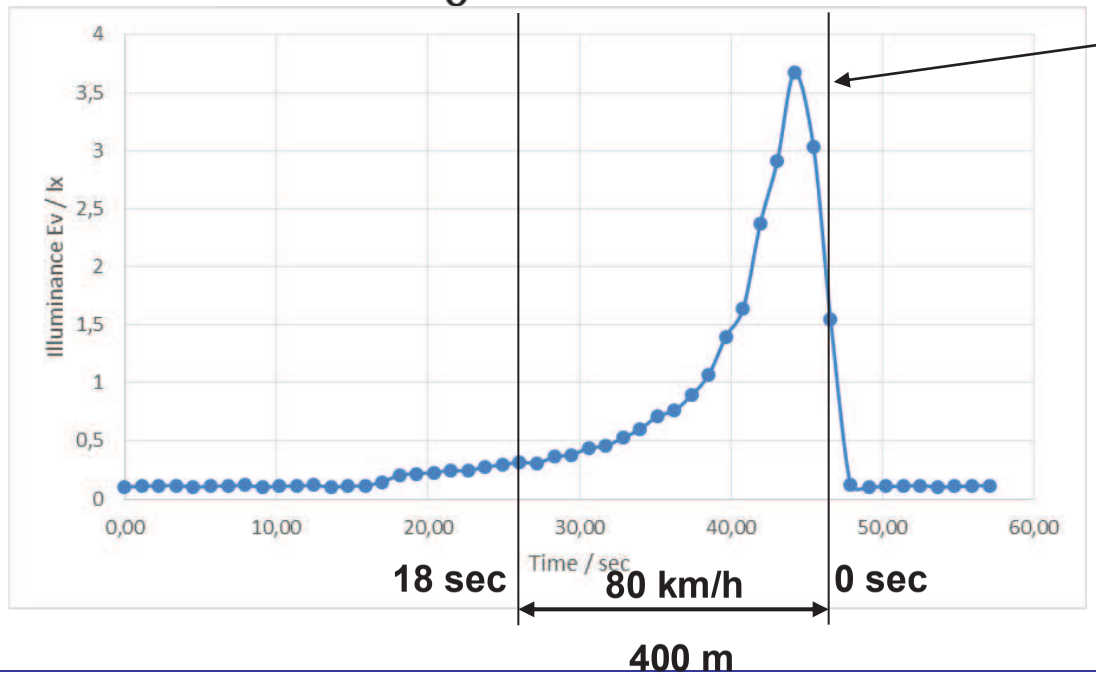




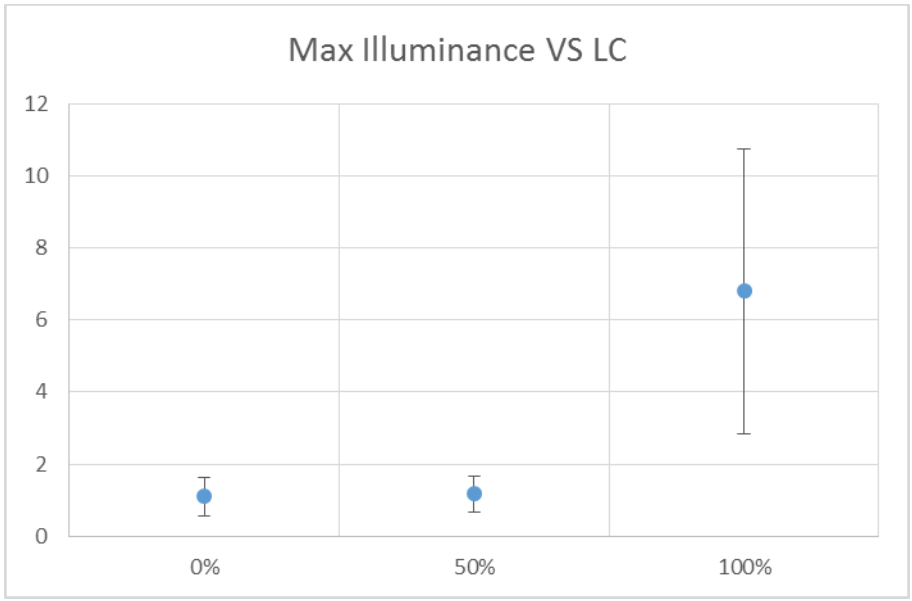
Evaluation of Illuminance

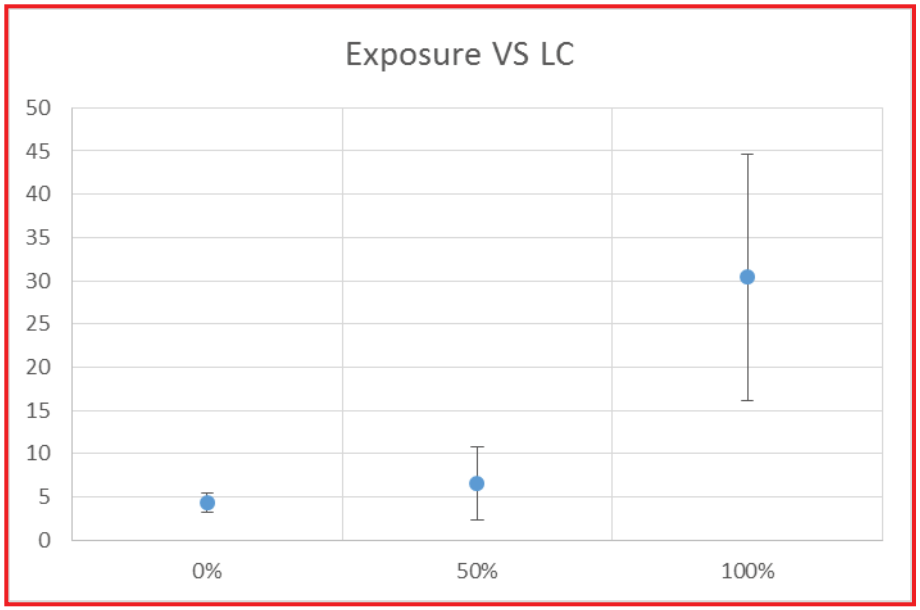
- Maximum of illuminance Ev_max
- Exposure in 400 m (Sprute): 80 km/h →18 sec exposure time

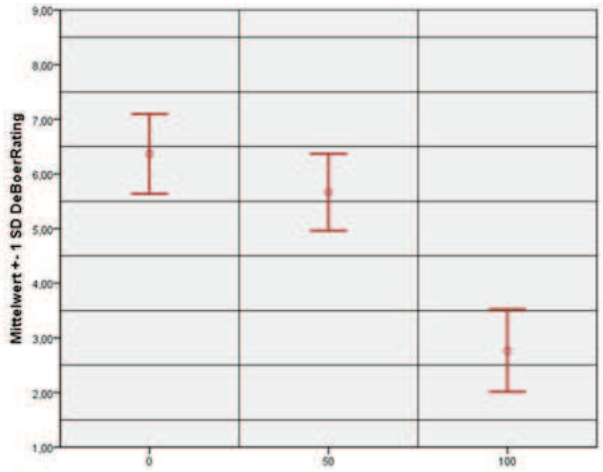
$$H_v = \int_0^{18} E_v(t)\, dt$$



Illuminance VS Loading Condition







Summary

- Results of Discomfort Glare and disability glare show clearly, that the behaviour of the vehicle is the important factor for deciding on levelling needs
- Light source is not significantly contributing
- Pitch angle is a qualified parameter for new regulation criteria

Summary

- The results show clearly, that the pitch angle as a parameter to measure the reaction of the vehicle according to loading could lead to a definition, where levelling is required and where it is not needed
- Car makers have to analyze, how a prediction of the pitch angle of a car under development could be determined

Action

- Special meeting in WGFL was organized in Darmstadt in 9/2013
- Continued discusssion in GTB meeting (11/2013) in Vienna and GTB Intermediate Meeting WGFL in Torino (2/2014)

Summary

- Input from various car makers to a prediction of the behaviour of future vehicles
- Discussion on a method to generate a classification with pitch angle to forecast the sensitivity of loading of newly developed vehicles
- Some car makers presented loading results on pitch angles of existing vehicles
- Statements from car makers have been collected

Summary

- Contributions from car makers show positive signals in being able to predict pitch angle of a vehicle in advance

Acknowledgements

- Thanks to TU Darmstadt Prof. Khanh, Dipl.-Ing. Bastian Zydek
- Thanks to DEKRA
- Thanks to GTB / GRE participants
- Thanks to car makers

Project within GTB TF CAVGS