Transmitted by the expert from France

Informal document GRE-73-25
(73rd GRE, 14-17 April 2015,
agenda item 6 (b))

Auto Leveling for LED Headlamps in Regulation R48.

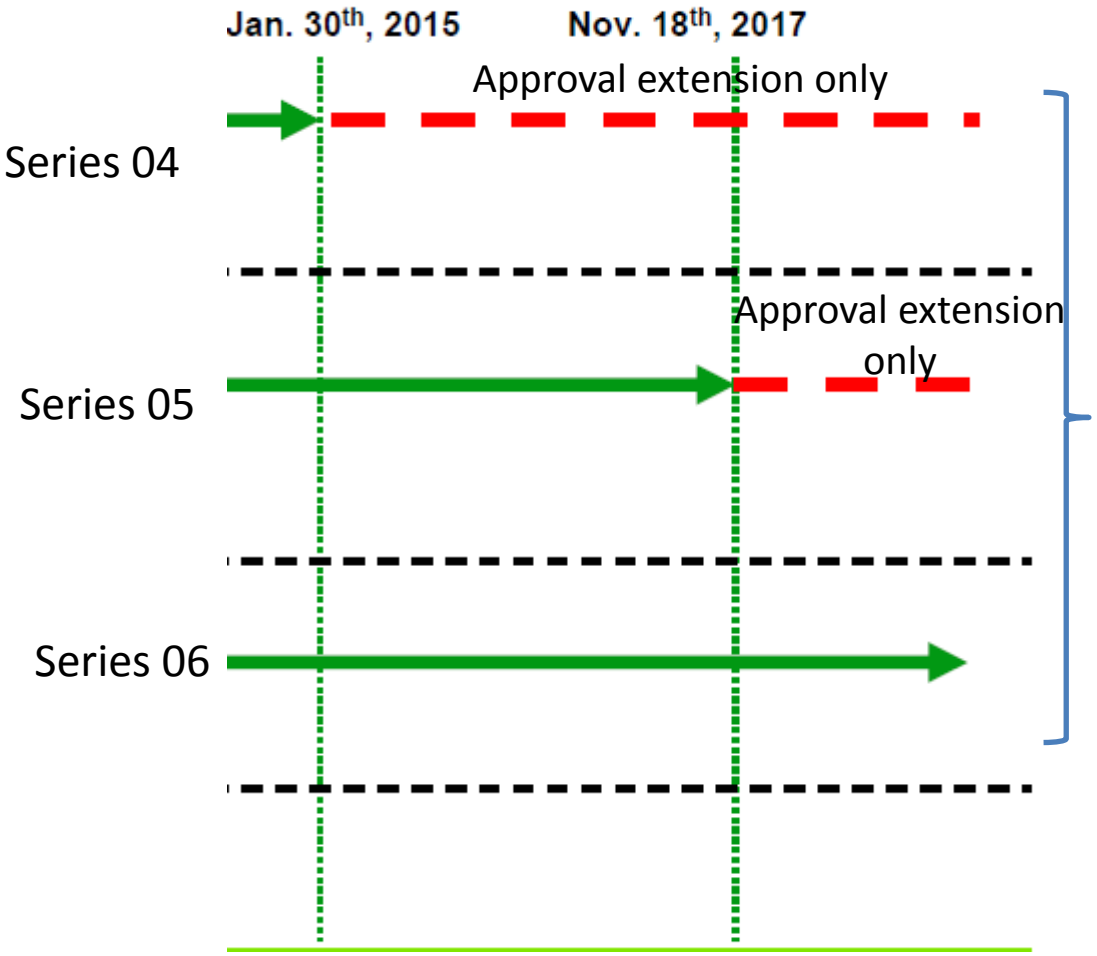
Justification for the French Proposal 2015-21.

Context of the current regulation.

- Installation regulation: R48.
  - Currently in force: series 04 (*), 05 and 06.
  - Auto-leveling device for low-beam with:
    - light source whose reference luminous flux > 2,000 Lm
    - LED module(s).
- GTB Study.
  - GTB got a mandate from GRE to define new prescriptions for the auto-leveling device, based upon scientific analysis.
  - Conclusions of the GTB study were presented to GRE (Document 71-32).
  - In the future, a new proposal based on this study could become a new series of amendment of R48 with new prescriptions for auto leveling devices.

(*) Approval extension only.

Current prescriptions of R48 Series.



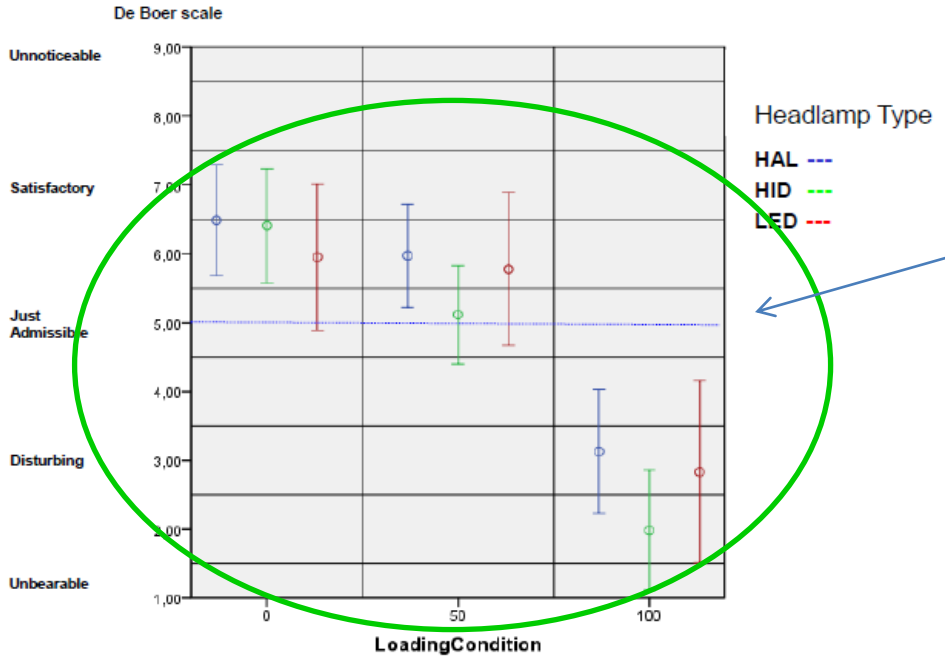
For all Series , Automatic leveling device required for

- Light sources whose Luminous Flux is > 2,000 lm
- **LEDs.**

Results of GTB study

- Based upon the analysis of Klettwitz night test.
- Document GRE 71-32. Page 84.

Results for Halogen, Xenon, LED



NO influence of the light source on the dazzle of the oncoming drivers

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

Conclusions of GTB Study.

Document GRE 71-32. Page 93.

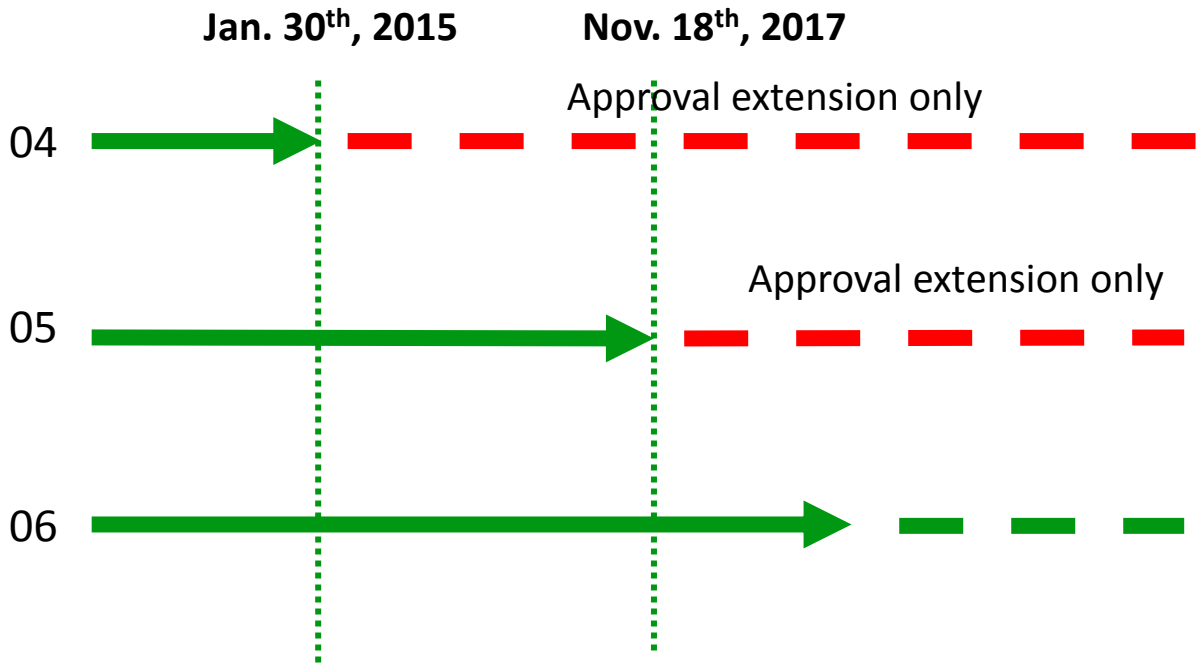
Summary

- 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

Proposal

- Document n° 2015-21 proposed by France.
- Taking into account GTB conclusion, Modification of ECE R48 series 04, 05 & 06 so that prescriptions for auto-leveling devices are the same for LED headlamps as for headlamps of other types (halogen and xenon).
- It is an **intermediate situation** which **does not interfere** with a future proposal which could be introduced in a new series of amendments (07).

Proposal of new prescriptions .



2015-21: For the Series 04, 05 & 06 , Automatic leveling device **only** for Light sources **including LED module(s)** whose Luminous Flux is > 2,000Lm.

07

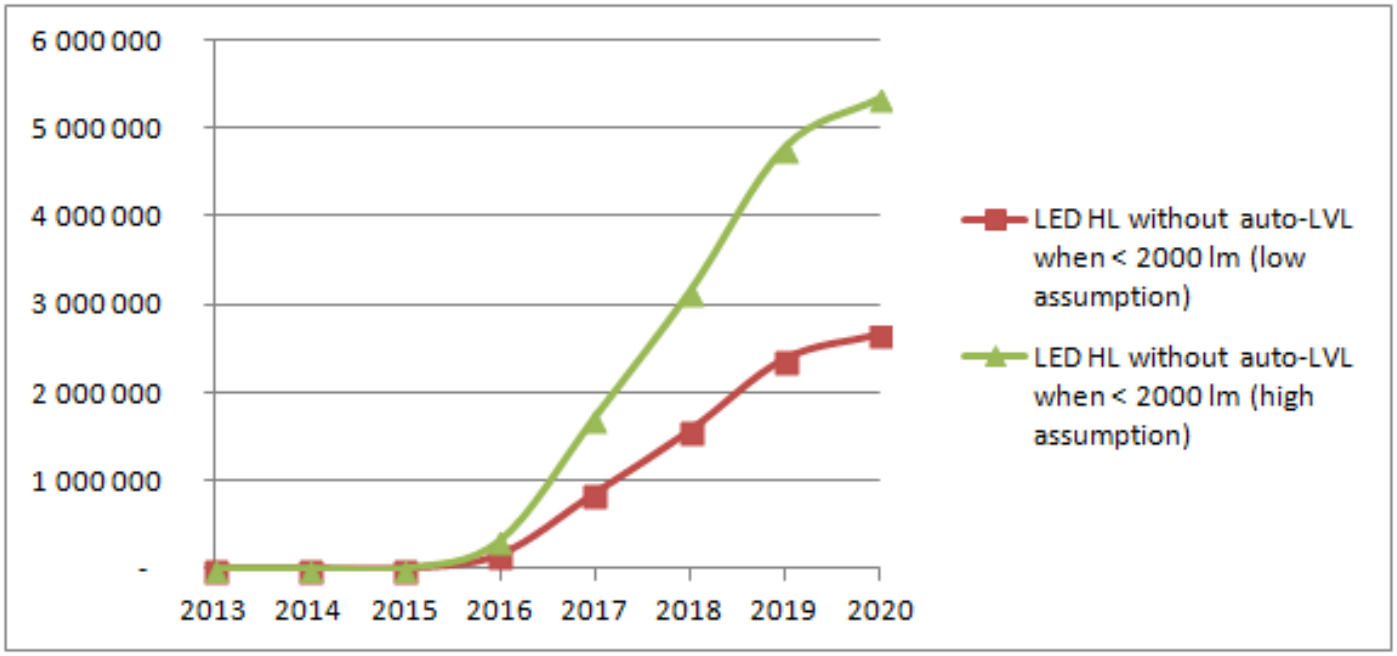
Further series with new prescriptions upon auto leveling devices

Advantages

- To remove the hurdle for the broadcasting of LED headlamps on the roads.
- More LED headlamps on the road (see next pages).
  - Safety impact.
    - By increasing the number of vehicles equipped with LED HLs (See page 9). :
      - Less “blind in one eye” cars on the roads.
  - Energy saving.
    - By reducing the power consumption of headlamps: Average CO_2 emissions of a car is decreased by 1 g CO_2 /km, based upon Technical guidelines of the European Commission (See page 10).

Marketing study.

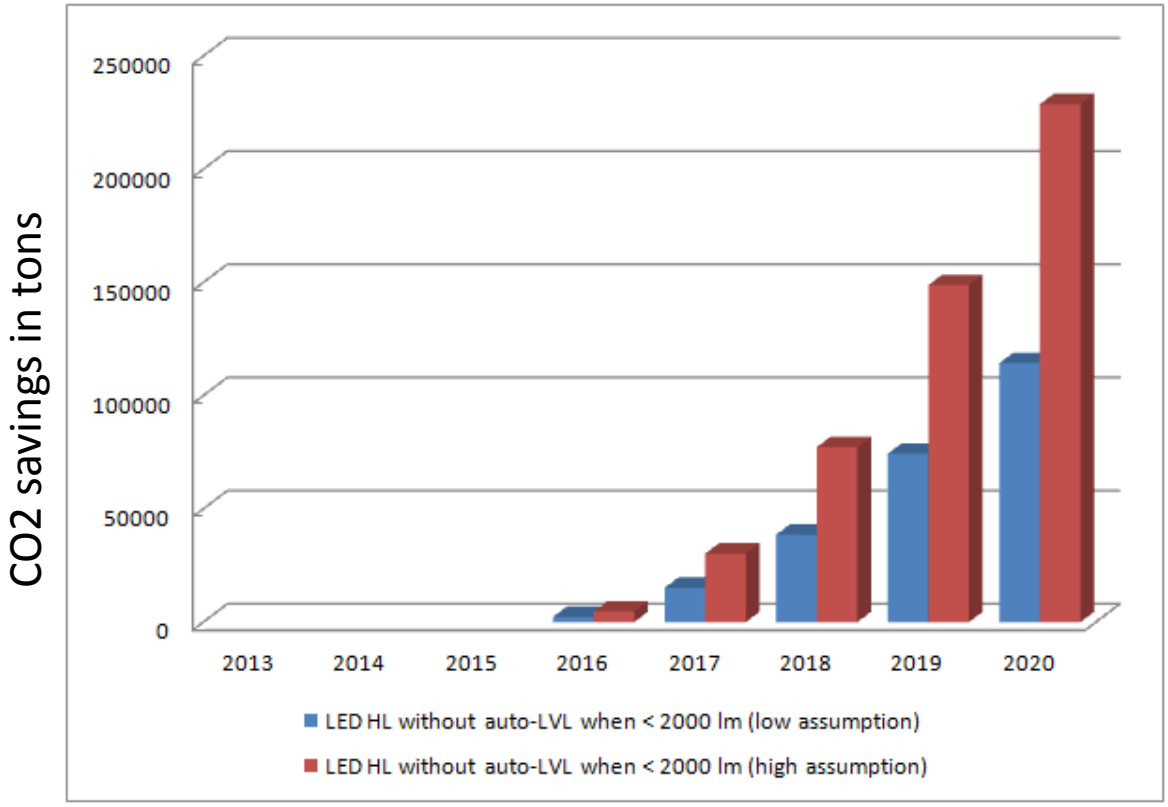
- Removing the auto-leveling requirement for LED headlamps whose luminous flux of the source is less than 2,000 Lm has a significant impact on the equipment rate of the vehicles.
- => in 2020, between 2.6 and 5.2M vehicles in more with LED due to the proposed modification.



Impact of the proposal on the LED equipped vehicles: (Europe + Turkey)

CO_2 emissions impact

- Hypothesis:
  - LED headlamps save 1g CO_2 /km.
  - Average mileage : 15000km/year.



Between 110,000 and 220,000 tons CO2 saved per year in 2020 in Europe.

One return Flight Paris New-York by a B777 ~ 400 tons of CO2.

Conclusions.

- No influence of the light source type on the dazzle of the other road users.
- Proposal: Same requirement upon the auto leveling for LED as for other light source types in the current R48 Series (04, 05, 06).
- No interference with any other proposal which could be introduced in the future in a new series (07) of R48.
- Consequences:
  - More LED headlamps fitted on new vehicles.
    - => improvement of road safety.
    - => reduction of CO2 emissions.
- Any question?