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1. Background

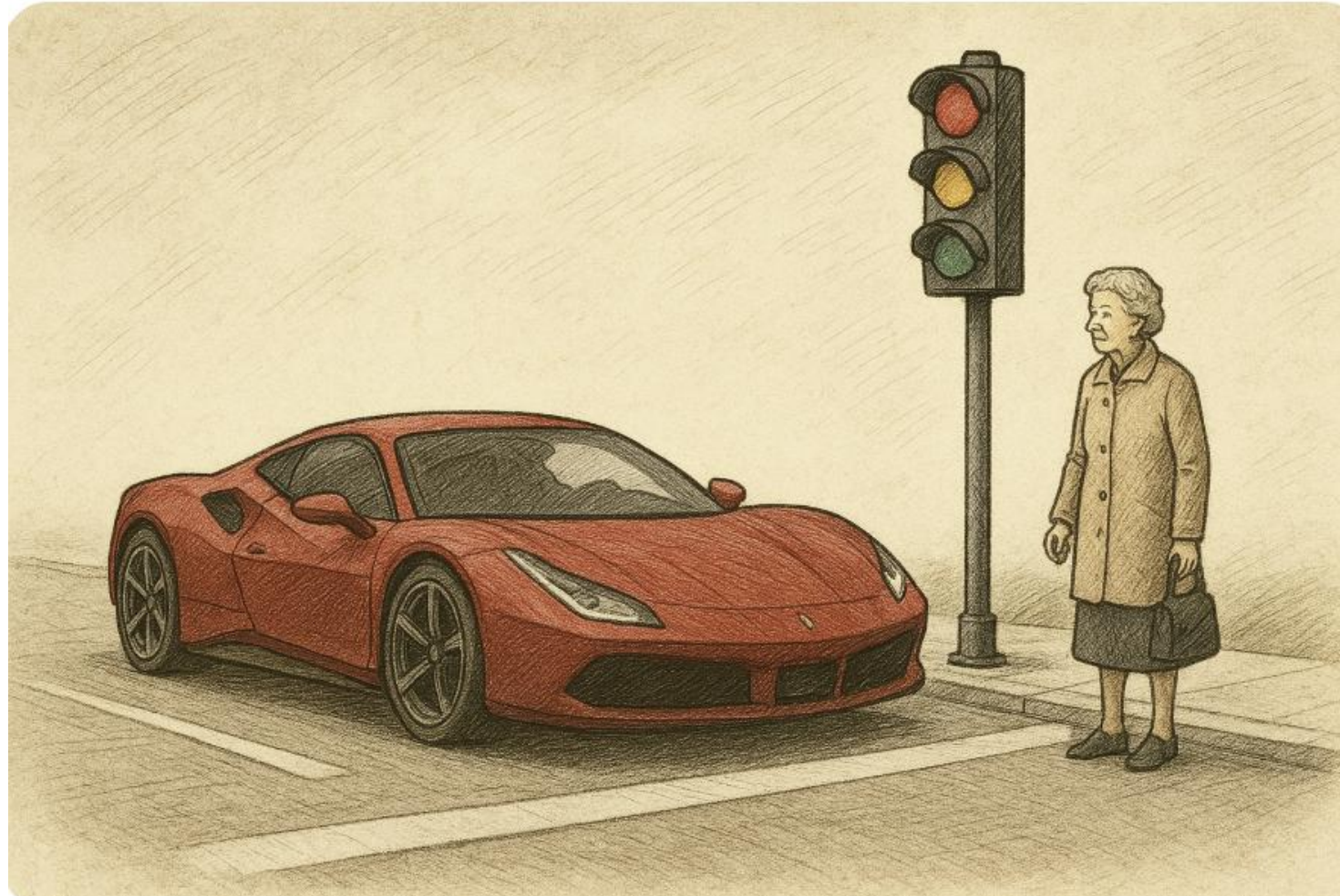
- At the 9th meeting of the IWG RD-ASEP on 21st of October 2025, a presentation was given by the International Council on Clean Transportation, ICCT (IG-ASEP-09-03Rev1), and another presentation from July 2025, (TFVS-18-02-Rev01). They proposed to amend ECE R51 on the stationary test in Annex 3. A «Not-to-exceed, NTE» noise limit for stationary vehicles of 95 dB(A) was presented. In the justifications, there was a reference to the World Health Organization (WHO), the European Environmental Agency (EEA) and a report from TU Berlin, to describe the benefit of such a limit from an annoyance and health perspective.
- In this presentation, I will give some comments to the presentation from ICCT, both regarding the challenges of having a NTE limit, as well its relevance for health and annoyance.
- I will give an update on the present development of the stationary test procedure as described in ISO5130 and its relevance for ECE R51.



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Proposal from ICCT: “From a health perspective to avoid such a person (vulnerably, elderly or children) to be exposed to noise level higher than 95 dB(A) from idling or engine revving stationary vehicles” (Annex 3).





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2. ICCT Proposal and noise and health issues:

- In the ICCT proposal and Justification, they write: «Studies have found that the maximum A-weighted sound pressure level of 95 dB(A) causes most people annoyance”. World Health Organization defines annoyance as a good indicator for measuring health impact of noise and accounts for a number of diseases linked to noise, and ICCT claims that annoyance increases above this level.»
- In addition to WHO, they list references to EEA and TU Berlin.



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WHO approach on noise and health:

- In general, the World Health Organization, WHO, recognize a relationship between noise exposure, annoyance and health issues (WHO Environmental Noise Guidelines for Europe, 2018). However, this relationship is based on international investigations between annoyance and exposure, defined by an ***equivalent noise indicator Lden*** (Weighted day-evening-night sound level) – see next slide
- In addition to Lden, Lnight is the second indicator used by WHO. Lnight can include single noise events. However, the Lnight is, as Lden, an ***energy-based*** indicator.

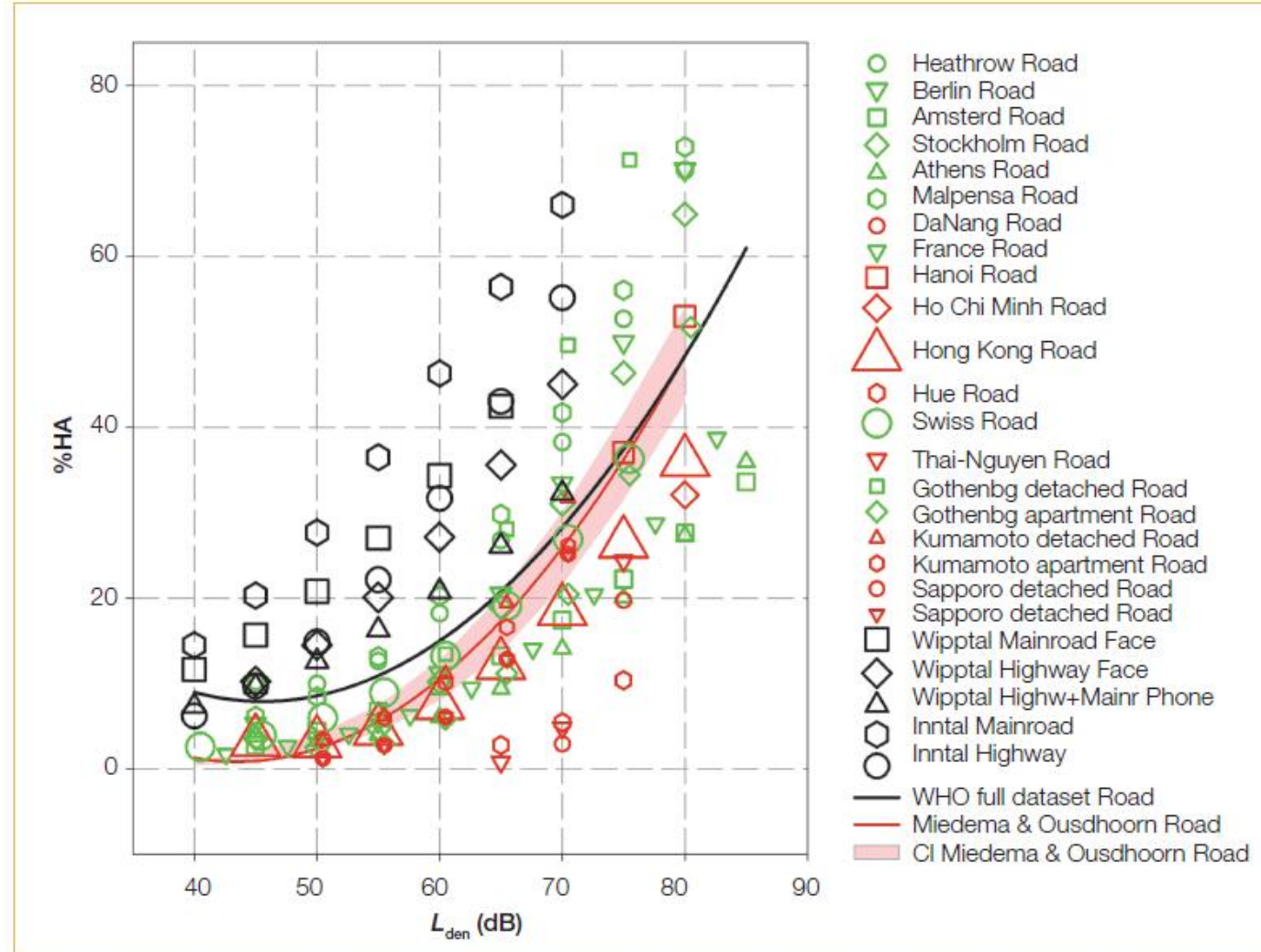


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WHO data for annoyance score and L_{den} :

Fig. 6. Scatterplot and quadratic regression of the relationship between road traffic noise (L_{den}) and annoyance (%HA)





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WHO and maximum sound levels:

«In many situations, average noise levels like L_{den} or L_{night} indicators may not be the best to explain a particular noise effect. Single-event noise indicators, such as the maximum sound pressure level (L_{Amax}) and its frequency distribution – are warranted in specific situations, such as in the context of night-time railway or aircraft noise events that can clearly elicit awakenings and other physiological reactions that are mostly determined by L_{Amax} . Nevertheless, the assessment of the relationship between different types of single-event noise indicators and long-term health outcomes at the population level, remains tentative. **The guidelines therefore make no recommendations for single-event indicators.**»



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Besides WHO, ICCT uses primarily these 2 references as basis for their justification:



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Health impacts of exposure to noise from transport in Europe

Published 06 Oct 2025

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Long-term exposure to noise from transport has negative effects on health. Based on data reported in 2022 under the Environmental Noise Directive, it is estimated that over 20 million people are highly annoyed and almost 7 million are highly sleep disturbed by long-term exposure to noise from transport. The European Union's 2030 zero pollution target aims to reduce the share of people chronically disturbed by transport noise by 30%. A significant decline in the number of people highly affected by transport noise is required to achieve this.



LÄRMBLITZER

Bericht zur Analyse der vom Lärmblitzer erfassten lauten Kraftfahrzeuge und deren Lärmwirkungspotenzial

Senatsverwaltung für Mobilität, Verkehr, Klimaschutz und Umwelt

BERLIN



But do these two documents say something about health risks and LAmax?

- **EEA report:** No references to LAmax-levels and relationship with annoyance and health. Only references to WHO Guidelines and the Environmental Noise Directive (END) in Europe, which deals with Lden and Lnight.
- **TU Berlin report:** This report deals only with the possible use of «Noise radars» and the its ability to detect noisy vehicles. The report analyse the different available technology and testing of such radars. It acknowledges the challenges of using a single noise limit, for example 85 dB (France and New York City) covering different classes of vehicles, like cars, HDV and motorcycles.
- In the report, there is a figure (figure 9) which is copied in the presentation by ICCT, assumably to show a relationship between maximum sound levels and annoyance (“Psychoakustische Löstigkeit”). This figure has a reference to an article by Di et al (Applied Acoustics, 2016): However, this article does **not** deal with relationship between maximum sound levels at all. It refers to laboratory experiments to investigate the influence of tonality in sound levels on the annoyance. The presented sound levels are equivalent noise levels from a 1000 kV transformer with tonal components.
- **My comment:** Please take into account the fundamental differences between a speed radar measuring the vehicle speed with high accuracy and any random measurement of the noise level of a single pass-by of a vehicle. The sound level is depending on distance, speed, driving behaviour, background noise and environmental conditions such as meteorological conditions. This will introduce measurement uncertainties.



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L_{Amax} and annoyance, ICCT and reference to SATO et al, 1999:

Using the annoyance score scale:

- 5 = very annoyed
- 4 = rather annoyed
- 3 = little annoyed
- 2 = notice, but not annoyed
- 1 = Do not notice

A limit of 95 dBA at 0.5 m: Annoyance Scale = 3
Point source: 83 dB at 2 m ~ 2.5 on the scale
and 71.5 dBA at 7.5 m: 2=Notice –not annoyed

ROAD TRAFFIC NOISE AND ANNOYANCE

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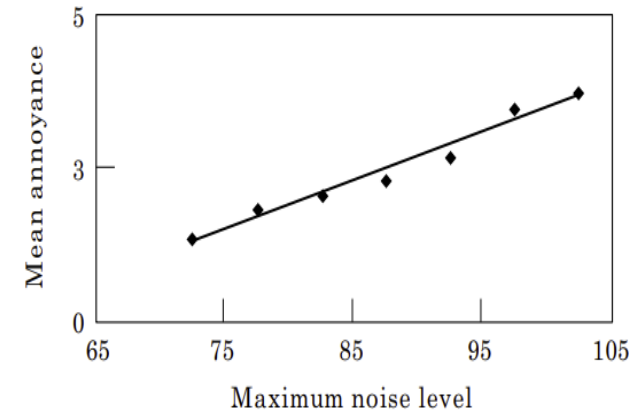


Figure 7. Relationship between average annoyance and personal noise exposure expressed as maximum noise level in 5 dB(A) classes.



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3. Standardization work – ISO5130

- Present edition: ISO5130:2019 is only valid for ICE vehicles. The basis of the standard is to compare a road-side check with a reference value, with a tolerance of (normally) 5 dB.
- The main scope of the standard is to provide a tool to perform in-use check of vehicles to ensure that the vehicle has not been manipulated or poorly maintained in the way that it produce unwanted high noise levels.
- However, the correlation with pass-by type approval levels are poor, due to no engine load nor tyre/noise contribution.
- Battery operated electric vehicles with Exterior Sound Enhancement Systems (ESES) also active in stationary mode, is not part of the present edition of ISO5130. A revision to include these vehicles are ongoing within ISO WG42.

ISO/CD 5130 – status of new proposal

- A Committee Draft has been distributed, and comments have been received from ISO members. The proposals for changes are currently under evaluation by the project leader (Berge) and ISO WG42.
- The main changes from the 2019-edition:
- M1-vehicles with ESES shall be measured in two microphone positions:
- The accelerator shall be fully engaged up to 100 % of travel unit range. The highest level of the two mics shall be reported. All modes shall be checked.

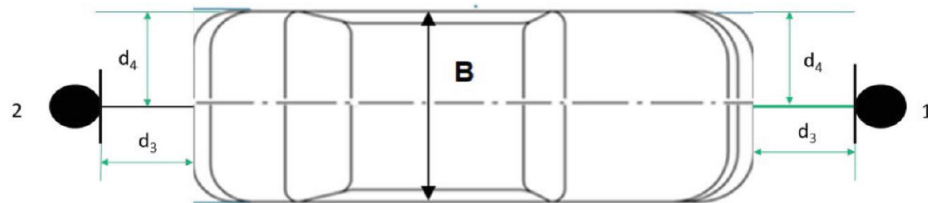


Figure 4 — B = width of the vehicle (m). $d_3 = 0,5 \pm 0,01$ m, $d_4 = B/2 \pm 0,02$ m

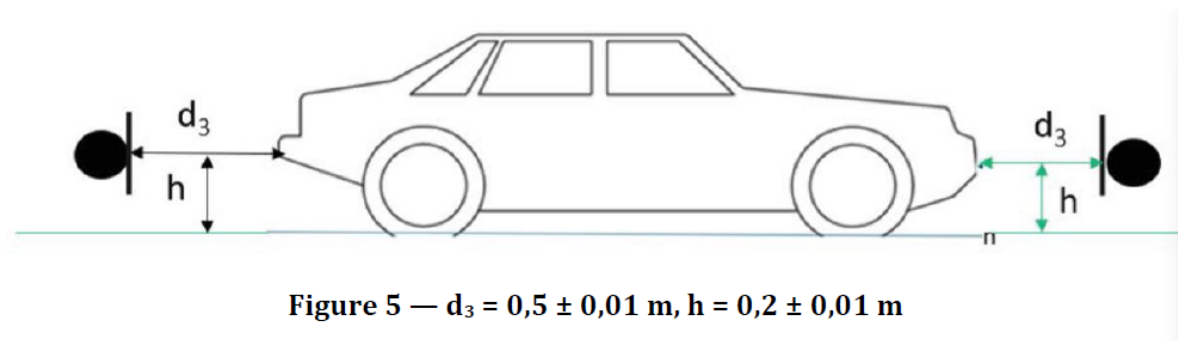


Figure 5 — $d_3 = 0,5 \pm 0,01$ m, $h = 0,2 \pm 0,01$ m



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Concerns related to a Not-to-exceed limit:

- For vehicles with ESES, the positions of the loudspeaker(s) for the external sound is not known for the controlling authorities, such as police. For simplification, only measurements in front or rear have been selected. These positions do not necessarily represent the positions giving the *highest* noise levels. It may be to one of the sides. But it should work, when checking against a reference level. However, for a NTE limit, measurements to the side of the vehicle may be necessary, which increases costs and time to perform the in-use test.



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4. ECE regulations and the way forward

- The revised ISO5130 with the inclusion of BEVs with ESES should be included in ECE Reg.51.04, Annex 3.
- A NTE limit for stationary vehicles may be part of Annex 9 and RD-ASEP. However, this will always be related to a sound level at 7.5 m and measured during type approval.
- For practical reasons, a NTE limit in Annex 9 is therefore *not* applicable to *in-use* control of a vehicle.

Final conclusion:

- A Not-to-exceed limit for stationary vehicles may be proposed and accepted on a *political* level.
- However, a limit of 95 dB cannot be linked to annoyance and health issues as proposed by ICCT.

Thank you for your attention!

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