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Agenda item 6
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Project STEER

Improving the EU Tyre Noise Label
An overview of the key findings

Erik Bühlmann[1], Felix Schlatter[1], Ulf Sandberg[2], Truls Berge[3], Luc Goubert[4]

[1]Grolimund+Partner AG – environmental engineering, Switzerland

[2]Swedish National Road and Transport Research Institute (VTI)

[3]SINTEF AS

[4]Belgian Road Research Centre (BRRC)

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Introduction

Project overview

Project Partners:

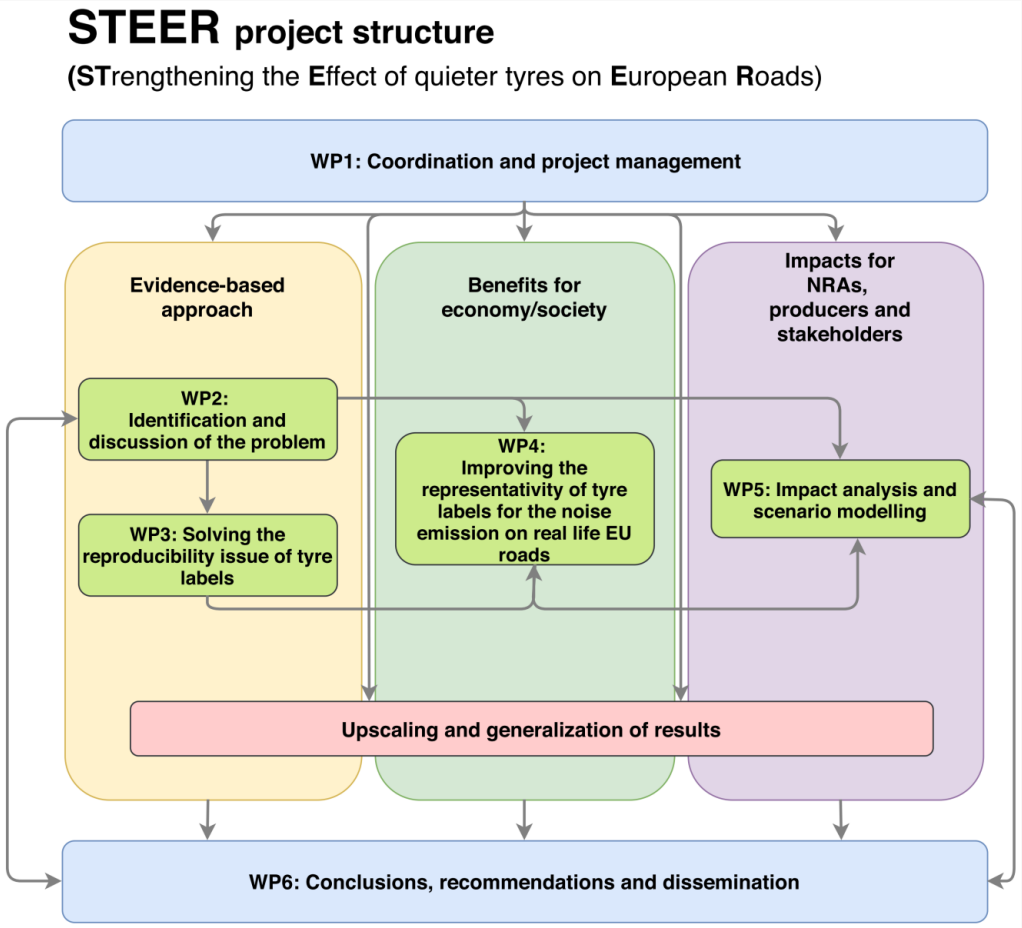
G+P ENGINEERS

vti

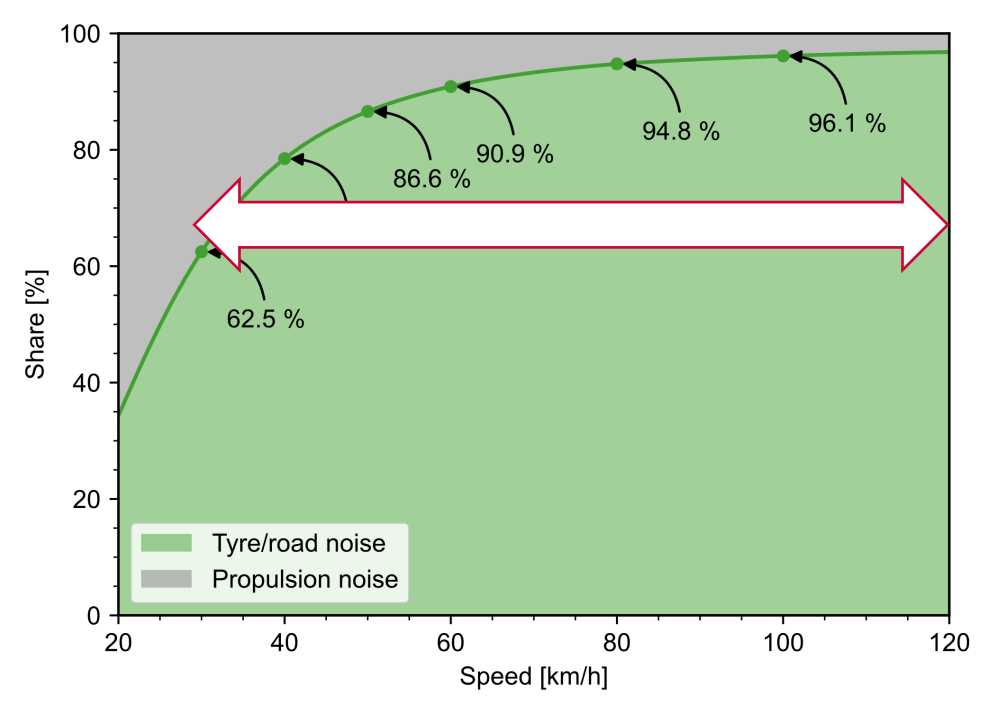
Belgian Road Research Centre
Together for sustainable roads

SINTEF

nokian TYRES



Where tyres have an inpact

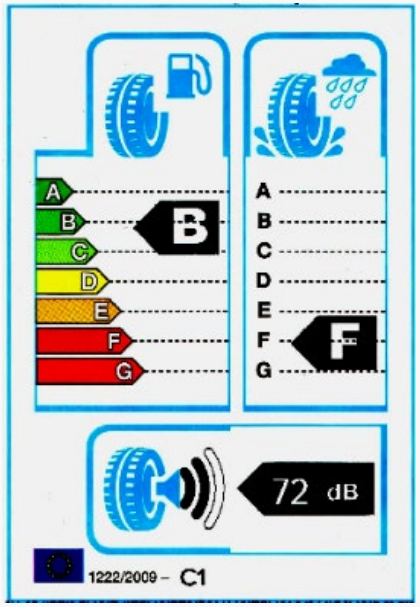


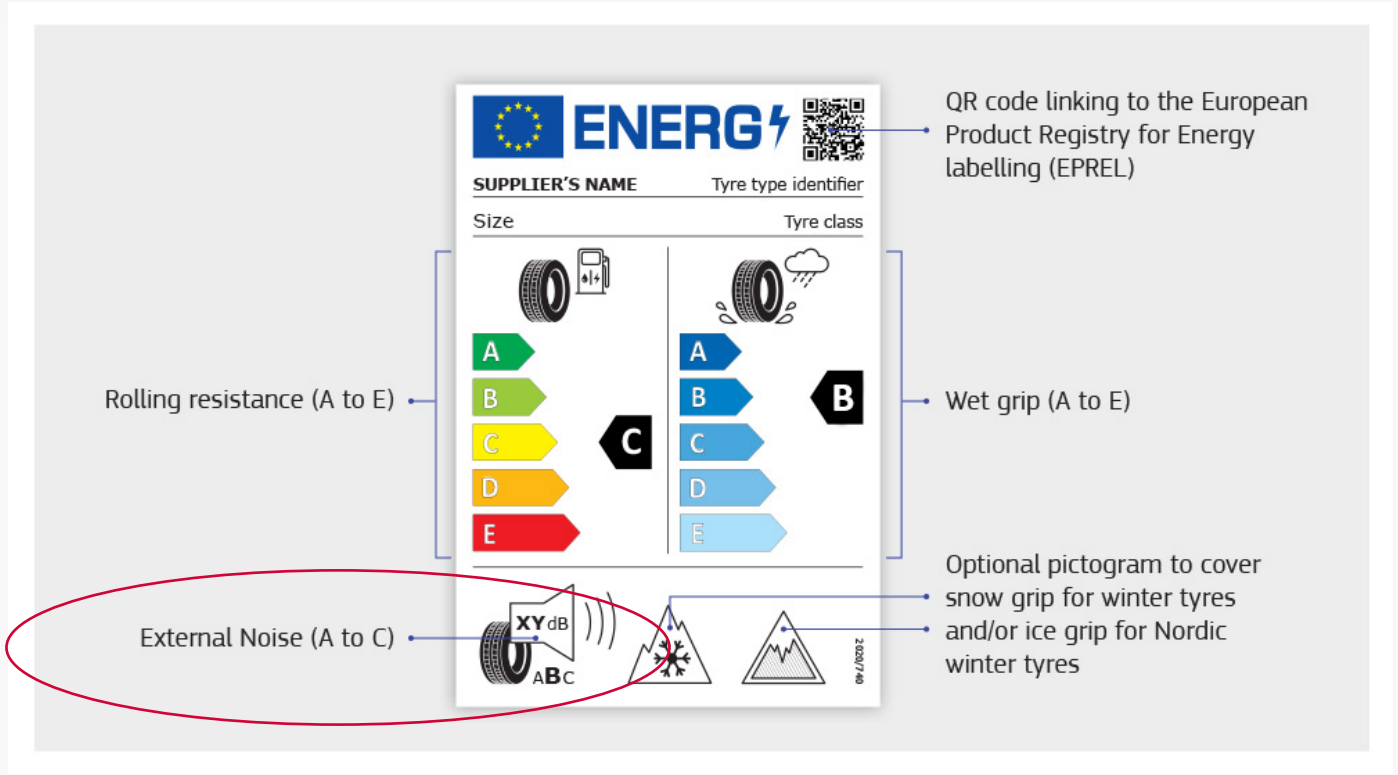
Area where quieter tires are potentially effective

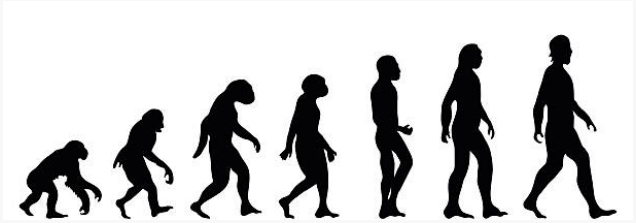
emissions for mixed traffic
(8%heavies) at constant speed
for a modern vehicle fleet

Quieter tyres potentially effective on highways and in cities (>30 km/h)

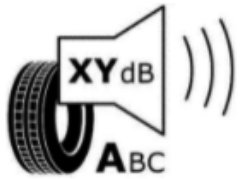
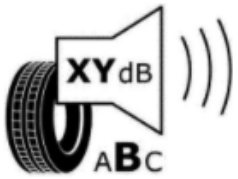
The evolution of the European tyre label







Noise label and label classes

$N \leq LV-3$	$LV-3 < N \leq LV$	$N > LV$
		

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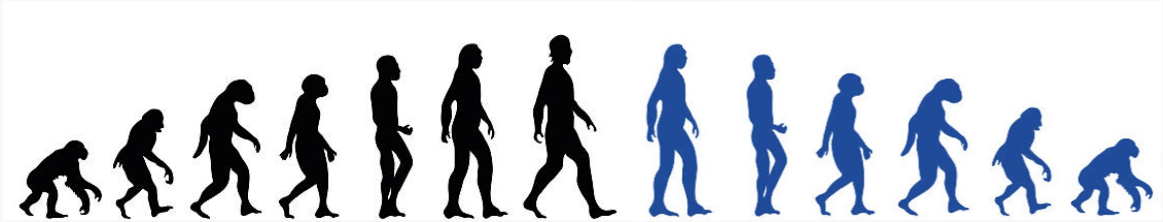
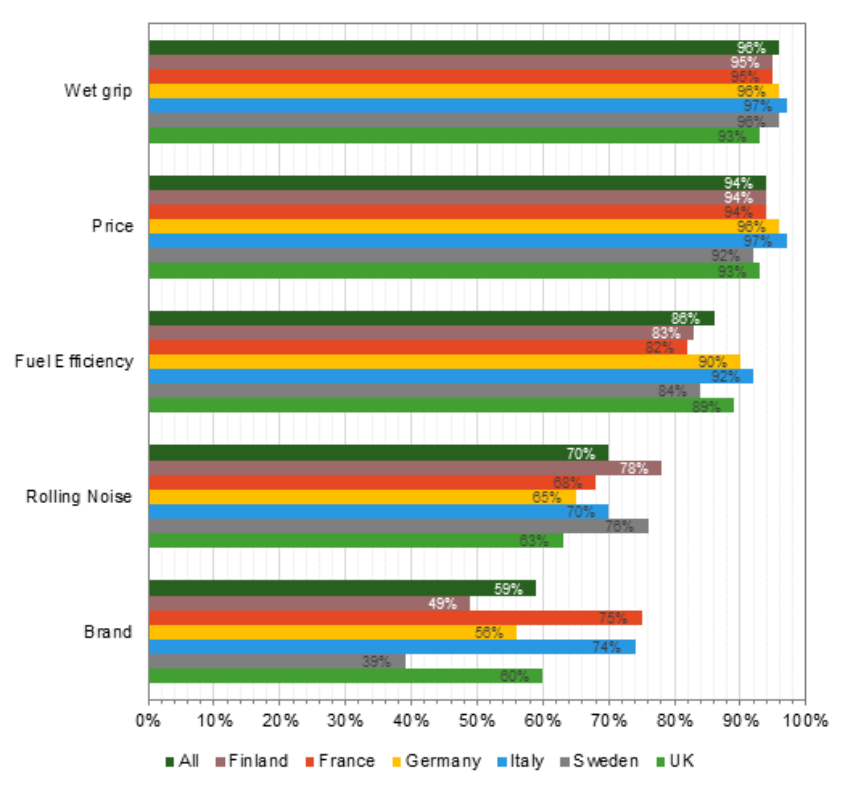


Importance of purchase criteria

Current status – importance of aspect

importance

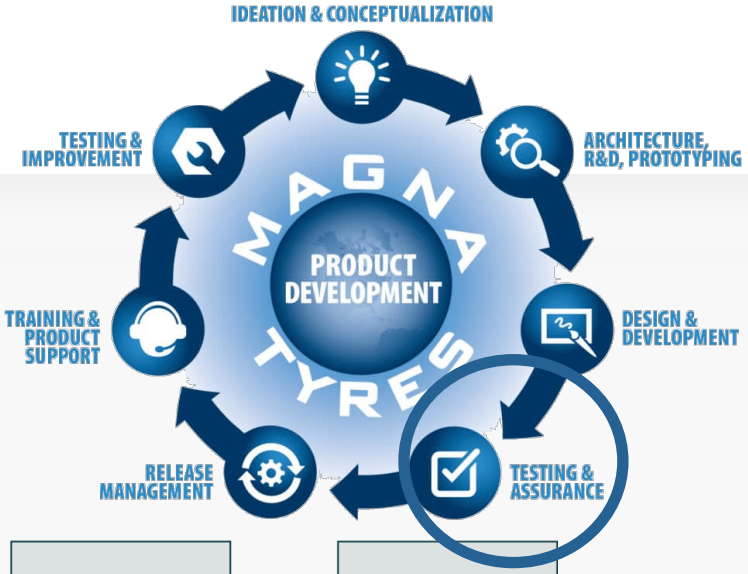


Importance of aspect (purchase criterion):

- «Price» high up
- «Rolling Noise» further down

Source of data: Final Report--Review study on the Regulation (EC) No 1222 / 2009 on the labelling of tyres. Prepared by Viegand Maagøe A / S 1–152, Copenhagen, Denmark. (URL: https://ec.europa.eu/energy/sites/ener/files/documents/Study%20in%20support%20of%20the%20Review%20of%20the%20Tyre%20Labelling%20Regulation_final.pdf.), graphic by the authors.

Tyre noise labelling procedure



Tyre product development cycle

Labelling procedure

selection of measurement equipment

selection of test track

selection of test vehicle

selection of set of tyres to be tested

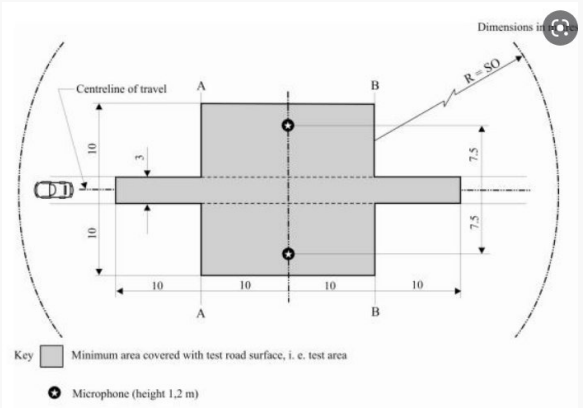
measurement set up and calibration of measurement equipment

monitoring of meteo conditions

coast-by measurements (16 pass bys minimum)

analysis of measurement data

determination of noise label



Coast-by (n=16)
At 70-90 km/h

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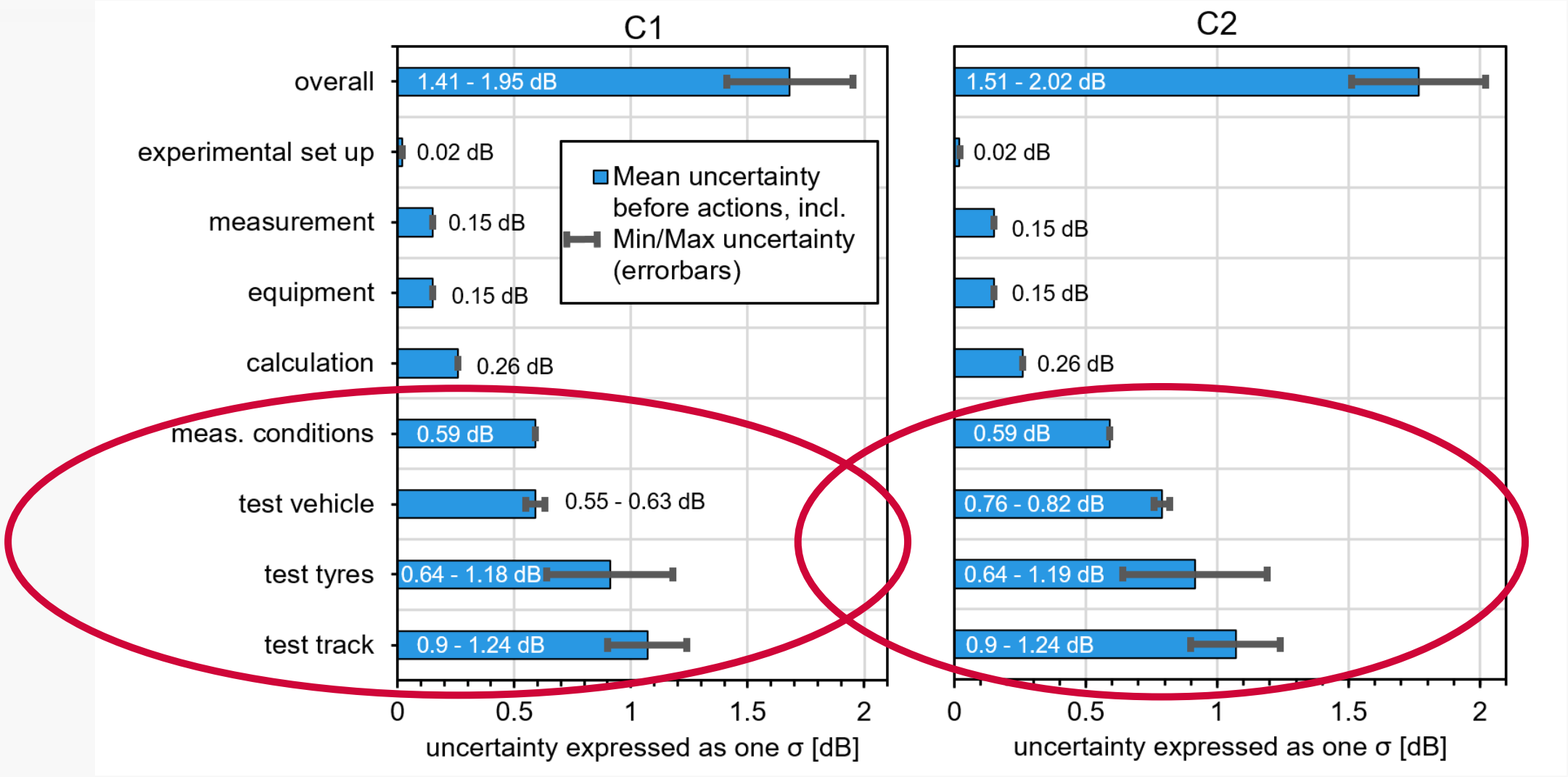
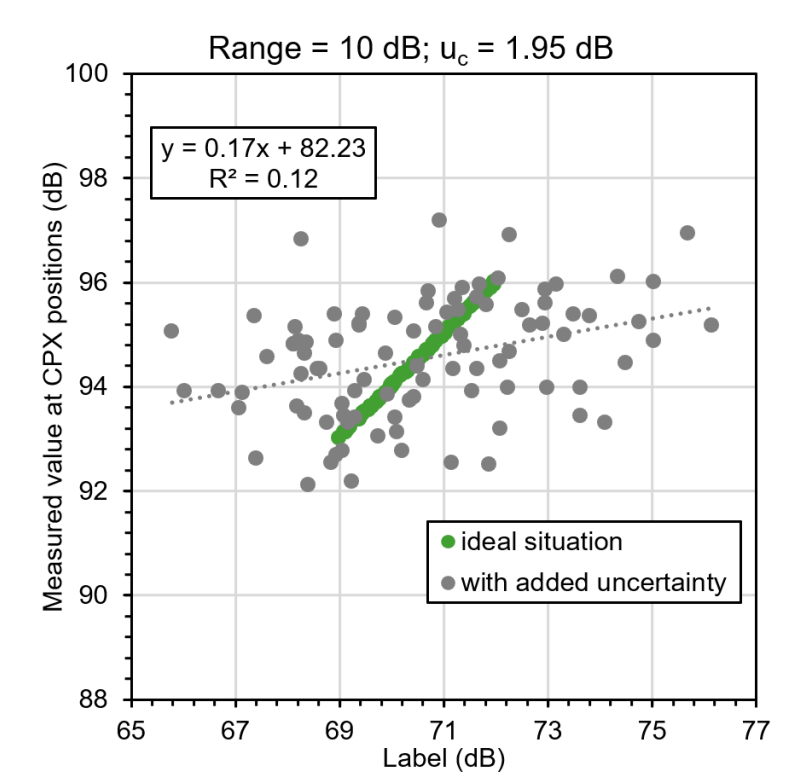
Results

Uncertainty of current procedure

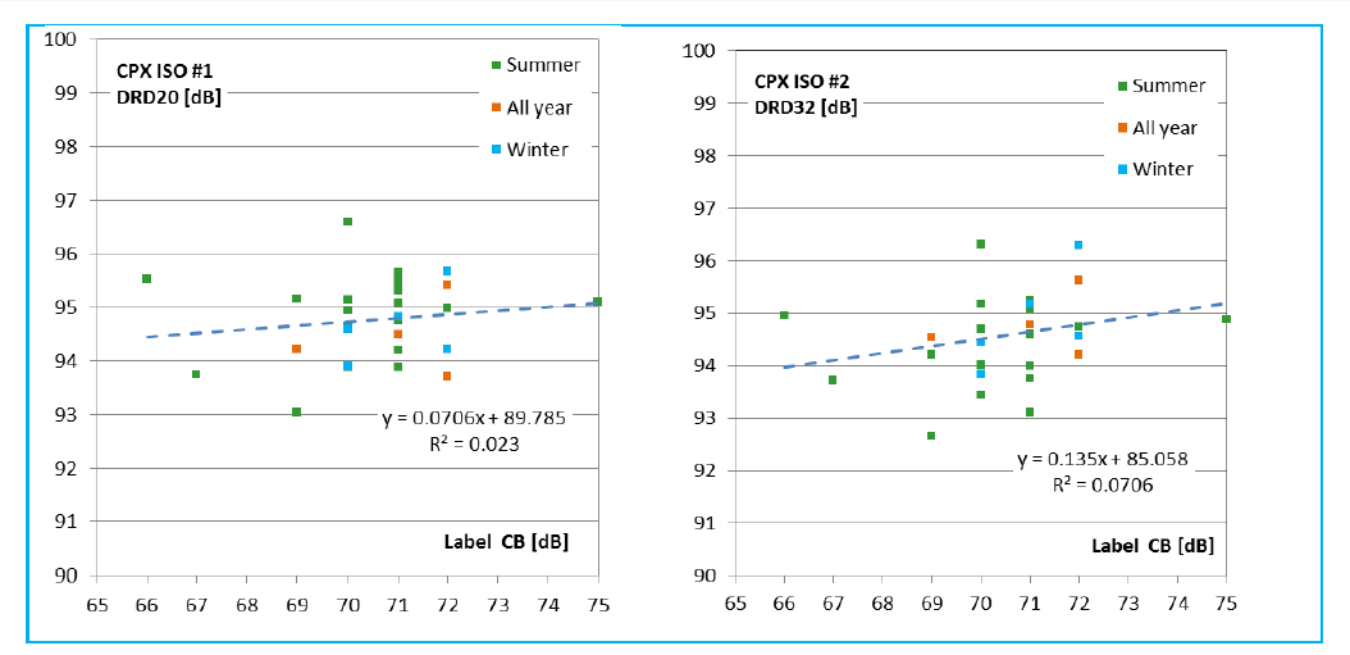


Implication of uncertainty of noise label

Scatter to expect for empirical studies checking the noise label

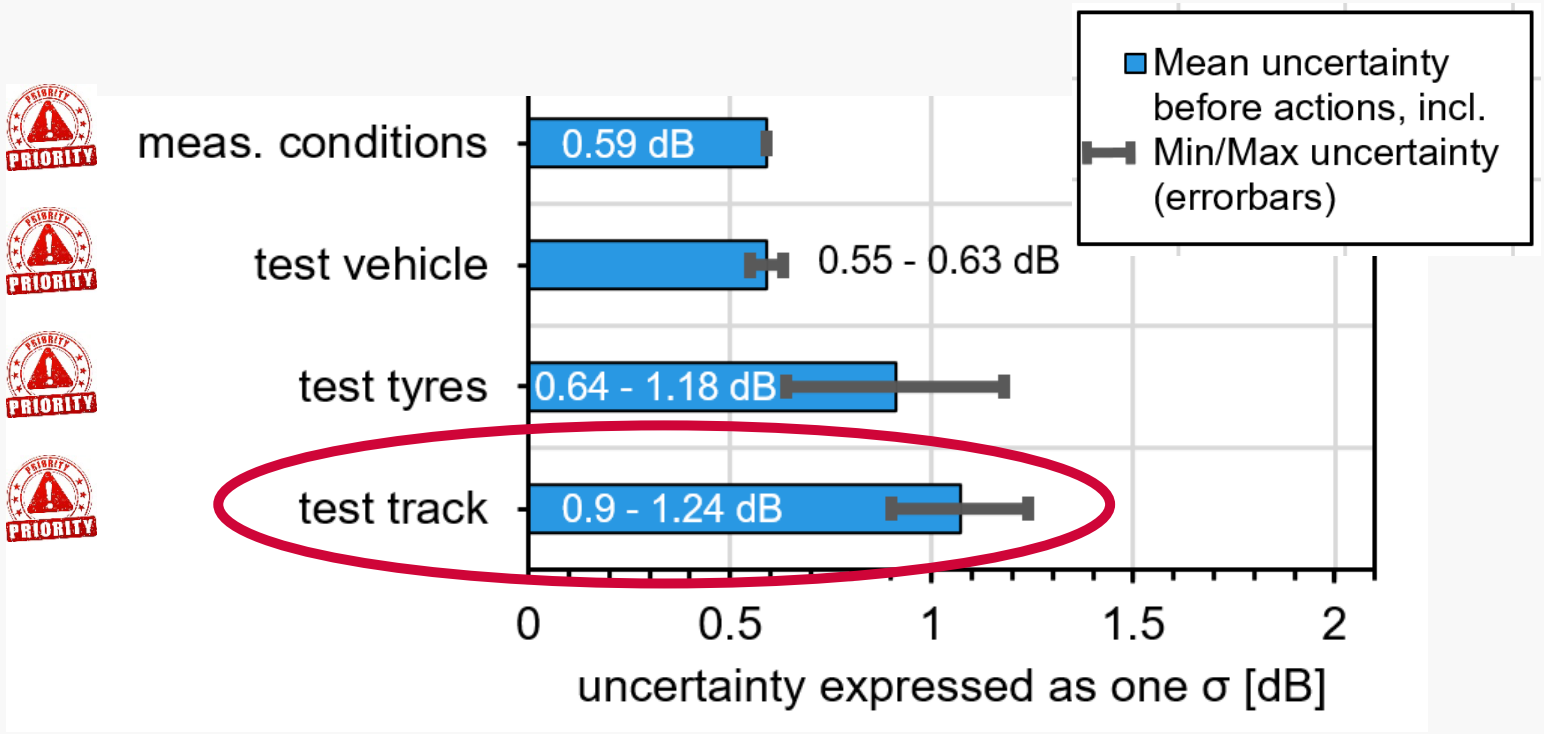


Scatter plots determined in the Nord Tyre Project



Low correlation coefficients are to be expected!

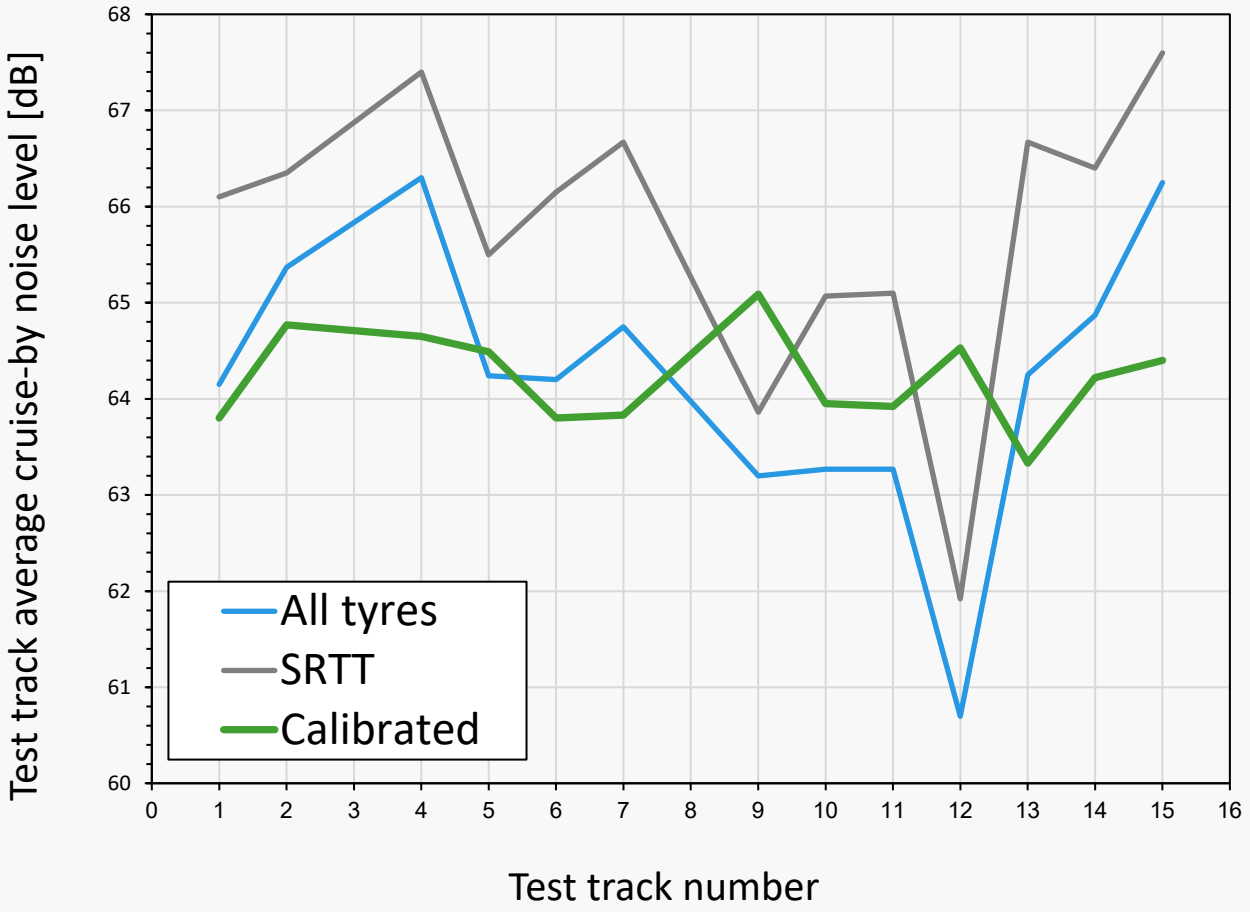
Important uncertainty contributions



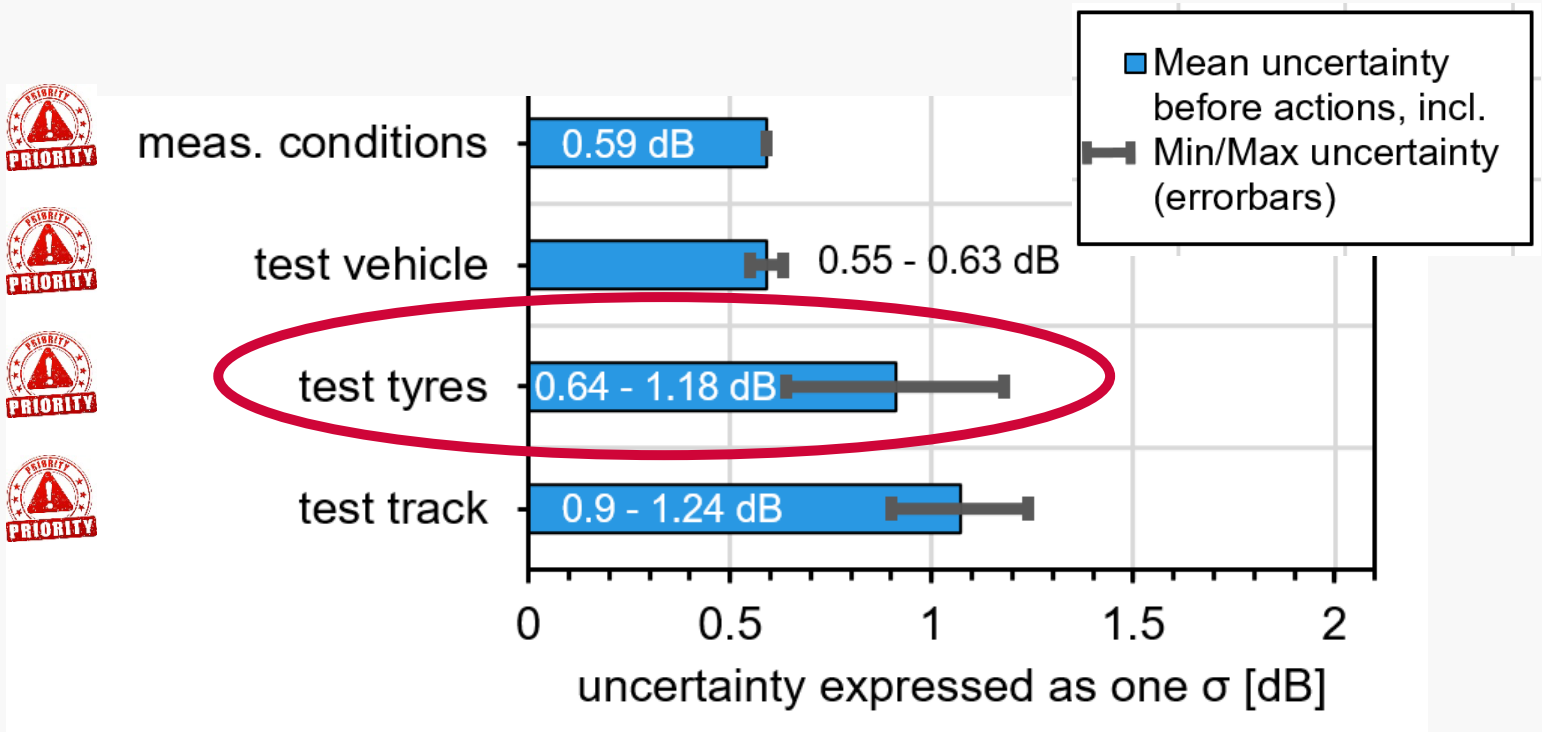
Improvement: Limiting test track influence

Solution:
Acoustic calibration of test track

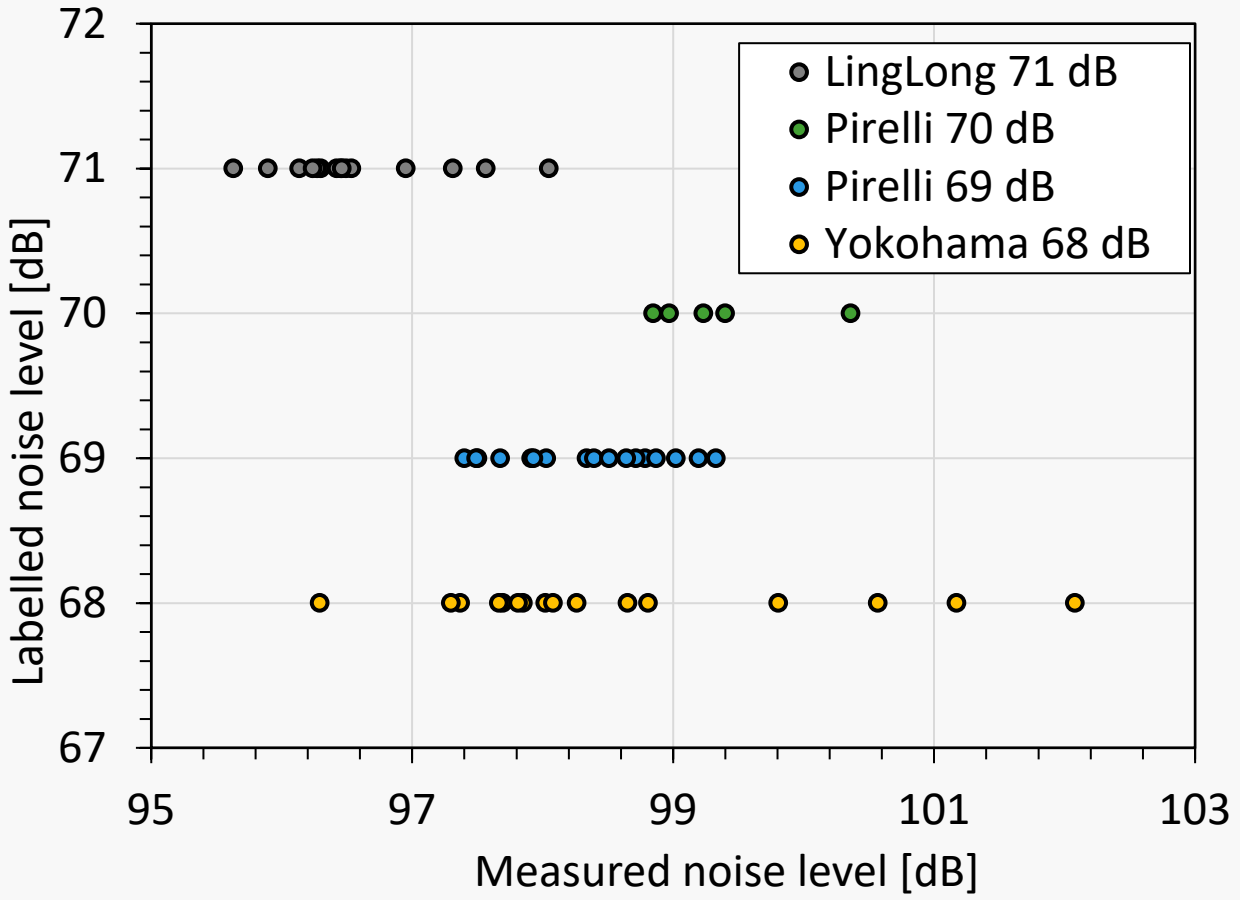
1. Using a set of reference tyres of the SRTT 16" type, specified in ISO/TS 11819-3,
2. mounted on a relatively well-defined vehicle,
3. conducting tyre/road noise measurements according to the method in R117,
4. normalizing the resulting noise level to a reference temperature using ISO/TS 13471-1,
5. and then normalizing the final result to some defined ISO 10844 reference level.



Important uncertainty contributions



Testing entire tyre lines



→ Large spread of noise levels within a tyre label
→ Consistent results between tyre liness from the same manufacturer
→ Consistency issues between tyres from different manufacturers → most likely due to acoustic variability of test tracks

Testing entire tyre lines

Solution:
Implement indoor testing on laboratory drum OR use simulations

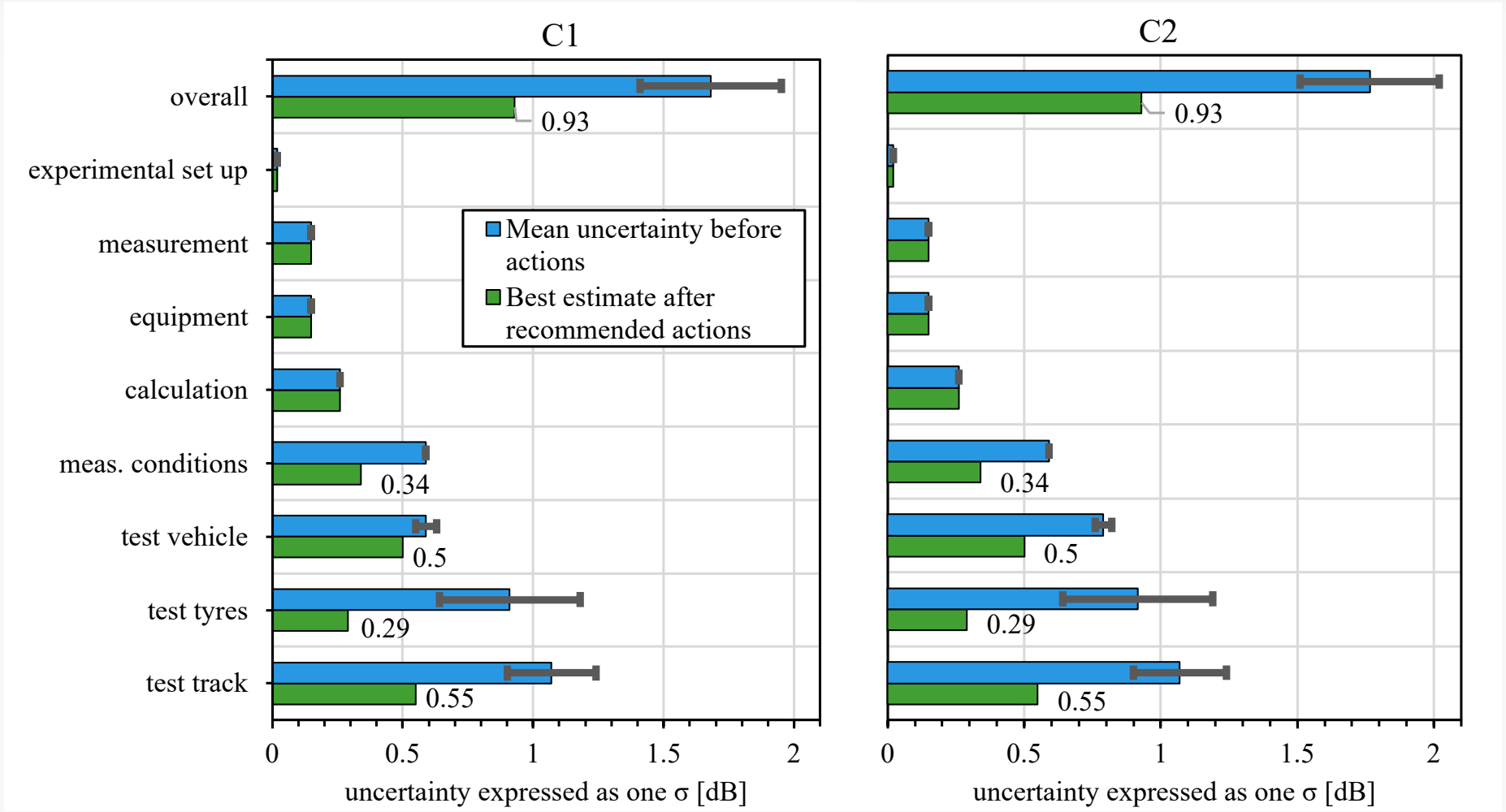
Indoor procedure:

- simplified measuring method
- determine differences between tyre variants within a tyre line
- use this difference to assign noise labels to all (or at least most) tyre variants with the type approval level as a reference.

OR alternatively:

- Determine relative differences between tyres by simulations

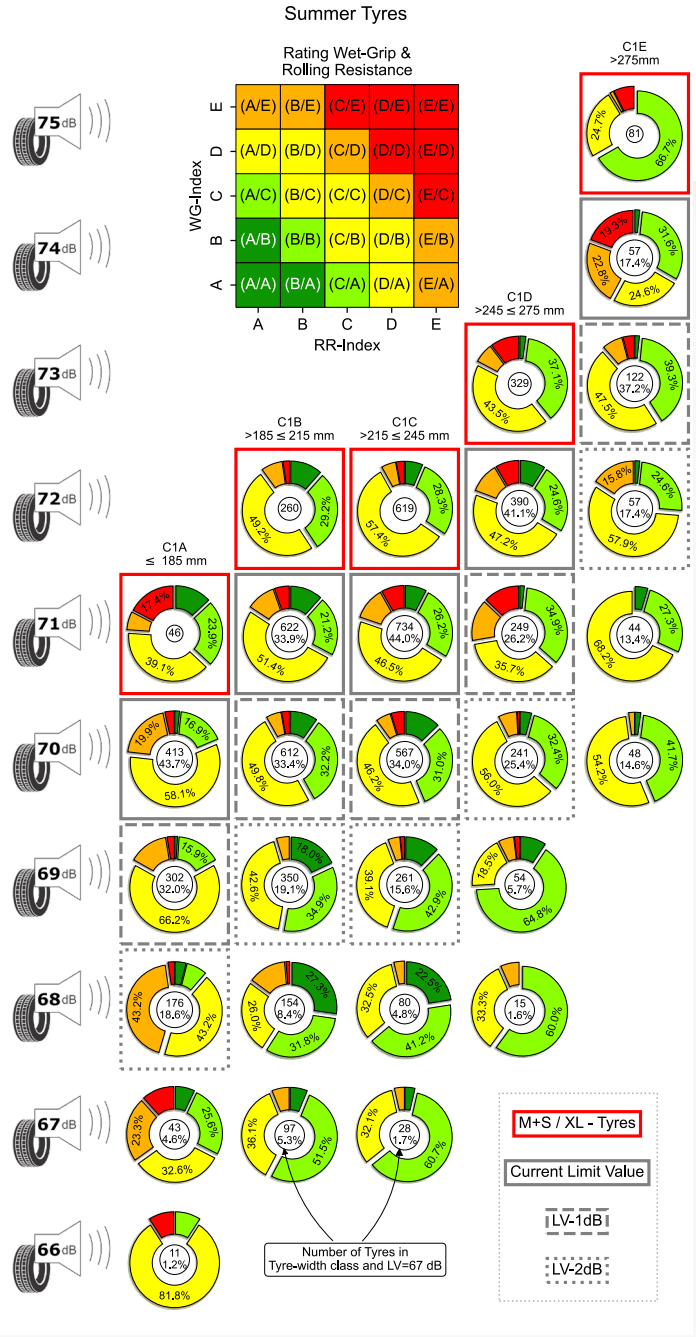
Expected improvements of uncertainty



Uncertainty can almost be halved by implementing the solutions offered by STEER!

Market analysis of low noise tyres

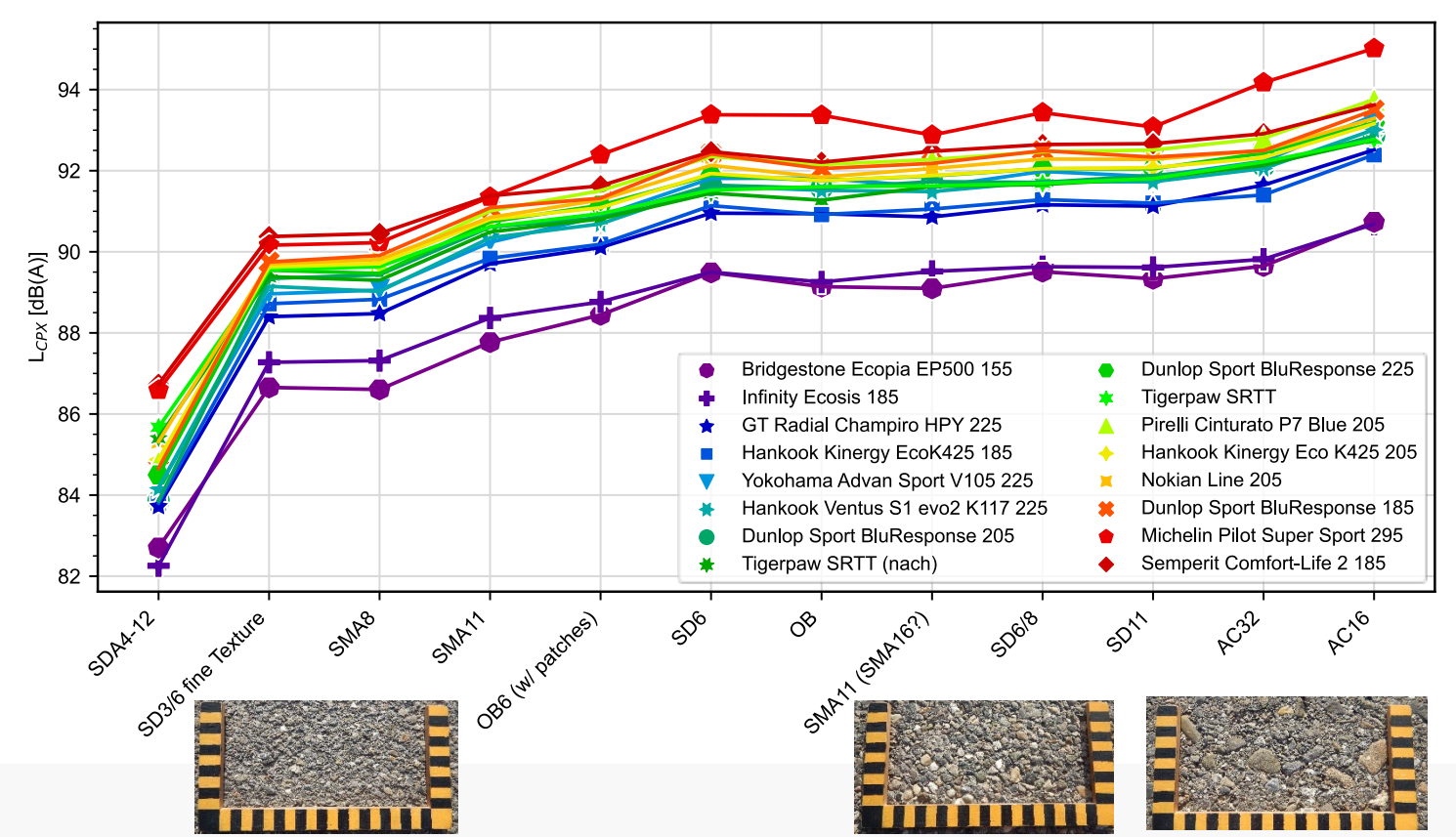
- Target conflicts between multiple categories?
  → Analysis of swiss database of tyres.
- Majority tyres are labelled close to the Limit Value (red boxes)
- Share of top performing (green colors) tyres is increasing with lower noise label values.



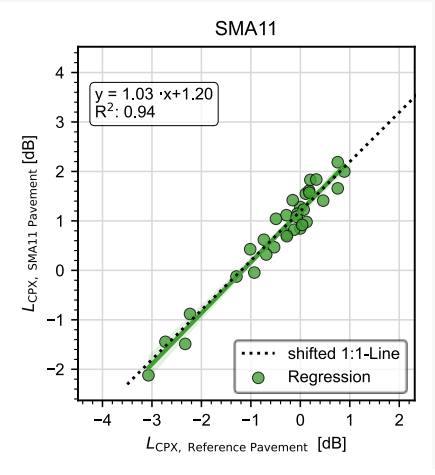
The influence of road surfaces

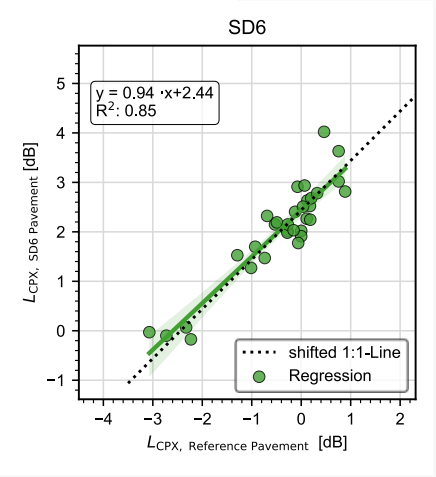
Is a quiet tyre quiet on all surfaces?

→ Yes, but minor rank changes are possible; reduced potential on very rough surfaces
→ Full potential for quieter tyres on road surfaces with fine to medium texture
→ Largest potential of quieter tyres on low-noise surfaces



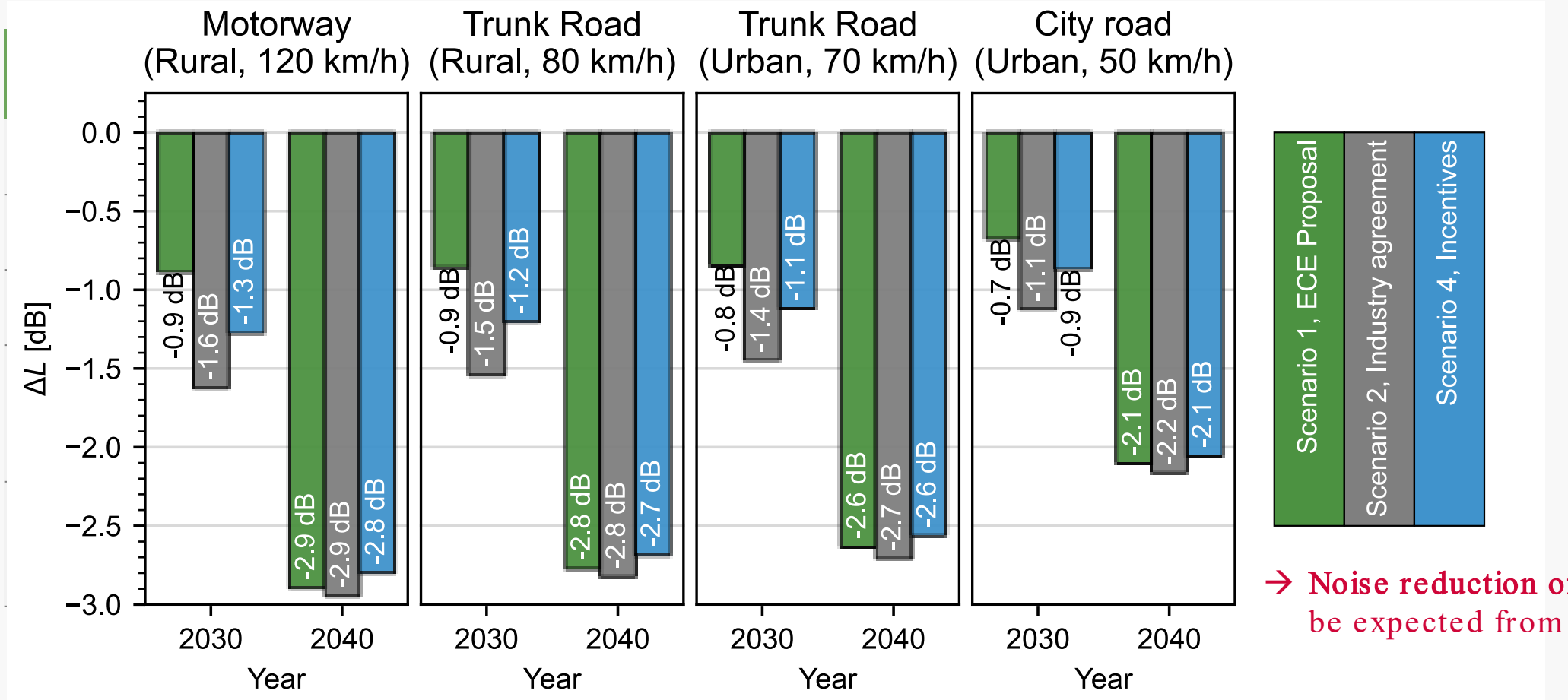
High correlation on different surfaces:





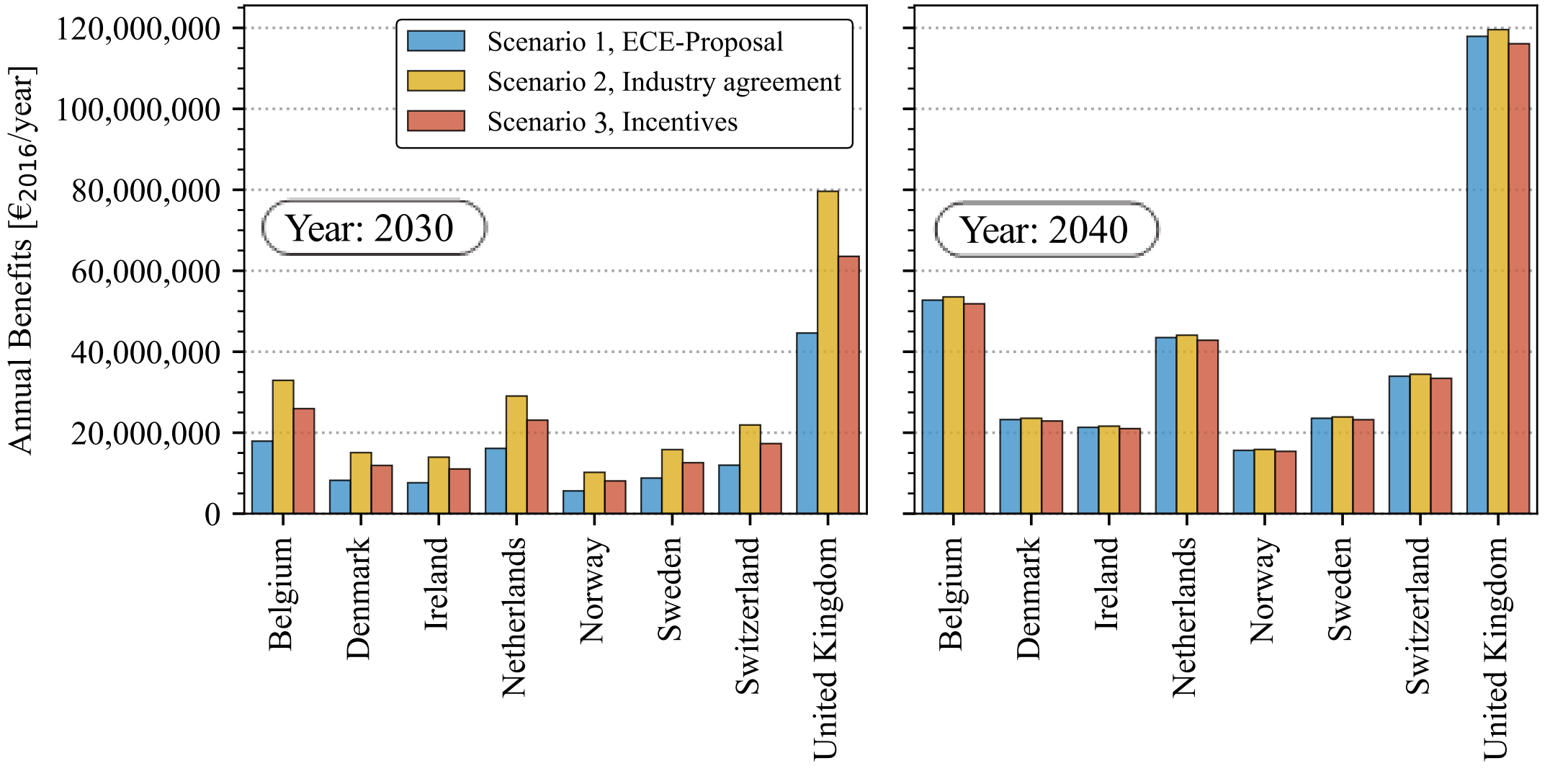
Scenarios to increase market share

Scenarios investigated in STEER



→ **Noise reduction of 2-3 dB** can be expected from quieter tyres

Resulting annual benefits from scenarios



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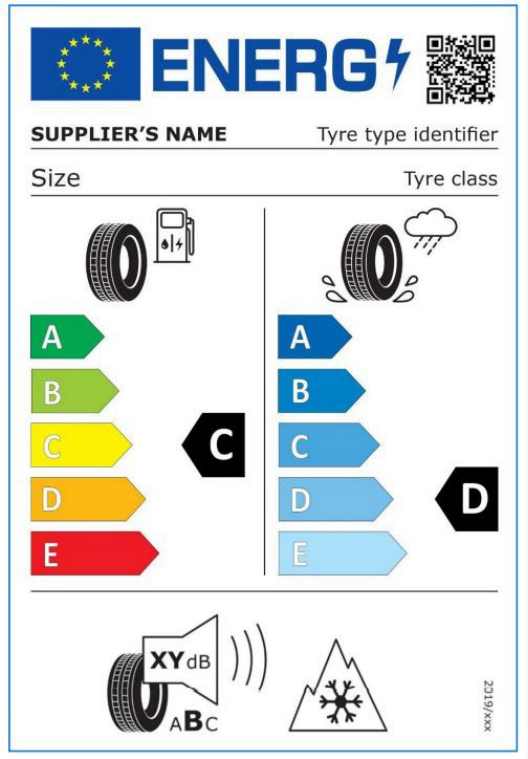
Conclusions & Recommendations

Urgent needs for improvements of the current labelling system

- Implement ***Reference Tyre Calibration*** to limit test track uncertainty
- **Test all tyre variants** within a tyre line (by lab-drum measurements OR simulations)
- Implement stricter **requirement for test vehicles**
- Improve **temperature correction**
- Re-establish **finer noise classes** for the noise label (at least 3 legal classes to differentiate)

→ If all suggested improvements are implemented, **uncertainty can be halved**!



Conclusion and Recommendations

- **3 dB reduction of road traffic noise** is possible, if market share of quieter tyres can be substantially increased
- Further investigate, specify and test the different scenarios
  Industry agreement / Consumer incentives
- **Benefits will likely offset the costs**
- **Act now:**
  - **to benefit from market trends (EV:s)**
  - **Act now to avoid jeopardising the benefits of new EU regulation**

Thank you for your attention!

General recommendation: Use a larger pump to inflate quieter tyres