

Shifts in tyre sound levels between 2007 and 2013

—
Erik de Graaff
(presented by Gijsjan van Blokland)

Client: Netherlands Ministry of
Infrastructure and Environment





Objective of the study

1. Investigate shifts in sound level distribution in tyre population on sale before and after revision of tyre regulation in 2009
2. Investigate correction values for specific tyre types
3. Interpret present distribution in terms of ambitious future threshold values

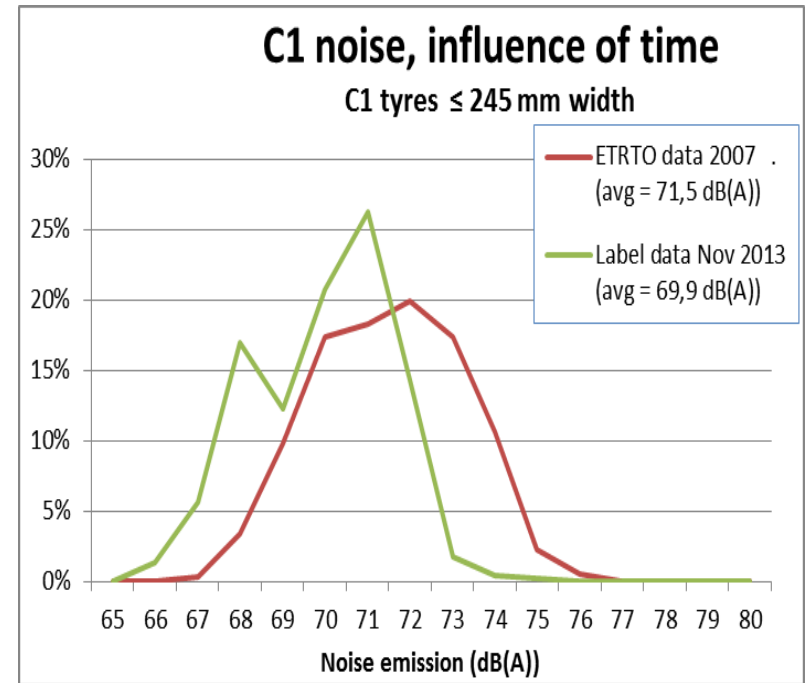
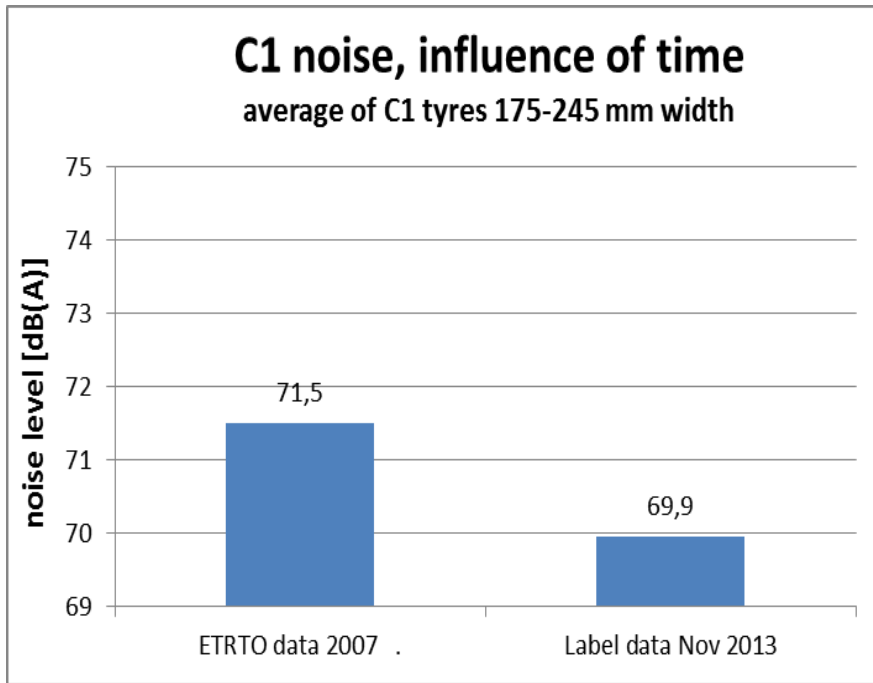


Work plan

- Comparison was made between the distribution of sound levels in the tyre type population in 2007 and 2013
- Both C1, C2 and C3 tyres were taken into account
- The 2007 population is based on data from ETRTO (C1) and FEHRL/TÜV/NL data for C2 and C3
- The 2013 population is based on the tyre type data base of VACO combined with the label values attached to these tyre types
- A selection of most common types was made on base of manufacturer selection and size selection
- In total 760 C1, 172 C2 and 372 C3 types were included in the study

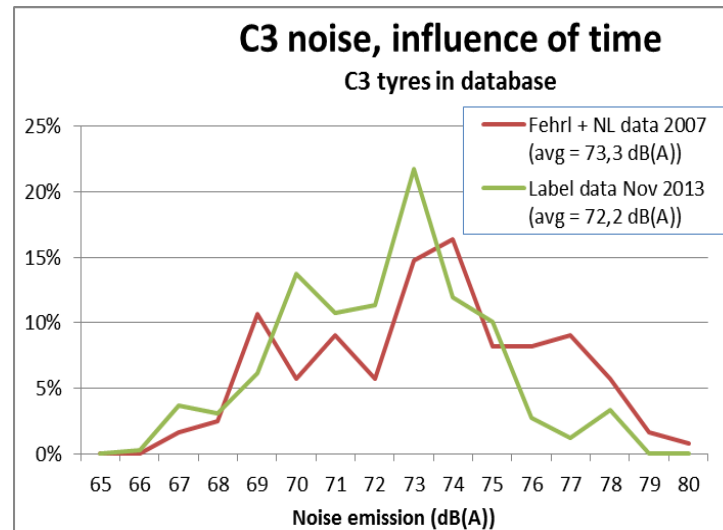
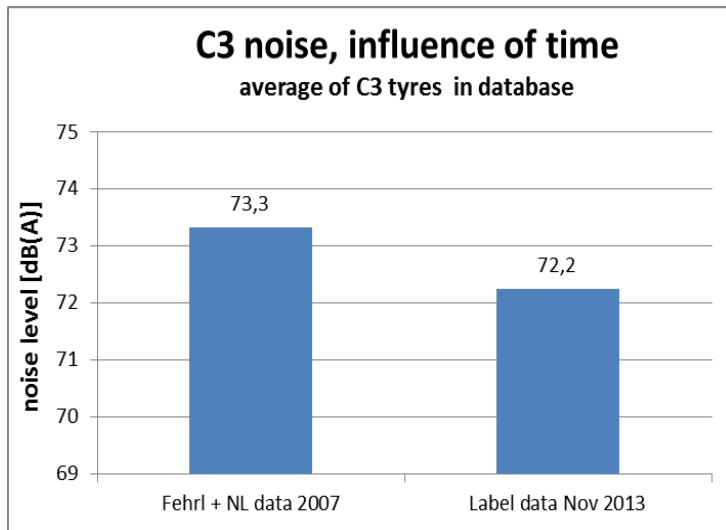
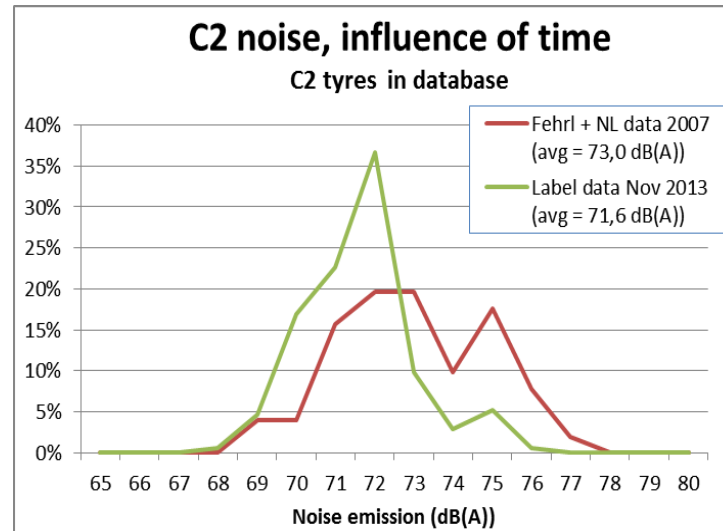
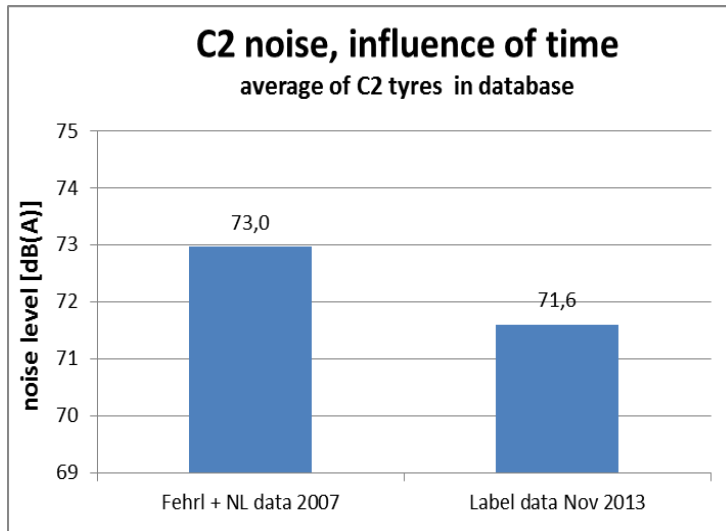


C1 tyres: 2007 vs. 2013





C2 and C3 tyres: 2007 vs. 2013





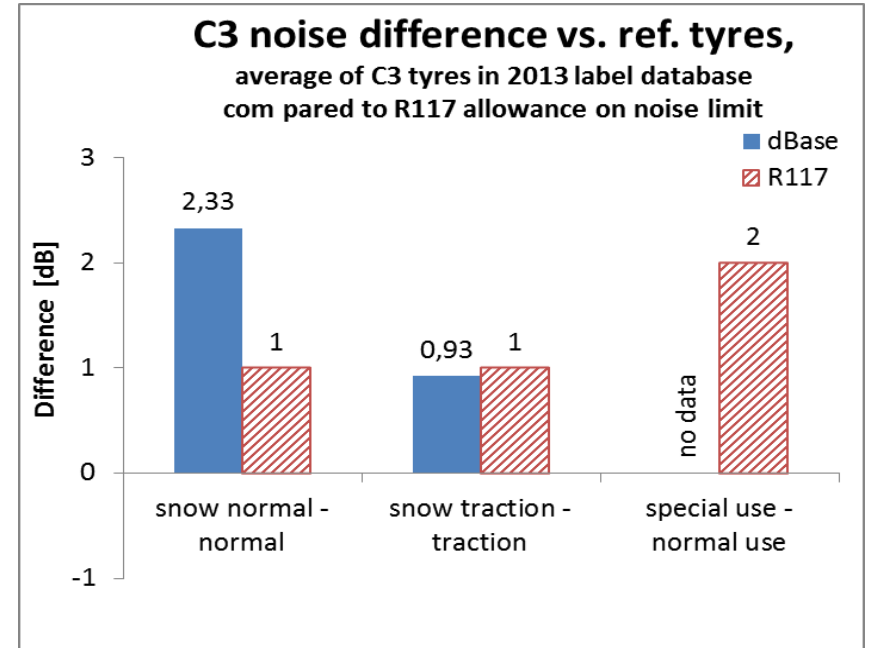
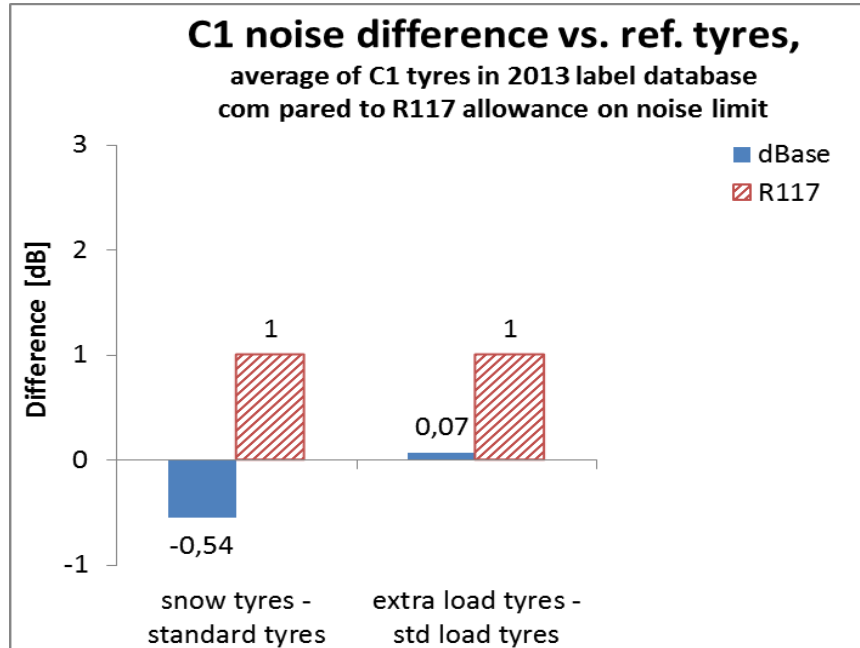
Observed shifts between 2007 and 2013

- Shift in average level:
 - C1 : - 1,6 dB
 - C2 : - 1,4 dB
 - C3 : - 1,1 dB

- Shift in shape of distribution:
 - C1 : moving of total distribution towards lower sound levels
 - C2 and C3 : narrowing of distribution



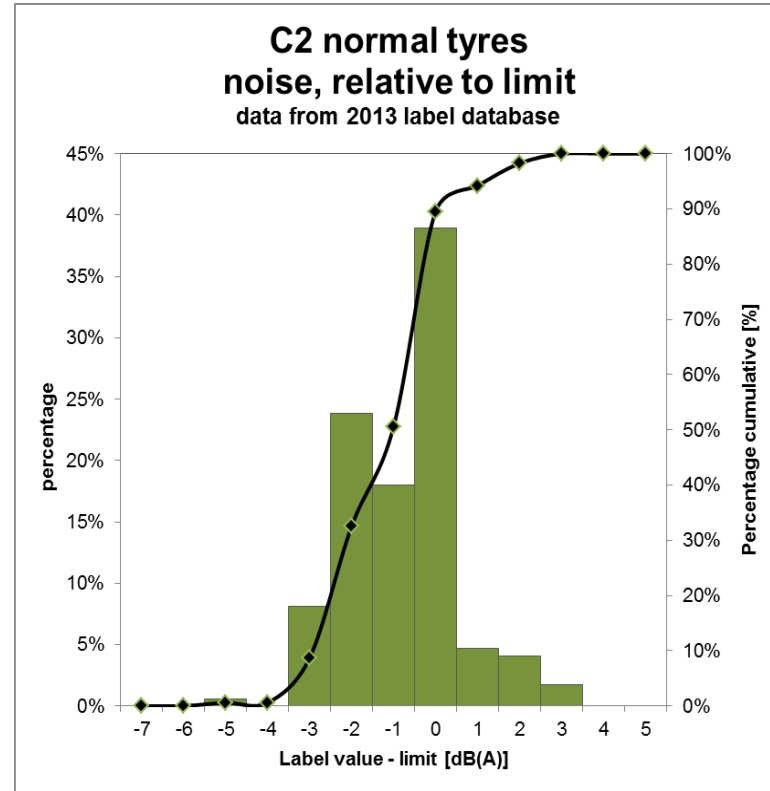
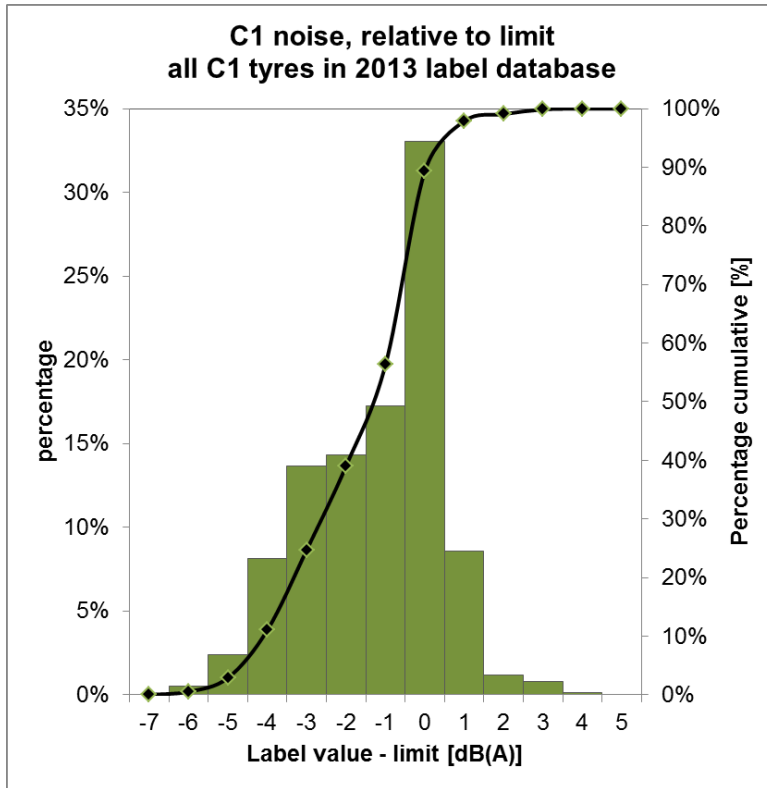
Observed effects due to special types



- C1: The applied correction values were not corroborated by the data
- C3: correction value for snow-normal underestimates difference found in data
- C3: correction value for snow traction in line with observed effect

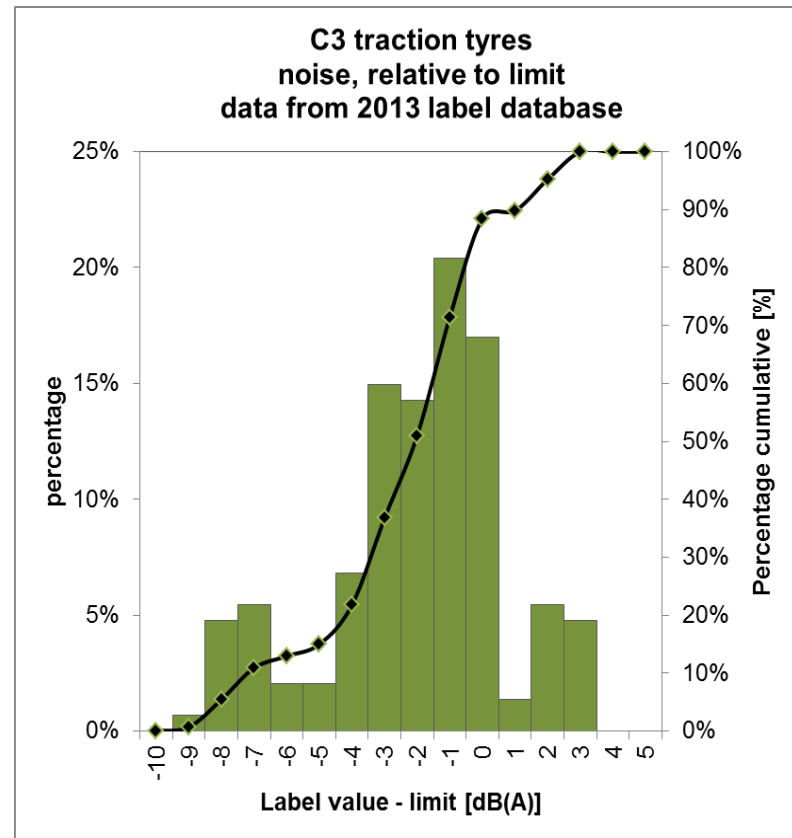
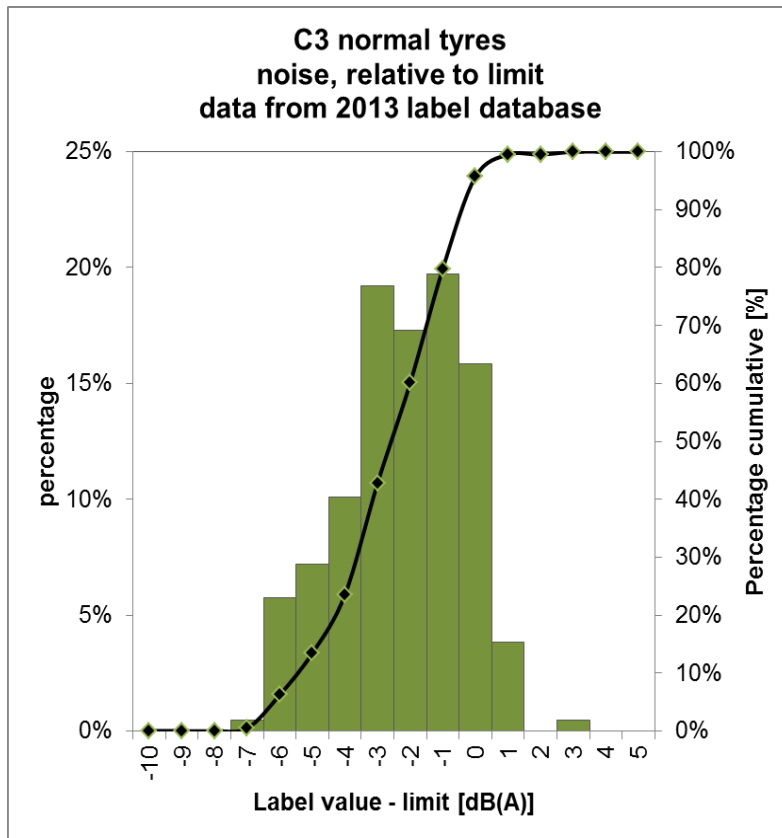


Evaluation margin with limit value: C1 and C2





Evaluation margin with limit value: C3 normal and traction





Values of 50, 80 and 99 percentile in margin distribution

Tyre (sub)class	“best 50%”	“best 20%”	“best in class”
C1	-1	-3	-6
C2	-1	-2	-5
C3 normal	-2	-4	-7
C3 traction	-2	-4	-9



Limits based on “best” 50% and “best” 20%

		Current EU and ECE Regulations	Current best 50% tyres in the NLs	Current best 20% tyres in the NLs
Tyre class	specification	Limits and correction values (dB(A))	Noise emission and correction values(dB(A))	Noise emission and correction values (dB(A))
C1	C1A ≤ 185	70	69	67
	C1B $>185 \leq 215$	71	70	68
	C1C $>215 \leq 245$	71	70	68
	C1D $>245 \leq 275$	72	no data	no data
	C1E >275	74	no data	no data
	Snow/XL/snow XL tyres	+1	0	0
C2	Normal tyres	72	71	70
	Traction tyres	73	no data	no data
	Snow normal tyres	+1	+1	+1
	Snow traction tyres	+2	no data	no data
	Special tyres	+2	no data	no data
C3	Normal tyres	73	71	69
	Traction tyres	75	73	71
	Snow tyres	+1	+2	+2
	Snow traction tyres	+1	+1	+1
	Special tyres	+2	no data	no data



conclusions

- A general reduction in tyre sound levels between 2007 and 2013 is observed
- Trends in the found distribution reflects effects of 2009 revision
- Regulatory correction values deviate from effects found in data sets
- Margin relative to present limit value:
 - 50 percentile $\approx -1,5$ dB
 - 80 percentile ≈ -3 dB
 - 99 percentile ≈ -7 dB