Transmitted by the expert from the Netherlands

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Possible Future Tyre Noise limits

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At the 60th GRB in September 2014 two presentations were given by the Netherlands related to tyres of motor vehicles. After both presentations the GRB discussed amongst others the tightening of the tyre noise limits. This paper is intended to come back to the most prominent conclusions of the two presentations and to initiate a discussion and work of the GRB on future tyre noise limits under ECE regulation R117.

1.Benefits of Triple A tyres in the Netherlands and the EU

Commissioned by the Netherlands, TNO performed two studies to show the potential benefits for the Netherlands and the EU if they would move from the currently used tyres to AAA tyres according to the EU tyre label. The results for the EU show that Triple A tyres would have a large impact on energy consumption, safety and vehicle noise. The use of Triple A tyres in the EU could annually save up to 17 billion liters of fuel and reduce CO2 emissions by roughly 42 Mton. This is equivalent to nearly 5% of the total CO2 emissions from road transportation in the EU. From a societal perspective, the associated annual cost savings are estimated to amount to 34 billion Euros. For more detailed figures see table 1.

Table 1. Potential benefits of AAA-rated tyres in the EU (societal perspective).

Potential benefits	**Energy**	**Safety**	**Noise**	**TOTAL**
Annual fuel savings [billion l]	17	-	-	17
Annual CO_2 reduction [$MtCO_2$]	42	-	-	42
Reduced number of fatalities	-	2567	-	2567
Reduced number of serious injuries	-	12353	-	12353
Reduced number of slight injuries	-	19631	-	19631
Reduced number of highly annoyed people [millions]	-	-	8.2	8.2
Reduced number of annoyed people [millions]	-	-	13.0	13.0
Reduced number of highly sleep disturbed people [millions]	-	-	3.4	3.4
Reduced number of sleep disturbed people [millions]	-	-	6.1	6.1
Annual cost savings [billion €]	13	10	11	34

For the Netherlands end-user, annual fuel cost savings would range from 90 € for passenger cars to 2000 € for long-haul vehicles (see table 2).

Table 1. End-user perspective: Annual fuel and cost savings for end-users in The Netherlands associated with a switch to A-rated tyres for energy.

Vehicle group	Annual fuel savings [l]	Annual cost savings [€]
Passenger cars (family, petrol)	67	117
Passenger cars (lease, diesel)	114	171
Service/delivery (diesel)	300	449
Urban delivery/collection (diesel)	449	674
Municipal utility (diesel)	507	761
Regional delivery/collection (diesel)	574	862
Long haul (diesel)	1612	2418
Construction (diesel)	526	790
Bus (diesel)	691	1036
Coach (diesel)	566	849

Conclusions that can be drawn from the Triple A studies are:
-Major benefits can be gained when moving to better tyres
- The choice for better tyres is to be made when tyres are replaced anyway or when the vehicle is new. It is not the intention to replace tyres halfway their lifetime. Therefore, no additional costs will have to be made (see also paragraph 3 and figure 3) .

2.Evaluation of tyre noise limits based on sold tyres in The Netherlands

Also commissioned by the Netherlands ministry of the environment, M+P presented at GRB60 a study on tyre noise limits. For all types of tyres C1-C3 an evaluation has been made of the development over time of the noise emission values of tyres sold in the Netherlands in 2007 and 2013. Figure 2 shows the data for C1 tyres.

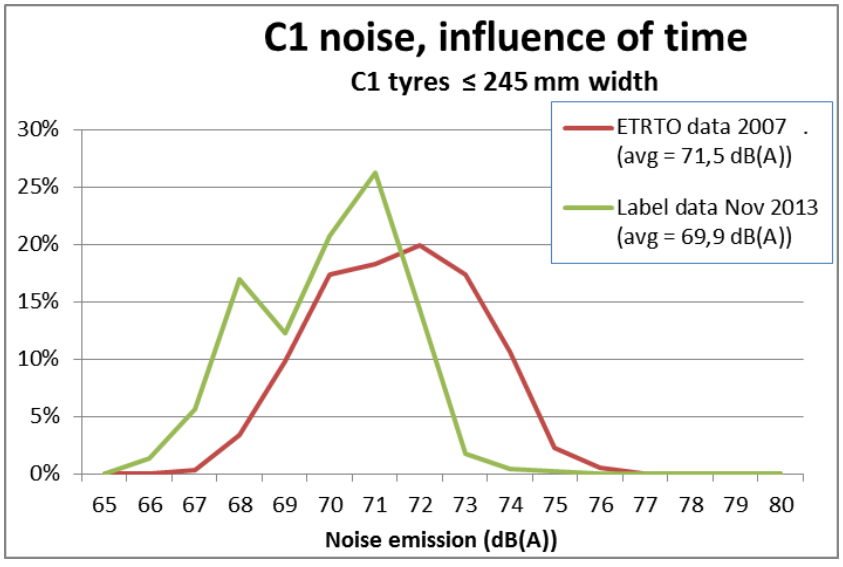

Figure 2. Tyre noise values of 2013 compared to the values of 2007.

To see if there is scope for tightening of the current tyre noise limits M+P also looked at the tyres sold in 2013 and the current noise limit for these tyres. For all types of tyres distribution graphs have been made of the emission values of the sold tyres related to their noise limit. Figure 3 shows the distribution of tyre noise limits of C1A tyres sold in the Netherlands in 2013.

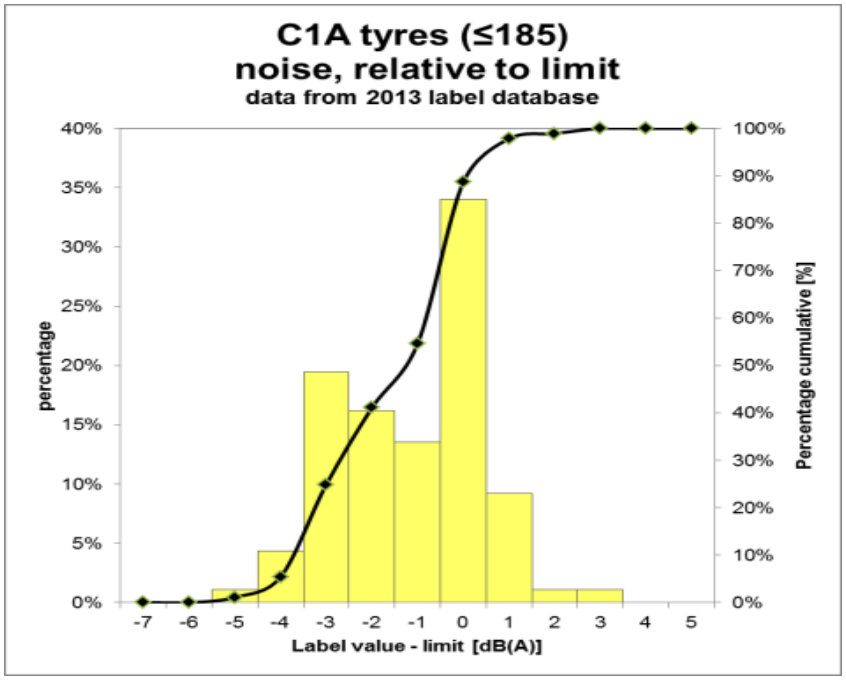

Figure 3. Statistical distribution of tyre noise emission values of C1A tyres sold in the Netherlands in 2013 relative to the current emission limit.

Besides the influence over time of the noise values of tyres and the distribution of the emission values compared to the noise limits, M+P also investigated the allowances for special tyres and the emission limits of special tyres. Surprisingly, some of the emission values did not match the figures for allowances and limits in the ECE and EU Regulations. M+P derived from the tyre sales data emission values several percentile values. Table 3 gives an overview of current emission noise limits in ECE and EU Regulations and the 50 and 20 percentile values of tyres sold in the Netherlands in 2013.

Table 3. Tyre noise limits and correction values (dB(A)) of current ECE and EU Regulations and calculated "Best 20%" and the "Best 50% " values of sold tyres in the Netherlands in 2013.

Tyre class	Specification	Current EU and ECE Regulations	Current best 50% tyres in the NLs	Current best 20% tyres in the NLs
C1	C1A ≤ 185	70	69	67
	C1B >185 ≤ 215	71	70	68
	C1C >215 ≤ 245	71	70	68
	C1D >245 ≤ 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 that can be drawn from the evaluation of noise limits of sold tyres are:
-over the last years tyres have developed to more quiet tyres, on average 1-2 dB
-many currently sold tyres already now perform better than the 20 Percentile emission values. For C1A tyres 40% of sold tyres already now lie 2 dB below the current ECE and EU limits.

3.Cost-Benefit Analyses of the use of better tyres

Paragraph 1 showed that large benefits can be gained moving to better tyres according to the EU tyre label. The analysis given in paragraph 2 indicates that there is technical development and that there is scope for tightening of the noise emission limits of tyres. Question remains whether tyres with better labels are more expensive. To investigate this M+P made an analysis of the sold tyres in the Netherlands and correlated the various aspects of the tyre labels with the price of the tyres. Figure 3 gives these correlations. Surprisingly, M+P found a slight negative correlation. Meaning that on average tyres with better quality are even little less expensive.

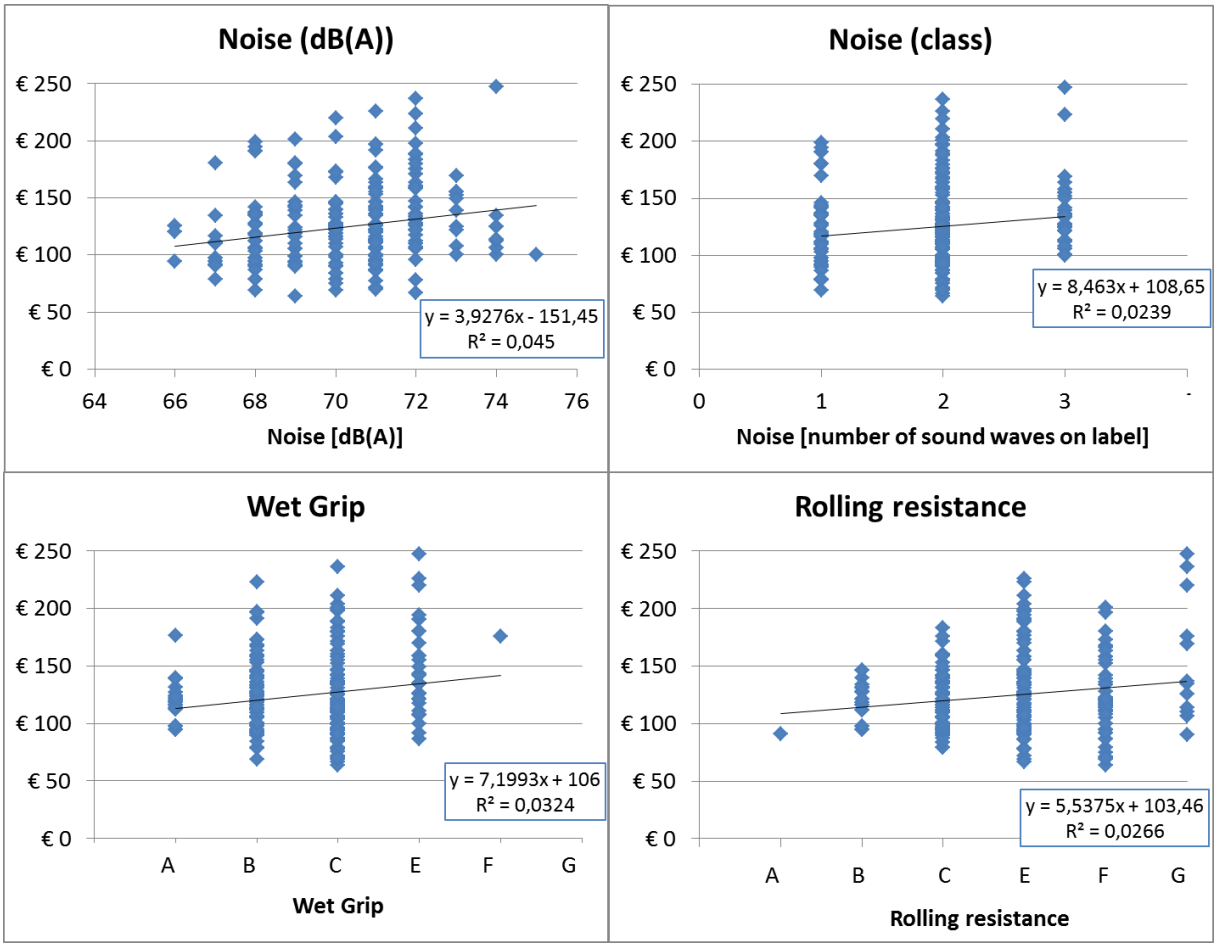

Figure 3. Aspects of the tyre label versus the advice sale prices of car tyres in the Netherlands. Internet sales the Netherlands, 472 tyres size 205/55R16, http://www.autobandenmarkt.nl/index.html.

In the process of tightening emission limits usually a Cost-Benefit Analysis is made. Based on the studies presented in this paper one can sketch the CBA for the tightening of the noise emission limits of tyres as follows: 'the benefits are high and the costs are negligible'.

<u>Conclusions that can be drawn on CBA's for reducing the tyre noise limits</u>
-any CBA will show large benefits at hardly any costs.

4.Overall conclusion

For the tightening of the noise emission limits two things are most vital. The first is that the benefits of doing this are high and the costs are negligible. Especially, when a transitional period for the entry into force of the updated tyre nose limits is taken ample enough no costs are involved. Second, it is important that tyres that can fulfill the new emission limits are available. And that is the case.

Evaluation and drafting new noise emission limit values for tyres know a cycle of around 8 years. In 2009 the current values have been developed that came info force in 2012. If the evaluation and revision starts now an amendment to R117 can be adopted in 2017. New emission limits can then enter into force in 2020.

To start the discussion in the GRB potential amendments to Regulation No. 117 are annexed to this document. This annex could be regarded a first draft discussion paper for GRB to assist its future work in amending R117.

Annex

Potential amendments to Regulation No. 117

Note: This text serves as a discussion document for GRB and shows how stage 3 limit values could be incorporated in the text of Regulation R117. **The added text is given in bold characters**. No text has been removed.

Paragraph 6.1, insert three new tables marked "stage 3", amending to read:

6.1. Rolling sound emission limits, as measured by the method described in Annex 3 to this Regulation.

6.1.1. For Class C1 tyres, the rolling sound emission value shall not exceed the values pertinent to the applicable stage given below. These values refer to the nominal section width as given in paragraph 2.17.1.1. of Regulation No. 30:

Stage 1	
Nominal section width	*Limit dB(A)*
145 and lower	72
Over 145 up to 165	73
Over 165 up to 185	74
Over 185 up to 215	75
Over 215	76

The above limits shall be increased by 1 dB(A) for extra load tyres or reinforced tyres and by 2 dB(A) for "special use tyres".

Stage 2	
Nominal section width	*Limit dB(A)*
185 and lower	70
Over 185 up to 245	71
Over 245 up to 275	72
Over 275	74

The above limits shall be increased by 1 dB(A) for "snow tyre for use in severe snow conditions" , extra load tyres or reinforced tyres, or any combination of these classifications.

Stage 3	
Nominal section width	***Limit dB(A)***
185 and lower	**67**
Over 185 up to 245	**68**
Over 245 up to 275	**69**
Over 275	**71**

6.1.2. For Class C2 tyres, the rolling sound emission value with reference to its category of use (see paragraph 2.1. above) shall not exceed the values pertinent to the applicable stage given below:

Stage 1	
Category of use	*Limit dB(A)*
Normal tyre	75
Snow tyre	77
Special use tyre	78

Stage 2			
Category of use		*Limit dB(A)*	
		Other	*Traction tyres*
Normal tyre		72	73
Snow tyre		72	73
	Snow tyre for use in severe snow conditions	73	75
Special use tyre		74	75

Stage 3		
Category of use	***Limit dB(A)***	
	Other	***Traction tyres***
Normal tyre	**70**	**71**
Snow tyre for use in severe snow conditions	**71**	**73**
Special use tyre	**72**	**73**

6.1.3. For Class C3 tyres, the rolling sound emission value with reference to its category of use (see paragraph 2.1. above) shall not exceed the values pertinent to the applicable stage given below:

Stage 1	
Category of use	*Limit dB(A)*
Normal tyre	76
Snow tyre	78
Special use tyre	79

Stage 2			
Category of use		*Limit dB(A)*	
		Other	*Traction tyres*
Normal tyre		73	75
Snow tyre		73	75
	Snow tyre for use in severe snow conditions	74	76
Special use tyre		75	77

Stage 3		
Category of use	***Limit dB(A)***	
	Other	***Traction tyres***
Normal tyre	**69**	**71**
Snow tyre for use in severe snow conditions	**71**	**72**
Special use tyre	**71**	**73**

Insert a new paragraph 12.10, amend to read:

12.10. As from 1 November 2020, Contracting Parties applying this Regulation shall refuse to grant approval if the tyre type to be approved does not meet the requirements of this Regulation as amended by the 03 series of amendments, and shall, in addition, refuse to grant approval if the stage 3 rolling sound requirements set out in paragraphs 6.1.1. to 6.1.3. of this Regulation are not complied with.