Report
GRB ad hoc Working Group ASEP

VS 14 febr

issued by the Chairman of the ASEP WG
GRB 51; February 2010

Meetings: (21)

1.	Amsterdam	2005 November
2.	The Hague	2006 January
3.	Geneva	2006 February
	3 a-d Task Force	2006 Feb-Aug
4.	Geneva	2006 September
5.	The Hague	2006 November
6.	Geneva	2007 February
7.	The Hague	2007 May
8.	The Hague	2007 October
9.	Ann Arbor USA	2008 January
10.	Geneva	2008 February
11.	Tokyo	2008 June
12.	Geneva	2008 September
13.	Paris	2008 November
	13a. Expert group Paris	2008 December
14.	Paris	2009 January
15.	Flensburg (Ger.)	2009 May
16.	**Paris**	**2009 December**

Reminder: why ASEP

- Annex 3 covers the part of the engine map with lower revs

- Decision made to have Additional Sound Emission Provisions to cover a wider part of the engine map (higher revs).

Why ASEP? (2)

In old days: no sound design

So one point in engine map is enough →

Vehicles behaved +/- lineair →

Firsts noise directives were sufficient

Wit sound design:

relation revs ←→ noise is free

→ One point not enough any more

Very helpful: ToR

3. The informal group **shall develop** a complementary test method and evaluation criteria for insertion into Annex 10. The complementary test method shall cover the noise emission under higher engine speeds and loads than the proposed procedure in TRANS/WP.29/GRB/2005/5, as amended.

ToR

The informal group **shall develop:**

- a complementary test method

- evaluation criteria for insertion into Annex 10.

That was exactly our mission for Paris

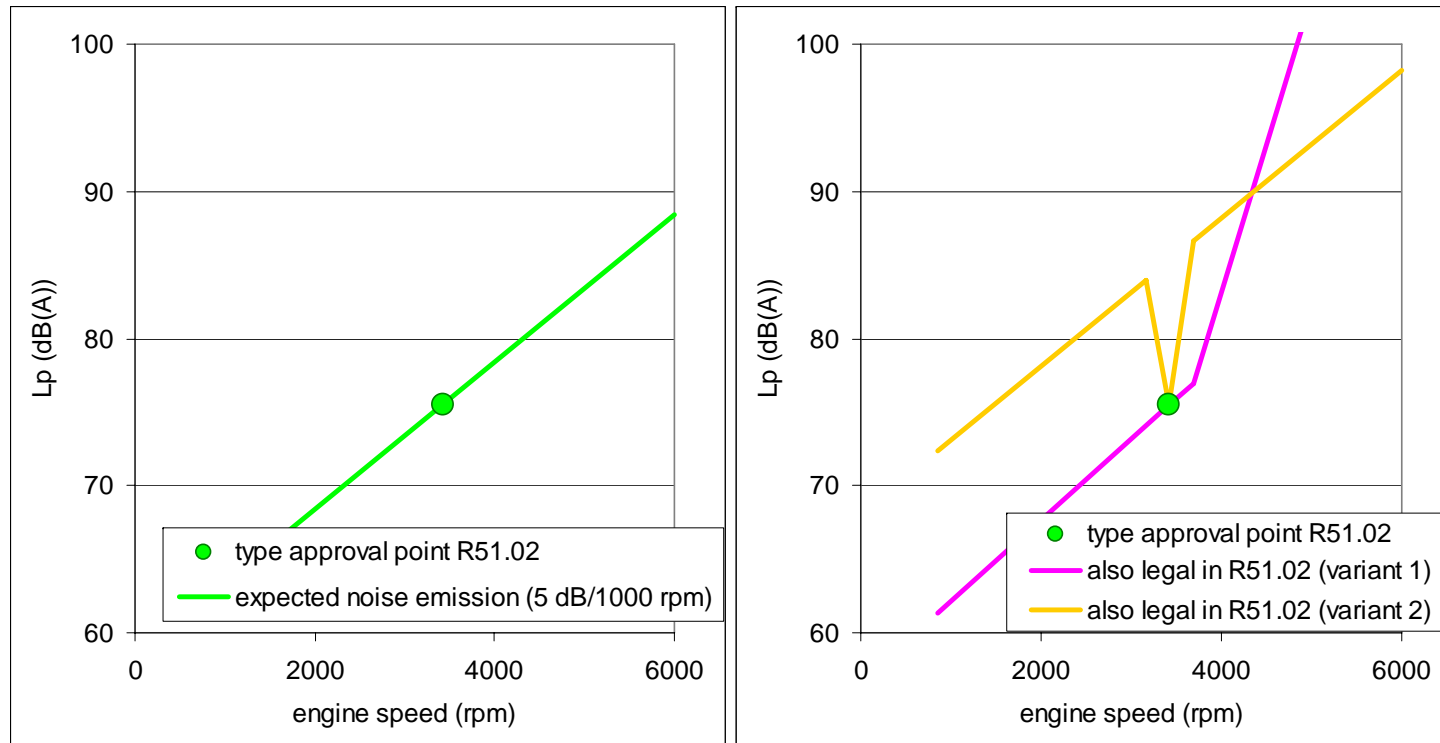# The Basics

The issue is rather complex

But the basic is simple:

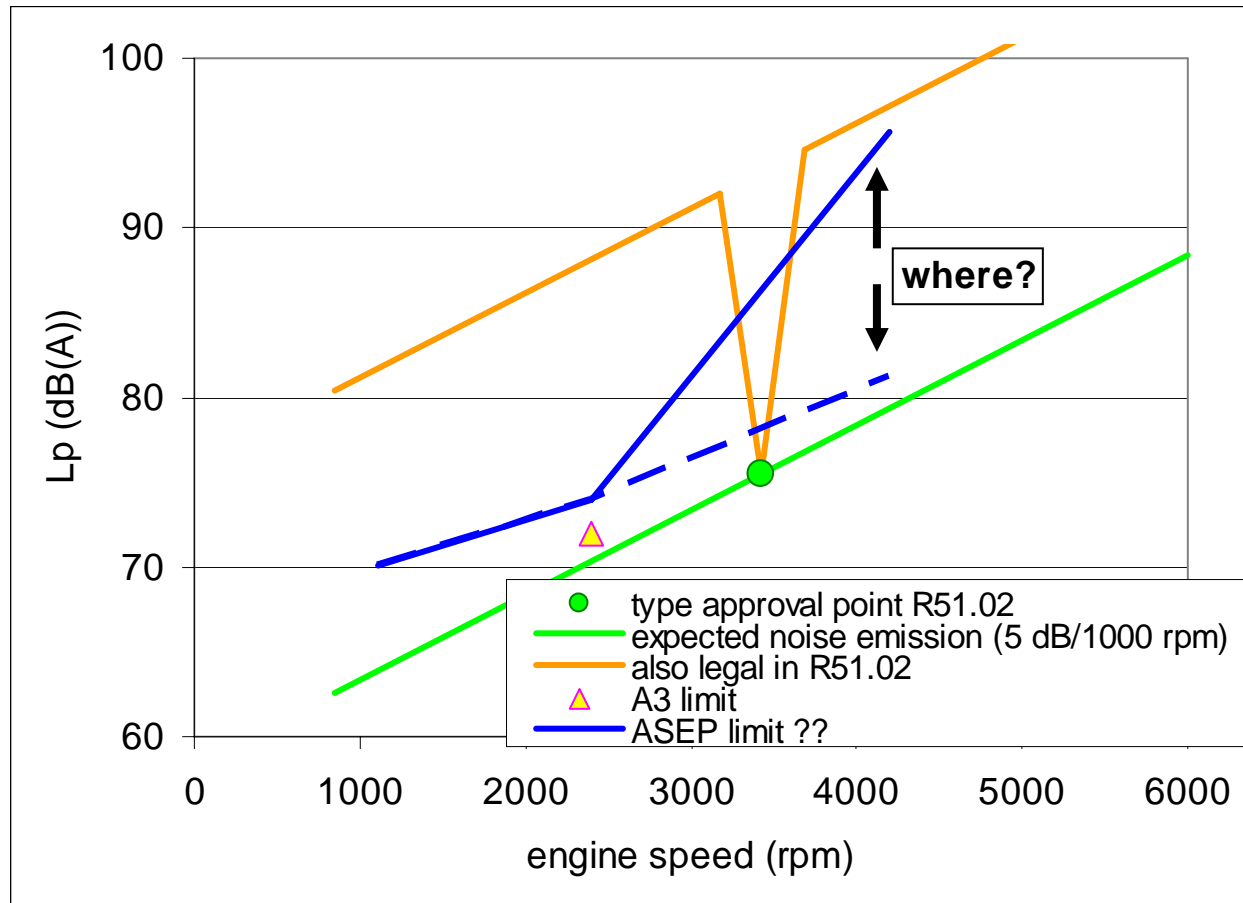A line in the engine map

How higher the line, how less stringent

Where to draw the line: that's all

Remember:
What should ASEP detect?

- Noise emission higher than expected reference curve
  - Non linear
  - Too high Lmax
  - Too high slope

What should ASEP detect?

- Where to draw the limit line: that's the question

That's all?

YES!, (but very complex)

Deliverables meeting 16

SHOULD BE

1. One method in the formal wording

2. A limitation proposal based on an analyses

BUT WHAT DO YOU GET?

1. One remaining issue: N1 vehicles
   – Discussion paper exclusion distributed

2. One document (GRB xxxx)
   – with the generals
   – with one method, not ready
     • proposed/developed by OICA,
     • discussed in the group
   – with one ready: NL (could be optimized)

3. A stringency analyses

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N1's and ASEP

N1's make a lot of sound

In the NL: 17% of the fleet makes 50% of traffic noise in towns

So hot issue: for <u>Annex 3 limitation</u>

N1 and ASEP

- Hardly private owners
- Not bought by emotion, but chosen on 'costs' by administrators/lease companies
- No customer demands for sound
- Much more variants as with M1's → high costs for industry
- No sound design noticed

N1: ASEP relevant? (2)

Plee in the group for exemption

Positive attitude

Proposal made, no time enough for a
perfect job.

So we provided a paper with the
possibilities, options and preferences

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Generals

Ready

Main body, measurement method, COP

Method 1 (OICA)

1. Procedure not ready:

    yes/no bonus silent vehicles

2. No limitation proposal

Method 1: relevance of the bonus

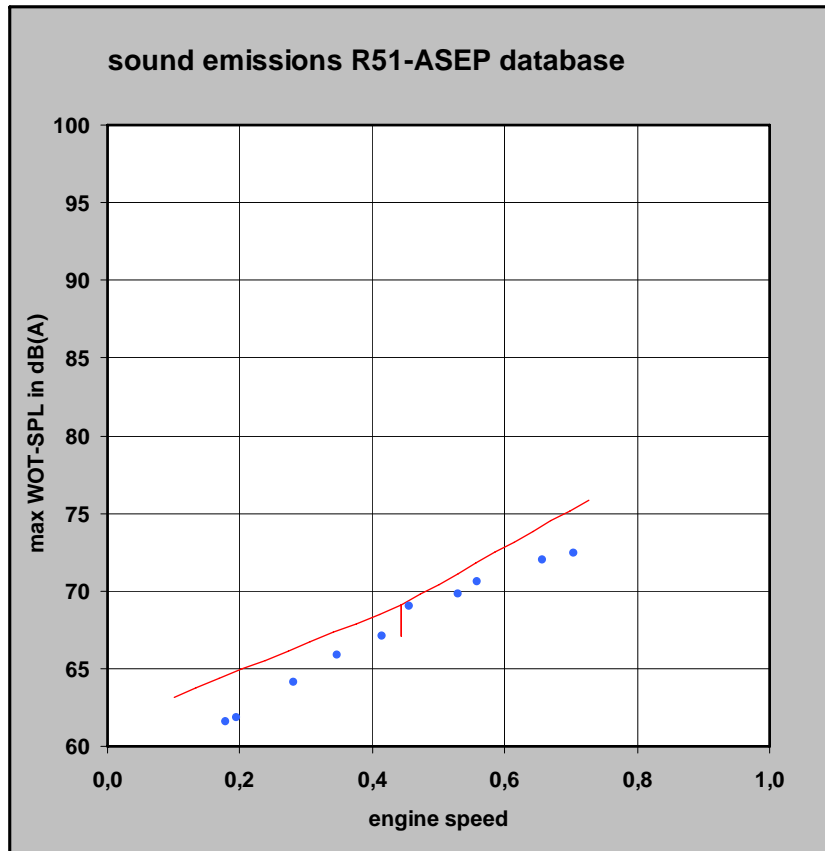Silent vehicles become 'normal' in higher revs area.

In Method 1 'jumps' are punished

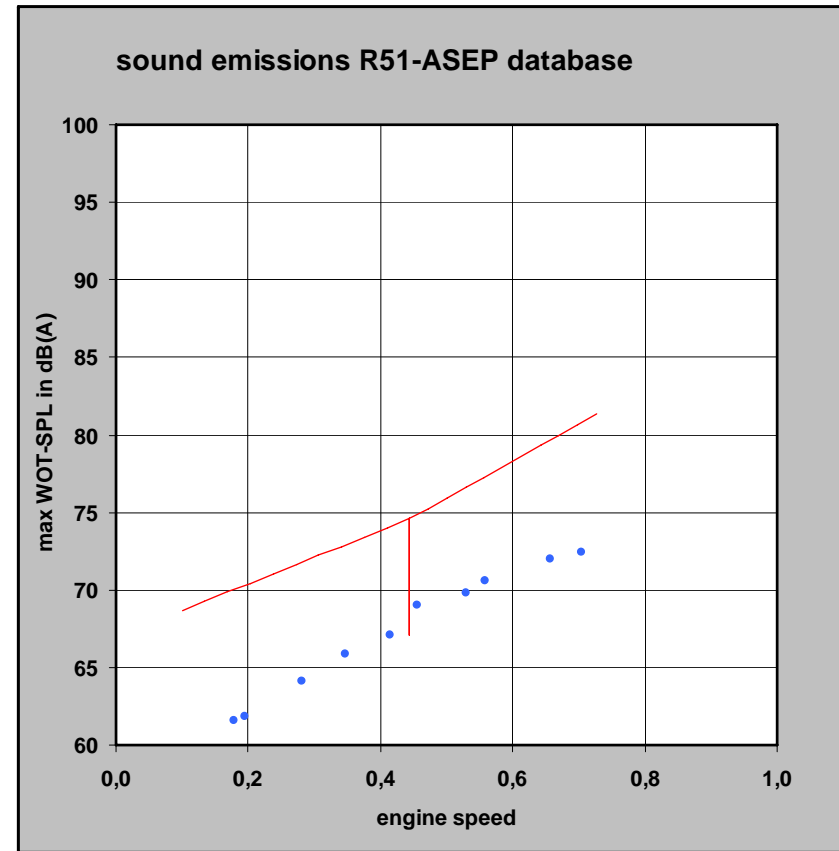With bonus: silent vehicles will pass tougher limitation options

Without the bonus → more vehicles are rejected → supports weaker limitation

Effect of bonus on silent vehicles

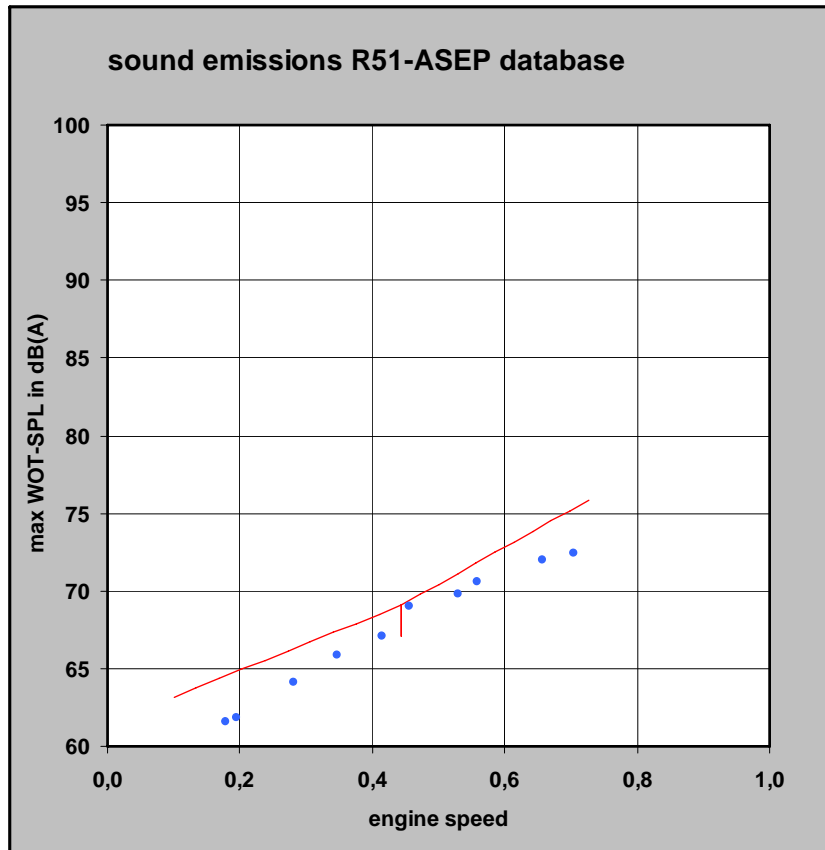## example vehicle: 5,5 dB under Annex 3 limit (veh 1-26)

Without bonus
OICA proposal becomes critical
$\Delta = 0,4$ dB(A)

With bonus
OICA proposal is uncritical
$\Delta = 6$ dB(A)

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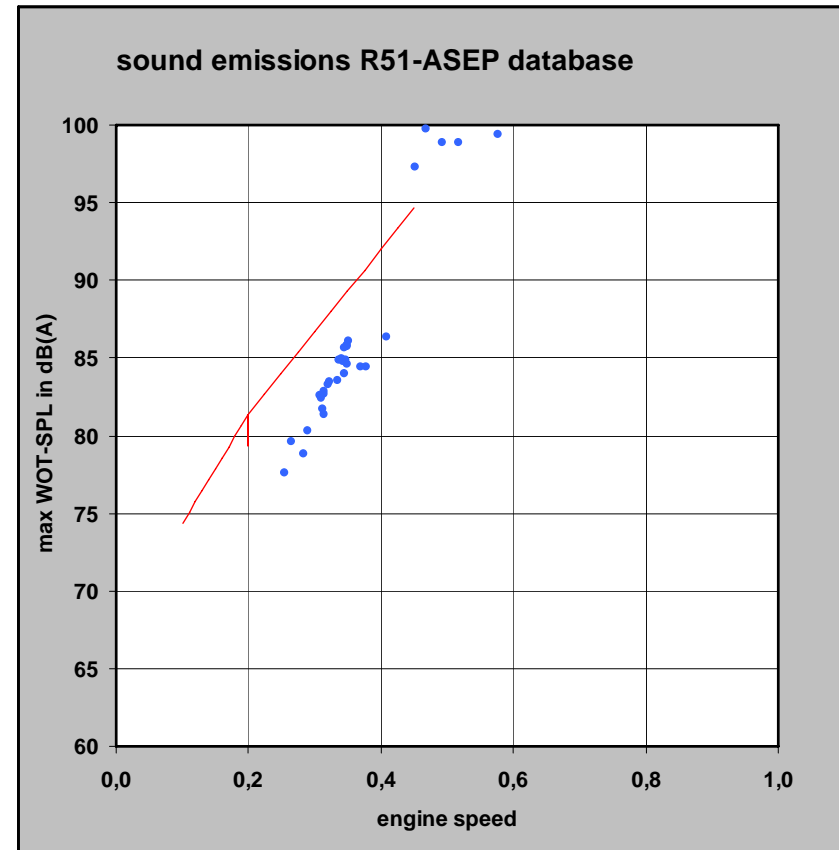# Method 1 investigates relative, not absolute noise emission

Vehicle 1-26
Lmax in control range = 76 dB(A)
OICA proposal becomes critical
$\Delta = 0{,}4$ dB(A)

Vehicle 200-13
Lmax in control range = 95 dB(A)
OICA proposal is uncritical
$\Delta = 3{,}4$ dB(A)

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Method 1 (OICA)

Caracteristics:

Self adjusting: more severe for silent vehicles; more lenient for 'soundy' vehicles

Anchor point, margin, slope, edging

No limitation proposal

Edging

Edging = Extra slope:

intended to compensate inaccuracy

with a 'tough' slope: it might be needed

With a liberal slope: makes it even more liberal

Method 2 (NL formal proposal)

Anchor point based on limit annex 3

Not To Exceed level (NTE)

Line between anchor point and NTE level

Below anchor point: slope (-3)

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3. A stringency analyses

Stringency Analysis

How:

    1. vehicles of concern
    2. relation with present demands

Vehicles of Concern

Defined by mr Steven, VDA and NL

Also defined:
- Vehicles with a high potential for increase
- Vehicles of no concern

Highlights Stringency Analysis

Method 1.

With limitation option Japan:

- 5 vehicles are rejected,
- 4 of these 5 are already rejected by Annex 3

With tougher limitation: more vehicles are rejected

Method 2 (NL)

All vehicles of concern detected

Collateral damage: other vehicles also hit

Limitation could be fine tuned

Please keep in mind

1. Limit/result Ann.3 is basis Ann.10
2. Limitation Annex 3 is leading for stringency
3. Without it Annex 10 limits can't be judged
4. Annex 10 has to be tuned to Annex 3 limits
5. Decisions should be made together
6. That's the only correct way to deal with stringency

Stringency analysis

- See informal doc NL
- Will be presented by NL, mr de Graaff

Relation with present demands

Well known from GRB 50

Why two proposals?

- Started with FRA&GER&JAP proposal
- NL alternative: based on performance
- OICA came in with their proposal
- NL out because of measurement uncertainty
- GER withdraw support for their own proposal
- OICA left alone

Why two proposals? (2)

- OICA combined with non stringent limitation options
- Stringency issue was raised
- Reg 51-2 vs -3: only one point to compare → weakening: up to 10 dB
- No drive to work on this in the group
- NL felt obliged to come foreword with an alternative (formal)

Informal working group

Group divided

Support for method 1

Sympathy for method 2

What about a compromise? (1)

In Paris not possible: you need 2 to tango

Technical: compromises always possible:

- Method 1 could be made more stringent
- Method 2 could be made more lenient
- Additional demands
- Other approaches/concepts
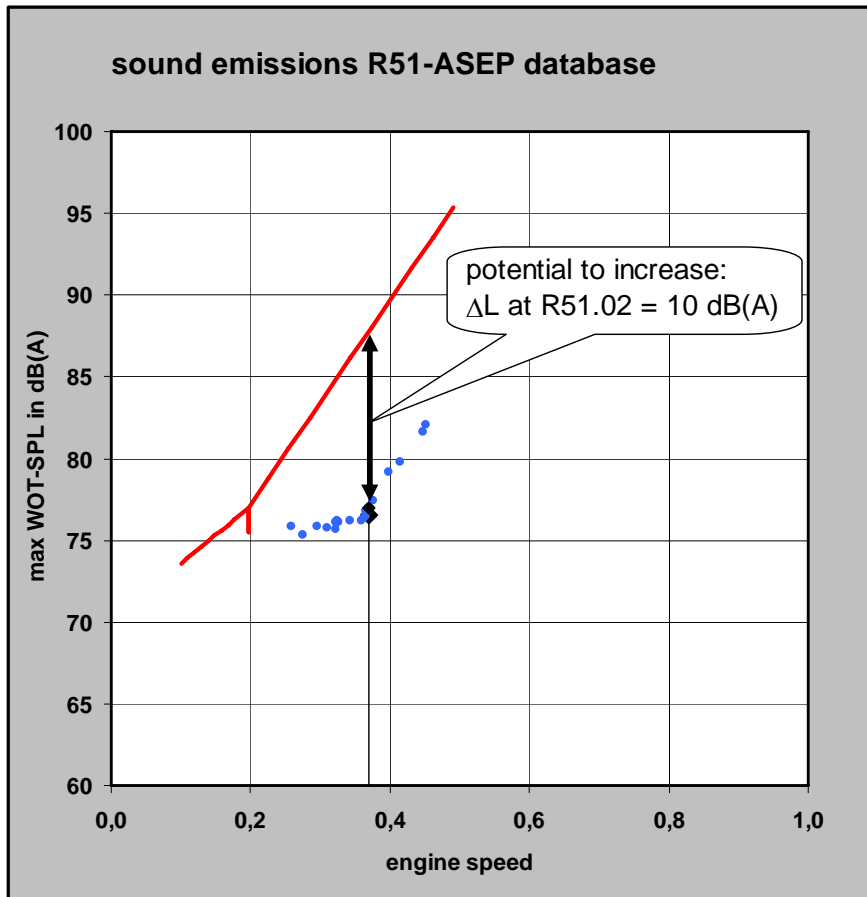
What about a compromise? (2)

Proposal KBA (*TAA of Germany*)
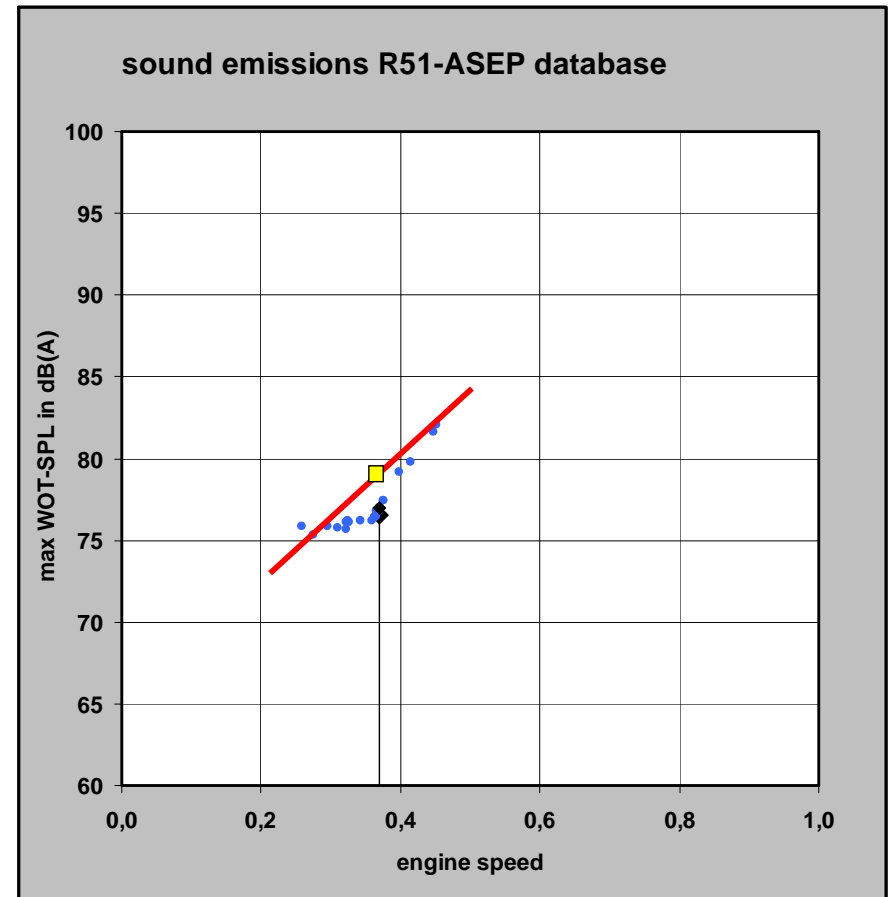
Additional anchor point in method 1 (OICA)
Pulls limit line down → 10 of 13 VofC detected

So it's a serious alternative to consider

Example KBA proposal (veh 200-14)

sound emissions R51-ASEP database

potential to increase:
ΔL at R51.02 = 10 dB(A)

OICA worst case limit without KBA:
Room to increase at R51.02: 10 dB(A)

OICA with KBA:
Vehicle has to be improved

Compromise? → skip 2 m/ss (4)

Formal NL-proposal

Forces Annex 3 test to lower gear/higher revs

Result: anchorpoint ASEP to the middle

Effect on method 1 (OICA)

No effect on method 2 (NL)

By the way: no justification ever given

Compromise: (5)
Options with the methods

1. Method 1 (developed by OICA)
2. Method 1 + KBA repair
3. Method 1 + skip 2 m/ss
4. Method 1 + KBA + 2 m/ss
5. Method 2 (NL)

Alternatives out of the concept

(concept = line in engine map: L vs N)

Skip 2 m/ss + KBA
- (as single point, without ASEP range)

Analyses tool mr Moore
- (based on v,a instead of n)

Stringency of compromises:
to be investigated

	Method	% vehicles of concern detected
	OICA + Jap limit	1 out of 14
compromises	OICA + more stringent limit	>1
	OICA + skip 2 m/ss	
	OICA + KBA	???
	OICA + KBA + skip 2 m/ss	
	KBA + 2 m/ss	<14
	Analysis tool mr Moore	
	NL 2 with less stringent limit	
	NL	14 out of 14

Compromise: and now?

Well: if you give us one more meeting

You get the analyses of the options:

- Which part engine map covered
- Stringency
- Effects on the database:

Do not forget

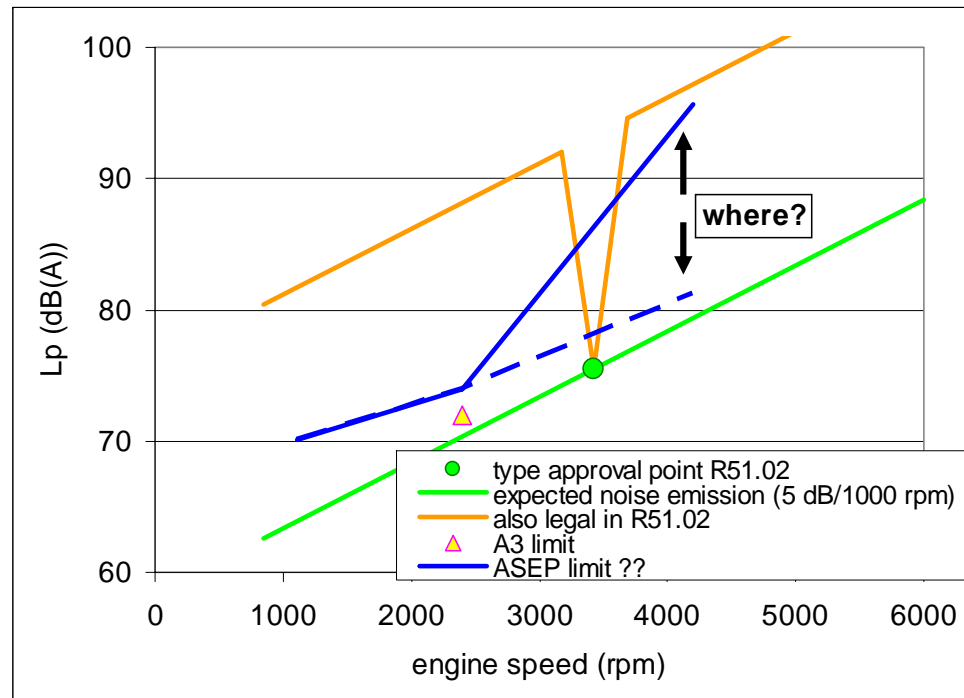It isn't a cow bargain!

Interest of industry:
- Fulfilling customer demands
- Freedom for sound design

Interest of some contr. parties:
- Decency demand on a 'decent' level
- Prevent drop down of 'sound design'

And remember:

- **Where to draw the line: that's all!**

THANK YOU