



Ministry of Infrastructure and  
Environment

Informal document **GRB-53-21**  
(53<sup>rd</sup> GRB, 15-17 February 2011,  
Agenda item 3(c))

# NL FORMAL ASEP

**(2011-02-15)**

February 17, 2011

# Update of NL ASEP proposal

(doc GRB-2011-08)

what has changed

what is the difference with the GRB chairman's proposal

(doc GRB-2011-02)

issued by the Netherlands

GRB 53, February 2011

# 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).

# Reminder: why ASEP

- Annex 3 limits for M1 and N1 will be around 70 dB(A)
  - (68-75 depending on stage and vehicle)
- What noise emission can we expect, and can we allow at conditions of higher acceleration and/or higher rpm?

# Keep in mind: dB is logarithmic

- 10 dB louder = 10 times as many vehicles



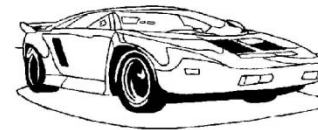
1 x 80 dB



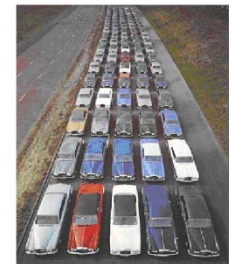
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10 x 70 dB

- 20 dB louder = 100 times as many vehicles



1 x 90 dB



=

100 x 70 dB

- 30 dB louder = 1000 times as many vehicles



1 x 100 dB



=

1000 x 70 dB

# Why NL proposal: concern

- GTI's and similar:
  - PMR 80-150 kW/t
  - Affordable to mass public
  - Client wishes sound design
  - Driven sporty

# Why NL proposal: concern

New technologies starts at the high end.

Drop down very fast to the cheap end,

Will also be with 'sound/noise design'

# Example NL concern

Measured GTI in urban street:

- $L_{\max} = 105 \text{ dB(A)}$ 
  - PMR = 110 kW/t
  - $a = 4,2 \text{ m/s}^2$  in 2<sup>nd</sup> gear

105 dB(A) is loud!



NOT TESTED IN 2<sup>nd</sup> GEAR  
IN ASEP PROPOSAL CHAIR  
due to:  
acceleration  $4,2 >$  boundary of 4

Note:  $1 \times 105 \text{ dB(A)} > 3000 \times 70 \text{ dB(A)}$



# Text missing in Formal doc 8

Page 11 Par 4:

Two major changes have been incorporated:

1. implementations of the proposals for improvement from the TNO Venoliva report
2. transition to a fixed Not To Exceed Level in dB(A), instead of a delta relative to the Annex 3 limit.

Page 11 Par 5:

- In GRB 52 the TNO Venoliva report was presented (ECE-TRANS-WP29-GRB-52-inf07e).
- Besides a preference for the NL ASEP proposal, it contains several proposals to improve the NL ASEP proposal.
- The Netherlands has taken on board these proposals for improvement from the TNO report in this update.

'Improvements' secretariat: Page 11 Par 5.B.ii

- TNO is not the technical service of the Netherlands
- TNO is the research contractor of the EC and author of the VENOLIVA report

# What has changed in NL ASEP?

- Adoption of TNO venoliva recommendations
  - Skip 2 m/s<sup>2</sup> boundary in Annex 3
  - Slightly more lenient ASEP parameters
  - Increase ASEP boundary 4 -> 5 m/s<sup>2</sup>
  - Limit curve as function of vehicle speed (not rpm)
  - ASEP limit also applies to partial throttle
- Now fixed Not-To-Exceed level in dB(A)
  - Instead of Delta relative to Annex 3 limit
  - NTE = 81-85 dB(A) (depending on vehicle class)

# Remember NTE 81-85 dB(A)

- Equal to 10-30 times 70 dB(A)
- Equal or higher than limit Heavy Trucks

Is this stringent?

# Is it stringent ?

- Yes, compared with industry wish for freedom for sound/noise (up to +100 dB)
- No, compared with normal technology

# Does it lead to extra costs?

- No:  
costs are in tuning close to the limitation and designing jumps outside the control range
- Remember:  
99% of uncritical vehicles passes NL ASEP

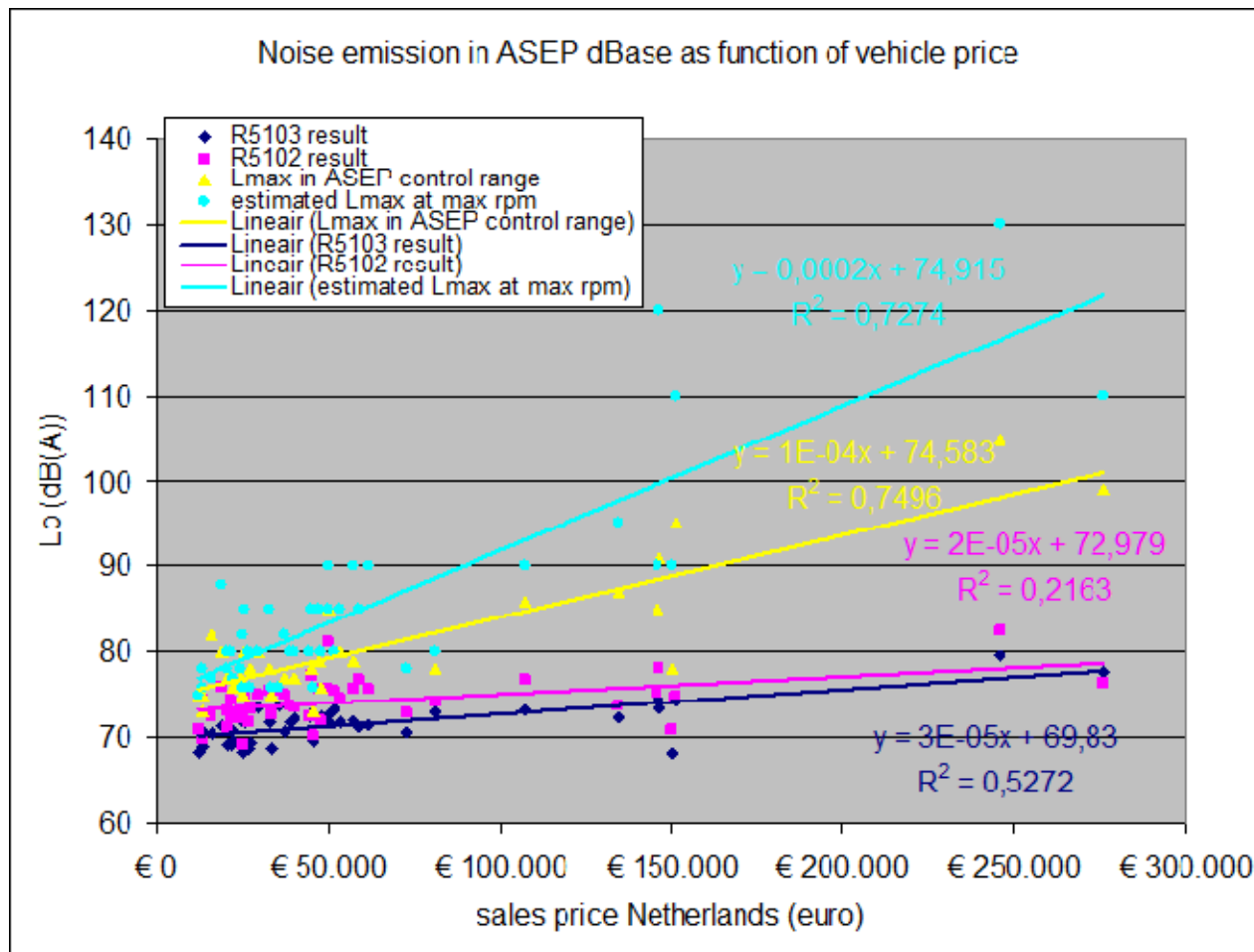
# Top 10 most silent vehicles

(source: informal doc 3 GRB feb 2000)

- Most silent car is a sports car  
– 9,7 dB under the limit!

Ranking	Manufacturer	Model	Noise Level
1	NISSAN	200SX - S14 Series	66,2
2	NISSAN	QX - A 32 Series 2L	66,7
	NISSAN	QX - A 32 Series 3L	66,7
4	PEUGEOT	106	66,9
5	MERCEDES-BENZ	C-Class Estate (S202) Diesel	67
	MERCEDES-BENZ	C-Class Saloon (W202) Diesel	67
	MITSUBISHI	Space Wagon - N84 Series	67
	VOLVO	S/V70 Model Year 2000	67
	VOLVO	C70 Coupé/Convertible Model Year	67
	MCC SMART	MCC Smart Coupé (MC01)	67

# Relation between price and noise

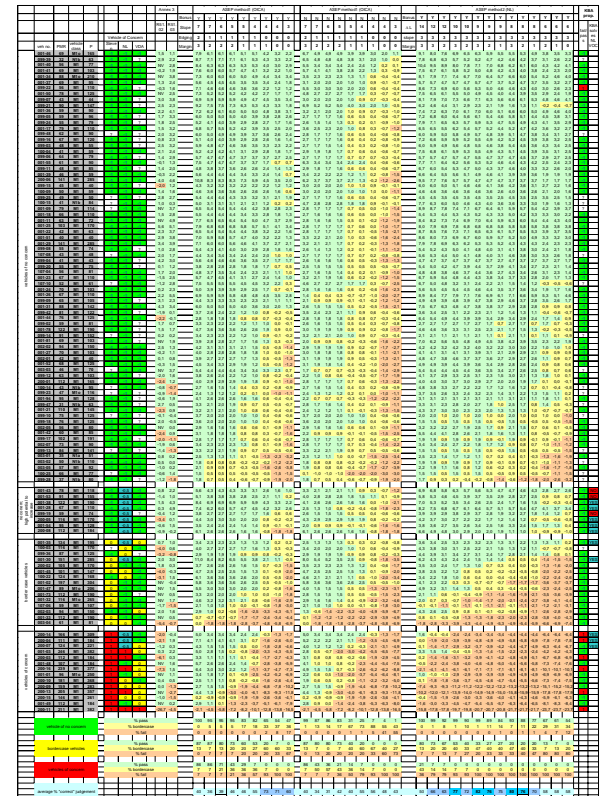


- Loud vehicles are more expensive!

# What is the effect of NL proposal?

- 99% of uncritical vehicles pass ASEP
- 86% of vehicles of concern fail ASEP

- Further information: GRB-52-inf15

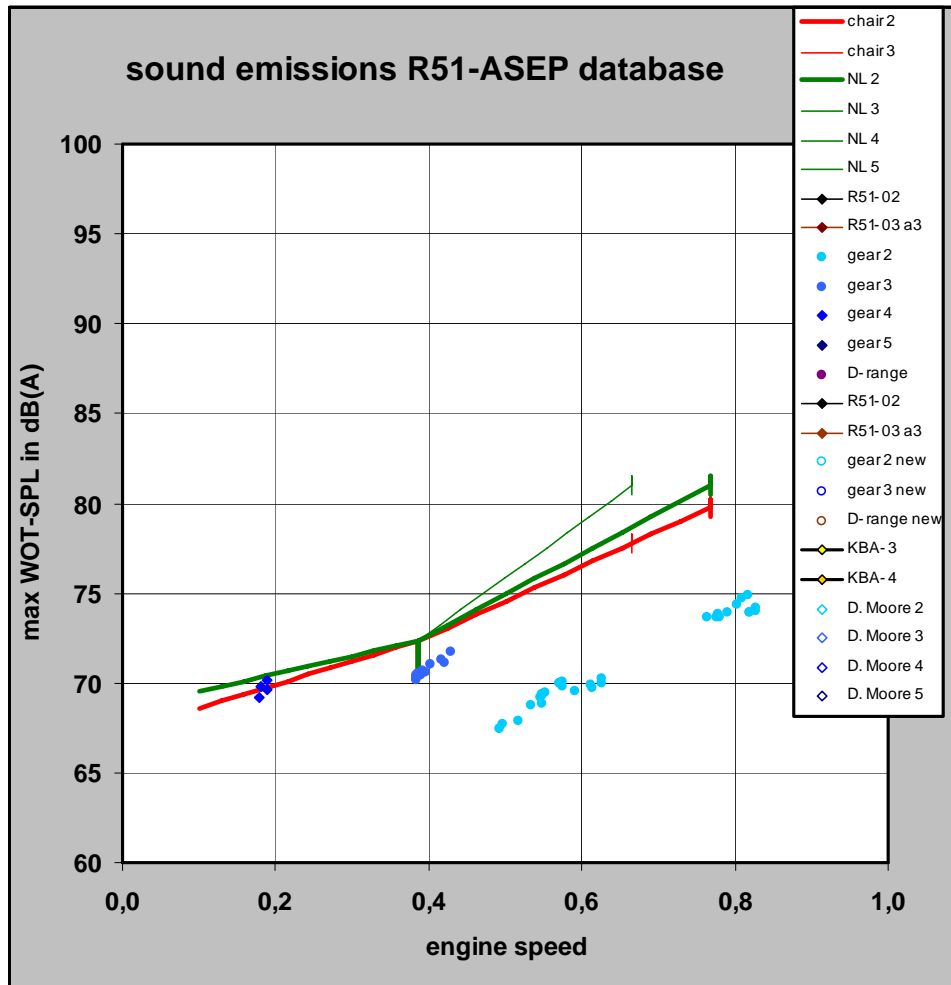




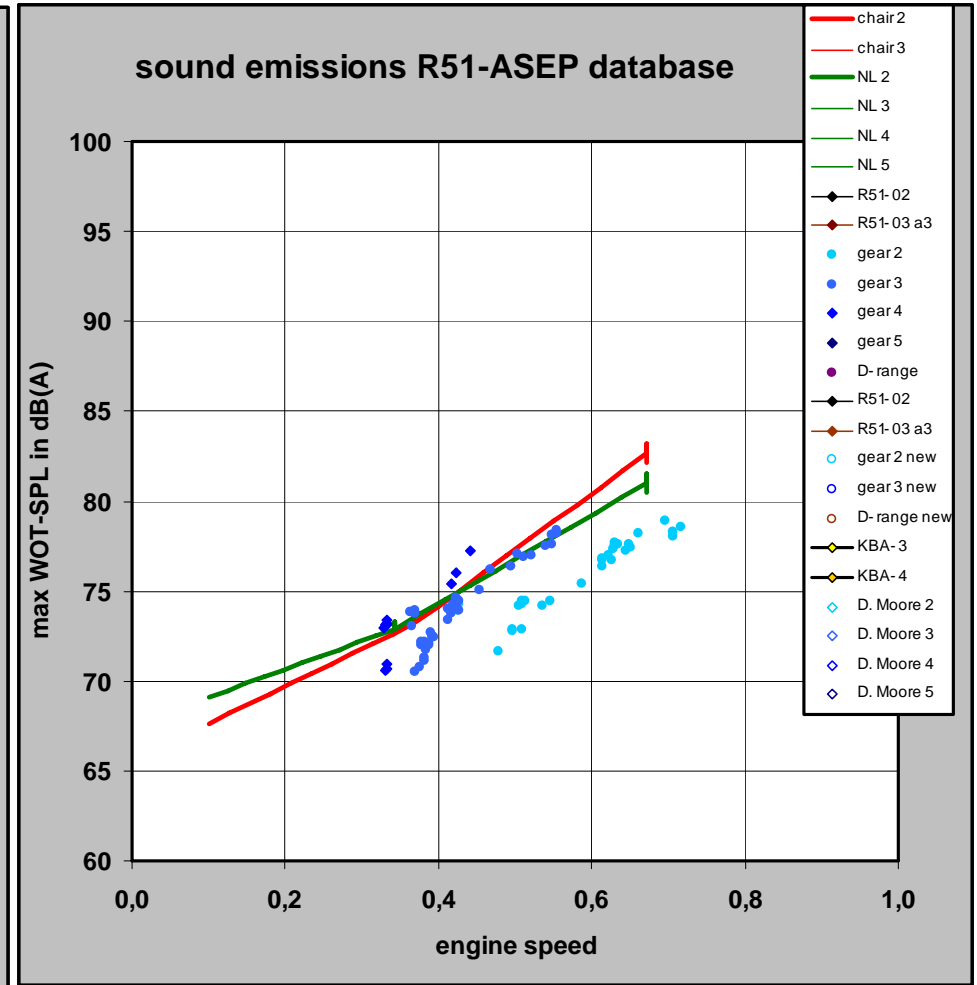
# Effect of Chair part 1 proposal

- 17% of uncritical vehicles fail
- 64% of vehicles of concern pass

# Comparison Chair ASEP vs NL ASEP



Veh107-04 PMR=56



Veh200-02 PMR=105

For many vehicles chair ASEP and NL ASEP are not very different, **except the silent and the noisy vehicles!!**

# Some essentials of chairman's ASEP different from NL ASEP

- Boundary conditions (Annex 10 par 2)
  - Acceleration boundary of  $4 \text{ m/s}^2$
  - Skipping 1st gear
- Slope method (Annex 10 par 3)
  - no bonus for silent vehicles
  - Virtually unlimited limit line in case of high rpm
- Lurban method Annex 10 par 6 (Moore)
  - Needs additional study/discussion
  - First results: more liberal than slope method
  - Limit  $L_{wot}$  sensitive to small changes

# Boundary: acceleration in 2nd gear

Max acceleration in 2nd gear (m/s <sup>2</sup> )	# of vehicles in ASEP dBase (out of 123 vehicles)	PMR range (kW/t)
>3,5	23	69-246
>4	<b>10</b>	101-246
>5	<b>4</b>	205-246
>6	<b>1</b>	246

- Acceleration around 4 m/s<sup>2</sup> is found frequently
  - Also in family cars, turbo diesels and GTI's
  - Due to a 4 m/s<sup>2</sup> limit in ASEP such vehicles cannot be tested in 2nd gear
- Acceleration above 5 m/s<sup>2</sup> is found only in supersportcars (> 200 kW/t)

# Relevance of the bonus

Silent vehicles become 'normal' in higher revs area.

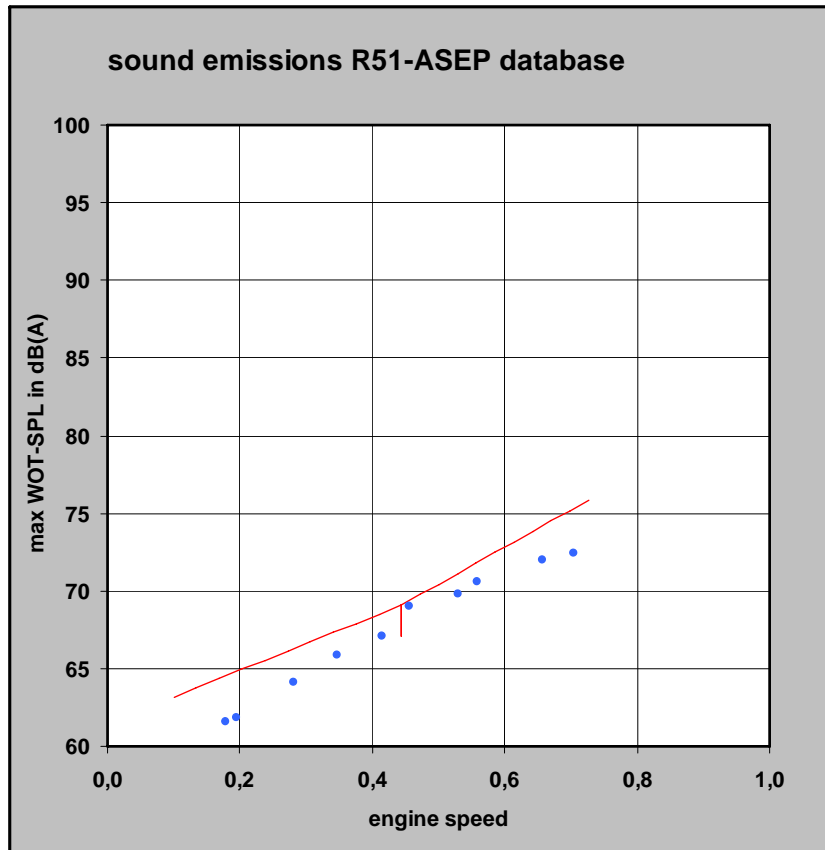
Without bonus 'jumps' are punished

With bonus: silent vehicles will pass tougher limitation options

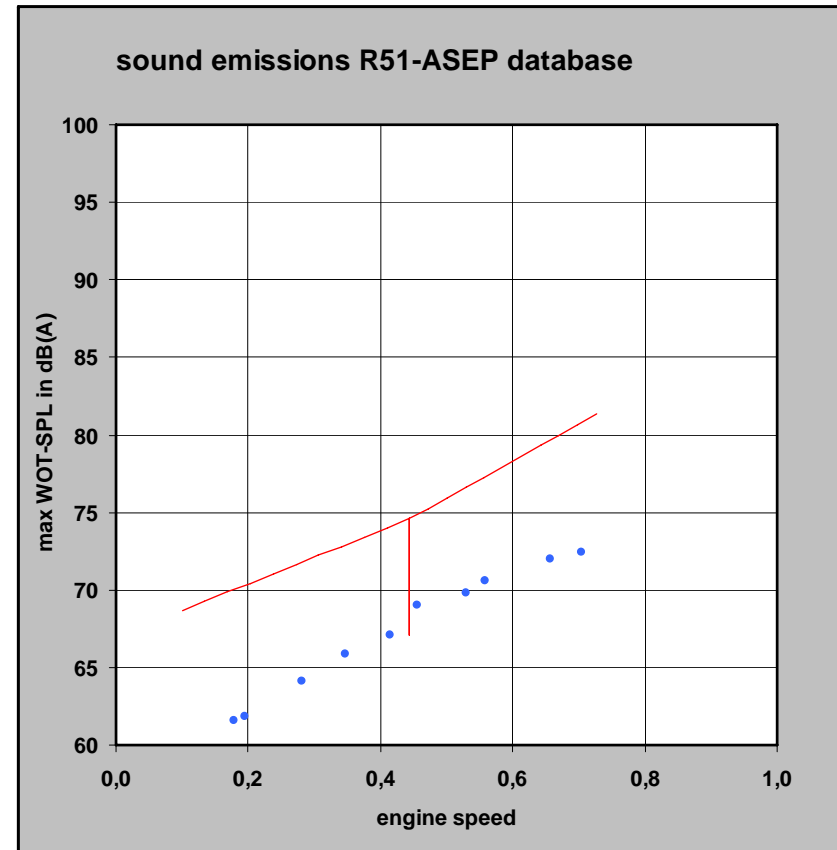
No bonus → more vehicles rejected → supports pleas for weaker limitation

# Effect of bonus on silent vehicles

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



Without bonus  
ASEP becomes critical  
 $\Delta = 0,4 \text{ dB(A)}$



With bonus  
ASEP is uncritical  
 $\Delta = 6 \text{ dB(A)}$

# Virtually unlimited limit line

- If the slope of 5 dB / 1000 rpm is combined with a very high engine speed range, this leads to extremely high limit curves, well above 100 dB(A)

# 'Moore' method, introduction

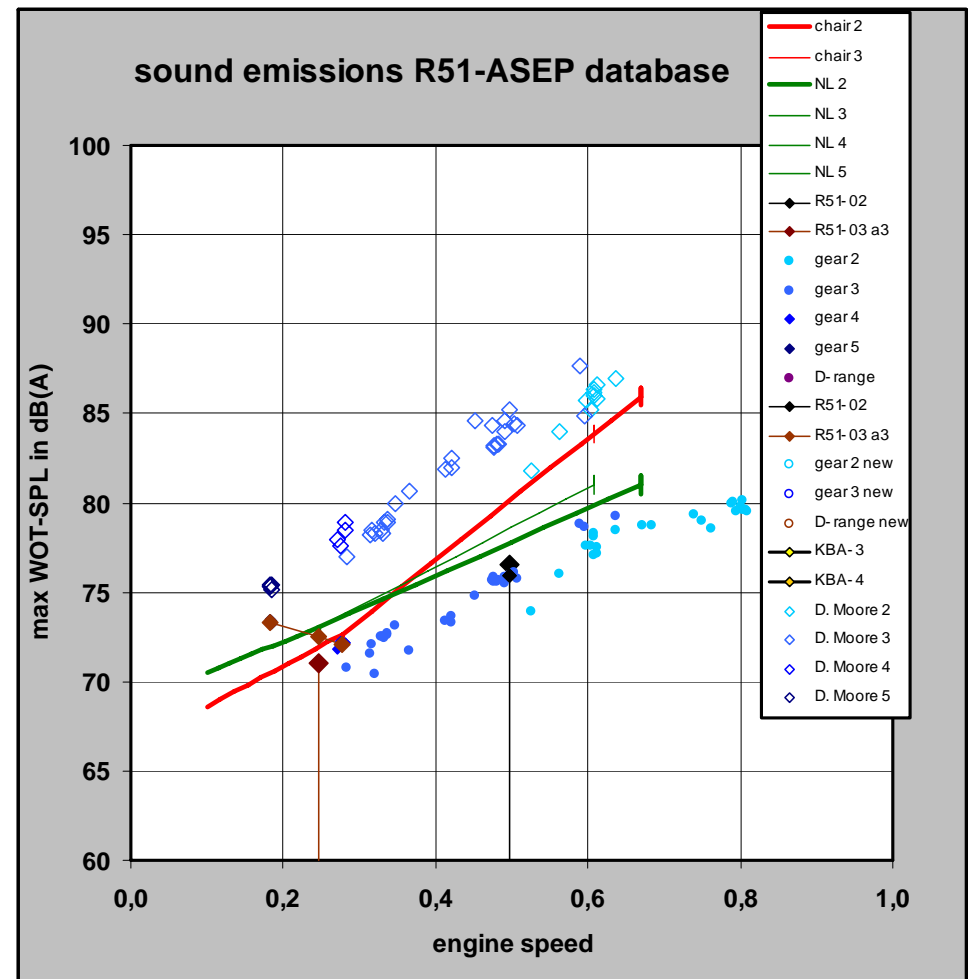
- Nice idea:
  - Based on acceleration instead of rpm
  - Design independent
- Needs to be studied in more detail
- First impressions
  - Rather liberal for high powered vehicles
  - Stringency very much dependent on
    - A3 limit
    - Tyre noise
  - Sensative to measurement errors acceleration



# Example of Lurban ASEP

normal vehicle: substantial room to increase

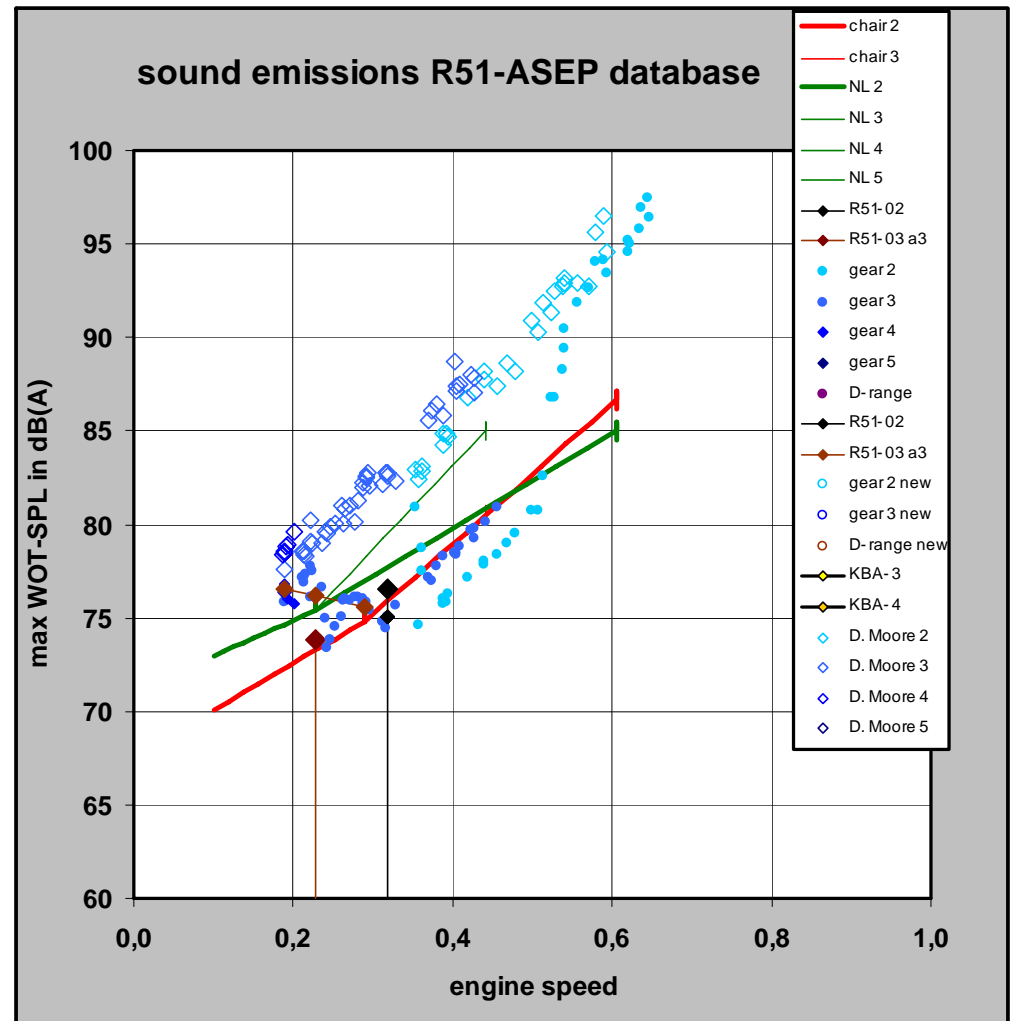
- Vehicle 200-08
- PMR 112 kW/t
- Assumed limit A3: 70 dB(A)
- $L_{\text{urban}}$  ASEP more liberal than
  - Chair ASEP (3-7 dB)
  - NL ASEP (5-8 dB)
  - R51.02 (8 dB)



# Example of Lurban ASEP

vehicle of concern: early jump allowed

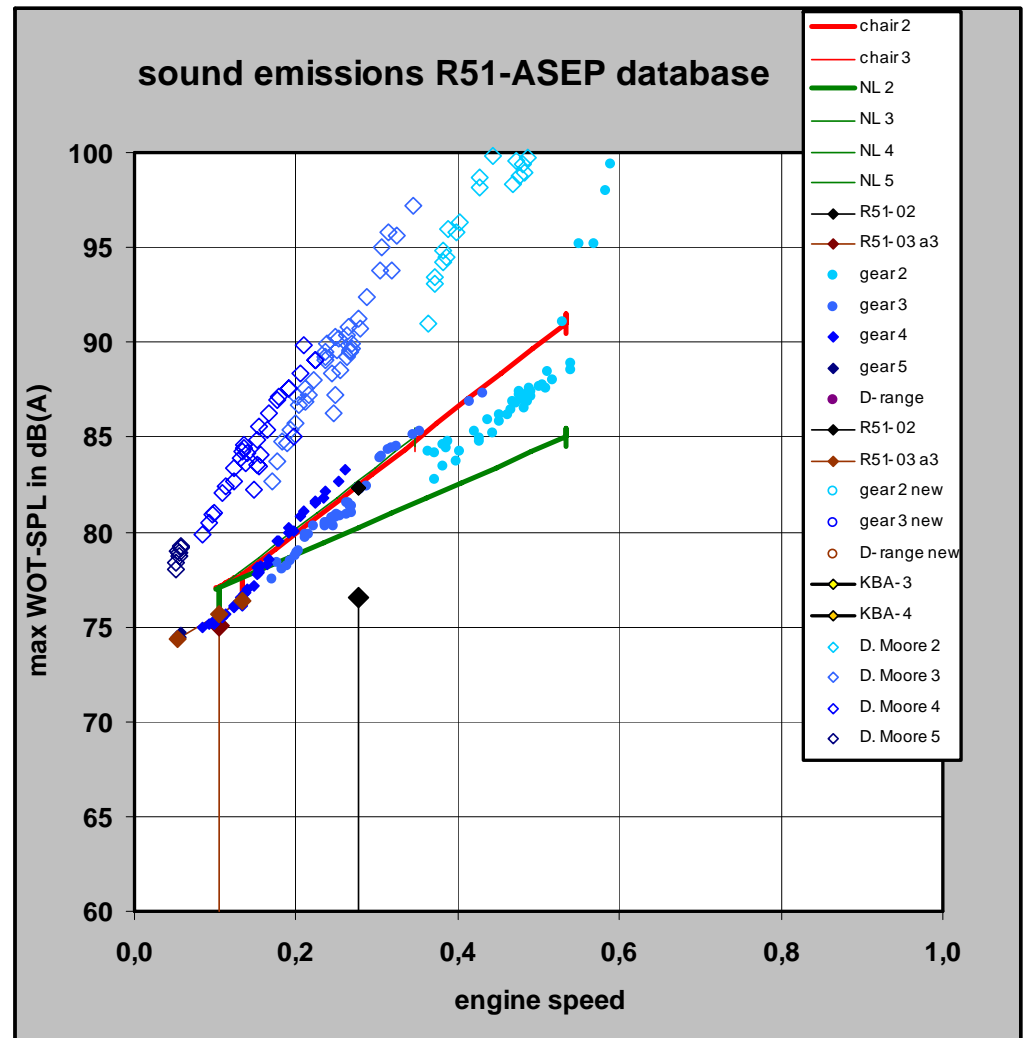
- Vehicle 200-09
- PMR 159 kW/t
- Assumed limit A3: 72 dB(A)
- $L_{\text{urban}}$  ASEP more liberal than
  - Chair ASEP (5-10 dB)
  - NL ASEP (3-12 dB)
  - R51.02 (7 dB)



# Example of Lurban ASEP

## noisy vehicle > 100 dB allowed

- Vehicle 200-16
- PMR 239 kW/t
- Assumed limit A3: 73 dB(A)
- $L_{\text{urban}}$  ASEP more liberal than
  - Chair ASEP (5-15 dB)
  - NL ASEP (5-20 dB)
  - R51.02 (15 dB)
- **Note:** significant spread in Lurban limit due to spread in acceleration



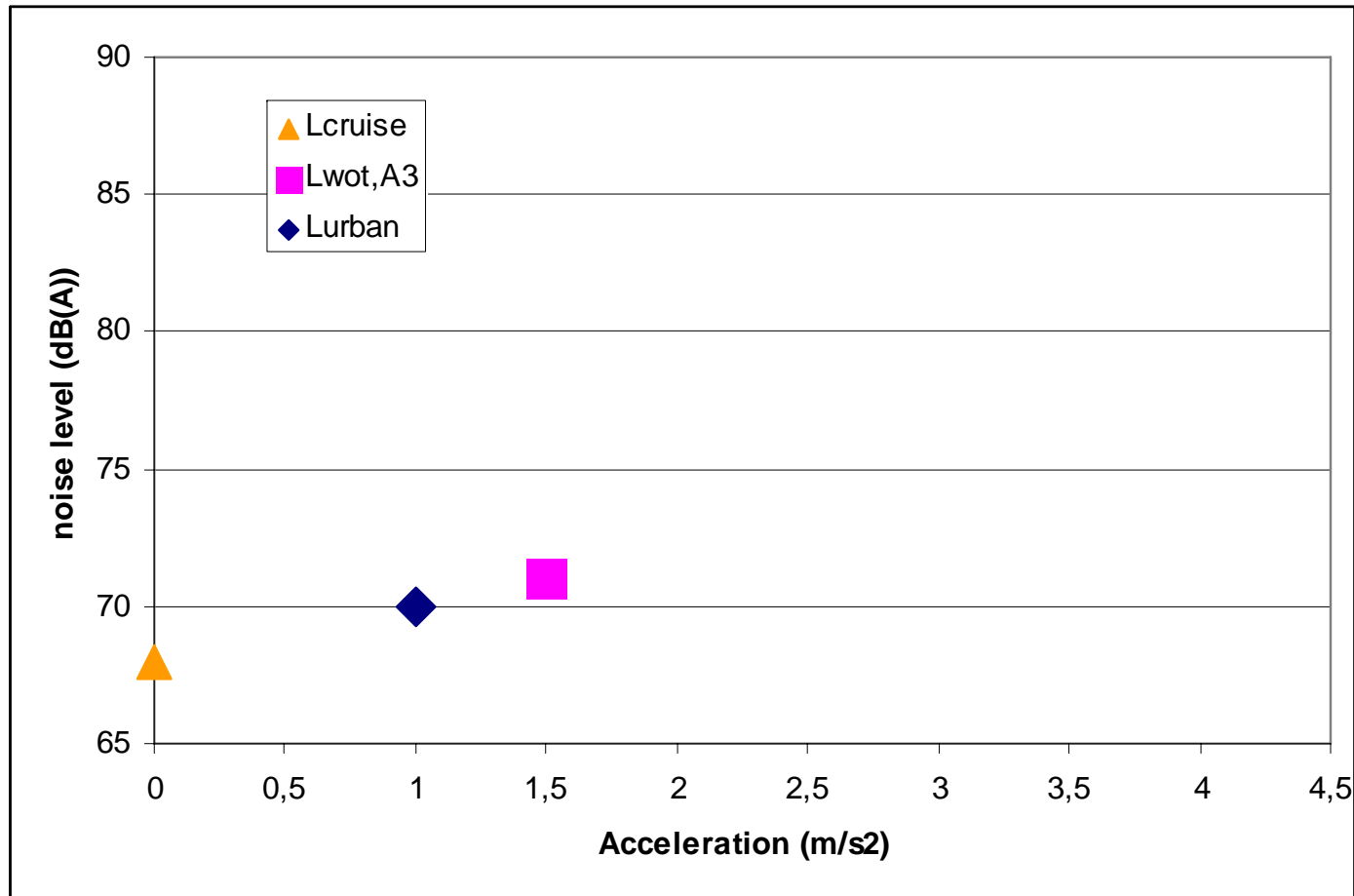
# Lurban ASEP sensitive to small changes

$$L_{\text{WOT,ASEP}} \leq \frac{3 - k_{p,\text{ASEP}} \times L_{\text{crs}} + L_{\text{urban}} + 0.15 \times (v_{\text{BB,ASEP}} - 50)}{1 - k_{p,\text{ASEP}}}$$

→ Might be as low as 0,2

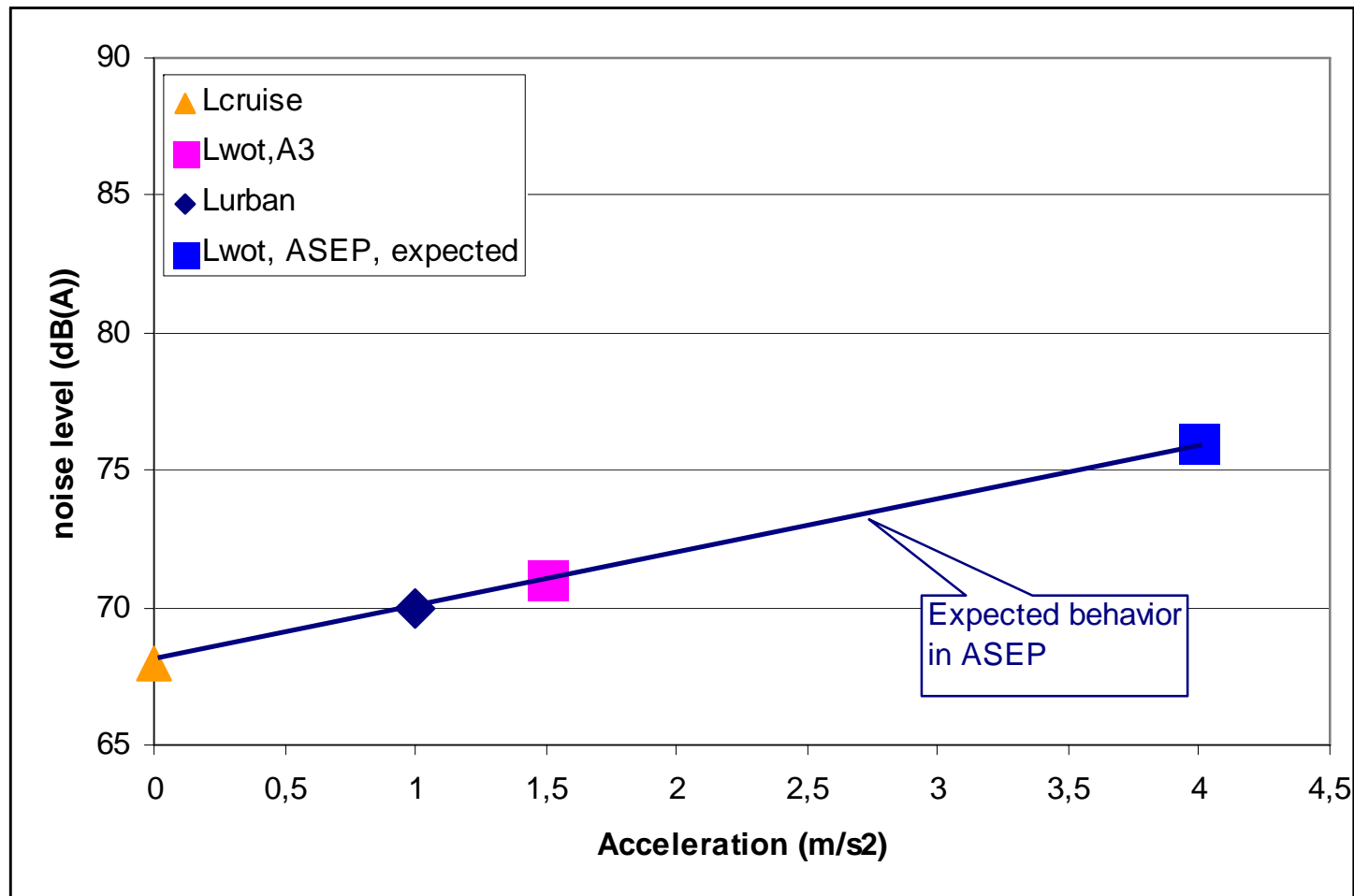
- The ASEP dBase contains values of  $K_{p,\text{ASEP}}$  up to 0,8
- this means
  - $\Delta L_{\text{wot,ASEP}} = 5 \times \Delta L_{\text{urban}}$  and  $\Delta L_{\text{wot,ASEP}} = 4 \times \Delta L_{\text{crs}}$ ,
  - 1 dB change in  $L_{\text{urban}}$  gives a 5 dB change in  $L_{\text{wot,ASEP}}$
  - 1 dB change in  $L_{\text{cruise}}$  gives a 4 dB change in  $L_{\text{wot,ASEP}}$
- Example: A lowering of the Annex 3 limit by 2 dB meanwhile enforces a 10 dB lowering of the noise emission in ASEP

# Example Lurban ASEP sensitivity



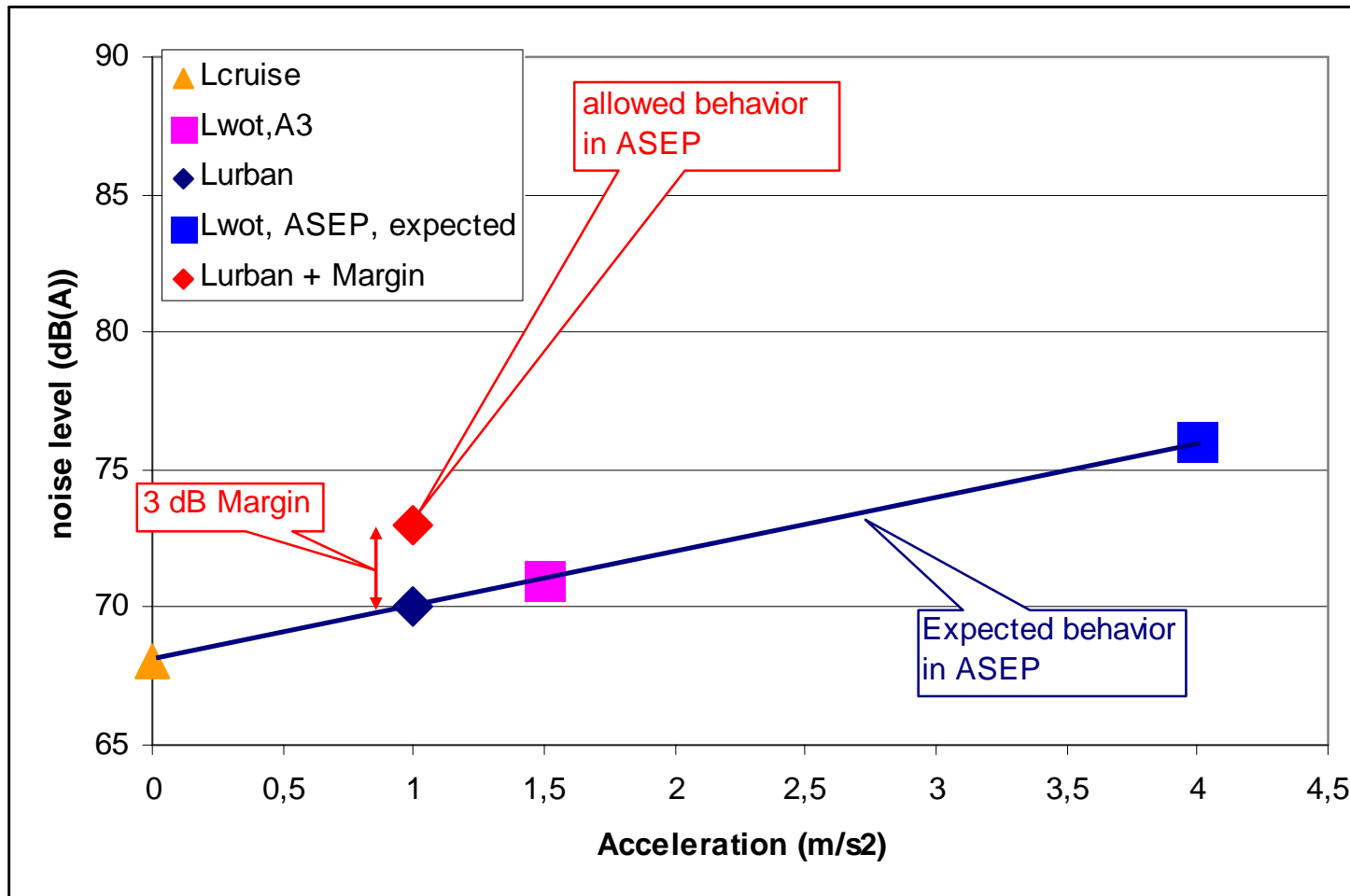
- Annex 3 procedure

# Example Lurban ASEP sensitivity



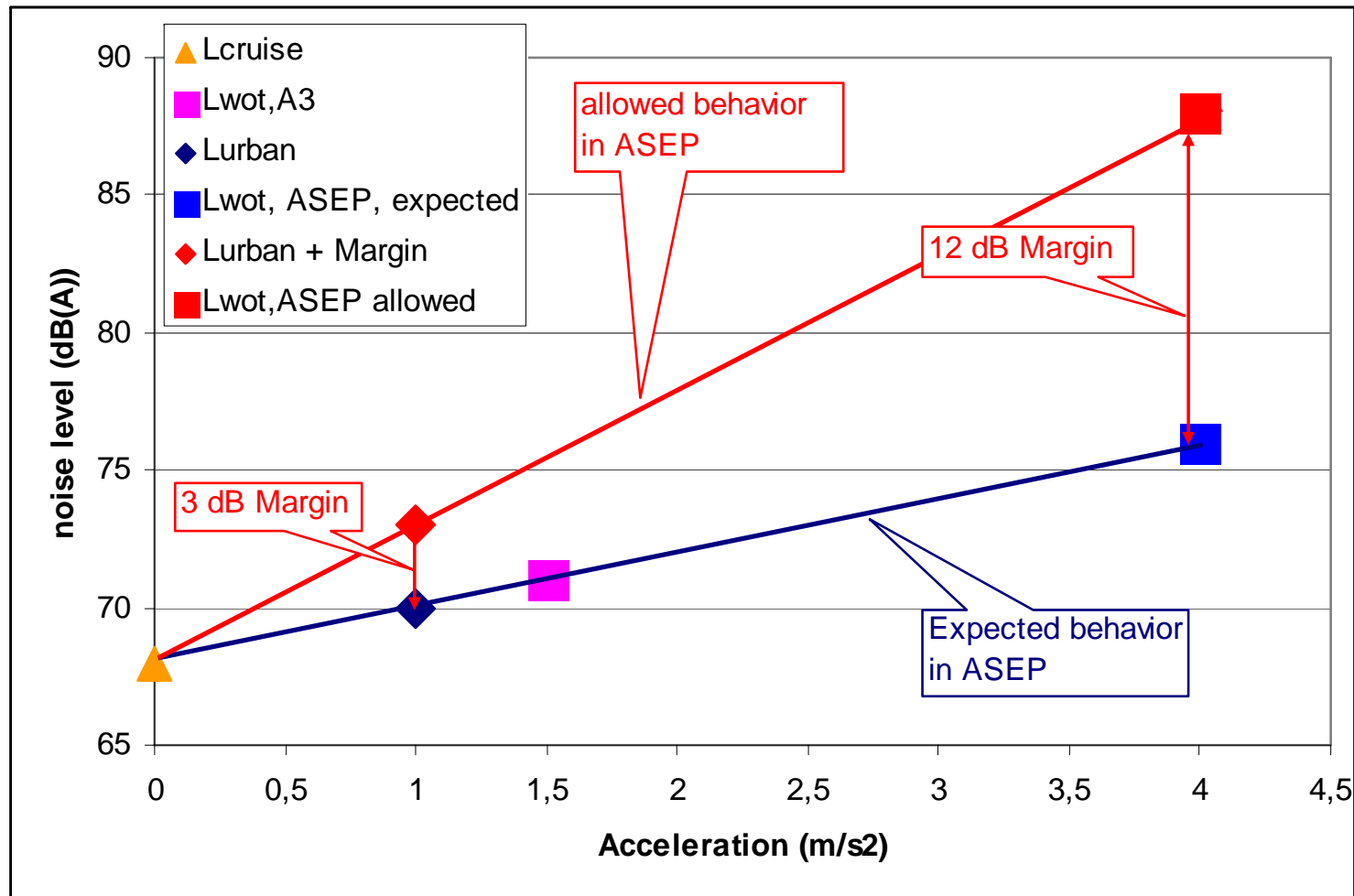
- Expected behavior in ASEP

# Example Lurban ASEP sensitivity



- Allowed: 3 dB Margin on Lurban in ASEP

# Example Lurban ASEP sensitivity



- Consequence: 12 dB Margin in Lwot,ASEP



# TNO audit 'Moore'

Advantage of the alternative method is that it is not limited to vehicles with an internal combustion engine, in contrary to the current GRBIG method.

## TNO audit 'Moore' (2)

So the main conclusion is that the alternative proposal as it stands now, is a very liberal and therefore environmental unfriendly alternative for the modified GRBIG proposal, which is somewhat more ambitious as the original proposal.

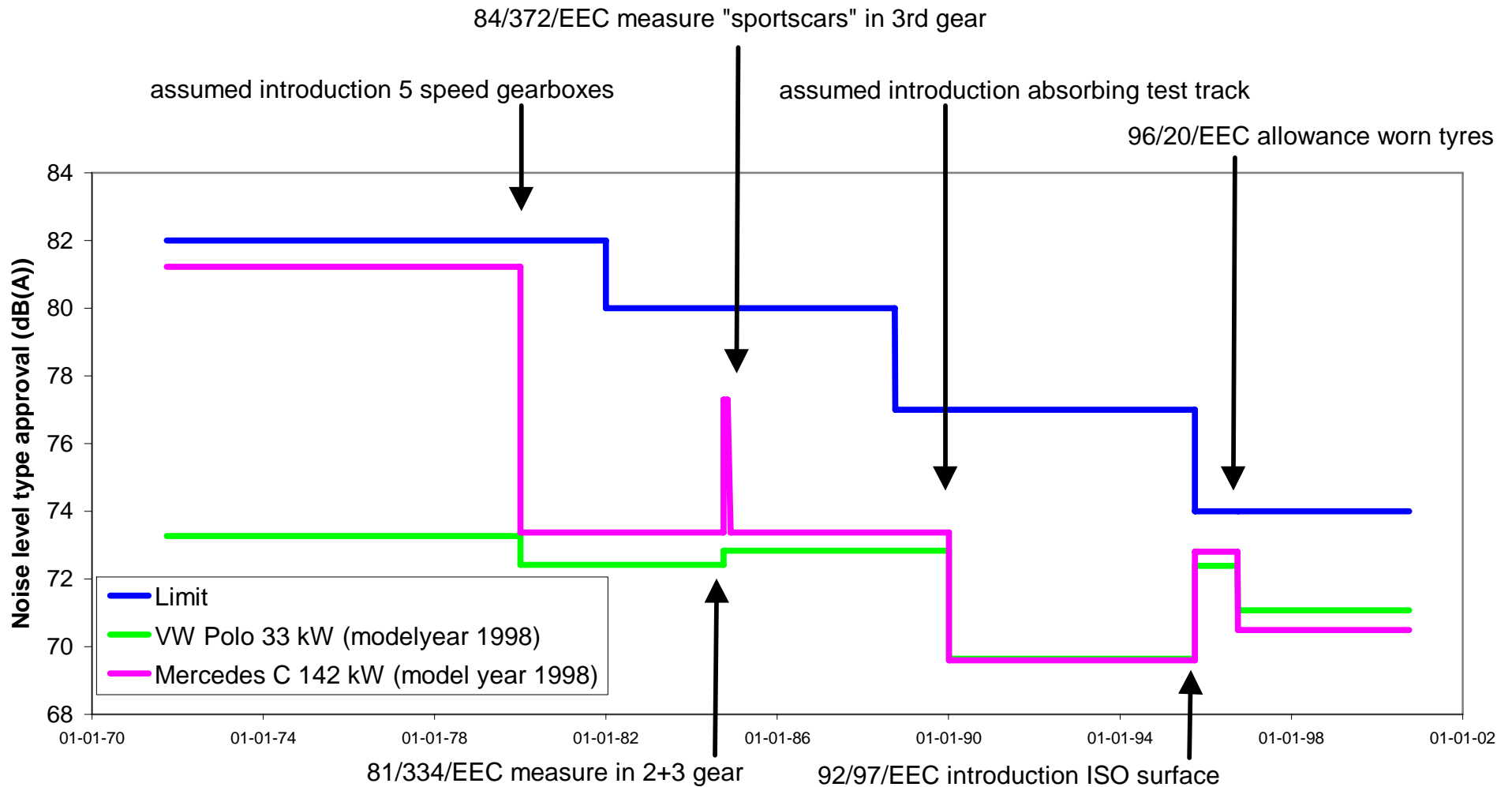
## My conclusion

As long as the 'Moore' method is in  
for every vehicle

There's no sense in having more  
stringent alternatives ('Chair', 'NL')

# 4e Stage of weakening?

## Effects of changes in the method



# In NL view

'Moore' proposal should be used for vehicles which can not be measured in Annex 10.

Thank You

# ACEA study

## COSTS – BENEFITS

Reaction on TNO feasibility and effect study

# ACEA study (expert opinion)

- The general approach of calculating benefits for noise is rather standard, and as can be expected every possibility is used to keep benefits low:
- Only WTP value: no estimate for health (DALY's or addition of night noise reduction)
- 25€/dB: the 2001 figure should be corrected for inflation
- Threshold: is 50 dB, so again an underestimate. It is true that the 50-55 is more difficult to obtain from EU-data, but extrapolations from other data could be used.
- The effect of limit reduction is likely to effect the whole distribution, making the final effect larger (eg 5 dB lower limit only 2 dB fleet reduction?)
- **All in all, the benefits are likely to be underestimated by a factor 2**



# ACEA study 2 (expert opinion)

The ACEA costs calculation had to adopt some very disputable assumptions to arrive at the astronomic figures for reducing noise. For example, the list of additional costs contain quite a number of measures which are already common. Actually leaving them out would cost more than introducing them. These costs then are thought to persist for 20 years. It is not easy to explain that the development of an absorbing layer continues to burden the manufacturer for 20 years.

# ACEA study 3 (expert opinion)

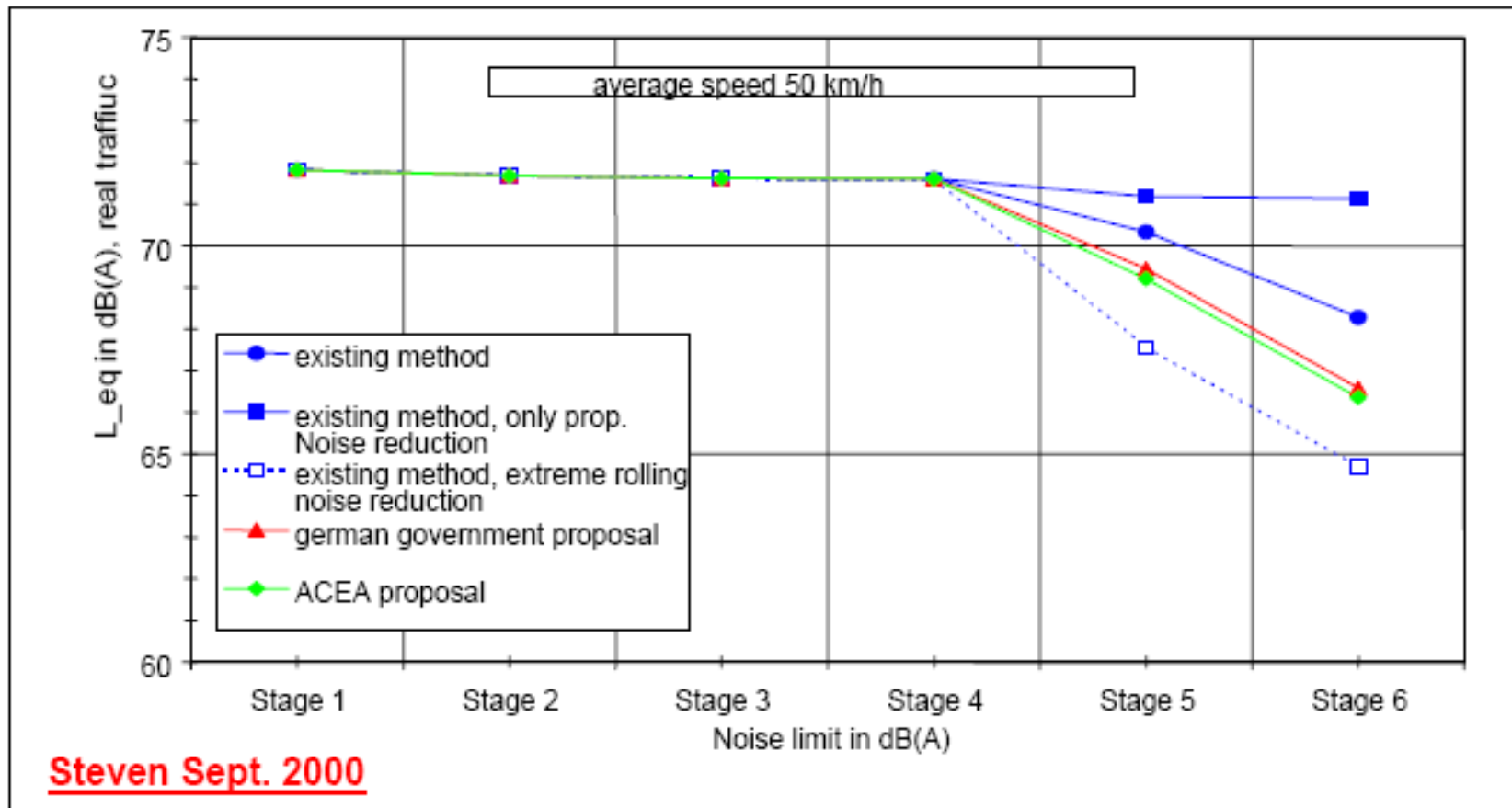
**In short the indiscriminate application of these assumptions lead to a caricature of CBA.**

THANK YOU



# Calculations FIGE

Calculation scenarios - noise reduction potential of various solutions  
roads with a speed of 50 km/h



# Mercedes fight to fulfill the limits

## Effects of changes in the method

