ASEP
-- Study of D/F Proposal --

GRB informal meeting #11

11-13 June 2008

JASIC

Question from OICA in the 10th informal meeting

⇒ What can be expected for a specific vehicle ?

Assumption :

Vehicles which meet R51/02 are expected (normal).

R51/02 Pass	ASEP (D/F-UBA)	
122 vehicles	Pass	103 vehicles
	Fail	19 vehicles

Why do they fail?

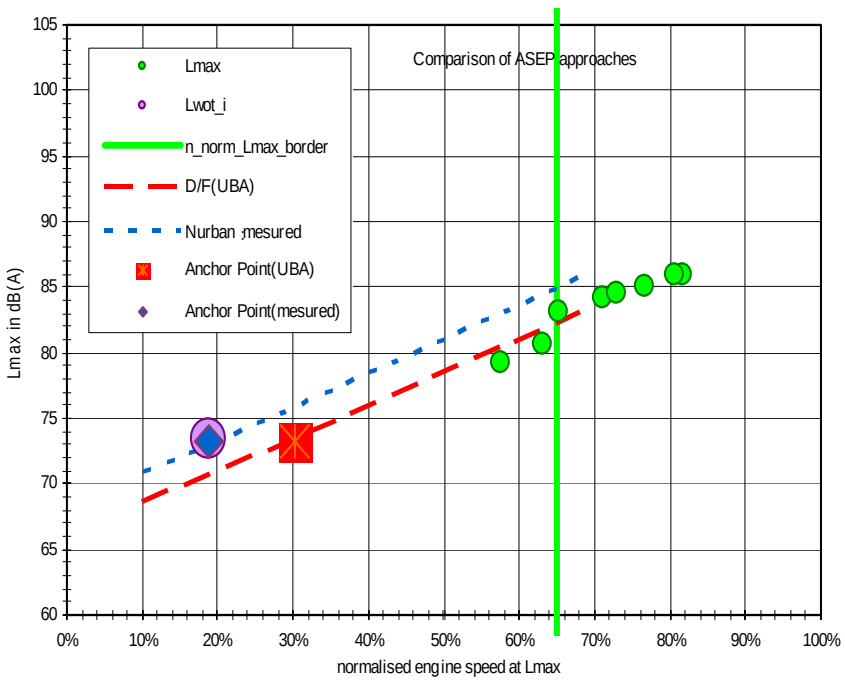
Example 1

Engine speed for the anchor point is calculated following equation.

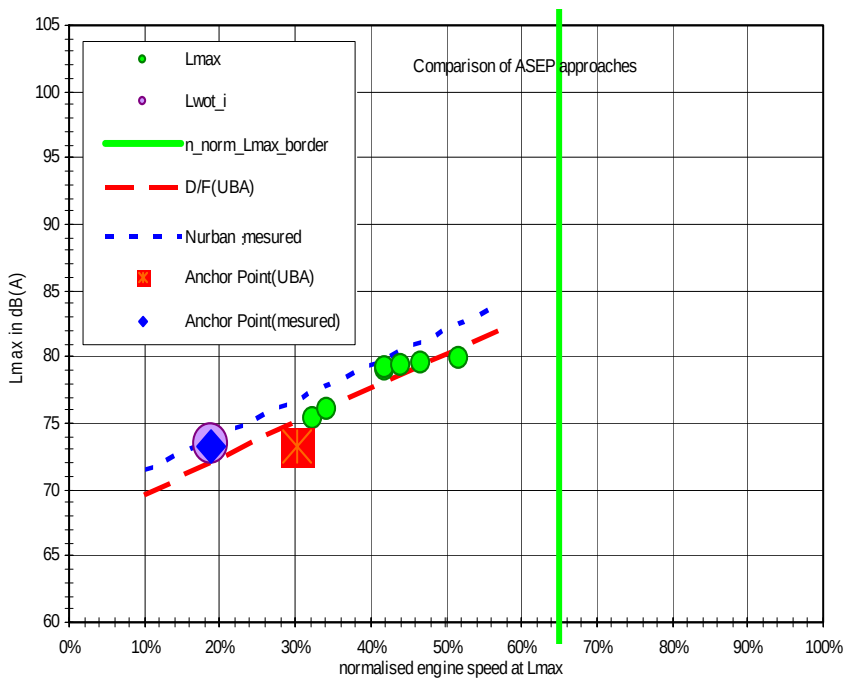
$$n_{ref} = no + (S - no) \times 2.2 \times PMR^{-0.43}$$

There are gaps between calculation and actual measurement.

Gear：2nd



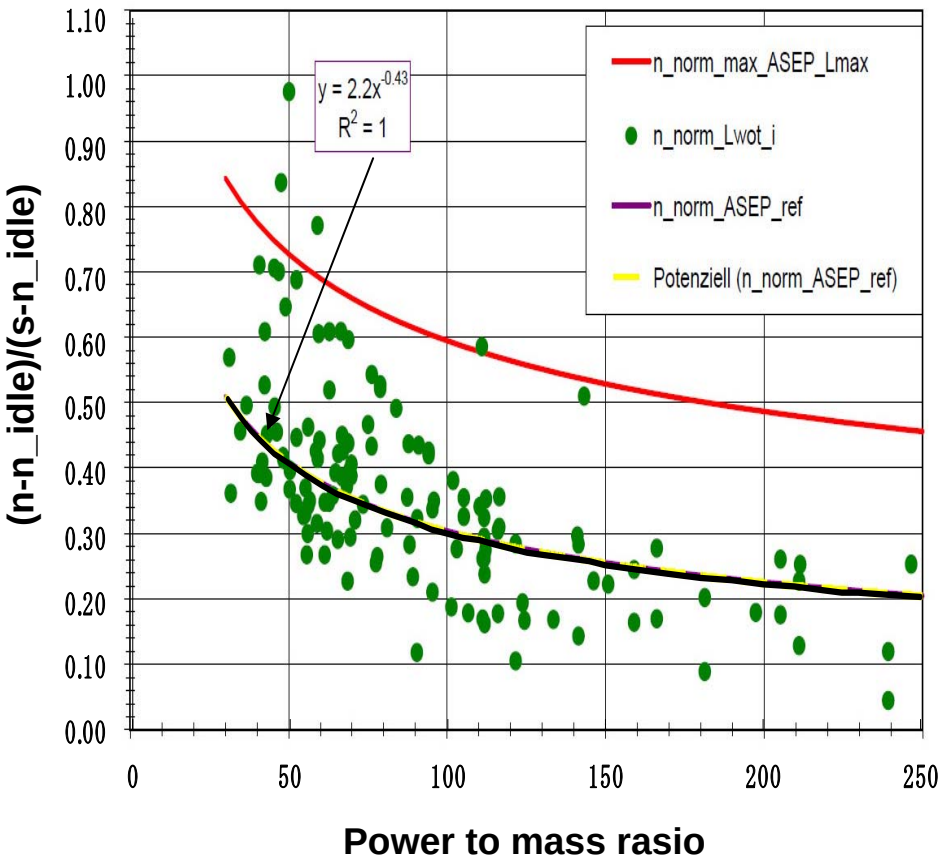
Gear：3rd

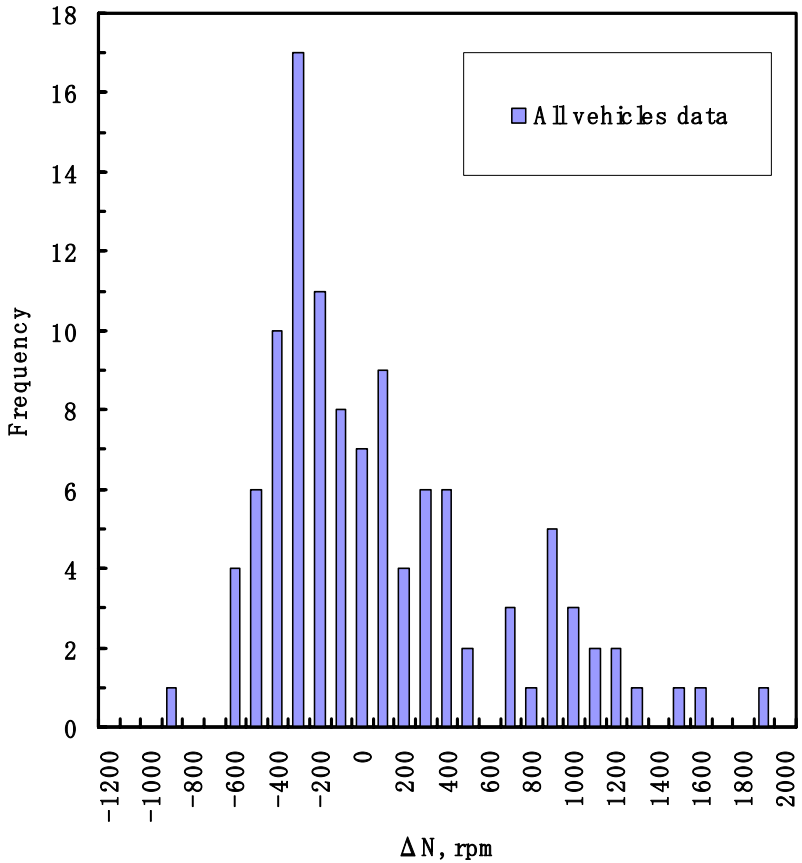


Vehicle：ASEP 1-45

How to define the engine speed for anchor point

- Nurban=2.2PMR$^{-0.43}$

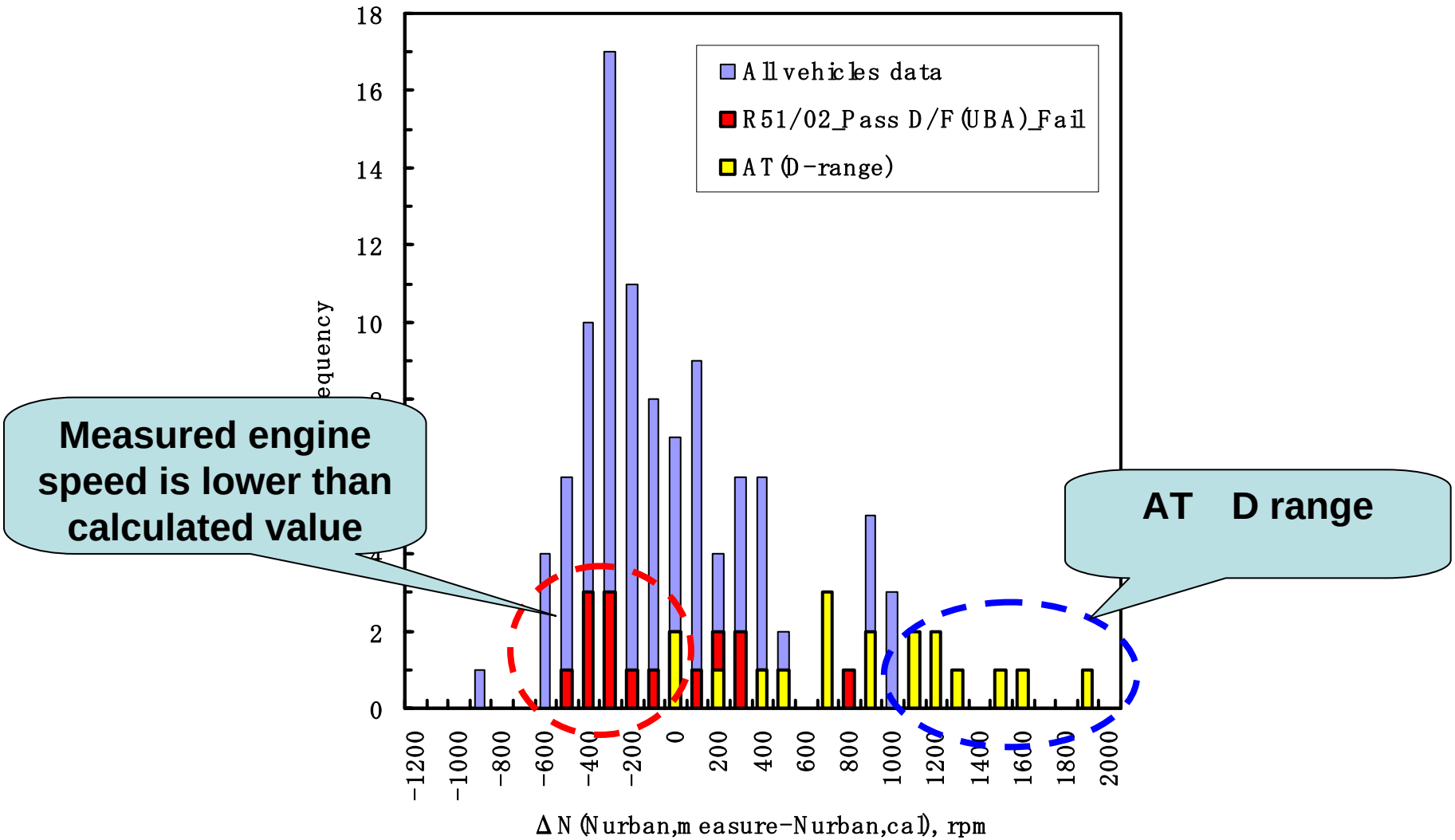




Difference

(Δ N=Measured value - Nurban)

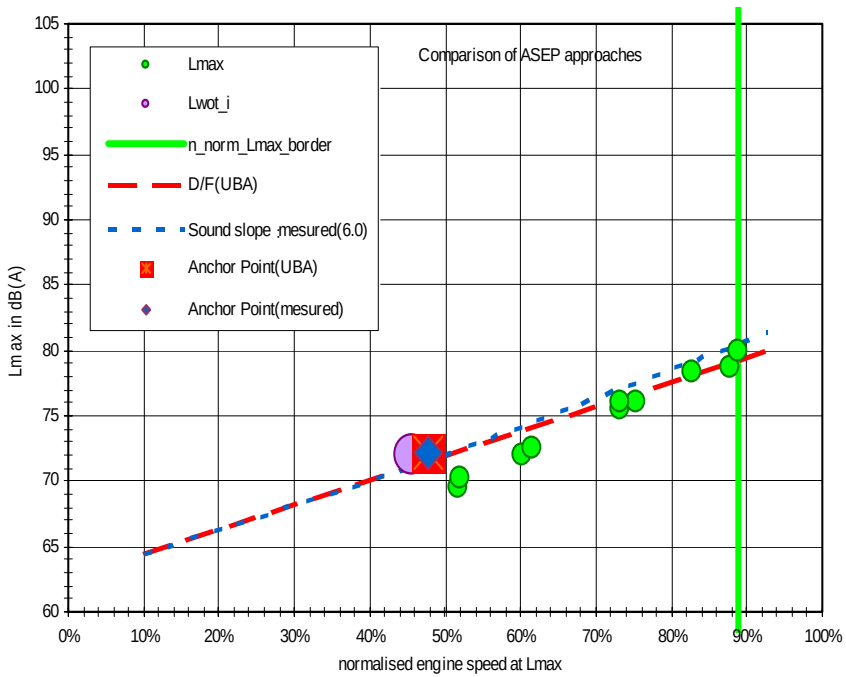
Difference ΔN for all vehicles



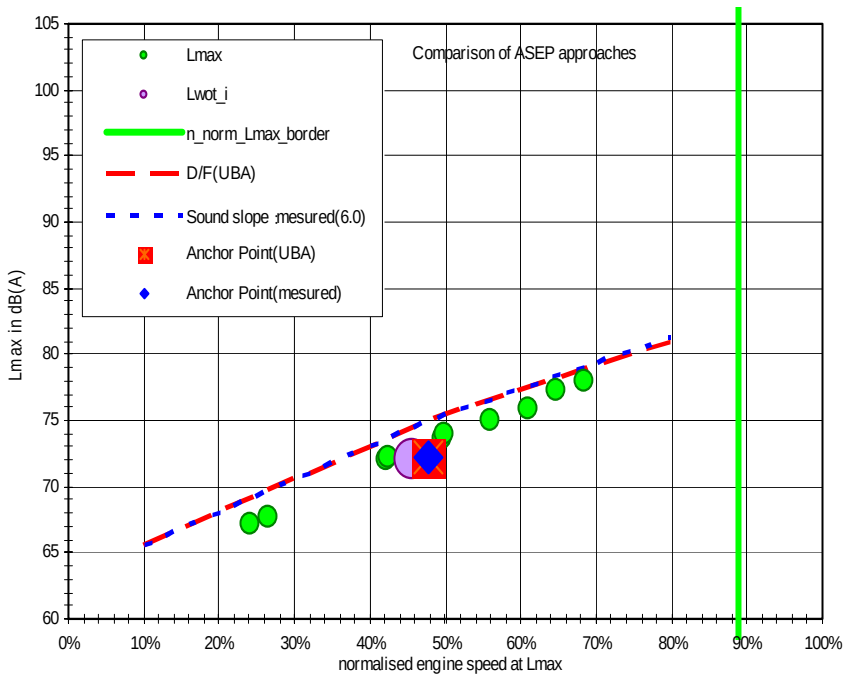
Example 2

Fixed sound slope (5dB/1000rpm) is used.

Gear：2nd

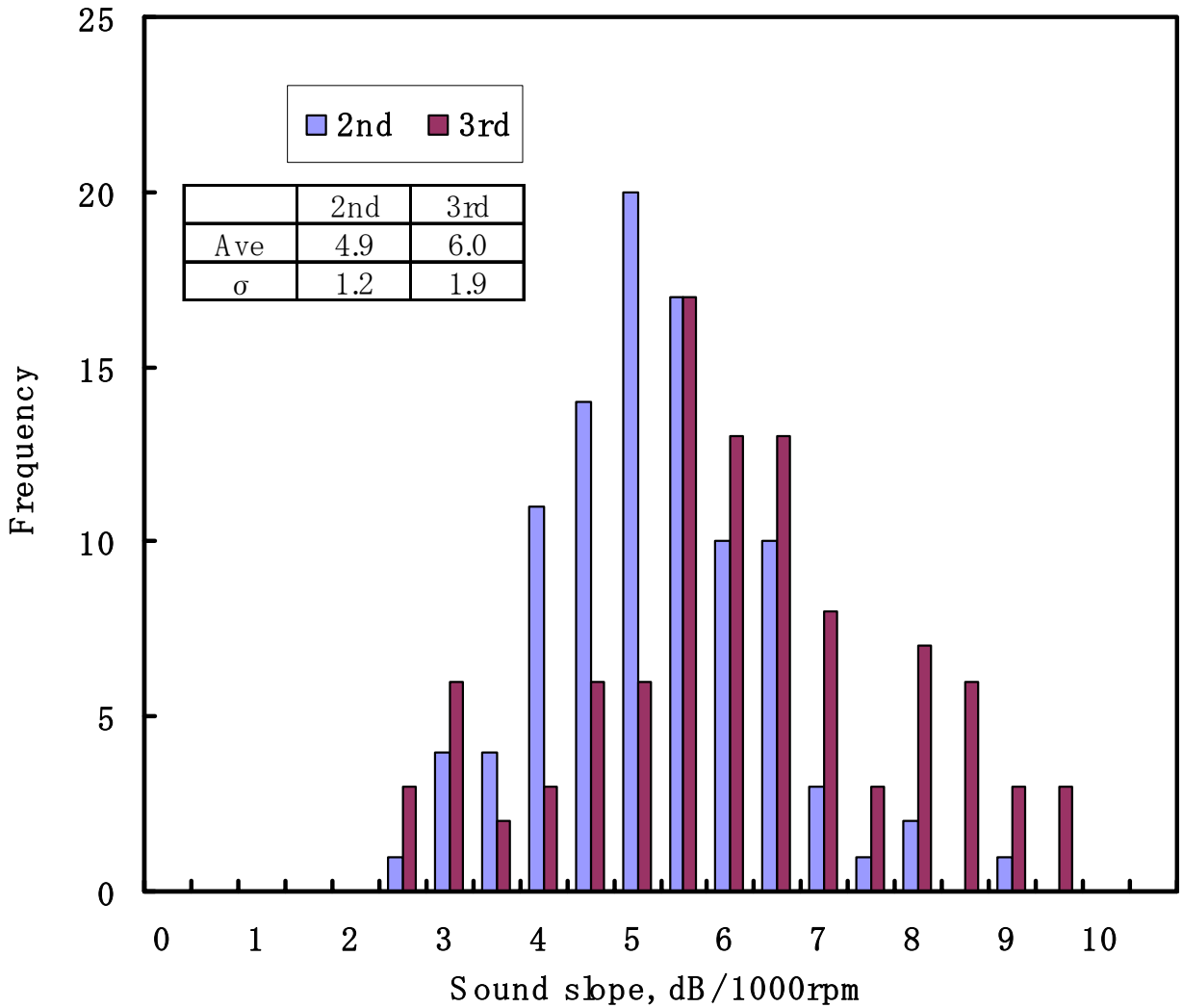


Gear：3rd



Vehicle：ASEP 3-1

Distribution of sound slope



	2nd	3rd
Ave	4.9	6.0
σ	1.2	1.9

Average

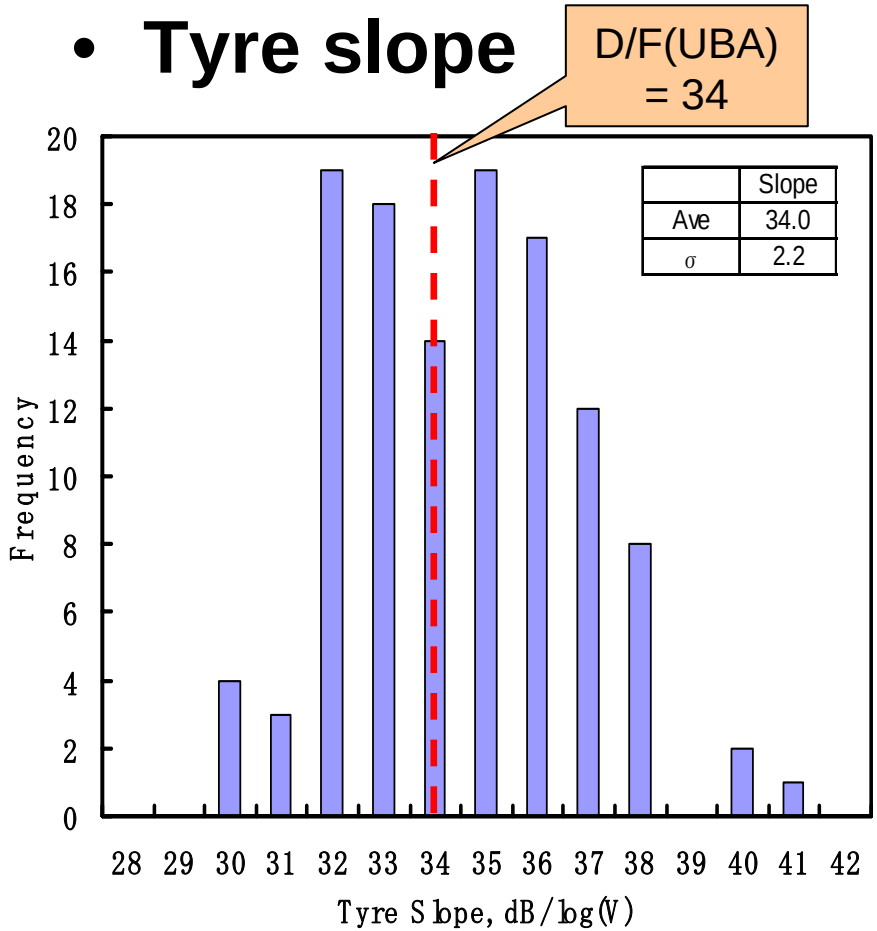
2nd : 5 dB/1000rpm

3rd : 6 dB/1000rpm

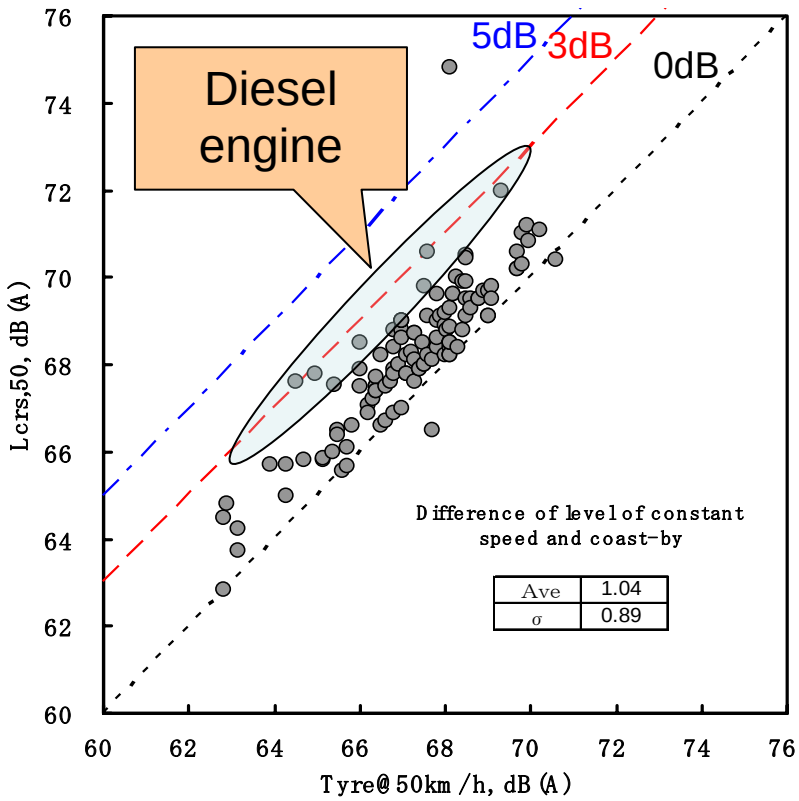
D/F(UBA) uses fixed value, 5dB/1000rpm

Tyre noise compensation

- **Tyre slope**



- **Constant speed**



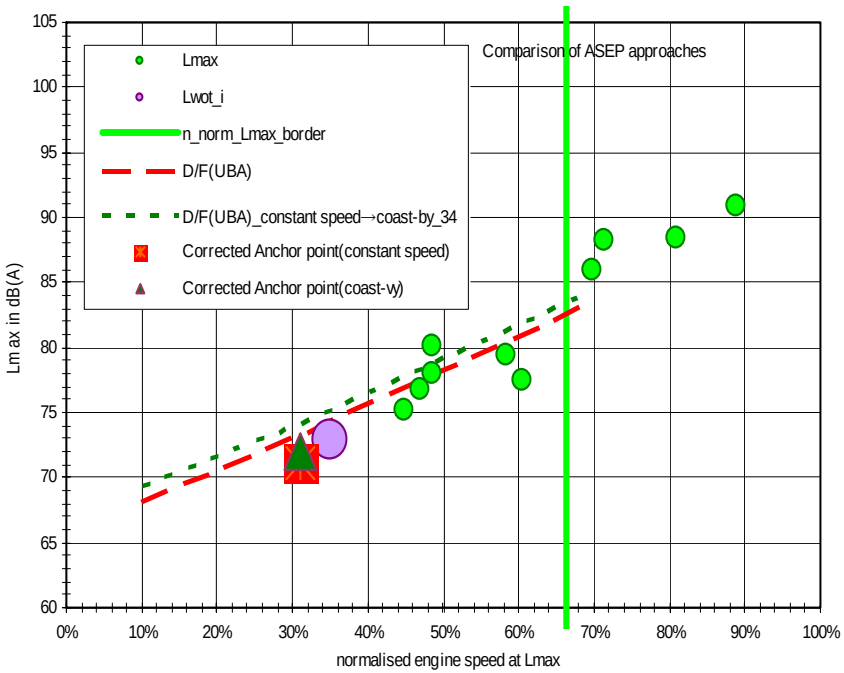
LASEP(n,v) = Lref – Δ + 10 dB × log10{ (10 Δ /10dB– 1) × 10 Γn × (n – nref)/10dB + (v/vref) Γv /10dB } + 2 dB

Δ = MAX(2 dB(A) ; Lref – Lcrs,50), Γn=4 / 5 , Γv=34

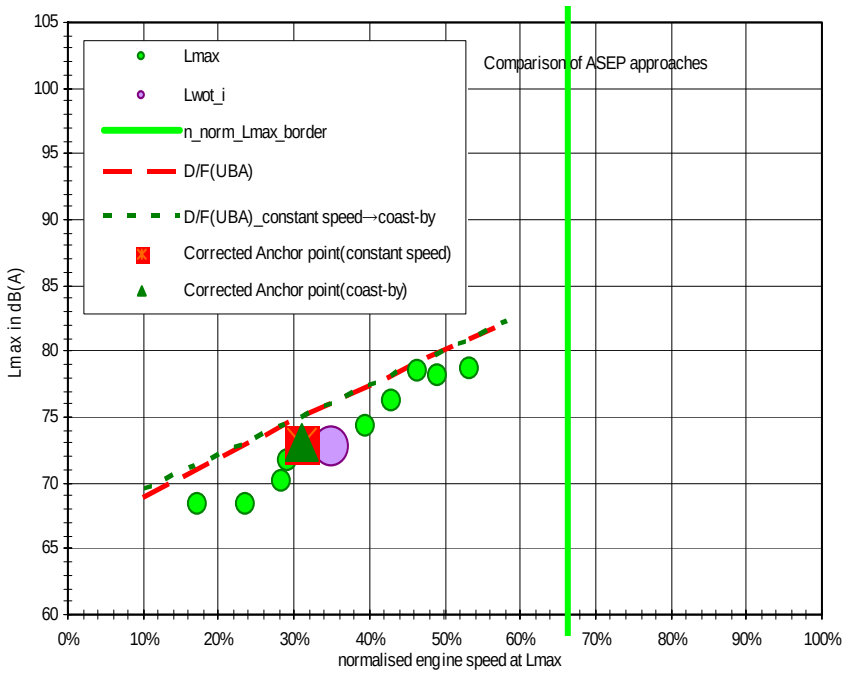
Example 3-1

Constant speed data are used instead of coast-by test data.

Gear：2nd



Gear：3rd

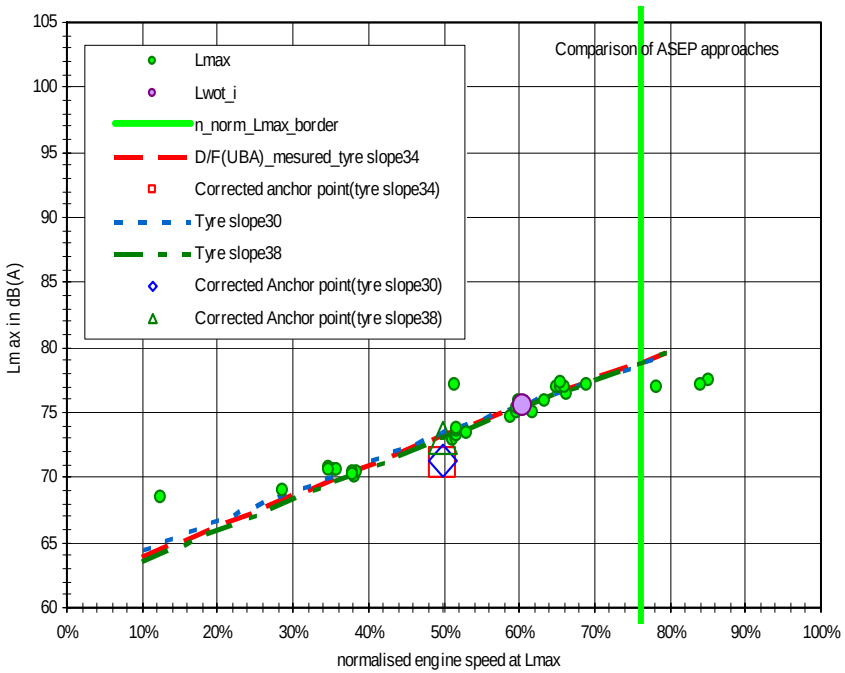


Vehicle： ASEP 1-01

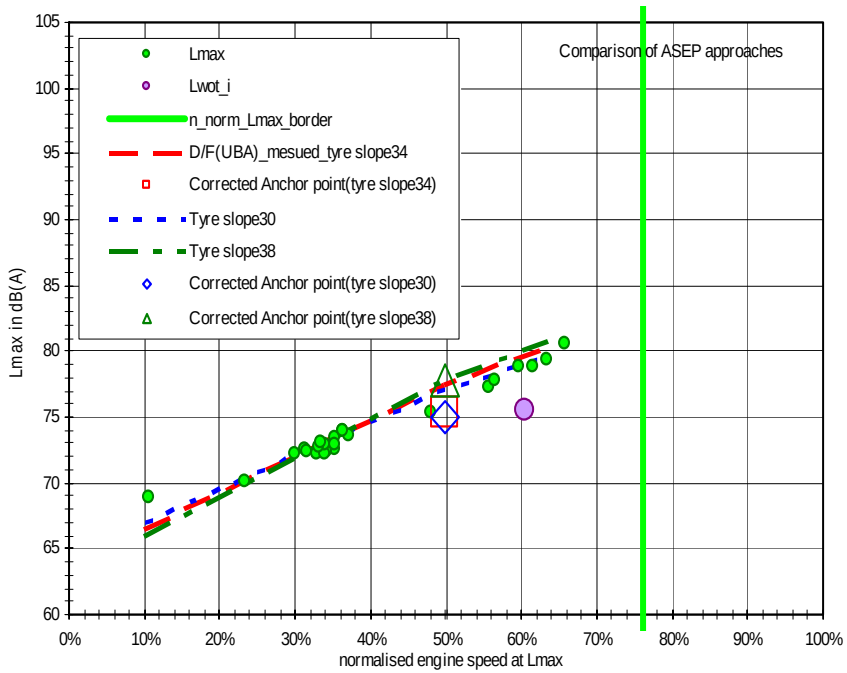
Example 3-2

Tyre slope for vehicle speed is used by fixed value 34.

Gear : 2nd



Gear : 3rd



Vehicle : ASEP 107-06

Summary (1)

- Engine speed σ = 560 rpm
- Sound slope σ = 1.5 dB/1000rpm
- Const/coast $\bar{x} + \sigma$ = 0.9 dB
- Tyre sound slope to vehicle speed σ = 2.2 dB/log(V)

Total ?

(※1 the range of vehicle speed 20 to 80kph)

Summary (2)

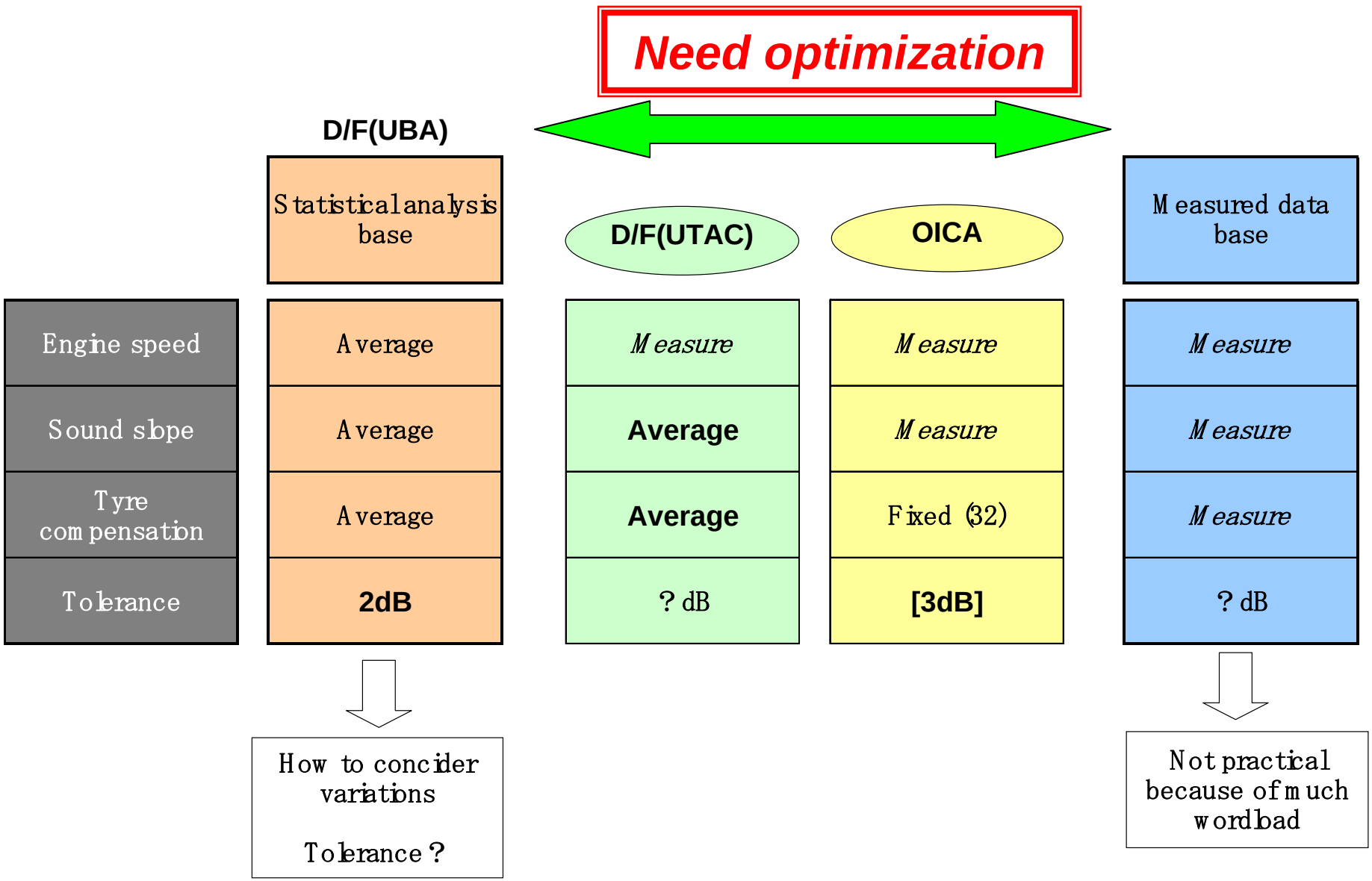
Vehicle No	Engeine speed	Sound slope	Const /coast	Tyre slope
asep-1-01		●	●	
asep-1-04		●	No data of coast-by	No data of coast-by
asep-1-45	●		△	
asep-1-48	●	●	△	
asep-3-01	△	●	△	△
asep-3-02	△	●		
asep-99-23			△	
asep-99-28	●	●	△	△
asep-99-47		△	●	
asep-100-14		●	△	
asep-107-06				△
asep-200-04	●	●		
asep-200-07	●	●	●	
asep-200-09	●	●	△	
asep-200-10	●			
asep-200-13	●	●	●	
asep-200-14	●		△	
asep-200-15	●	●	●	

● ≥ 0.5 dB

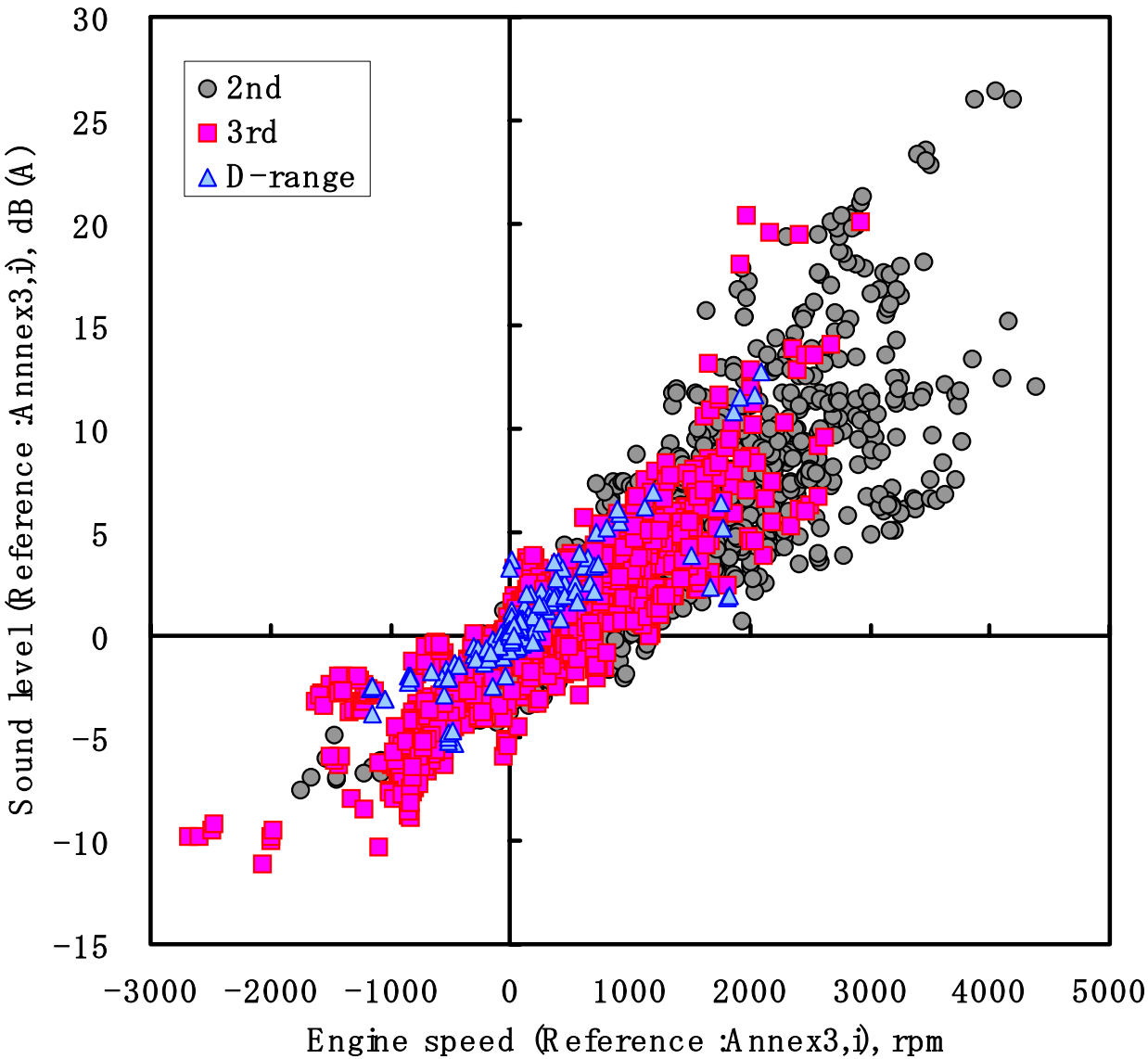
△ 0 ～0.5 dB

Especially, engine speed and sound slope are influent parameters.

Conclusion

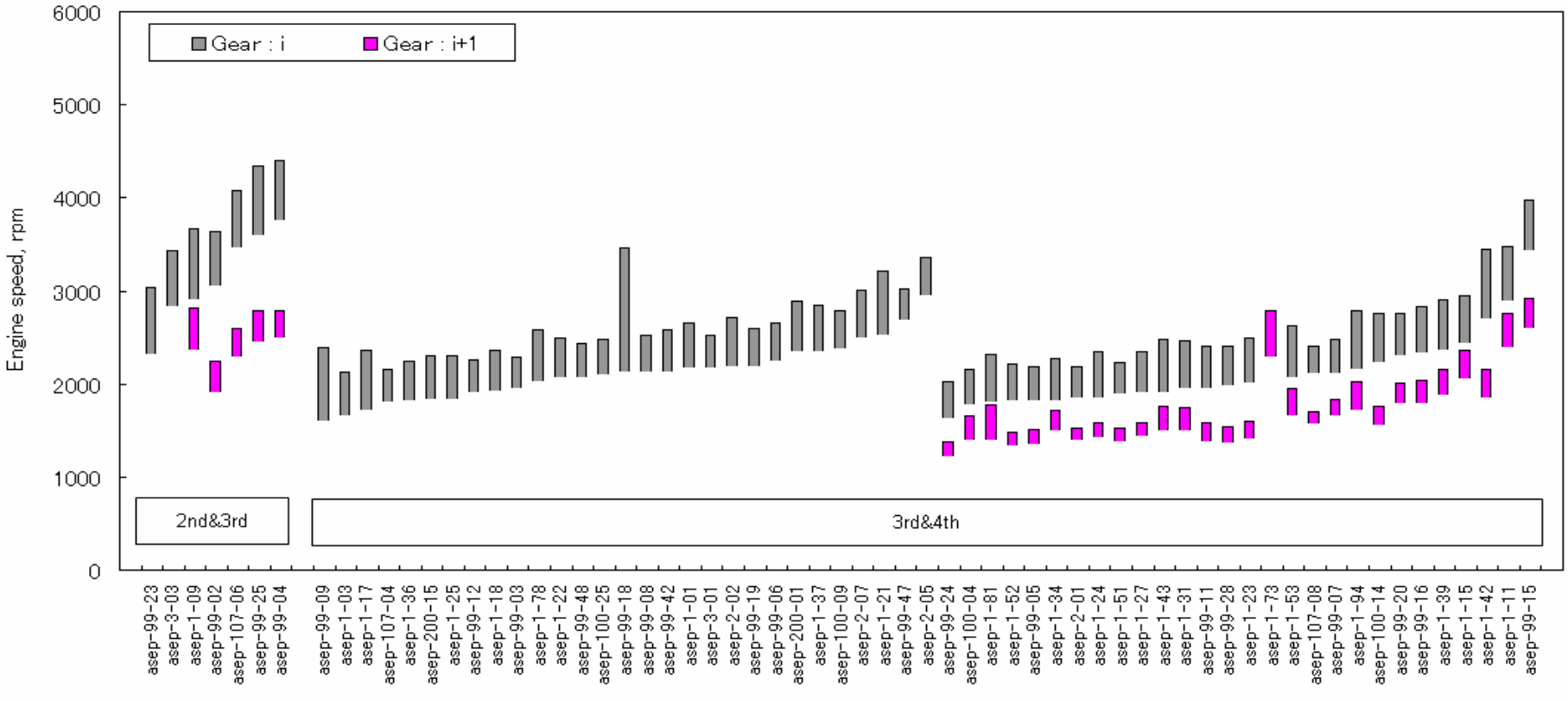

Need optimization
D/F(UBA)
Statistical analysis base
D/F(UTAC)
OICA
Measured data base
Engine speed
Sound slope
Tyre compensation
Tolerance
Average
Average
Average
2dB
Measure
Average
Average
? dB
Measure
Measure
Fixed (32)
[3dB]
Measure
Measure
Measure
? dB
How to concider variations
Tolerance ?
Not practical because of much wordbad

How about lower engine speed of Annex3?



There is no example that exceeds the noise level of Annex3 below the engine speed of Annex3.

Engine speed during Annex3 (1)



Engine speed during Annex3 (2)

Lower engine speed are already covered in Annex 3