

**Outlook and progress of the IWG RD-ASEP R41
amendment proposal for a new 06 Series of
amendments to UNECE regulation N° 41 (Noise
emissions of Motorcycles)**

ASEP and RD-ASEP in R41/04, R41/05 and R41/06

Purpose	Check for inappropriate sound increases outside of Type Approval conditions	Close grey zones in ASEP test conditions	Tightening the available margin, especially at high Rpm
	R41/04	R41/05	Future R41/06
Speed range	20 – 80 km/h	10 – 100km/h (for PMR ≥ 150)	
Max Rpm	$3,4 * PMR^{-0,33} * (S - n_{idle})$	0,8 x S (= increased)	
Gears tested	Fixed gear (not including 1st)	Any gear (including 1st)	
Number of tests	2 reference points + 2 additional conditions	2 reference points + up to 14 additional operating conditions (for a 6speed Manual transmission)	
Throttle operation (between AA' & BB')	WOT only	Any constant throttle	
Approach (pre AA')	Constant speed only	Any Constant speed, acceleration, deceleration	
Applicability	All (PMR>50)	All (PMR>50)	

ASEP limits

$(n_{pp'} \geq n_{wot(i)})$

* Based on fleet data *

$$L_{wot(i)} + (5 * n_{pp'} - n_{wot(i)}) / 1000 + 3$$

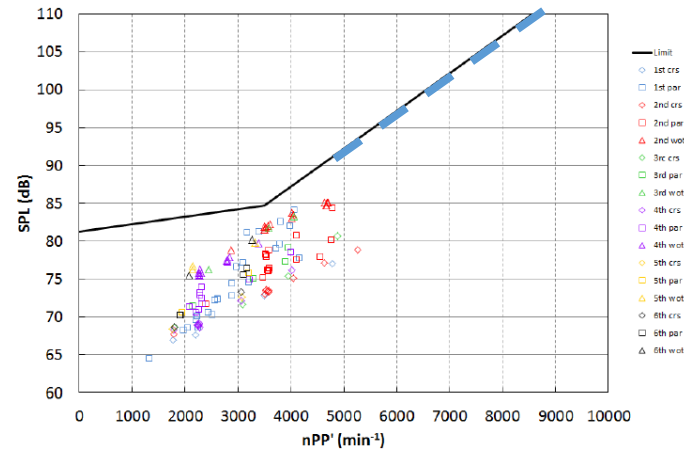
**New stricter
limit line**

R41/05 limit line issue

The R41/04 and R41/05 limit line for rpm over $n_{wot,(i)}$ allows for 5dB/1000Rpm

$$L_{wot,(i)} + (5 * (n_{pp'} - n_{wot,(i)}) / 1,000) + 3 \quad (\text{for } n_{pp'} \geq n_{wot,(i)})$$

- The R41/05 limit line is theoretically unlimited:



- The R41/05 limit line at high Rpm is not coherent with the “natural sound emission behaviour” of the motorcycle.

R51/03 Supplement 7: The formulas for (i.a) power train mechanic sounds acknowledges a logarithmic trend with Rpm:

Formula 3.4. No.1

$$L_{PT_EXP} = \theta_{PT_LO} \times \lg\left(\frac{(n_{BB'_TEST} + n_{SHIFT_PT})}{(n_{BB'_CRS_ANCHOR} + n_{SHIFT_PT})}\right) + L_{REF_PT}$$

Formula 3.4. No.2

$$L_{PT_EXP} = \theta_{PT_HI} \times \lg\left(\frac{(n_{BB'_TEST} + n_{SHIFT_PT})}{(n_{BB'_CRS_ANCHOR} + n_{SHIFT_PT})}\right) + L_{REF_PT}$$

R41/06 limit line concept proposal objectives

- Update the limit line for $n_{PP'} > n_{wot,(i)}$ to reflect the technical progress since it was first introduced in R41/04 in 2011
- Reduce the available limit at higher engine Rpm for $n_{PP'} > n_{wot,(i)}$
- Better reflect the “natural sound emission behavior“ of a motorcycle. (“natural” means without flexibilities in the exhaust/silencer system)
- Ensure fair treatment of vehicles with different engine characteristics by introducing a section in the formula to reflect the Rpm range of the individual vehicle for $n_{PP'} > n_{wot,(i)}$,
- Keep the limit line for $n_{PP'} < n_{wot,(i)}$ unchanged: Data shows that with the introduction of RD-ASEP (R41/05) the limit definition is already adequately stringent
- Guarantee that the new limit line is always more stringent than the current R41/05 limit line

R41/06 limit line concept proposal

Current R41/05 limit definition for engine rpm $> n_{wot,(i)}$

$$L_{wot,(i)} + (5 * (n_{pp'} - n_{wot(i)}) / 1000) + 3$$

New R41/06 limit definition for engine rpm $> n_{wot,(i)}$

Similar to how the R41/04 ASEP limit line was established, and inspired by the logarithmic function of the “sound expectation model “ of R51 RD-ASEP, a ‘best fit’ curve was developed based on non-offending vehicle fleet data (vehicles without flaps)

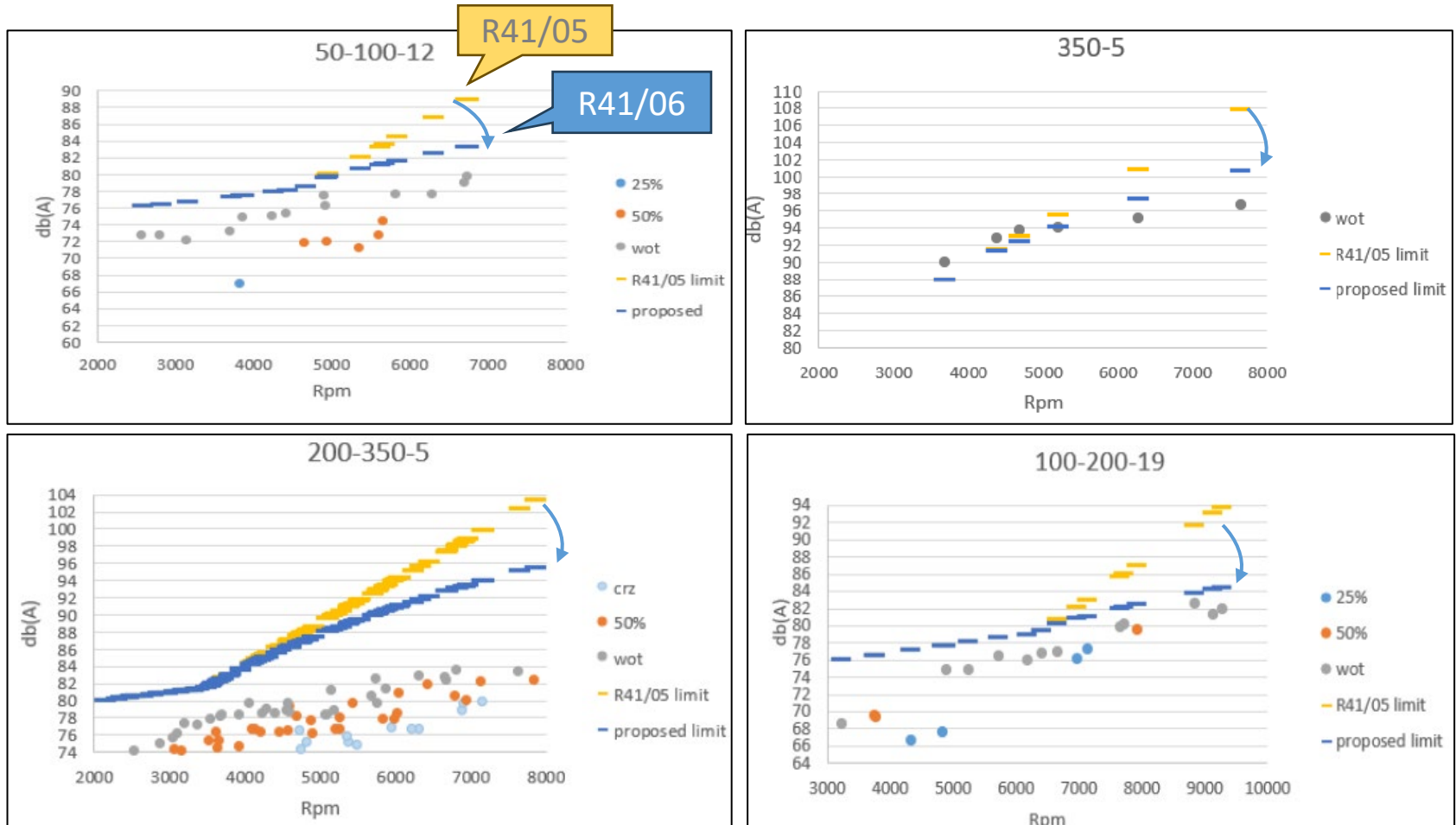
$$L_{wot,(i)} + \underbrace{(11 + (n_{BB',max} - n_{AA',min}) / 1000)}_{\text{Factor to take into account the Rpm range of individual vehicle}} * \underbrace{\ln((n_{pp'} + n_{adj}) / n_{wot(i)})}_{\text{logarithmic function to avoid "indefinite" increase of the limit line: lower the limit line with increasing rpm}} + 3$$

Factor to take into account the Rpm range of individual vehicle

(e.g. V-twin cruiser has max 6000Rpm
A Supersport 4-cylinder can rev over 14.000Rpm)

logarithmic function to avoid “indefinite” increase of the limit line: lower the limit line with increasing rpm

R41/06 limit line concept proposal: examples



See also [RDASEP-01-02 R41](#), [RDASEP-02-03 R41](#) and [RDASEP-02-04 R41](#) for more examples

R41/06 amendment outlook

The Amendment for the next 06 series of amendments to UNECE R41 can be simple and quick.

The main parts to be amended are:

1) Transitional provisions:

- Paragraph 12 to be amended
- Final transitional dates to be discussed

2) New ASEP limit line:

- Annex 7 Paragraph 2.6 be amended for $n_{pp'} \geq n_{wot(i)}$:

2.6. RD-ASEP limits

The maximum noise level recorded during the passage of the motorcycle through the test track shall not exceed:

$L_{wot(i)} + (1 * (n_{pp'} - n_{wot(i)}) / 1\ 000) + 3$ for $n_{pp'} < n_{wot(i)}$ and

$L_{wot(i)} + (5 * (n_{pp'} - n_{wot(i)}) / 1\ 000) + 3$ for $n_{pp'} \geq n_{wot(i)}$

Replace
or add
New
limit line

Where $L_{wot(i)}$ and $n_{pp'}$ have the same meaning as in paragraph 1 of Annex 3 and $n_{wot(i)}$ refers to the corresponding engine speed when the front of the vehicle passes the line PP'.

If the tests according to Annex 3 of this UN Regulation and the RD-ASEP tests are performed with the same vehicle in immediate sequence, the values for $L_{wot(i)}$ and $n_{wot(i)}$ from the Annex 3 test may be used, if agreed by the type approval authority. Otherwise, when compliance with these limits is checked, values for $L_{wot(i)}$ and $n_{wot(i)}$ shall be newly determined by measurements as defined in paragraph 1 of Annex 3, however using the same gear (i) and the same pre-acceleration distance as during type approval.

See also [RDASEP-02-02 R41](#)

R41/06 Remaining issues

1) Limit line concept proposal:

Some Contracting Parties would like to see further reduction of the limit line, especially at High Rpm

2) Vehicles with Continuously Variable Transmissions (CVT):

For some vehicles with variable gear ratios or automatic transmissions with non-lockable gear ratios, RD-ASEP testing often results in Rpm's out of the control range

See also [RDASEP-02-04 R41](#) slides 8 & 9

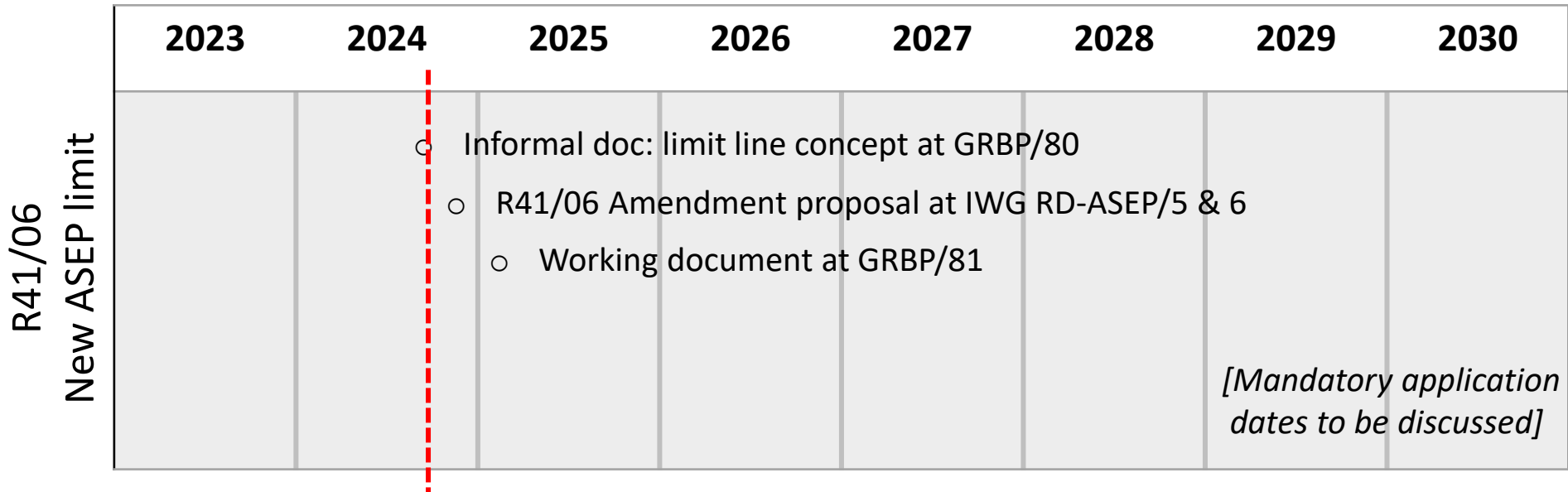
3) Transitional Provisions

4) Interpretation clarifications for R41/05:

See also [RDASEP-04-02 R41 Rev1](#)

R41/06 Timeline

IWG RD-ASEP aiming at a Working document at Feb 2025 GRBP/81:



See also [RDASEP-04-04 R41](#)

Thank you