10 July 2018

P R E S E N T A T I O N O F

INTERNATIONAL ORGANIZATION OF MOTOR VEHICLE MANUFACTURERS

Various Technical Topics on the development of ASEP

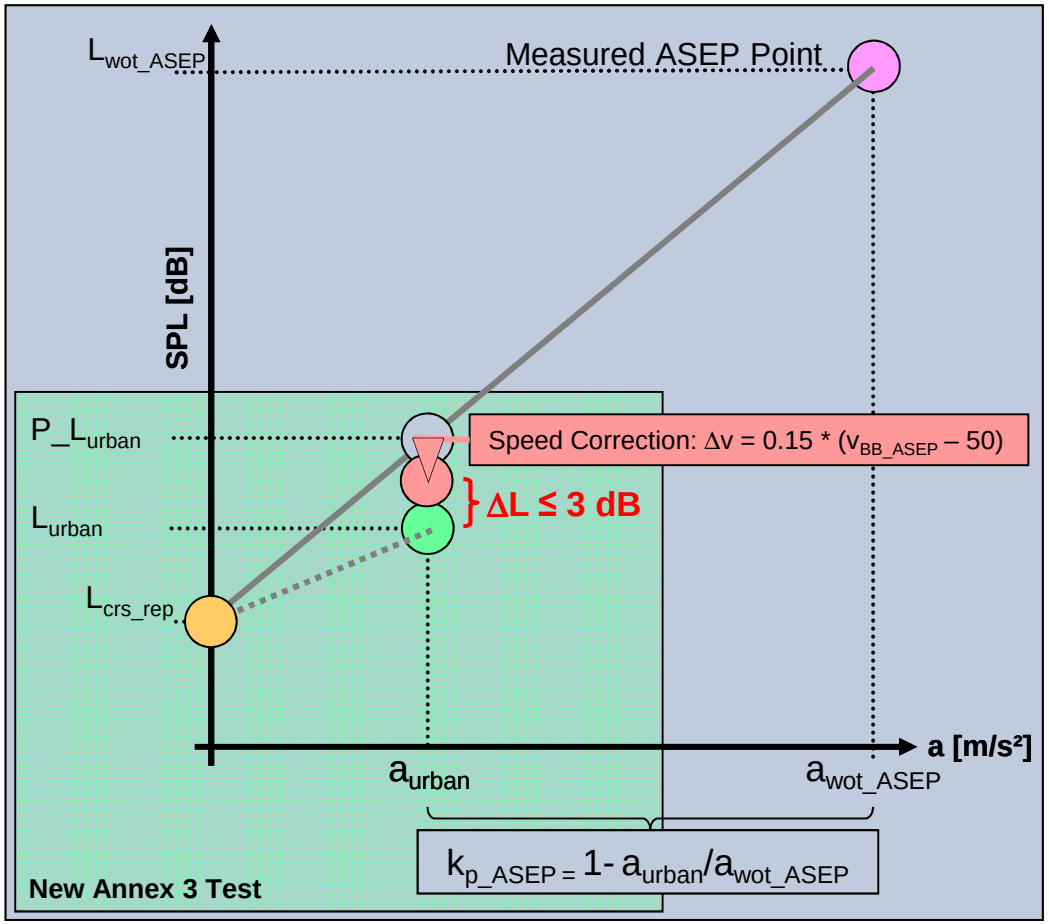
L_{urban}-Assessment

Informal Working Group ASEP
Report Paper on
Interpretation of ASEP Paragraph 6.2.3 last sentence

Introduction

- IWG ASEP has prepared a report paper to provide guidance for the understanding and interpretation of ASEP paragraph 6.2.3 last sentence.
- An explanation is provided for „significant deviation“ in terms of sound, leading to a suggested ΔL_{ASEP} of 6 decibel.
- While the ΔL_{ASEP} of 6 decibel is directly applied for the „Slope-Assessment“, reduced values are suggested for the alternative assessment method the L_{urban}-Assessment“.
- This small presentation is intended to provide help for better understanding.

Concept of the Alternative L_{urban}-Test

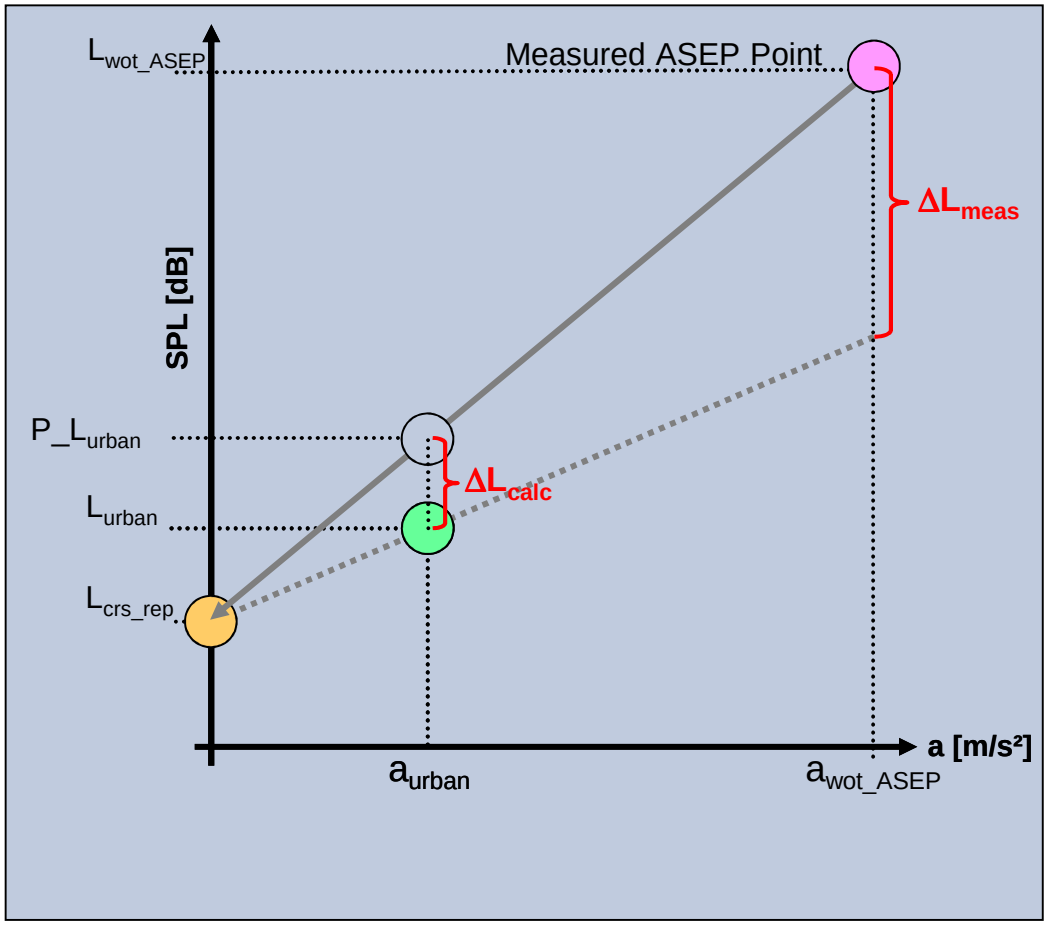


Flow Chart for Assessment of ASEP using Pseudo L_urban

1	Perform the Type Approval Test according to Annex 3 of ECE R51; Report the following parameter: a_{urban}; L_{urban}; L_{crs_rep}
2	Perform a sound measurement on the test track (operation conditions within the ASEP boundaries) Reported results are: v_{bb_ASEP}; a_{wot_ASEP}; L_{wot_ASEP}
3	Calculate the particular partial power factor kp: $k_{p\_ASEP} = 1- a_{urban}/a_{wot\_ASEP}$
4	Calculate the Pseudo L_urban: $P_{L\_urban} = L_{wot\_ASEP} - k_{p\_ASEP} *(L_{wot\_ASEP} - L_{crs\_rep})$
5	Compensate for the speed influence, $P_{L\_urban\_ASEP} = P_{L\_urban} - 0{,}15 * (v_{BB\_ASEP} - 50)$
6	Check vehicle compliance with ASEP $\Delta L_{ASEP} = P_{L\_urban} - L_{urban} \leq 3$ dB

The method allows to assess individual runs. Step 2 to step 6 have to be repeated after every test run.

Concept of the Alternative L_{urban}-Test



A measured sound level L_{wot_ASEP} is rated in the L_{urban} method according to the acceleration performance that has been achieved in that particular test condition.

The higher the acceleration, the lower the evaluation values for that single point.

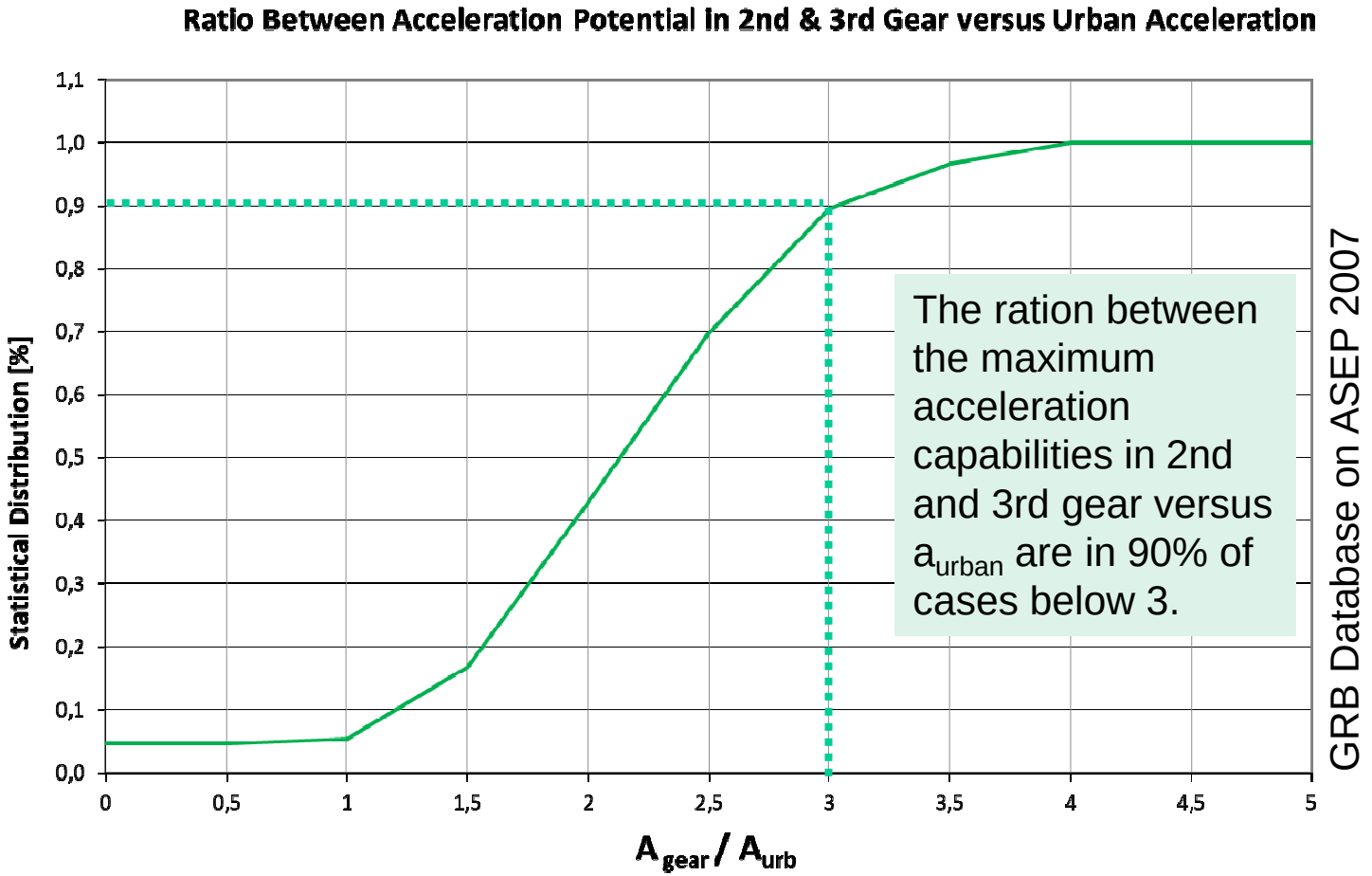
$$\frac{L_{wot\_ASEP}}{L_{P\_Lurban}} \sim \frac{a_{wot\_ASEP}}{a_{urban}}$$

A ΔL_{ASEP} of 6 decibel is quoted by the acceleration ratio between the achieved acceleration and a_{urban}.

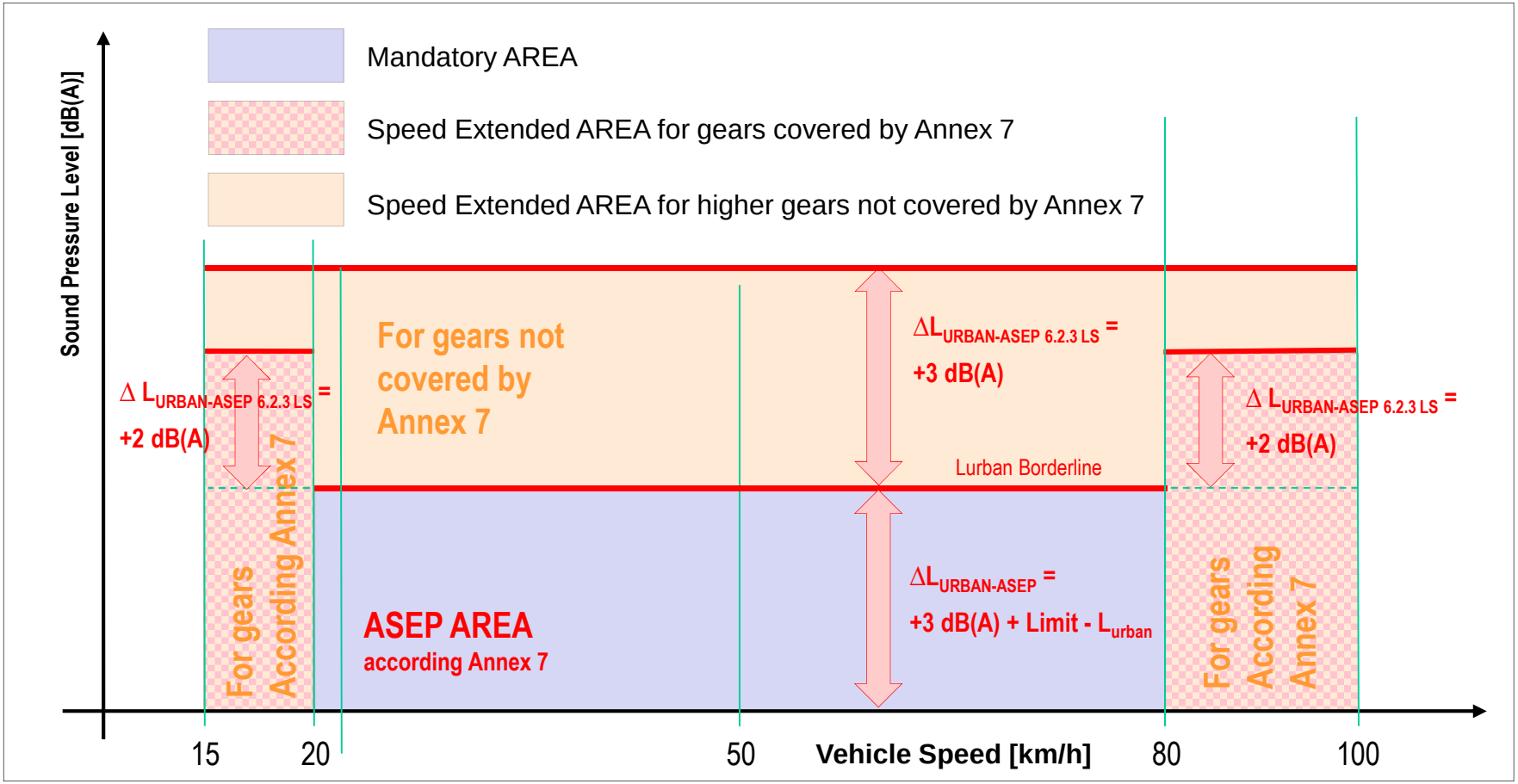
Acceleration Potential per Gear

- The acceleration is gear dependant.
- Low gears provide high acceleration potentials at low speeds, while high gears provide limited acceleration potential at higher speeds.
- The IWG ASEP suggests 2 dB for the gears covered by the ASEP control range Annex 7 paragraph 2.5, and 3 dB for any other gears.
- The gears included in the ASEP control range are lower gears with higher acceleration capabilities, mostly 2nd and 3rd gear.
  - When making a rating between the acceleration potiential in these low gears versus the applicable aurban, the ratio is mostly not exceeding the factor 3.
  - That means a ΔL_{ASEP} of 6 dB would be quoted with 2 dB.
- All other gears – higher gears - will have much less acceleration performance. The ratio would be much lower than the factor 3. In lack of data, a factor 2 is estimated.
  - For these gears a ΔL_{ASEP} of 6 dB would be quoted with 3 dB.

Acceleration Potential in Low Gears



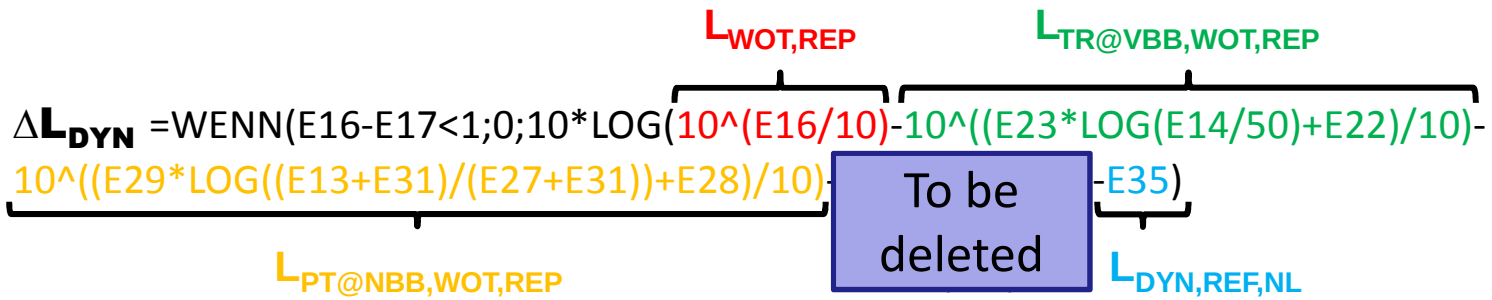
Limitation Concept for L_{urban} Assessment



Sound Prediction Model

Correction to the Model

Clarification on ΔL_{DYN} Calculation



Two times dynamic load considered ???

- The formula shall calculate the delta dynamic between no load and full load.
- Within the energetic calculation the $L_{DYN,REF,NL}$ is incorrectly considered and shall be deleted.
- There is little impact of this mistake, as $L_{DYN,REF,NL}$ is always low, mostly 15 dB or more below the energy of tyre rolling sound and meachanical sound.

E16 = Lwot,rep	E14 = vBB,WOT,REP	E13 = NBB,WOT,REP	E28 = LREF,PT,NL
E17 = Lcrs, rep	E22 = LREF,TR	E31 = NSHIFT,PT,NL	E35 = LREF,DYN,NL
E23 = Slopecrs,<50km/h	E29 = Slope,PT,<NBB,CRS,REP	E27 = NBB,CRS,REP	