Problems with Noise-Emissions of Vehicles / NORESS and possible Solutions
Contents:

1. Present Situation
2. Problems
3. Solutions
Present Situation (1)

Most M1/N1-vehicles have to fulfil ASEP.

ASEP-Compliance via Manufacturer Declaration.

Measurement between $V_{AA'} \geq 20$ and maximum $V_{BB'} \leq 70$ or $80$ km/h

Gear/Gear-ratios where vehicle-accleration $a_{wot} \leq 5,0$ m/s$^2$ and $n_{BB'} \leq 2,0 \times PMR^{-0,222} \times S$ or $n_{BB'} \leq 0,9 \times S$ ($n_{BB'}$: smaller value)
Contents:

1. Present Situation

2. Problems

3. Solutions
Problems (1)

Complaints about noise annoyance based in 100% on
- Reckless Driving Behavior,
- Technical Changes (Manipulations),
- UN-/EU-Approvals of to loud vehicles / NORESS or
- Utilization of “Grey areas” of EU-/UN-Reg. by Manufacturers

As a result, more and more demands for:
- requirements for stricter limits (e.g. Stage 3) and
- in the meantime, the ICE's own right to exist is critically discussed !

In the long term, the vehicle manufacturers get in trouble about this !
Problems (1)

1. Reckless Driving Behavior

(Starting at the highest engine RPM, extreme acceleration, non-compliant speed)

**Responsible: Driver** (DE-Fines: speed exceedance up to 1520,- € + driving ban).

**Note:** Negative image falls on driver and possibly to vehicle-category!

**Result:** Request for more controls and higher penalties!
Problems (2)

2. Technical Changes (Manipulations)

(Racing-Silencers, dB-Eaters, Additional control units, illegal flap systems/-steering etc.)

Responsible: Registered Keeper / Driver (DE-Fines: 270,- / 180,-€);

Multiple offenders: Psychological Test is possible

Note: Negative Image falls on Manufacturer, vehicle-category or ICE !

Result: Request for higher penalties and lower limits (e.g. Stage 3) !

Sufferer: Vehicle Manufacturer
Problems (3)

3. UN-/EU-Approvals of too loud vehicles / NORESS

(ASEP-Declaration of Manufacturer not OK, Deviation Vehicle/NORESS to Approval etc.)

These Approvals create pressure on development of the "quiet manufacturers"

Responsible: Manufacturer

Note: Negative Image falls on Manufacturer, vehicle-category or in general ICE!

Result: Request for lower limits (e.g. Stage 3)!

Sufferer: Each Vehicle Manufacturer
Problems (4)

4. Utilization of “Grey areas” of UN-/EU-Regulation by Manufacturers
(Racing-Mode, Extremely loud outside ASEP (Range/Gears), Use of dB-Eater etc.)

Owners Manuals often don’t give any Information about forbidden use of „Racing-Modes“ inside public traffic, including legal consequences for the driver.

Responsible: Manufacturer / Driver (DE-Fines: - / 20,-€);
Multiple offenders: Psychological Test is possible

Note: Negative Image of loud Vehicles/NORESS falls on Manufacturer, vehicle-category or in general ICE!

Result: Request for lower limits (e.g. Stage 3); first registration ban ICE e.g. > 2025!
Sufferer: Each Vehicle Manufacturer

UN-R 51.03 / (EU) 540/2014 corrected “Grey Areas” only minimally!
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Solutions (1 and 2)

Problem 1 Reckless driving behavior

**Solution to 1:**
Can not be solved by GRB and its UN-Regulations.

Problem 2. Manipulations
(Racing-SD, dB-Eater, additional illegal controllers of silencers with variable geometries and illegal modifications etc.)

**Solution to 2:**
Insert additional requirements comparable to UN-R 41.04 Point 6.5 in UN-R51 (Additional prescriptions related to tamperability and manually adjustable multi-mode exhaust or silencing systems).
Solution (3)

Problem 3. UN-/EU-approvals of loud vehicles or NORESS
(Manufacturer’s ASEP-declaration is not OK; Deviations between sold products and type approval vehicle/NORESS etc.)

Solution to 3: ASEP have to be part of type approval test and these tests have to be done mandatory by Technical Service (TS):

1. complete tests of ASEP by TS or

2. verification of a minimum number of points by TS, which have to be measured by the manufacturer completely before type approval tests or

3. mandatory measurement by TS (complete or verification of min. number of points) only for silencer systems with variable geometries, etc.
Problem 4
Utilisation of grey areas of UN-/ EU-Reg. by vehicle-/NORESS-manufact.
(Racing-Mode, Extremely loud outside ASEP (Range/Gears), Use of dB-Eater etc.)

Solution to 4: Extension of the existing ASEP-Range (speed/gears) with the aim:

Produced sound level of a vehicle outside ASEP-Range/-Gears has to be more or less the same during “usual road use” than inside ASEP-Range/-Gears.

Definition “usual road use”:
- Vehicle speed between minimum 0 and maximum 100 or 120 km/h and
- engine speed between
  - a minimum $n_{AA}$ of e.g. 1200 rpm and a maximum $n_{BB} < 90\%$
Solution (4)

Responsible values for ASEP-Range:

- **Minimum values** ($n_{AA}$): The vehicle speed of more than 0 km/h of each gear ratio which produces at minimum an engine speed of e.g. 1200 rpm.

  **Examples:**
  1. **Gear**: Idle-speed 850 rpm & vehicle speed at 1200 rpm is 5 km/h.

  ASEP range 1. Gear starts at 5 km/h (Minimum)

  2. **Gear**: vehicle speed at engine speed 1200 rpm is 20 km/h.

  ASEP range 2. Gear starts at 20 km/h (Minimum)

- **Maximum values** ($n_{BB}$): The vehicle speed lower than e.g. 120 km/h of each gear ratio which produces at maximum an engine speed of e.g. $n_{BB} < 90\% \, S$.

  **Examples** ($S = 6000$ rpm; $90\% \, S = 5400$ rpm):
  1. **Gear**: vehicle speed at 5400 rpm is 15 km/h.

  ASEP range 1. Gear ends at 15 km/h (Maximum)

  4. **Gear**: vehicle speed at 5400 rpm is 130 km/h.

  ASEP range 4. Gear ends at 120 km/h (Maximum)


**Solution (4)**

**Statement:**
ASEP has to be measured also in a speed range between $0 < V_{ASEP} < 20 \text{ km/h}$ and $80 < V_{ASEP} < \text{e.g. 100 to 120 km/h}$ during type approval tests

Discussions are needed about:

- **Restrictions on test conditions for vehicle speeds > 80 km/h** (e.g. no ISO-test track is needed; test side in accordance to Annex 3 can have deviations).

- **Calculation of limit values** of additional ASEP-areas which have to be fulfilled.

- **Reconstruction on measurement:** e.g. “$v \cdot a$ - concept” with realistic vehicle speed and acceleration ranges.

  (Realistic = low speeds & higher acceleration; higher speed & lower acceleration)

- **Different areas where all gears/gear-ratios used** ($n_{AA'} > 1200$ and $n_{AA'} < 90\% \text{ S}$)
  
  **Urban** (0 - 50 km/h), **Country Road** (60 - 90 km/h) and **highway** (90 - 120 km/h)

- **Realistic timeline** for these bigger ASEP-modifications.
Conclusion

Problems

2. Manipulation
3. UN-Approvals of loud vehicles or NORESS
4. GREY-AREAS

FUTURE Stage 3 and ICE ? 😞
Conclusion

Solutions

1. Anti-tampering requirements

2. ASEP part of TA-test

3. Extension ASEP-Range

FUTURE Stage 3 and ICE ? 😊
Thanks for your attention!