Suggestions on development of UN Regulation No. 51
Introduction

China has collected more than 200 public comments on Chinese GB 1495 final draft “Limits and measurement methods for noise emitted by accelerating motor vehicles”.

From these comments we see the public expectations on future noise standards and regulations. And which will also make sense for the development of UN noise regulations.
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The manufacturers and the public begin to consider the differences and connections between pollution, noise and sound.
How to improve the noise environment during the night time is really a big issue.

1. Change the whole logistic and transport system?
2. Wider speed range and lower limit value for commercial test?

The cities need logistic, so commercial vehicles have to go inside urban area during night time. And always start and pause and travel at very high speed.

The commercial vehicles are always more loudly than passenger cars. And also the test method now only covers a short speed range.

Commercial vehicles are forbidden to travel in the urban area during day time in many cities.
Electric vehicles

Different behavior on road
- Acceleration ($> 2 \text{m/s}^2$)
- Torque (high and quick)
- Power (low rated power but high peak power)

New test method needed

Different sound
- EV is sometimes quiet
- EV is not always quiet
- Lower sound level ≠ acceptable sound

New evaluation method needed

Different kinds
- Battery
- Hybrid
- Fuel cell

New definition needed
ASEP + Simplification of test method

The opinion is still very strong in the industry and technical service that the method B is too complicated.

ASEP is added now, and it will be a new challenge for the manufacturers, technical service organizations and ISO test tracks.

A more clear scope for ASEP, an easier approach for the whole pass-by noise standards and also the in use vehicle test method are all needed for management.

The simplification work is necessary for the whole system of Regulation No. 51, and China has already some trying in test simplification and tested on 5 vehicles based on “China Test Cycle”.
Test mass and reference acceleration ($a_{wot \, \text{ref}}$)

<table>
<thead>
<tr>
<th>Vehicle category</th>
<th>Vehicle test mass</th>
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| $M_1$            | $m_t = m_{ro} \pm 5\%$  
The test mass $m_t$ of the vehicle shall be between $m_{ro} - 10\%$ and $m_{ro} + 20\%$ |
| $N_1$            | $m_t = m_{ro} \pm 5\%$  
The test mass $m_t$ of the vehicle shall be between $m_{ro} - 10\%$ and $m_{ro} + 20\%$ |
| $M_2$ ($M \leq 3,500$ kg) | $m_t = m_{ro}$  
The test mass $m_t$ of the vehicle shall be between $m_{ro} - 10\%$ and $m_{ro} + 20\%$ |

3.1.2.1.2.4. Reference acceleration $a_{wot \, \text{ref}} = 1.59 \times \log_{10} (\text{PMR}) - 1.41$

3.1.2.1.4.1. Vehicles locked gear ratios

The following conditions for selection of gear ratios are possible:

(a) If one specific gear ratio gives an acceleration in a tolerance band of 5 percent of the reference acceleration $a_{wot \, \text{ref}}$ not exceeding 2.0 m/s$^2$, test with that gear ratio.

- The tolerance of test acceleration is only $\pm 5\%$, which is much lower than the tolerance of test mass (nearly $\pm 15\%$).
- -10% and +10% comparing test shows it has little changes in the sound level, but high influence on acceleration. Which will lead to different test gears and 1.5 dB(A) difference.
- We change the tolerance of test mass or gear selection acceleration tolerance trigger?
Rights and responsibilities

- **Manufacturers**
  - They do not have the responsibility to adjust the vehicle acceleration performance even it is higher than 2m/s².
  - They have the rights to change the vehicle before COP test, including the acceleration performance and tyres selection.

- **Technical Service Organizations**
  - They have the rights to make the decision on the test situation like when or if the vehicle need a pre-acceleration according to the vehicle's performance, but not need to get the agreement of manufacturers.
  - They have the rights to know what is the normal road use condition, and all the changes of vehicle during the test should be in the monitoring of them.
Thanks for your attention

Web site: www.catarc.org.cn