GRBIG-ASEP-06-006 Submitted by the Netherlands Feb 2007

Additional options for ASEP data processing methods

If a system based on x dB/1000rpm will not work

Back ground: paper by OICA: GRBIG-ASEP-05-003

Significant spread in slope of regression curve

2.0

0.0

1

3

5 6

8 9

OICA INTERNATIONAL ORGANIZATION OF MOTOR VEHICLE MANUFACTURERS 14,0 Total Vehicle Sound Emission 2nd Gear 3rd Gear 12.0 2nd Gear 95% Coverage 10.0 Slope dB/1000rpm 3rd Gear 95% Coverag 8,0 Average 3rd Gear Average 2nd Gear 6.0 4,0

Vehicle No.

10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

Discussion: what is the target of ASEP

INTERNATIONAL ORGANIZATION OF MOTOR VEHICLE MANUFACTURERS INTERNATIONAL ORGANIZATION OF MOTOR VEHICLE MANUFACI INTERNATIONAL ORGANIZATION OF MOTOR VEHICLE MANUFACTURERS Vehicle 85kW/t - S=4000rpm Vehicle 98kW/t - S=6000rpm Vehicle 246kW/t - S=6500rpm WOT 2. Gang WOT 2, Gang Slope 2nd gear: 11.5dB/1000rpm = 71,881x + 49.65 Slope 2nd gear: 3.3dB/1000rpm WOT 3 Gand $R^2 = 0.9815$ WOT 3 Gap; Annex 3 Resul Annex 3 Result y = 38,329x + 53.012 y = 17.47x + 68.38Proposal Limit Curve Concern? $R^2 = 0.814$ $R^2 = 0.9834$ Proposal Limitatio Linear (WOT 2. Gang) Linear (WOT 2. Gang 80 SPL [dB(A)] SPL [dB(A)] . Slope 2nd gear: 12,4dB/1000rpm ... Vaa=20 km/h . WOT 2nd Gear WOT 3rd Gear 60 I wot - new tes Pronosal Limit Curve inear (WOT 2nd Gear 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% 0% 10% 20% 40% 50% 0% 10% 20% 30% 40% 50% 60% 70% 90% 1009 30% Normalized Engine Speed (n-nidle)/(S-nidle) Normalized Engine Speed (n-nidle)/(S-nidle Normalized Engine Speed (n-nidle)/(S-nidle Nov. 2006 Page 16 Nov. 2006 Page 19 Additional Sound Emission Provisions (ASEP) Additional Sound Emission Provisions (ASEP) Additional Sound Emission Provisions (ASEP) Vehicle 1 Vehicle 2 Vehicle 3 Slope< 6 dB/1000 rpm Slope> 6 dB/1000 rpmSlope> 6 dB/1000 rpm Extrapolation to Lp,max = Extrapolation to Lp,max Extrapolation to Lp,max $= 90 \, dB(A)$ $= 90 \, dB(A)$ 120 dB(A)

Observations

- Vehicle 1 seems to be fairly comparable to vehicle 2; both in PMR and in presented noise data; yet their slopes in dB/1000 rpm are wide apart (3.3 and 11.5) and on either side of the expected limit (6 dB/1000 rpm)
- Vehicle 2 and 3 have a similar slope (11.5 and 12.4); yet they seem to differ considerably, both in PMR and in extrapolated noise at rated engine speed

Question

• Could their be another descriptor for acceptable noise in the ASEP region?

Concepts discussed in the Netherlands

- 1. Replace limited slope by a not to exceed level, eg
 - a) 90 dB(A) within ASEP boundary condition
 - b) Lwot,i + 20 dB(A) within ASEP boundary conditions
- 2. Evaluate noise as function of % rated engine speed instead of absolute engine speed eg.
 - a) 0.3 dB/%
- 3. Evaluate noise as function of vehicle speed and acceleration instead of engine speed. eg

a)
$$L_{pmax} = C_1 + C_2^* a + C_3^* v$$

b) $L_{pmax} = C_1 + C_2^*(a - a_{ref}) + C_3^*(v - v_{ref})/v_{ref}$ $v_{ref} = 50 \text{ km/h}$ $a_{ref} = a_{wot,i}$

c)
$$L_{pmax} = C_1 + C_2^* a + C_3^* Log(v/v_{ref})$$

Example of analysis of existing data 29 vehicles; 50 km/h; All gears



Question to all ASEP members

 Could you analyse your existing data if such models fit better than the current model (x dB/1000 rpm)