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Additional Sound Emission Provisions

Exemption from ASEP of Smaller Commercial Vehicles of Category N1 and their Derivates in Category M1

**50th GRB Working Party on Noise
September 2009**



INTERNATIONAL ORGANIZATION OF MOTOR VEHICLE MANUFACTURERS



Historical Background of ASEP

- The new type approval test as defined in Annex 3 of ECE R51 will simulate better the typical environmental conditions. This will lead to lower engine speeds.
- GRB was concerned that the higher engine speed range is less controlled in future than it is with ECE R51.02 Method A.
- This could be used by some vehicle types to increase the sound emission.
- Therefore GRB constituted an working group to provide a proposal for an additional test called - ASEP
- Commercial vehicles where not considered to be affected. However in the category N1, commercial vehicles meet vehicles types based on M1.



Justification for the Exclusion of “TRUE” N1 vehicles

- **Commercial vehicles are designed to a high level of utility. It is very inopportune to design for special sound emission, what is always paired with considerable increase in costs.**
- **Commercial vehicles are basically used by employees and not by the owner. A company has often many vehicles in a car pool, serving the particular commercial needs.**
- **Duty vehicles have a high variety within one type. In comparison to M1 Types the number of variants/version can increase by a factor of 5 to 10. A detection of a worst case for testing is not possible without physical testing. A declaration of conformity can therefore only be stated by the manufacturers subsequent to extensive testing.**
- **Duty vehicles have a very low PMR resulting in low acceleration potential. Dimensional limits of test tracks may prohibit the proper execution of the test with the proposed scope ranging to 70 km/h.**
- **For these reasons it is our understanding that heavy vehicles of category N1 and their M1 derivatives (M1 derived from N1) should not be included in the scope of ASEP.**



Vehicles that are meant by OICA to be Excluded

- Vehicles types in focus are those, that are designed as a platform from which a large variety of derivatives can be produced.
- Many of these types can be used to carry good, but the derivatives are not limited to this.
- Examples for these platforms...



One platform for many variations





One platform for many variations

Radstand (mm)	Zulässiges Gesamtgewicht (kg)	Kastenwagen		Kombi		Fahrgestell		Pritschenwagen mit Einzelkabine	Tiefbedeckter Wagen mit Einzelkabine	2,0-l-Otto-Motor (85 kW) Bosch-Motronic ME 7.5	3,2-l-Otto-V6-Motor (173 kW) Bosch-Motronic ME 7.1.1
		mit Normdach	mit Mittelhochdach	mit Normdach	mit Mittelhochdach	mit Einzelkabine	mit Doppelkabine				
3.000	2.600	Nutzlast 815 - 900 kg 		Nutzlast 750 - 900 kg 						nach 98/69/EG IB, EURO 4 Serie Super bleifrei DIN EN 228 ROZ 95	nach 98/69/EG IB, EURO 4 Serie Super bleifrei DIN EN 228 ROZ 95
	2.800	Nutzlast 1.000 - 900 kg 	Nutzlast 970 - 970 kg 	Nutzlast 935 - 905 kg 	Nutzlast 905 - 475 kg 	Aufbaulast 1.225 - 935 kg 		Nutzlast 1.060 - 770 kg 		1,9-l-TDI-Motor (62 kW) ohne/mit Dieselpartikelfilter (DPF) Pumpe-Düse-Direkteinspritzung 4 1.896 62 bei 3.500 200/1.600 - 2.400 nach 98/69/EG IIIA, EURO 4 ² Serie Diesel, gem. DIN EN 590	1,9-l-TDI-Motor (70 kW) ohne/mit Dieselpartikelfilter (DPF) Pumpe-Düse-Direkteinspritzung 4 1.896 62 bei 3.500 200/1.600 - 2.400 nach 98/69/EG IIIA, EURO 4 ² Serie Diesel, gem. DIN EN 590
	2.850	Nutzlast 1.065 - 865 kg 	Nutzlast 1.035 - 835 kg 		Nutzlast 970 - 740 kg 	Aufbaulast 1.290 - 1.215 kg 		Nutzlast 1.125 - 1.060 kg 		2,5-l-TDI-Motor (96 kW) mit Dieselpartikelfilter (DPF) Pumpe-Düse-Direkteinspritzung 5 2.459 96 bei 3.500 340/2.000 - 2.300 nach 98/69/EG IIIA, EURO 4 ² Serie Kombination möglich Diesel, gem. DIN EN 590	2,5-l-TDI-Motor (128 kW) mit Dieselpartikelfilter (DPF) Pumpe-Düse-Direkteinspritzung 5 2.459 128 bei 3.500 400/2.000 - 2.300 nach 98/69/EG IIIA, EURO 4 ² Serie Kombination möglich Diesel, gem. DIN EN 590
	3.000	Nutzlast 1.200 - 800 kg 	Nutzlast 1.170 - 770 kg 		Nutzlast 1.135 - 705 kg 	Aufbaulast 1.425 - 1.135 kg 		Nutzlast 1.260 - 970 kg 			
	3.200	Nutzlast 1.391 - 1.016 kg 			Nutzlast 1.328 - 921 kg 						
3.400	2.800	Nutzlast 970 - 567 kg 	Nutzlast 940 - 537 kg 	Nutzlast 920 - 517 kg 	Nutzlast 895 - 455 kg 	Nutzlast 845 - 405 kg 	Aufbaulast 1.185 - 895 kg 	Aufbaulast 1.110 - 626 kg 	Nutzlast 1.000 - 710 kg 	Nutzlast 1.000 - 710 kg 	Nutzlast 960 - 476 kg
	2.850	Nutzlast 1.035 - 832 kg 	Nutzlast 1.005 - 802 kg 	Nutzlast 965 - 782 kg 	Nutzlast 960 - 740 kg 	Nutzlast 910 - 690 kg 	Aufbaulast 1.250 - 1.135 kg 	Aufbaulast 1.175 - 841 kg 	Nutzlast 1.065 - 950 kg 	Nutzlast 1.065 - 950 kg 	
	3.000	Nutzlast 1.170 - 767 kg 	Nutzlast 1.140 - 737 kg 	Nutzlast 1.120 - 717 kg 	Nutzlast 1.095 - 655 kg 	Nutzlast 1.045 - 605 kg 	Aufbaulast 1.305 - 1.095 kg 	Aufbaulast 1.210 - 828 kg 	Nutzlast 1.290 - 910 kg 	Nutzlast 1.290 - 910 kg 	1.190 - 606 kg
	3.200	Nutzlast 1.361 - 983 kg 	Nutzlast 1.331 - 1.030 kg 	Nutzlast 1.311 - 1.013 kg 	Nutzlast 1.286 - 871 kg 	Nutzlast 1.256 - 818 kg 	Nutzlast 1.216 - 856 kg 				

Six different engines

+ Various GVW
+ Various Axle Ratio

many variants have to be considered under ASEP



Vehicles that are meant by OICA to be Excluded

- ▶ Vehicles types in focus are those, that are designed as a platform from which a large variety of derivatives can be produced.
- ▶ Many of these types can be used to carry good, but the derivatives are not limited to this.
- ▶ Examples for these platforms...
- ▶ For most platforms there are derivatives that allow the carriage of people. The seat capacity is for driver license reasons limited to 9 persons. Thus these vehicles are registered as M1 vehicles.
- ▶ **OICA proposes to exclude these M1 vehicles from ASEP.**



Vehicles that are meant by OICA to be Excluded

- Under the vehicle category N1 many special purpose vehicles are type approved, not really designed for the typical use as we have in mind.
- Those types are made by very small manufacturer that have very limited resources and capability for complex type approval.
- Examples are ...

Special Purpose Vehicles under N1



Those Vehicles should be excluded from ASEP !



Vehicles that are NOT meant by OICA to be Excluded

- In the category N1, there are also many vehicle types that are typically derived from M1 vehicles.

- Examples are ...

Vehicles that are NOT meant by OICA to be Excluded



... those are coming from M1 types and should be covered by ASEP.

We call them „OTHERS“ further down the presentation

Proposal for a definition to distinguish between these different vehicle types.

- The vehicles in focus have two typical parameters:
 - The payload is considerably higher compared to M1 vehicles
 - The power-to-mass-ratio based on the gross vehicle weight is significant lower to M1 vehicles

- OICA proposal:
 - Exclude N1 vehicles if

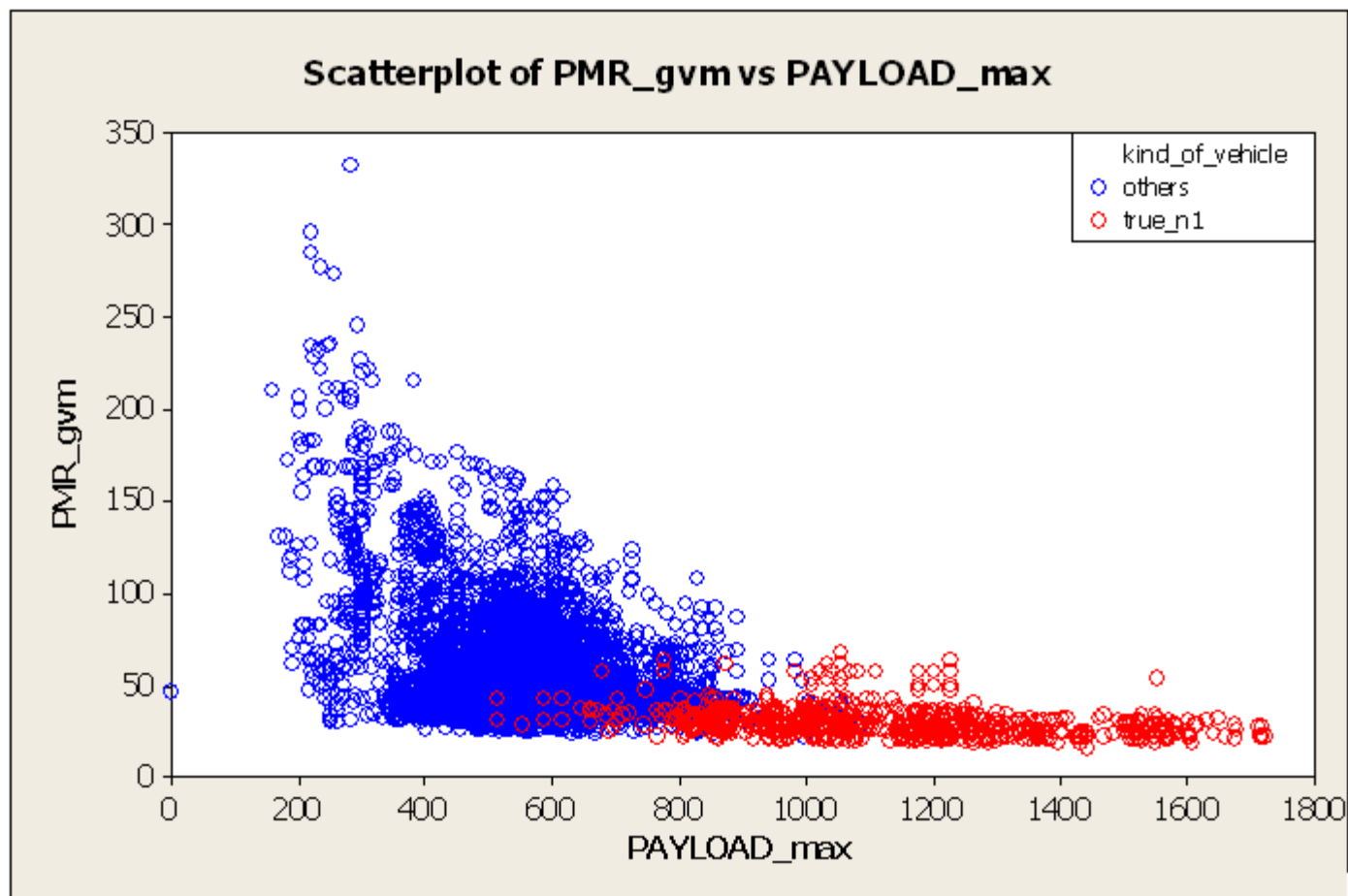
Payload \geq 850 kg AND PMR \leq 40 kW/t
where the PMR is based on the gross vehicle mass

- How does this separate between “TRUE” N1 and others ?

How do “TRUE” N1 mix with others when using these parameters

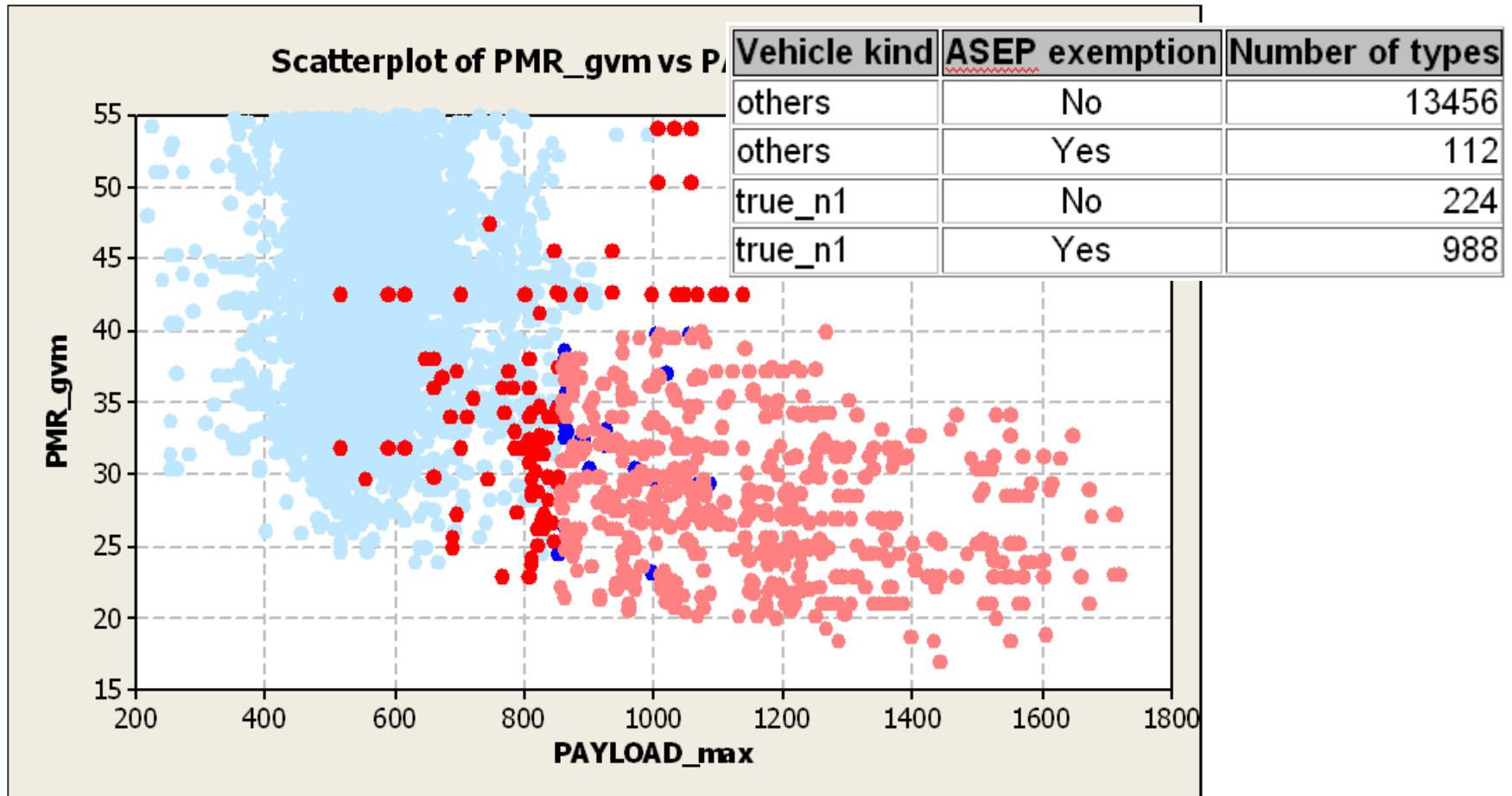
- The AAA-database from 2007 used for the discussion in the CO2 field provides technical data for 14.800 vehicles types of M1 and N1.
- As “TRUE” N1 those vehicles were marked:
 - CITROEN JUMPER
 - FIAT DUCATO
 - FORD TRANSIT
 - HYUNDAI H-1
 - IVECO DAILY, 29L12, 35S12
 - MERCEDES 208, 211, 213, 215, 216, 311, 313, 315, 316, 324, SPRINTER, VIANO and VITO
 - NISSAN INTERSTAR and PRIMASTAR
 - OPEL MOVANO and VIVARO
 - PEUGEOT BOXER and EXPERT
 - RENAULT MASTER and TRAFIC
 - TOYOTA HI-ACE
 - VW CRAFTER, LT, LT35 und TRANSPORT

“True” N1 in the AAA-Database





Split in the Database when Applying the OICA Criteria



What are those “Others” that are excluded ?

make	models	Number of affected vehicles	PMR_gvm		PAYLOAD_max	
			from...	...to	from...	...to
CITROEN	JUMPY	33	23.2	39.9	872	1052
FIAT	SCUDO	17	24.4	39.9	924	1009
FORD	GALAXY	12	26.4	38.7	861	862
LAND ROVER	DEFENDER	6	29.4	30.4	900	1085
	FREELAND.	2	32.0	32.6	887	887
MERCEDES	CLASSE V	1	33.2	33.2	924	924
	SERIE G	1	35.8	35.8	865	865
SEAT	ALHAMBRA	19	26.4	38.7	852	862
VOLKSWAGEN	CADDY	4	24.5	33.1	851	889
	SHARAN	17	33.7	38.7	852	862

➤ Three kind of vehicles belong to this group:

- Some small commercial vehicles, between true commercial vehicle and passenger car.
- True Working Offroader with high payload and low engine power.
- Family vans with their base engines and high payload.
Not intended for commercial use, but with a similar design to carry big families and their luggage.

Examples for those “Others”





What are those “TRUE” N1 that are NOT excluded ?

make	models	Number of affected vehicles	PMR gvm		PAYLOAD max	
			from...	...to	from...	...to
CITROEN	JUMPER	3	25.3	32.4	820	845
FIAT	DUCATO	2	32.4	32.4	820	820
HYUNDAI	H-1	13	27.2	41.2	645	828
MERCEDES	208	1	23.0	23.0	805	805
	211	1	30.9	30.9	805	805
	311	1	28.6	28.6	810	810
	324	1	54.2	54.2	1550	1550
	VIANO	27	27.3	68.5	695	1225
	VITO	6	47.5	61.3	1055	1225
NISSAN	INTERSTAR	2	26.3	31.5	813	819
OPEL	MOVANO	1	37.5	37.5	850	850
	VIVARO	2	26.6	34.7	823	840
PEUGEOT	EXPERT	2	34.4	34.4	769	810
RENAULT	MASTER	9	26.3	38.1	805	850
	TRAFIC	8	22.9	35.4	720	849
TOYOTA	HI-ACE	7	26.9	33.1	785	835
VOLKSWAGEN	CRAFTER	1	42.8	42.8	849	849
	TRANSPORT	137	23.7	61.7	513	1135

Can the Proposed Parameters be Optimized?

- ▶ Are there better values for the power to mass ratio and the max payload ?
- ▶ One can repeat this exercise with other values for pmr and payload and will get the following ratios of failures in M1 and misses in N1:

	750 kg	800 kg	850 kg	900 kg
45 kW/t	495 / 102	303 / 116	152 / 191	54 / 295
40 kW/t	315 / 150	222 / 164	112 / 224	50 / 326
35 kW/t	207 / 349	170 / 357	80 / 414	35 / 494
30 kW/t	36 / 623	33 / 625	20 / 648	14 / 694

First Value: M1 exempted from ASEP

Second Value: N1 required to make ASEP

- ▶ The combination of a 40 kW/t and 850 kg gives the lowest total number of misses and failures. All other combinations are not as good as this one.



Summary

- ▶ The OICA criteria to exclude “TRUE” commercial vehicles in its N1 and M1 derivatives from ASEP testing as defined by

Payload \geq 850 kg AND PMR \leq 40 kW/t
where the PMR is based on the gross vehicle mass

is a good compromise.

- ▶ Only 1100 from 14780 vehicles in the database are affected at all.
 - ▶ In 112 cases vehicles are excluded from ASEP, which are not meant to be.
 - ▶ IN 224 cases vehicles are NOT excluded from ASEP, which are considered to be “TRUE” N1 and should not required to perform ASEP.

NO VEHICLES ARE EXCLUDED FROM ASEP WHICH DID TRIGGER THE WISH FOR THE DEVELOPMENT OF ASEP.