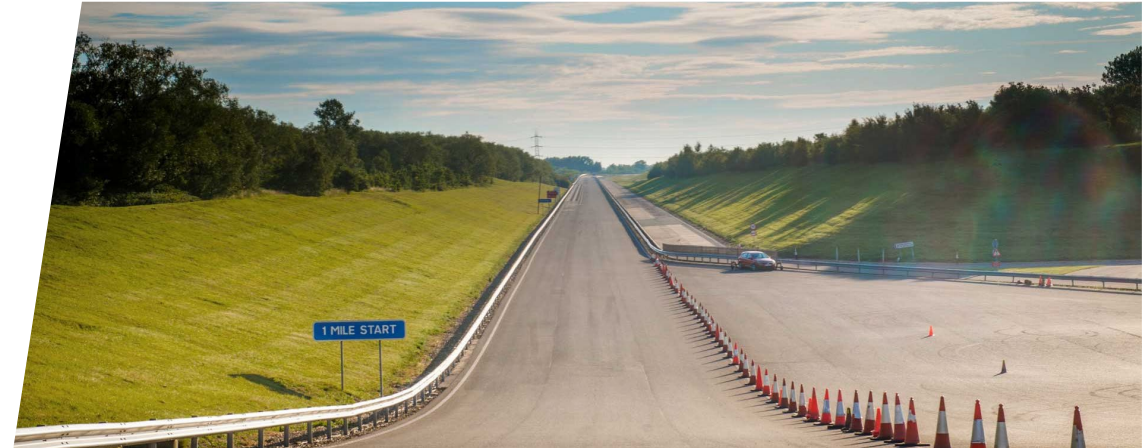




ACEA study on ASEP
16.09.2024 – *WP1 & WP2*



ACEA initiated a study on ASEP, which was later joined by several Contracting Parties (France, Germany, Japan, The Netherlands)

The study consists of two work packages



WP.1: Achievements by ASEP (as in force today)

WP.2: Monitoring of RD-ASEP

WP.1, started from the following questions:

- Did ASEP affect vehicle design and technology?
- Did ASEP lead to a remarkable release of single vehicle annoyance in real traffic?
- How is ASEP handled during type approval?

The following work packages were carried out during WP1

- WP1.1 → **Literature review**, on the development of ASEP and its impact on the product design.
- WP1.2 → **Questionnaire survey**, towards manufacturers and contracting parties
- WP1.3 → **Test campaign on vehicles**, 8 vehicles (4 twins) tested

OICA proposal

- Detecting **non-linearities**, cycle-beating, cheating.
- **Engineering** method based on a linear **regression** determined individually per vehicle.
- **Engine speed** based.

F/D proposal

- Based on **linear sound behaviour**.
- Establishing **limit curves** based on fixed slopes.

Slope-Assessment

- Combination of F/D and OICA proposals.
- Critics/limitations:
- The engine speed, as only explicative variable, limits the gear ratios to $k \leq i$ (for limiting the influence of the rolling noise).
- No Not-to-exceed limit (No worst-case).
- Slope-Assessment could allow noisier vehicles than R51.02.

Model-based approach

Netherlands proposal

- Establishing **limit curves**.
- Method not based on a physical noise model but geometrically built from both the **anchor** point and a **N-T-E** point at the **maximum** engine speed.
- Dealing with the worst-case, but the slope could be artificially flat, especially for vehicles with high rated engine speed.

Ref. Sound Assessment

- Preserving the **benefits** of **R51.02**.
- Operating conditions close to 61 km/h and 1.9 m/s².

L_{urban}-Assessment

- Defining a **vehicle of concern** using L_{urban} as **metric**.
- **Classifying** method **empirically** established from dataset.
- The assumptions make difficult to understand the physical noise behaviour of the vehicles.

Not-To-Exceed approach

Administration's observation: citizens' complaints (from environment groups)

- Sound emitted by M1 cars is perceived as **one source for annoyance**, but less important compared to other sources.

Administration's action: noise abatement for single events noises

- Installation of automated noise camera to **monitor sound** from passing vehicles
- Such monitoring can be used to gain an overview about **nature, number and timing of any kind of noise events** (sirens, horns, street sweepers, garbage trucks, modified vehicles, reckless driving, buses, trucks and more).

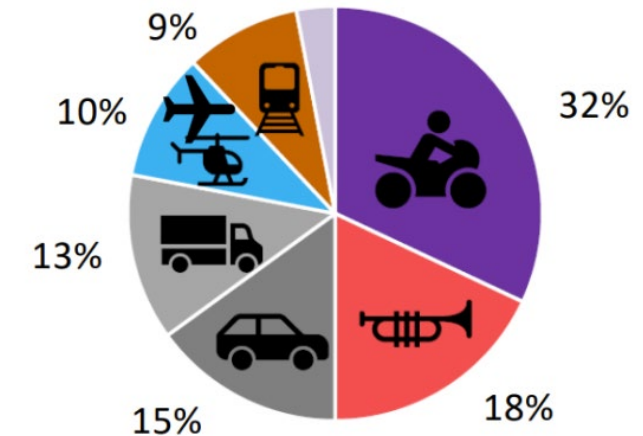
Manufacturer view: satisfying customers expectation (stipulated by press reports)

- Many customers request a **pleasant sound**.
- Compromise is needed to serve customer and comply with regulations (especially ASEP).

Press' (motor vehicles magazine) observation:

- The sound of newer car models seem to be **less emotional**.
- Customers report that new cars were "**disappointing** compared to previous models".

Major sources for citizen complaints

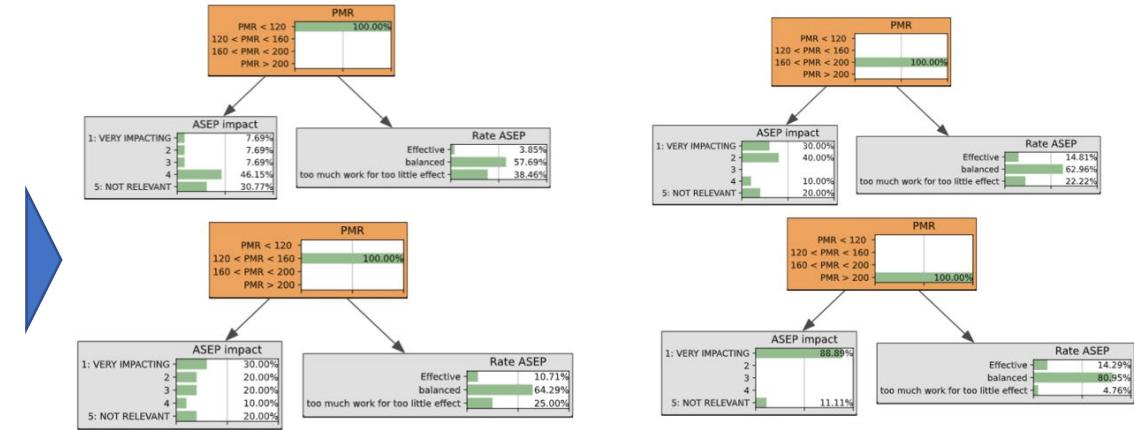


Medusa Noise Monitor

Key findings from OEMs questionnaire

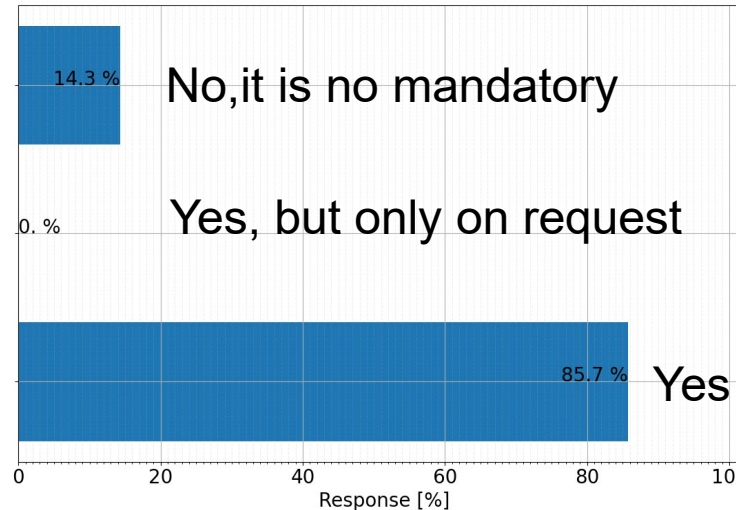
1. Most manufacturers apply the guidance of the GRB-68-03 voluntarily.
2. Correlation between the PMR and the impact of the ASEP.
3. Most manufacturers of vehicles with low PMR are little impacted by ASEP.
4. Most manufacturers of low PMR vehicles consider ASEP too time-consuming with minimal impact.
5. Most manufacturers of high PMR vehicles rate ASEP as being balanced regarding time consumption versus effort on sound reduction.
6. ASEP has an impact, especially on exhaust system, ECU and TCU.

Way of Data Analysis

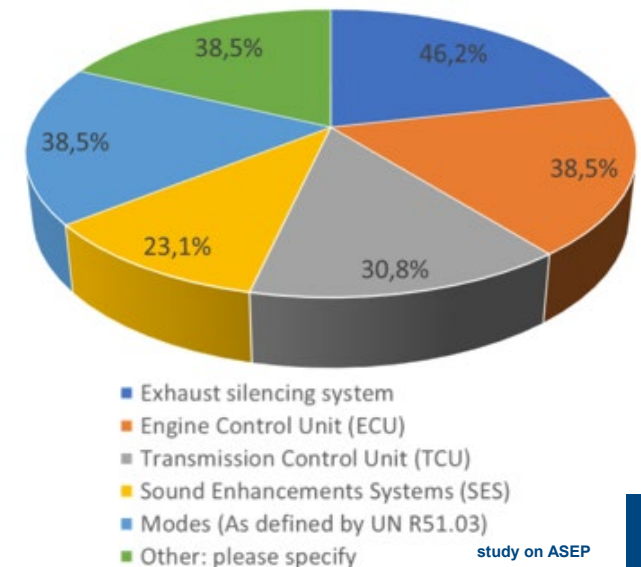


Answers to the questionnaire:

Do you follow the guidance of GRB-68-03?

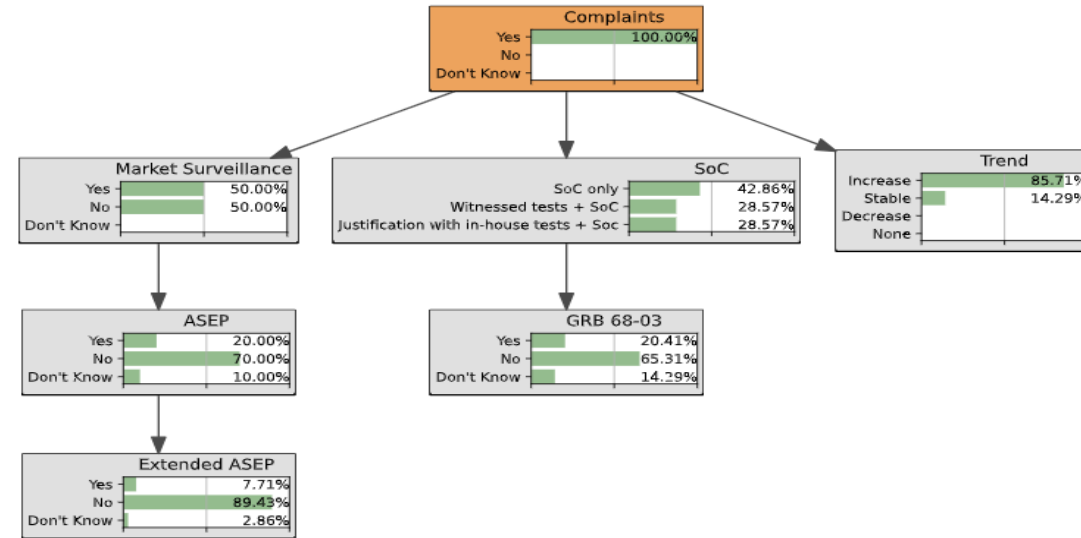


Which components were impacted by ASEP?

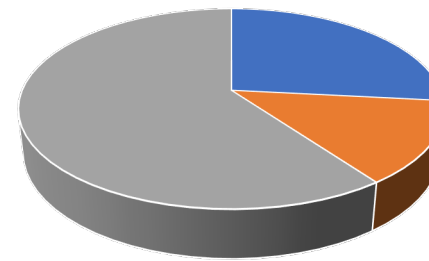


Key findings from CPs questionnaire

1. The trend of citizens' complaints seem to increase, which could be linked to more awareness of environmental noise issues (after Covid 19, with home office, ...).
2. Vehicle sound is not systematically controlled in the frame of Regulation 2018/858 market surveillance (MaS). Only half of CPs answering to the questionnaire apply MaS for vehicle sound.
3. ASEP is rarely tested during Market Surveillance
4. Low assessment or information regarding the ASEP effectiveness in reducing single vehicle noise.

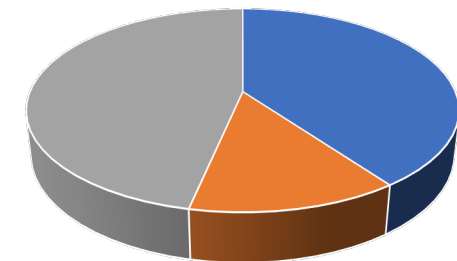


In your opinion, has ASEP contributed to making noisy single vehicles quieter?



■ YES ■ NO ■ DON'T KNOW

Is ASEP an important tool for single vehicle noise abatement ?



■ YES ■ NO ■ DON'T KNOW

Conclusions:

- At least, the EU system enables multiple tools to enforcement for noise abatement
- A recommendation is to
 - Systematically use the MaS
 - Enforce in-use controls and strength Periodical Technical Inspection (PTI).

WP1 Test program:

- Tests were performed according to **UN R51.02, UN R51.03, ASEP** and **partly RD-ASEP** based on the test program outlined by the IWG RD-ASEP in 2017/2018.
- Eight vehicles (four twin pairs) were identified as potential candidates.
- The term “Twin vehicle” refers to:
 - one approved under UN R51.02, and
 - the successor model approved under UN R51.03 (preferably stage 2).
- Vehicle selection was based on press reports, the outcome of questionnaires, and availability.
- Availability was a challenge as the target vehicles were high-powered and difficult to obtain therefore, data were also received from.
 - An authority research program conducted between 2018 and 2020
 - Manufacturer type approval tests (witnessed by their technical service)
- Test completion was achieved in August 2024.

TWIN 1 – Technical Background Information

TWIN 1 – OLD Model

General Approval Information		
Model Year	2015	
Official Approval	UN R51.02	73 dB(A)
For this study	UN R51.03	71 dB(A)

Tech. Data	Value	Unit
Engine	4 cylinder Petrol	1998 cc
Net Power P _n	201	kW
Rated Engine Speed S	5500	1/min
Curb Mass m _{ro}	1545	kg
PMR	143	kW/t
Reference Point	Front	
Tyre Dimension	225/40 ZR18 92W	
Max Vehicle Speed	254	km/h

GEAR RATIOS CALCULATED PER RUN								
AVG	9,6	15,7	21,6	29,1	35,0	43,0		
i	1	2	3	4	5	6	7	8

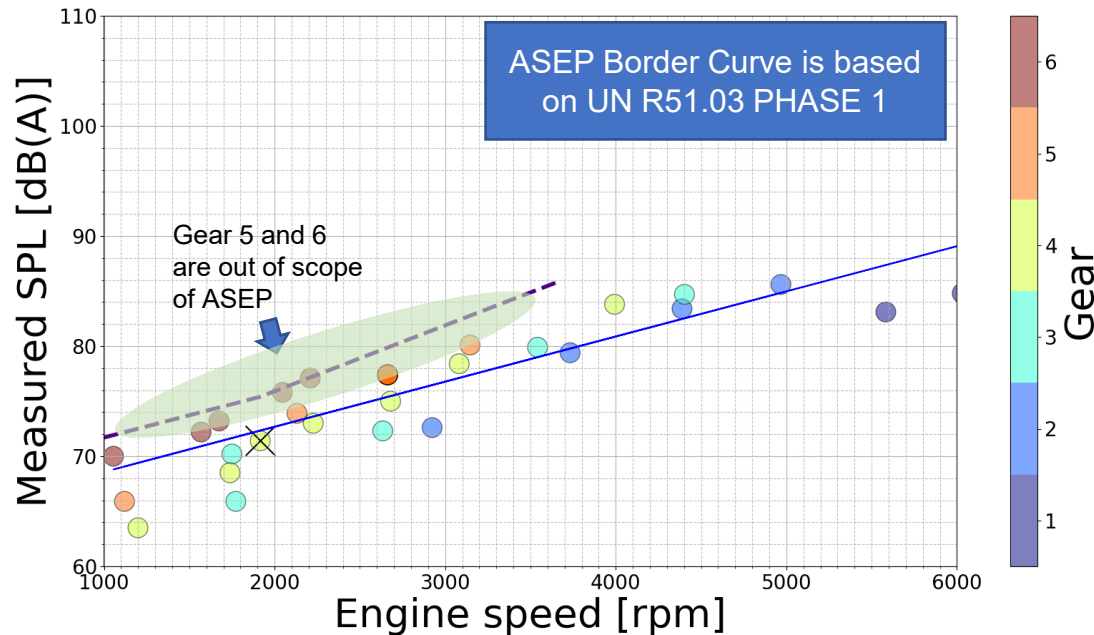
TWIN 1 – NEW Model

General Approval Information		
Model Year	2022	
For this study	UN R51.02	73 dB(A)
Official Approval	UN R51.03	70 dB(A)

Tech. Data	Value	Unit
Engine	4 cylinder Petrol	1,798 cc
Net Power P _n	221	kW
Rated Engine Speed S	8250	1/min
Curb Mass m _{ro}	1569	kg
PMR	141	kW/t
Reference Point	Front	
Tyre Dimension	235/40 ZR18 91Y	
Max Vehicle Speed	255	km/h

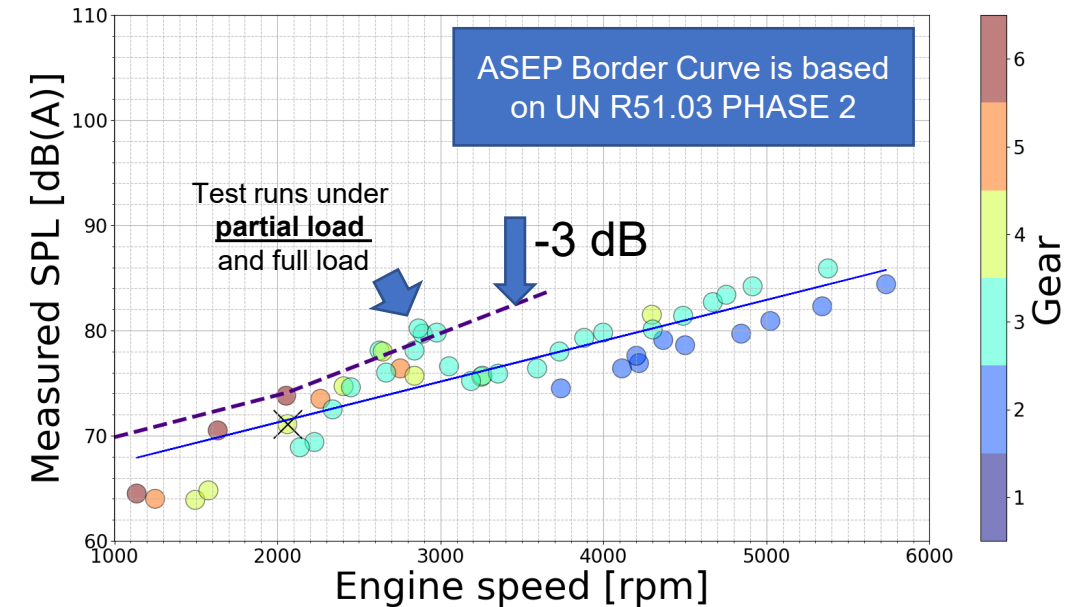
GEAR RATIOS CALCULATED PER RUN								
AVG	8,7	14,0	20,1	27,5	34,8	42,4		
i	1	2	3	4	5	6	7	8

TWIN 1 – OLD Model



Data Source: UTAC test data, 2024

TWIN 1 – NEW Model



Data Source: UTAC test data, 2024

FINDINGS:

- ❖ Old model is not affected by ASEP
- ❖ New model struggles more with the ASEP border curve created by a tailpipe resonance.
- ❖ However, especially for high engine revolutions shows much lower sound levels compared to the old model.

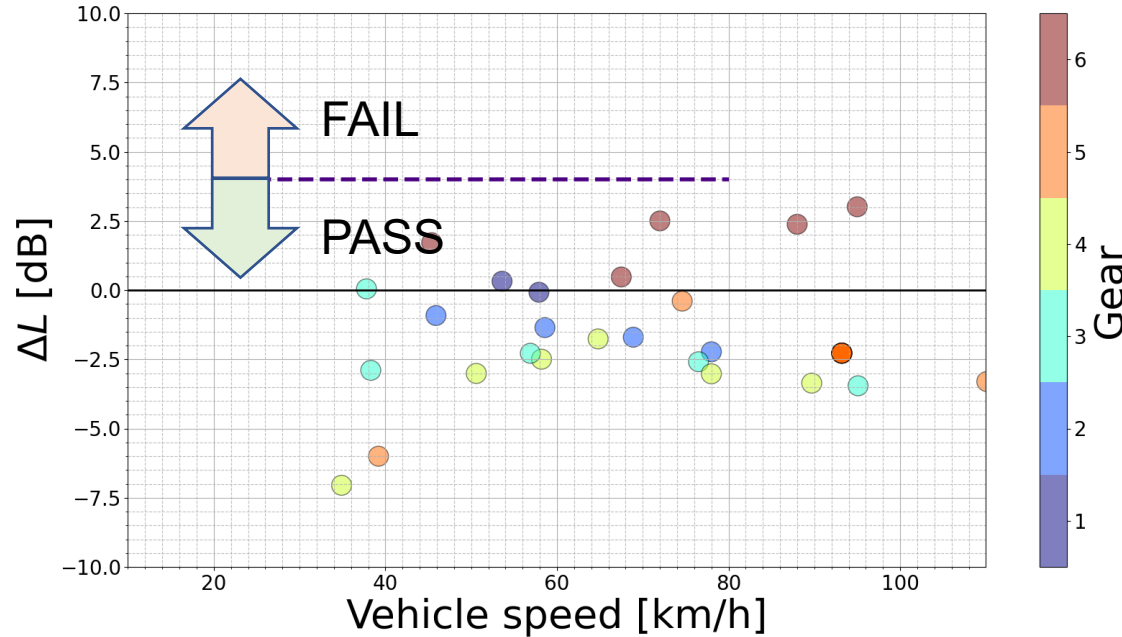


CONCLUSIONS:

- ❖ Overall, the new model is about 3-5 dB quieter than the old model
- ❖ Quieter tyres - even with bigger size - and a quieter powertrain enable the change

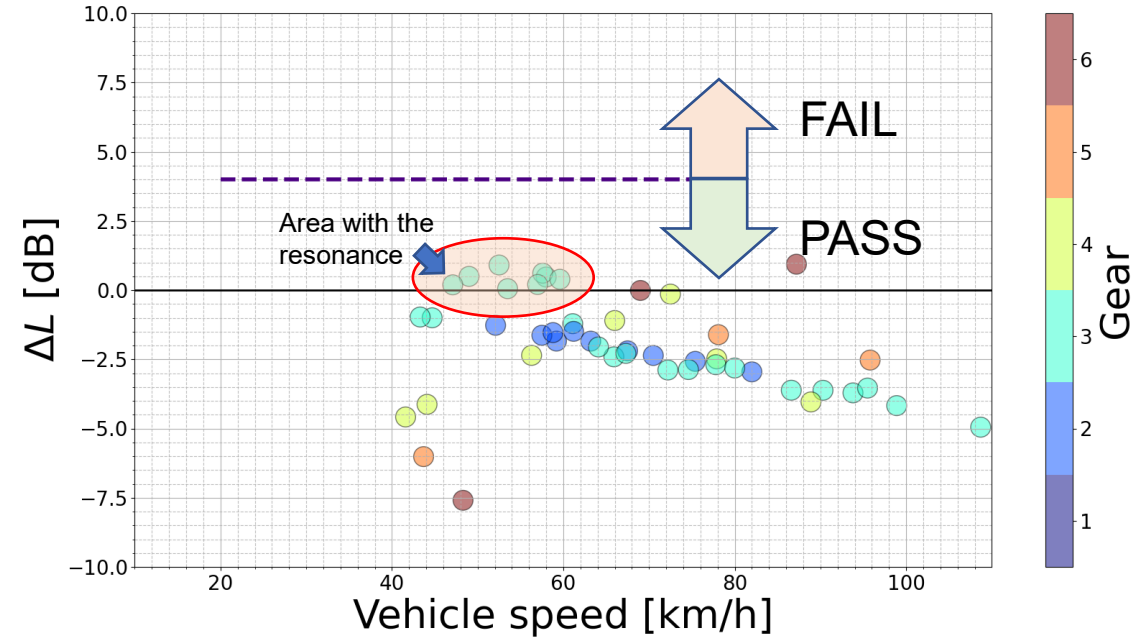
TWIN 1: L_{urban}-Assessment method

TWIN 1 – OLD Model



Data Source: UTAC test data, 2024

TWIN 1 – NEW Model



Data Source: UTAC test data, 2024

FINDINGS:

- ❖ Both vehicles (old and new) can pass the L_{urban}-Assessment
- ❖ The old model is closer to the L_{urban} border.
- ❖ For the new model, L_{urban}-Assessment indicates the area of sensitivity, but the vehicle can pass the test.
- ❖ Partial load run (not shown by this graphs) can be more critical compared to full load.

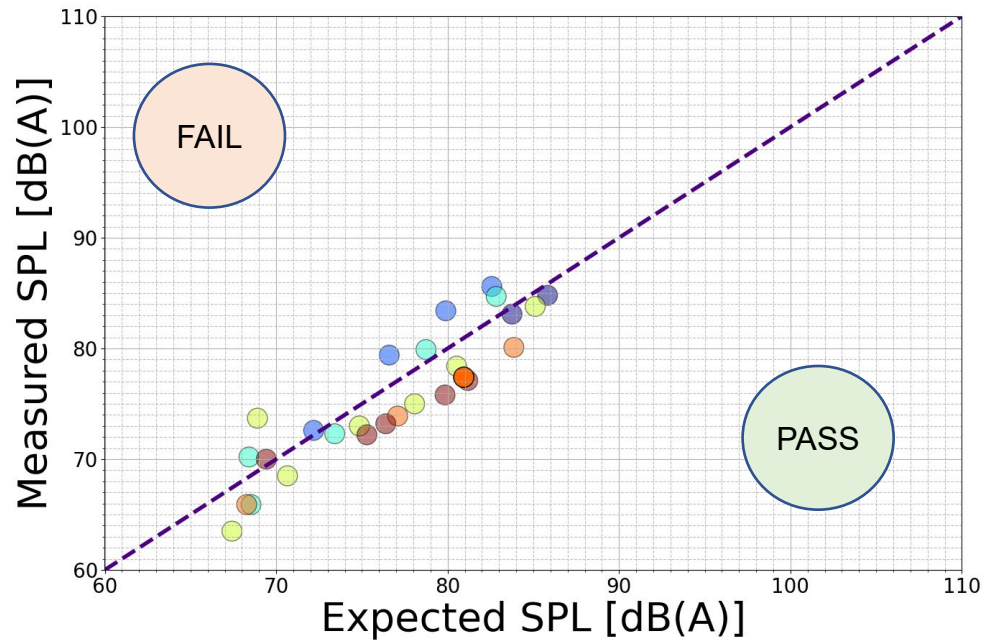
CONCLUSIONS:

- ❖ L_{urban}-Assessment is more tolerant compared to the Slope-Assessment.



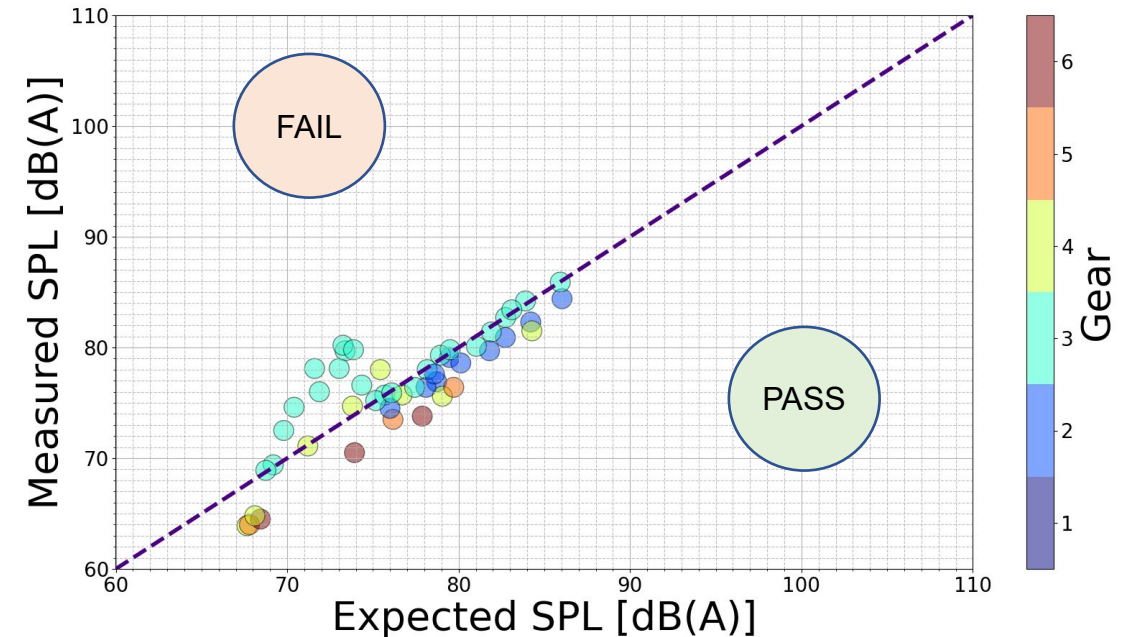
TWIN 1: RD-ASEP comparison measurement / expectation

TWIN 1 – OLD Model



Data Source: UTAC test data, 2024

TWIN 1 – NEW Model



Data Source: UTAC test data, 2024

FINDINGS:

- ❖ Both vehicles (old and new) fail RD-ASEP
- ❖ The new model could pass RD-ASEP, except of the resonance area.



CONCLUSIONS:

- ❖ The question can be raised, whether a single resonance shall create a fail of the vehicle in type approval.
- ❖ The scope of ASEP should be to identify, if a vehicle is deviating from the type approval manner over a large – driver usable range- from the expected sound level.

TWIN 2 – Technical Background Information

TWIN 2 – OLD Model

General Approval Information		
Model Year	2011	
Official Approval	UN R51.02	72.2 dB(A)
For this study	UN R51.03	73 dB(A)

Tech. Data	Value	Unit
Engine	8 cylinder Petrol	4 163 cc
Net Power P_n	331	kW
Rated Engine Speed S	8250	1/min
Curb Mass m_{ro}	1954	kg
PMR	169	kW/t
Reference Point	Front	
Tyre Dimension	265/35 R19 98Y	
Max Vehicle Speed	250	km/h

GEAR RATIOS CALCULATED PER RUN								
AVG		12,5	18,7	22,9	30,1	39,2		
i	1	2	3	4	5	6	7	8

TWIN 2 – NEW Model

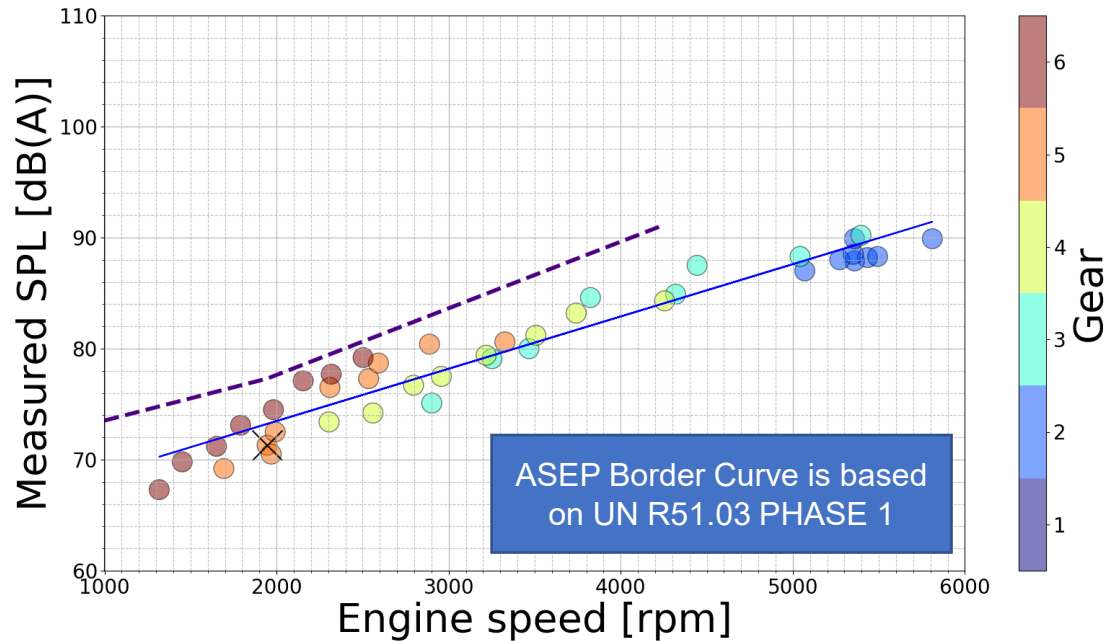
General Approval Information		
Model Year	2017	
For this study	UN R51.02	69 dB(A)
Official Approval	UN R51.03	71 dB(A)

Tech. Data	Value	Unit
Engine	6 cylinder Petrol	2 894 cc
Net Power P_n	331	kW
Rated Engine Speed S	6700	1/min
Curb Mass m_{ro}	1860	kg
PMR	178	kW/t
Reference Point	Front	
Tyre Dimension	275/30 R20 97Y	
Max Vehicle Speed	250	km/h

GEAR RATIOS CALCULATED PER RUN								
AVG		13,0	18,3	24,2	30,9			
i	1	2	3	4	5	6	7	8

TWIN 2: ASEP Slope-Assessment method

TWIN 2 – OLD Model

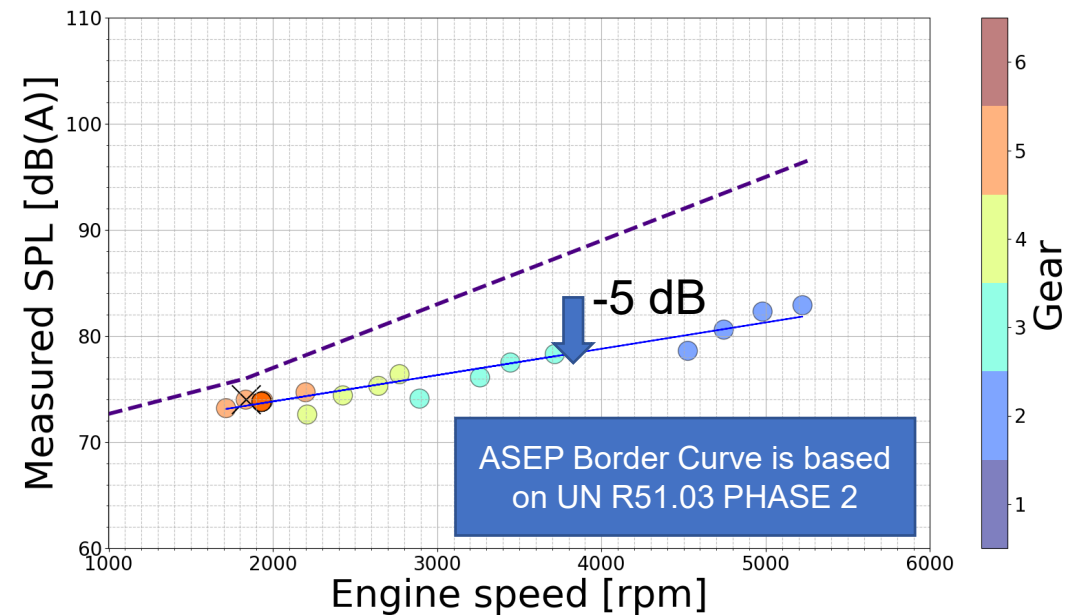


Data Source: Manufacturer Data, 2023, inhouse testing, data check by UTAC

FINDINGS:

- ❖ The old model can pass the ASEP test.
- ❖ The orange and brown points are higher gears, which are not in the focus of ASEP today.
- ❖ The new model is very different, given by a new engine. (V6 instead of V8), despite the wheel are bigger.

TWIN 2 – NEW Model



Data Source: Manufacturer Data, 2023, inhouse testing, data check by UTAC

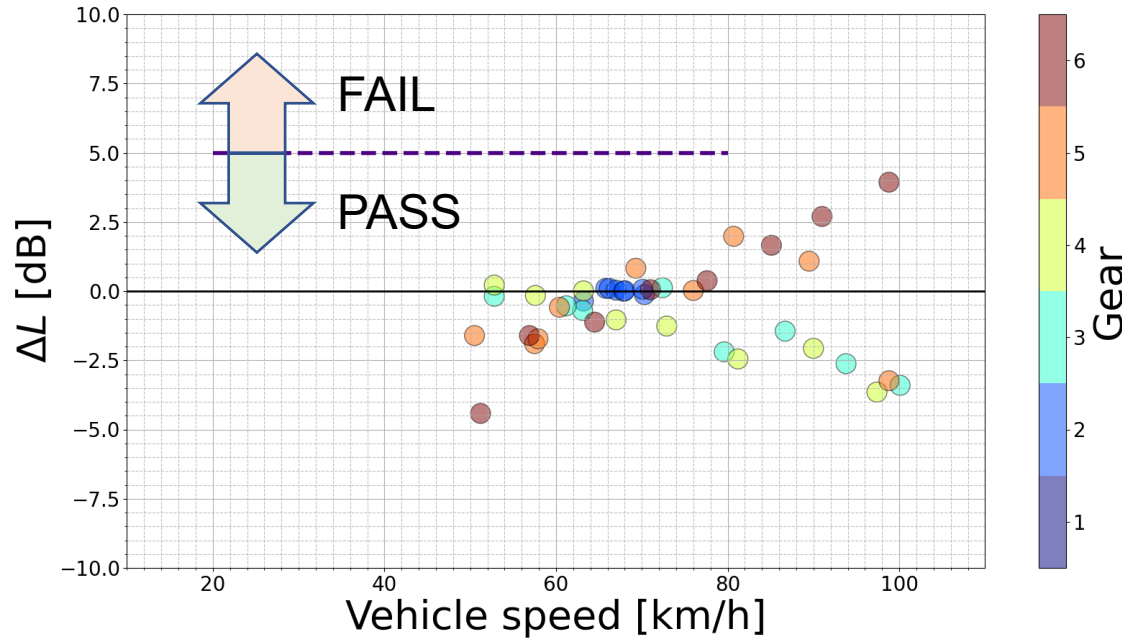
CONCLUSIONS:

- ❖ The new model show is about 5 dB to 8 dB quieter especially towards higher engine speeds.



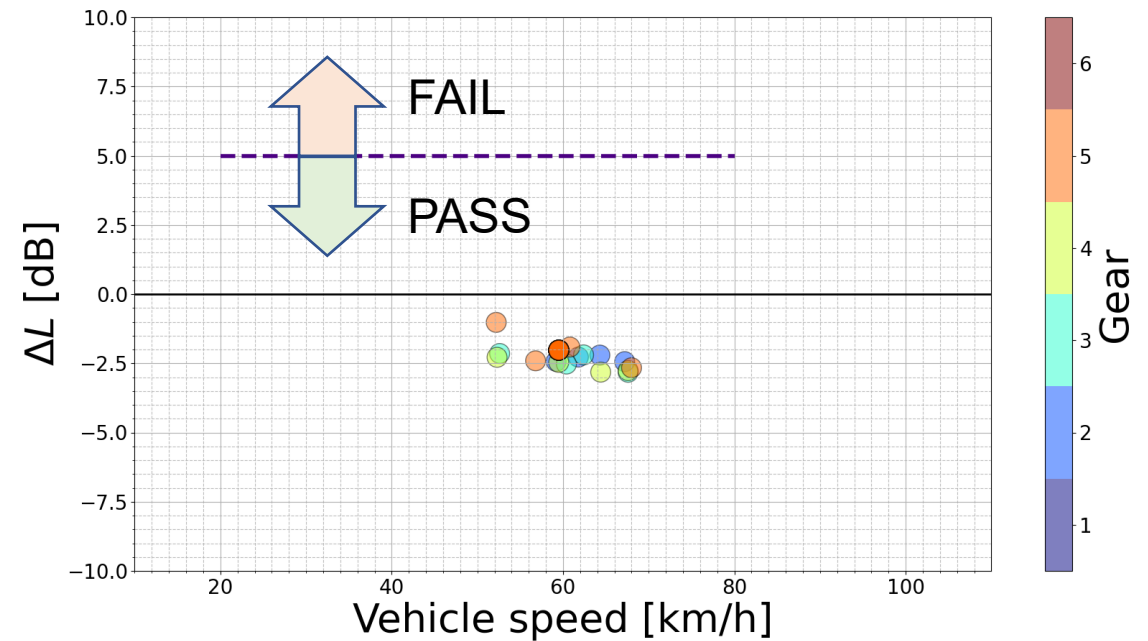
TWIN 2: L_{urban}-Assessment method

TWIN 2 – OLD Model



Data Source: Manufacturer Data, 2023, inhouse testing, data check by UTAC

TWIN 2 – NEW Model



Data Source: Manufacturer Data, 2023, inhouse testing, data check by UTAC

FINDINGS:

- ❖ Both vehicle comply with L_{urban} -Assessment.
- ❖ The new model is much below the ASEP border.

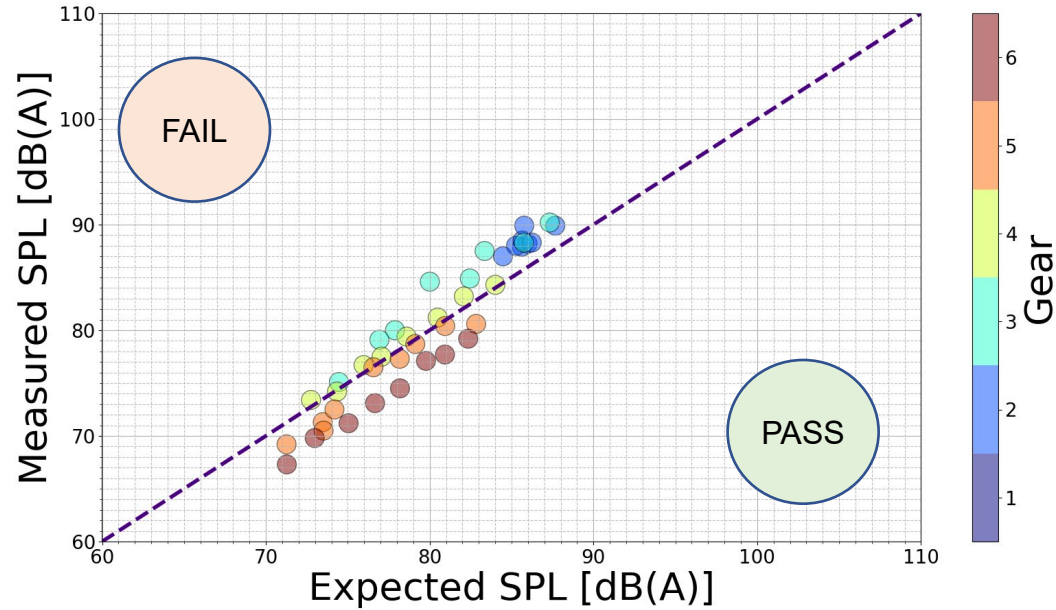


CONCLUSIONS:

- ❖ Again, the L_{urban} method is less demanding compared to the Slope -Assessment

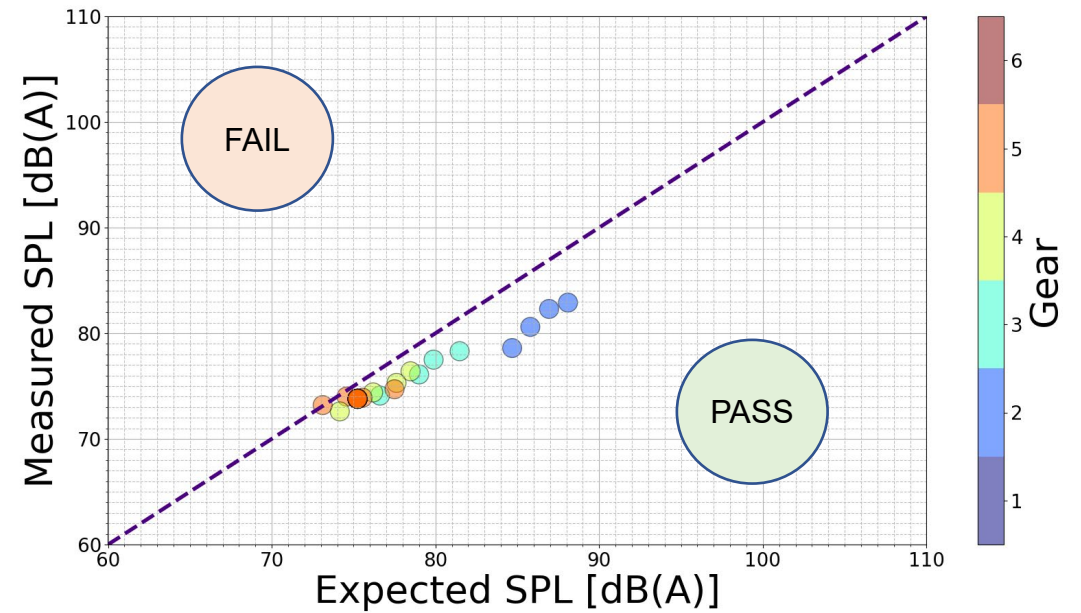
TWIN 2: RD-ASEP comparison Measurement / Expectation

TWIN 2 – OLD Model



Data Source: Manufacturer Data, 2023, inhouse testing, data check by UTAC

TWIN 2 – NEW Model



Data Source: Manufacturer Data, 2023, inhouse testing, data check by UTAC

FINDINGS:

- ❖ The old model cannot pass RD-ASEP in low gear over a large range, while the new model could pass RD-ASEP.
- ❖ The new model has no difficulties in passing even RD-ASEP.



CONCLUSIONS:

- ❖ RD-ASEP is more demanding compared to the current ASEP provisions.

TWIN 3 – Technical Background Information

TWIN 3 – OLD Model

General Approval Information		
Model Year	2017	
Official Approval	UN R51.02	74 dB(A) (Normal) 96 dB(A) (Sport)
For this study	UN R51.03	71 dB(A)

Tech. Data	Value	Unit
Engine	R5 Petrol	2480 cc
Net Power P _n	294	kW
Rated Engine Speed S	5850	1/min
Curb Mass m _{ro}	1476	kg
PMR	199,2	kW/t
Transmission	AT	6 Gears
Reference Point	Front	
Tyre Dimension		
Max Vehicle Speed	250	km/h

TWIN 3 – NEW Model

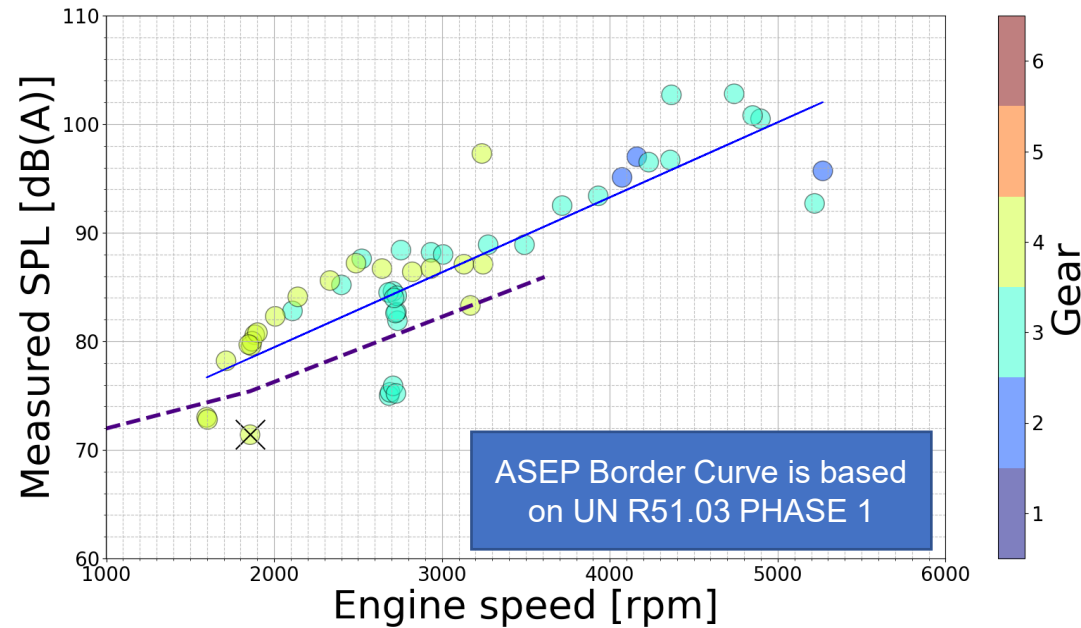
General Approval Information		
Model Year	2018	Facelift of OLD Model
For this study	UN R51.02	72 dB(A)
Official Approval	UN R51.03	70 dB(A)

Tech. Data	Value	Unit
Engine	R5 Petrol	2480 cc
Net Power P _n	294	kW
Rated Engine Speed S	7000	1/min
Curb Mass m _{ro}	1548	kg
PMR	189,9	kW/t
Transmission	AT	7 Gears
Reference Point	Front	
Tyre Dimension	245/35 R 19 (Front)	255/30 R20 (Rear)
Max Vehicle Speed	250	km/h

GEAR RATIOS CALCULATED PER RUN								
AVG		14,6	21,5	29,9				
i	1	2	3	4	5	6	7	8

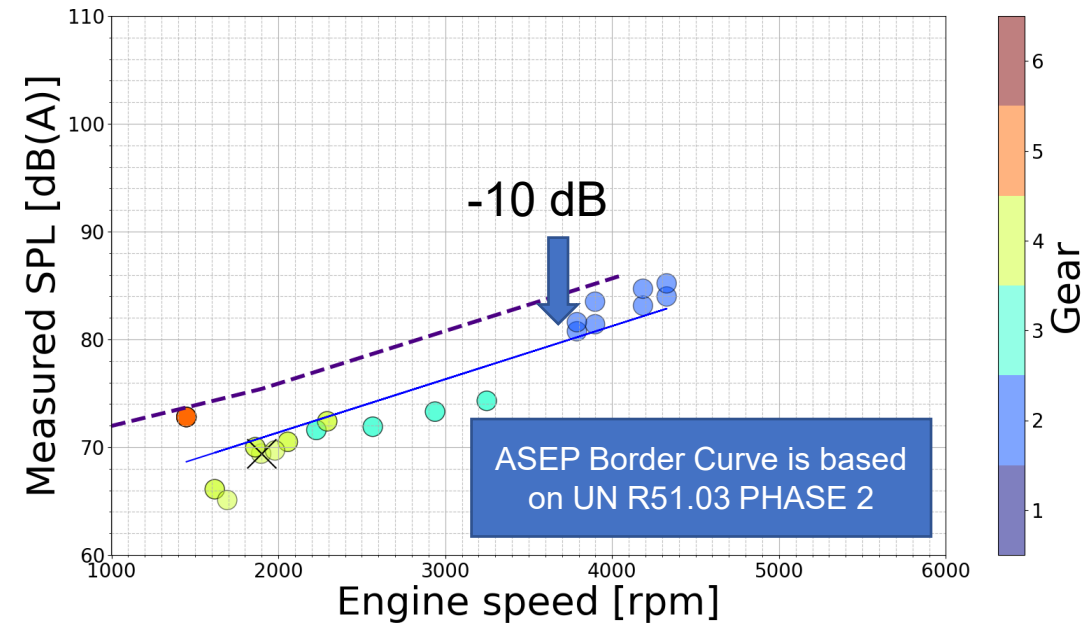
GEAR RATIOS CALCULATED PER RUN								
AVG		14,2	21,3	29,3	37,5			
i	1	2	3	4	5	6	7	8

TWIN 3 – OLD Model



Data Source: German UBA, 2020; Forschungskennzahl 3717 54 103 0 FB000238 *Überprüfung der Geräuschemissionen von Motorrädern im realen Verkehr Abschlussbericht*

TWIN 3 – NEW Model



Data Source: Manufacturer Data, 2018, gained during vehicle type approval; witnessed by technical service

FINDINGS:

- ❖ The old model does not comply with the ASEP Slope-Assessment (and was not forced to comply with it)
- ❖ The new model was approved under UN R51.03 phase 2 perspective and consequently complies with ASEP.
- ❖ The new model is 10 dB quieter than the old model.

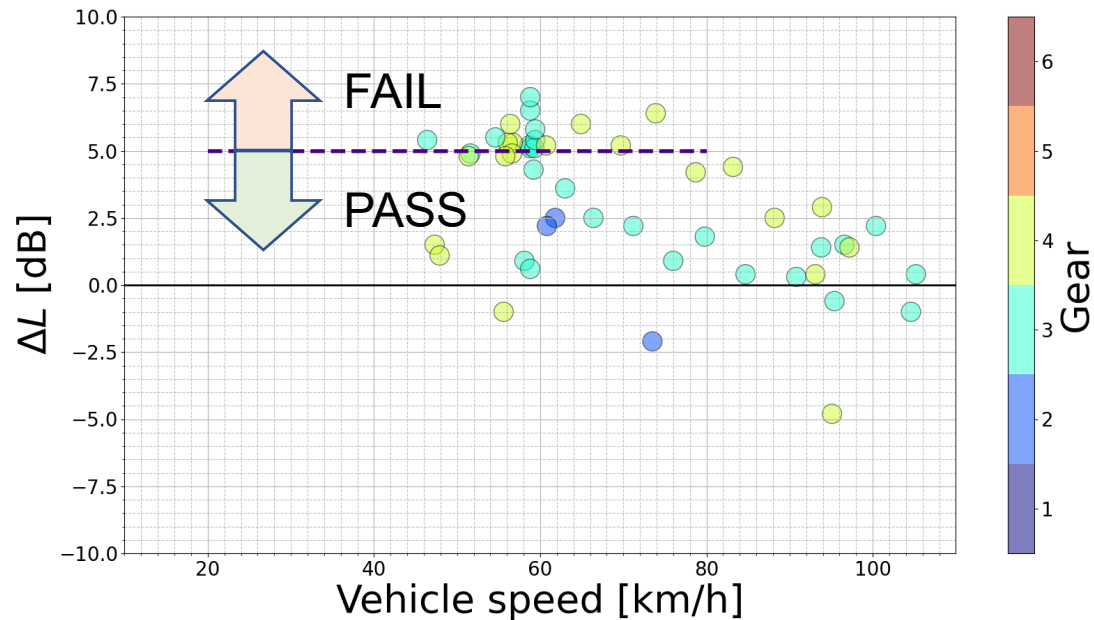


CONCLUSIONS:

- ❖ Both models comply with the UN R51.03 phase 3 limit of 71 dB
- ❖ **Only Annex 3 Provisions would not have forced any re-design.**
- ❖ **The re-design of the vehicle was stipulated by the ASEP provisions of UN R51.03.**

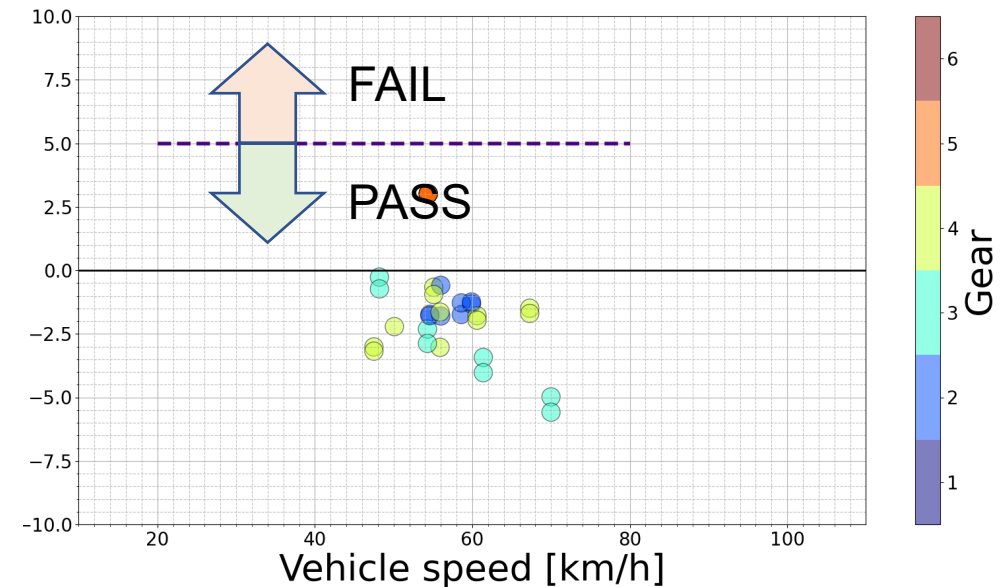
TWIN 3: Lurban-Assessment method

TWIN 3 – OLD Model



Data Source: German UBA, 2020; Forschungskennzahl 3717 54 103 0 FB000238 *Überprüfung der Geräuschemissionen von Motorrädern im realen Verkehr Abschlussbericht*

TWIN 3 – NEW Model



Data Source: Manufacturer Data, 2018, gained during vehicle type approval; witnessed by technical service

FINDINGS:

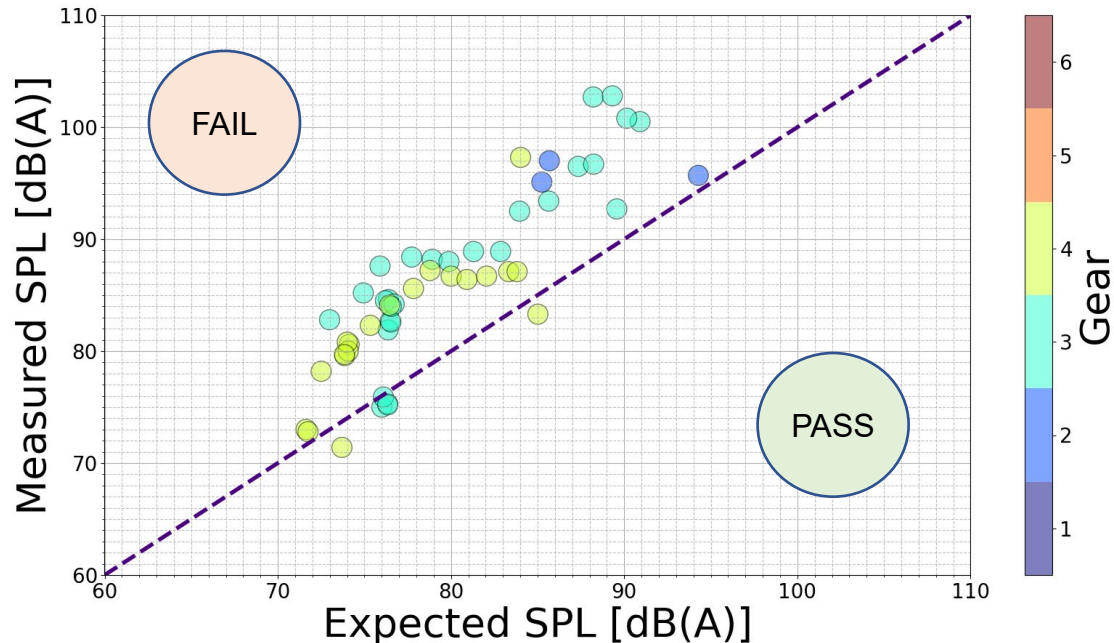
- ❖ Same finding, the old model does not pass the Lurban-Assessment.
- ❖ But, more „pass-points“ compared to the Slope-Assessment



CONCLUSIONS:

- ❖ Same conclusions as for the Slope-Assessment from the previous slide.
- ❖ Lurban is less stringent compared to the Slope-Assessment

TWIN 3 – OLD Model

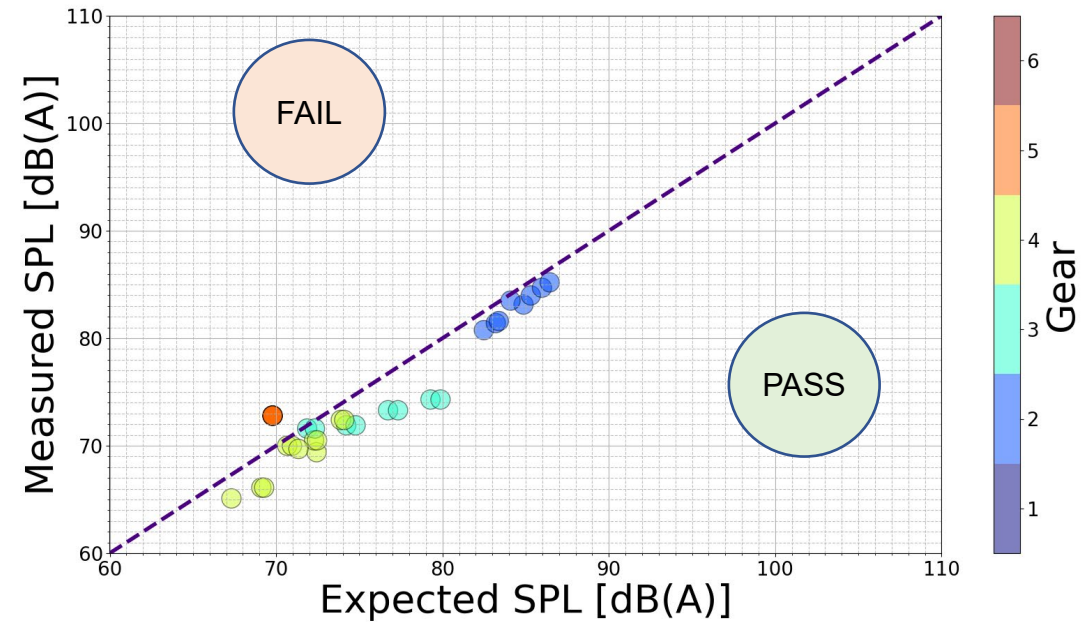


Data Source: German UBA, 2020; Forschungskennzahl 3717 54 103 0 FB000238 *Überprüfung der Geräuschemissionen von Motorrädern im realen Verkehr Abschlussbericht*

FINDINGS:

- ❖ Only few tested points of the old model can comply with RD-ASEP (5 points)

TWIN 3 – NEW Model



Data Source: Manufacturer Data, 2018, gained during vehicle type approval; witnessed by technical service

CONCLUSIONS:

- ❖ Here again, RD-ASEP is most stringent to the vehicle sound performance, compared to the existing ASEP evaluation methods



TWIN 4 – Technical Background Information

TWIN 4 – OLD Model

General Approval Information		
Model Year	(2016 R51.02) - 2019	
Official Approval	UN R51.02	74 dB(A) (AT-D) 90 dB(A) (MT-2/3)
For this study	UN R51.03 phase 1	72 dB(A)

Tech. Data	Value	Unit
Engine	R4 Petrol	1368 cc
Net Power P _n	132	kW
Rated Engine Speed S	5500	1/min
Curb Mass m _{ro}	1045	kg
PMR	126	kW/t
Transmission	Automized MT	5 Gears
Reference Point	Front	
Tyre Dimension		
Max Vehicle Speed	225	km/h

GEAR RATIOS CALCULATED PER RUN								
AVG	8,8	14,5	21,3	28,1	37,1			
i	1	2	3	4	5	6	7	8

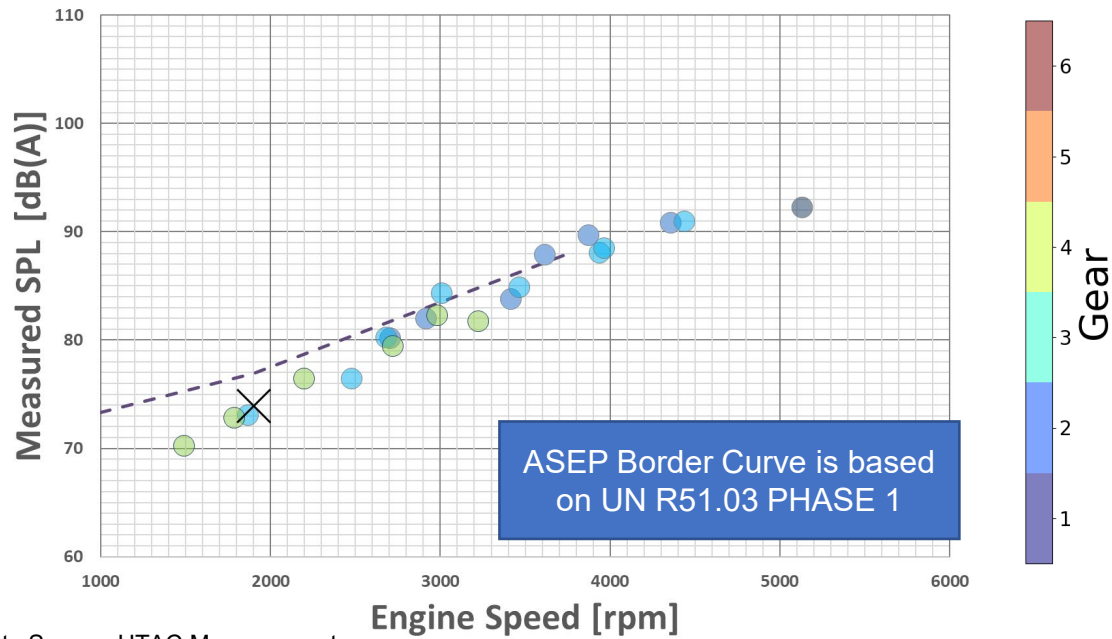
TWIN 4 – NEW Model

General Approval Information		
Model Year	2020	
For this study	UN R51.02	67 dB(A)
Official Approval	UN R51.03	67 dB(A)

Tech. Data	Value	Unit
Engine	Electric	cc
Net Power P _n	114	kW
Rated Engine Speed S	n.a.	1/min
Curb Mass m _{ro}	1335	kg
PMR	85	kW/t
Transmission	AT	1 Gear
Reference Point	Front	
Tyre Dimension		
Max Vehicle Speed	155	km/h

TWIN 4: ASEP : Slope-Assessment method

TWIN 4 – OLD Model



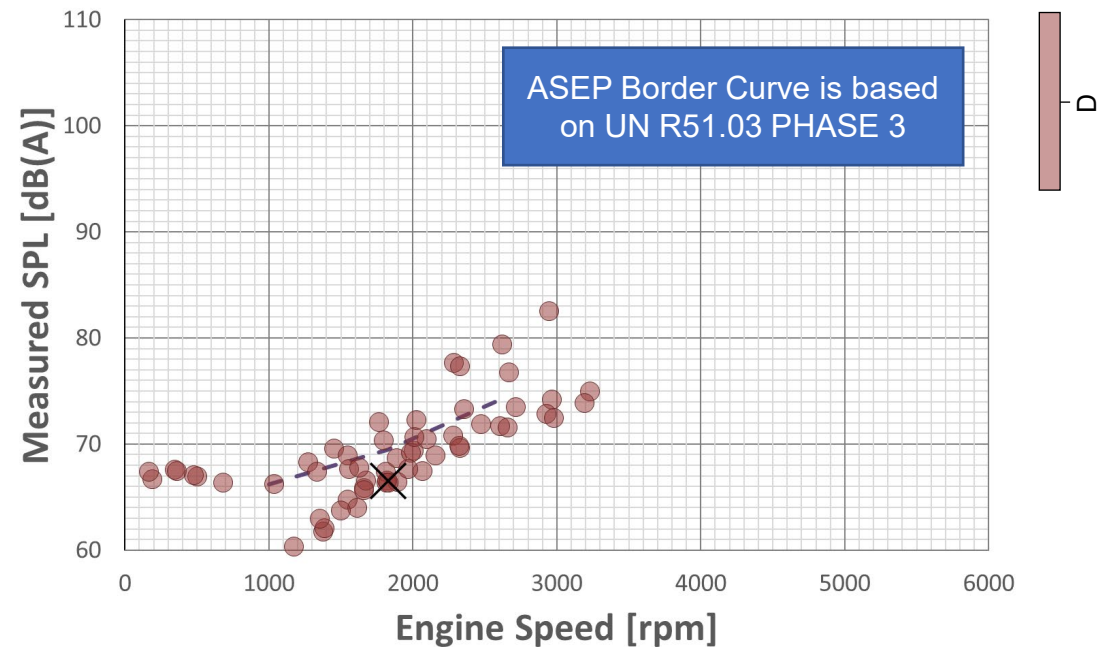
Data Source: UTAC Measurements

FINDINGS:

- ❖ The old model was approved under UN R51.02 in D.
- ❖ could have passed UN R51.03 phase 1 (due to low cruise test results, only tested in 4th gear manual) and it roughly complies with ASEP.
- ❖ Old model, would not meet the phase 3 limits as currently enforced.
- ❖ The new model is not subject to ASEP as it is an electric vehicle. However, if it were subjected to ASEP, it would not comply with the phase 3 limits.



TWIN 4 – NEW Model



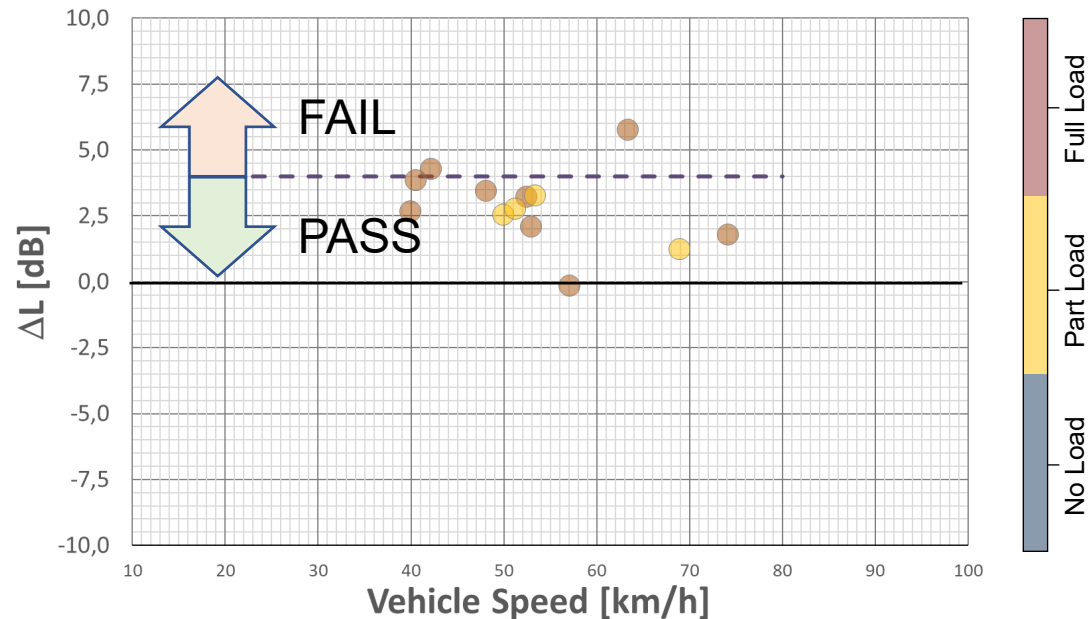
Data Source: UTAC Measurements validation

CONCLUSIONS:

- ❖ Although the new model is notably quieter compared to the old model, it does not comply with ASEP phase 3 limits.
- ❖ The artificially added sound is detected by the existing ASEP model.

TWIN 4: L_{urban} -Assessment method

TWIN 4 – OLD Model

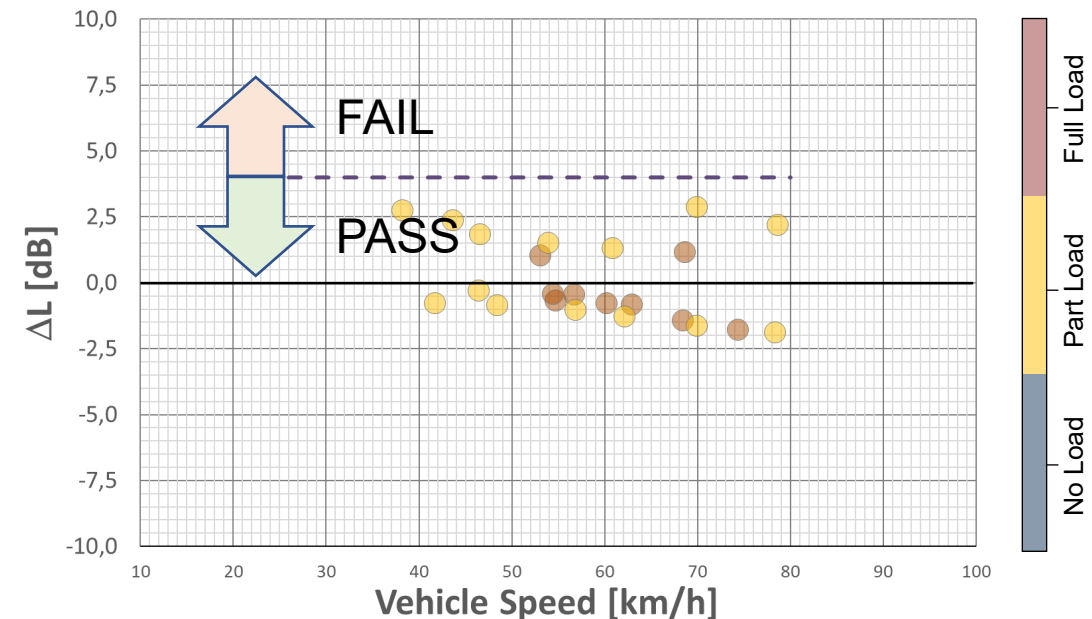


Data Source: UTAC Measurements

FINDINGS:

- ❖ L_{urban} and Slope assessment are very similar in this case for the old model, in both cases are near to fail.
- ❖ The new model passes the L_{urban} assessment.
- ❖ Extra loud points mentioned on previous page cannot be evaluated using L_{urban} assessment because all these points have accelerations below a_{urban} .

TWIN 4 – NEW Model



Data Source: UTAC Measurement validation

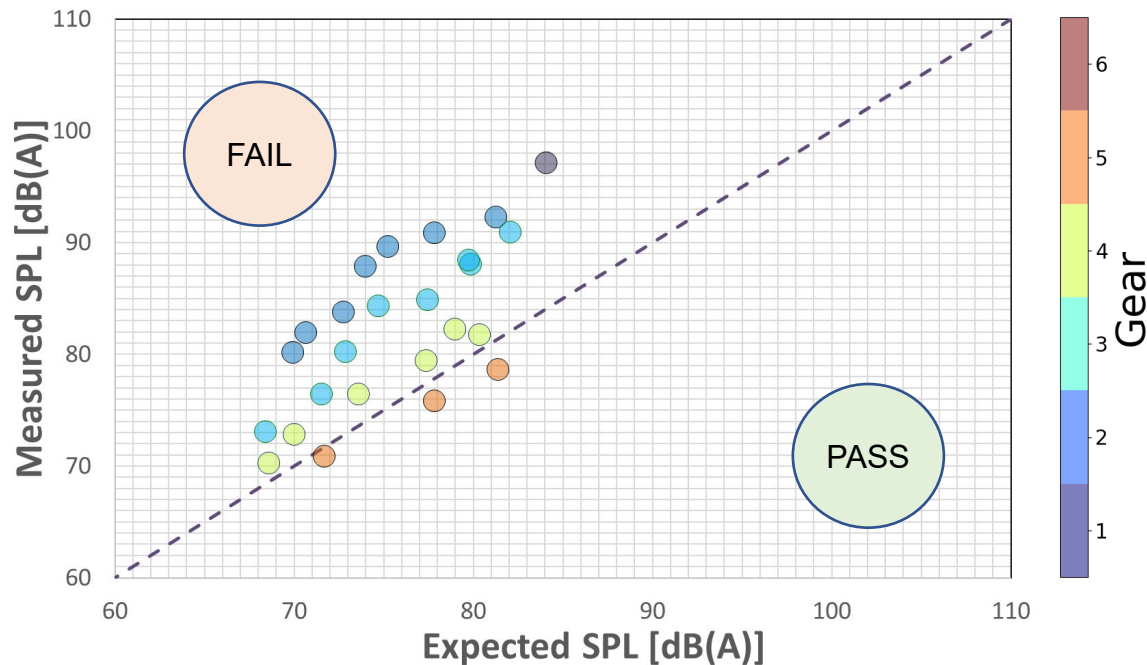
CONCLUSIONS:

- ❖ Although the old model fails the L_{urban} method, the method remains less demanding compared to the slope assessment method
- ❖ The L_{urban} method cannot assess artificially added sounds where there are no accelerations, as the algorithm does not support this type of assessment and would fail if attempted



TWIN 4: RD-ASEP comparison Measurement / Expectation

TWIN 4 – OLD Model

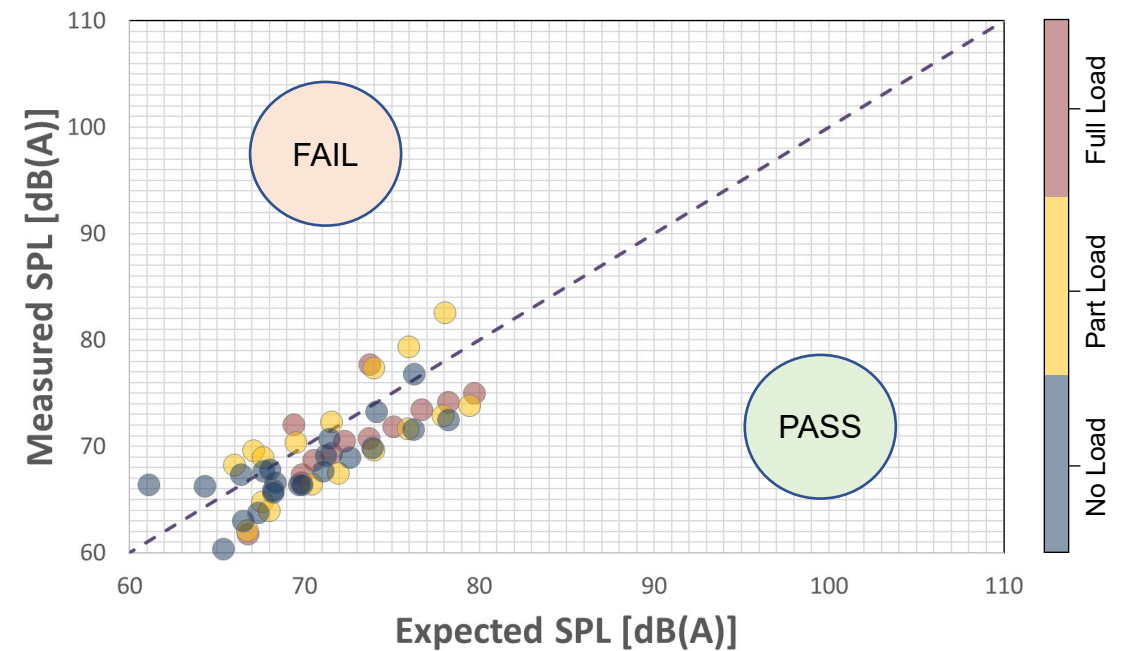


Data Source: UTAC Measurements

FINDINGS:

- ❖ The TWIN-4 old model mostly fails to meet all expected sound levels (the graph shows full load only).
- ❖ The new model can easily pass, except where the artificially added sound produces excessive noise.
- ❖ Overall, the sound level of the new model is 10 dB to 15 dB lower, even with the use of this artificial sound.

TWIN 4 – NEW Model



Data Source: UTAC Measurements

CONCLUSIONS:

- ❖ The new model is an electric vehicle with added sound in addition to the provisions of UN R138.
- ❖ Where excessive sound has been added, the RD-ASEP model detects it, and the vehicle fails to meet the expected sound levels.



Literature Review:

- ❖ Reports on real-world single-event noises show that vehicles subject to UN R51.03 ASEP contribute only a limited share to the overall problem.
Press releases indicate that newer models have less “thrilling sound” compared to previous models.

Questionnaire:

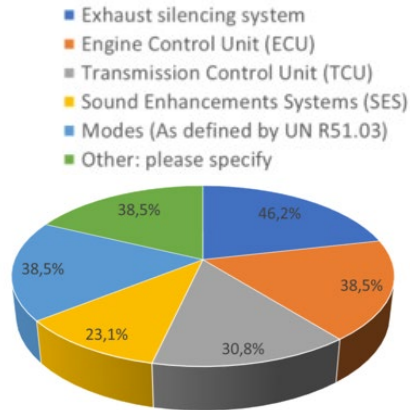
- ❖ Manufacturers report that ASEP impacts especially high-performance vehicles, requiring redesigns mainly of the exhaust system, ECU, and TCU.
- ❖ Most manufacturers apply the guidance of GRB-68-03 voluntarily.
- ❖ Contracting Parties confirm that noise from single vehicles is a pressing concern for citizens.
- ❖ However, for Market Surveillance exterior noise of vehicles is not systematically applied. and ASEP is rarely checked.

Test Campaign:

- ❖ **For all investigated TWIN, the newer models were substantially quieter compared to their previous model, even though the older models already complied with UN R51.03 Annex 3 limits**
- ❖ **The progress in sound reduction was driven by the enforcement of UN R51.03 limits (from phase 1 to phase 3) in combination with ASEP as a package**
- ❖ **Slope-Assessment is generally more stringent compared to L_{urban} -Assessment.**
- ❖ **The upcoming RD-ASEP (status as of the 2023/24 monitoring phase draft) will be more stringent compared to any current ASEP provisions.**

Questions asked for WP.1

Did ASEP affect product designs?

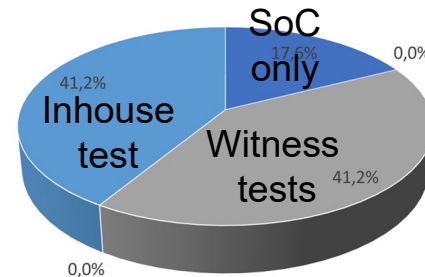


Answers by UTAC, based on the research, questionnaire analysis and test campaign:

YES, all new models tested were substantially quieter compared to the previous model, typically 5dB to 10dB, in some cases even more

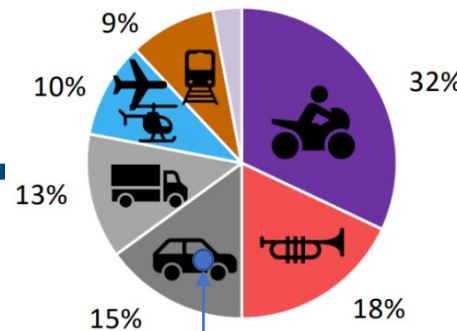
How is ASEP handled during type approval ?

Q6 How do you prove compliance with ASEP towards the TAA? (Multiple selection possible)



ASEP compliance, by statement of compliance (SoC) based on in-house tests, or witnessed tests together with the authority.

Did ASEP lead to a remarkable release of single vehicle annoyance in real traffic?



NO, complains by citizens have not been reduced; less than 30% of the fleet are UN R51.03 vehicles (**70% of the vehicles were never tested by ASEP**), so older vehicles, other noise sources, or aspects not subject to UN R51 play a role.

Study on ASEP – Final Conclusions

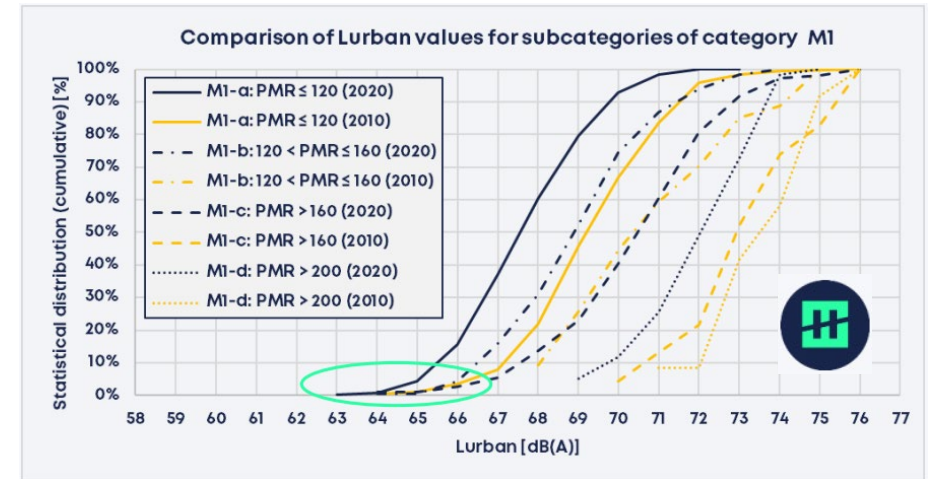
The study investigated in WP.1 the impact of ASEP on current vehicle technology.

Although only a limited number of vehicles were tested—perhaps too few for such a general conclusion—the result is clear.

The ATE EL study from 2021, conducted on behalf of ACEA, already indicated that progress in technology for M1 vehicles was greatest for high-performance vehicles (class M1-c).

Conclusion in one sentence can be expressed as:

UN R51.03, as a package of Annex 3 testing with limits in three phases, along with the specifications on ASEP (paragraph 6.2.3 of the main body plus Annex 7), has delivered significant progress for high-performance vehicles.



ATE EL study on behalf of ACEA, August 2021

Main findings for category M1

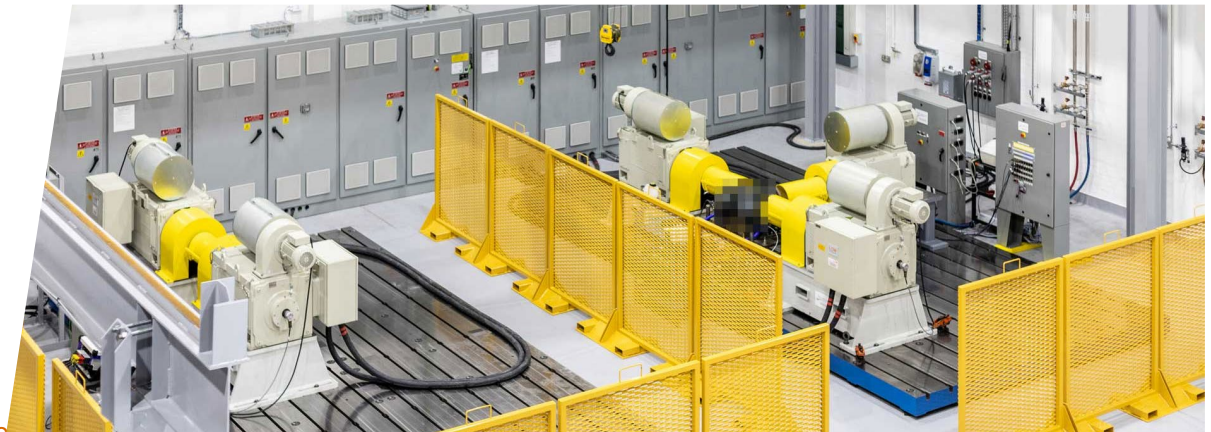
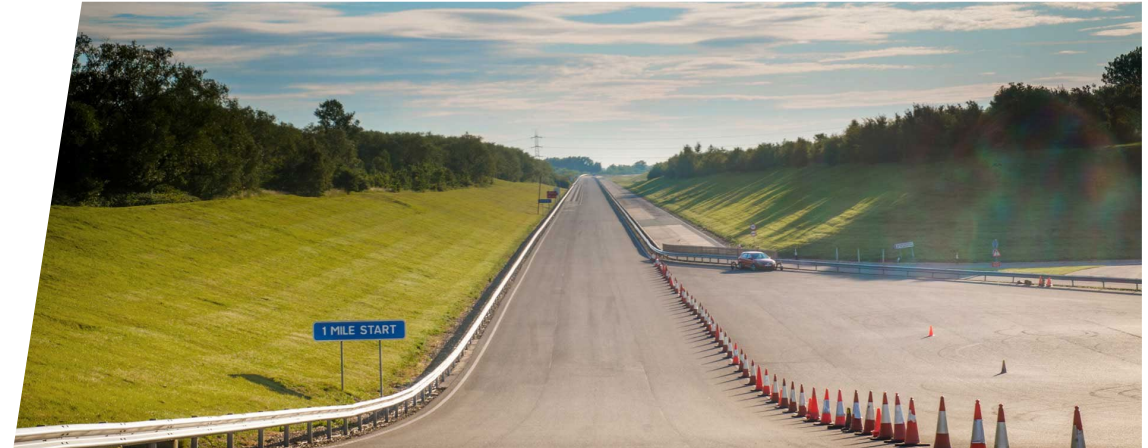
Mean values improvements:

- ✓ M1-a: -1.6 dB(A)
- ✓ M1-b: -1.5 dB(A)
- ✓ M1-c: -2.5 dB(A)
- ✓ M1-d: -1.5 dB(A)

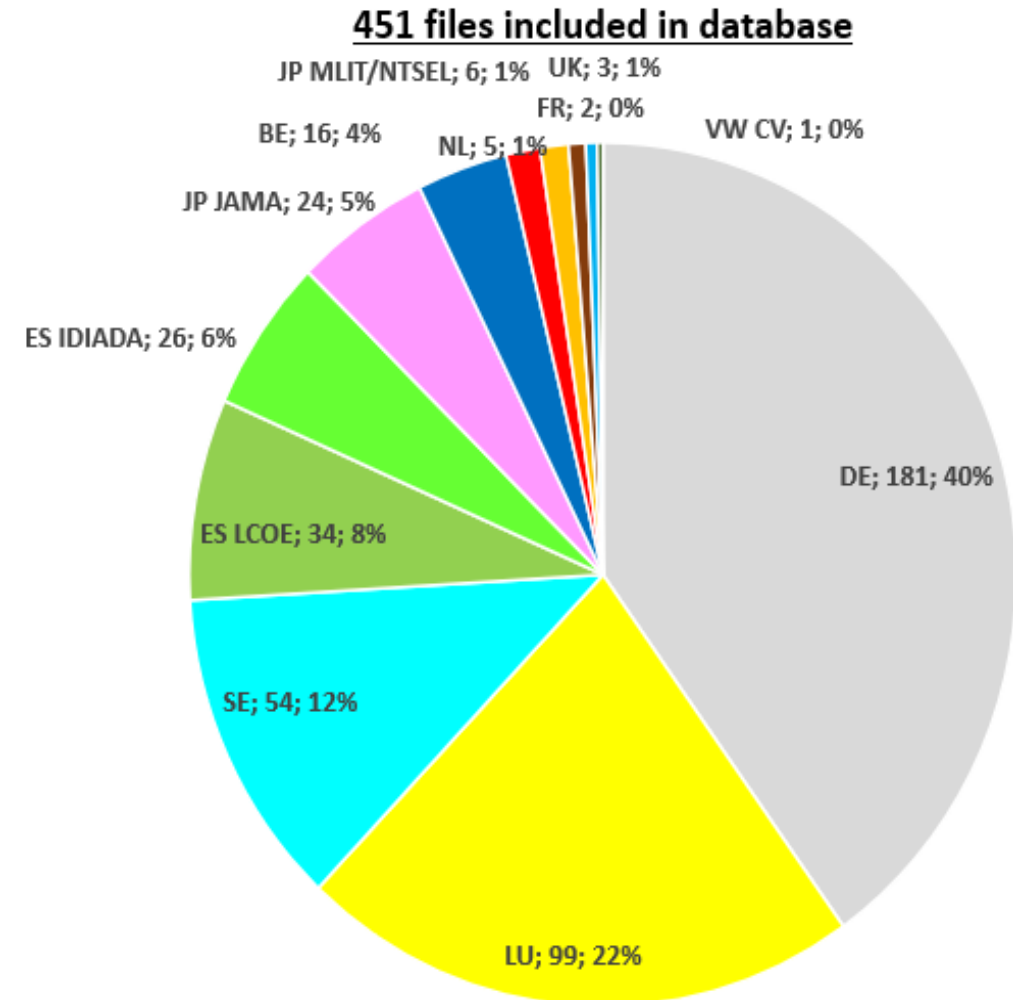


ACEA study on RD-ASEP data base

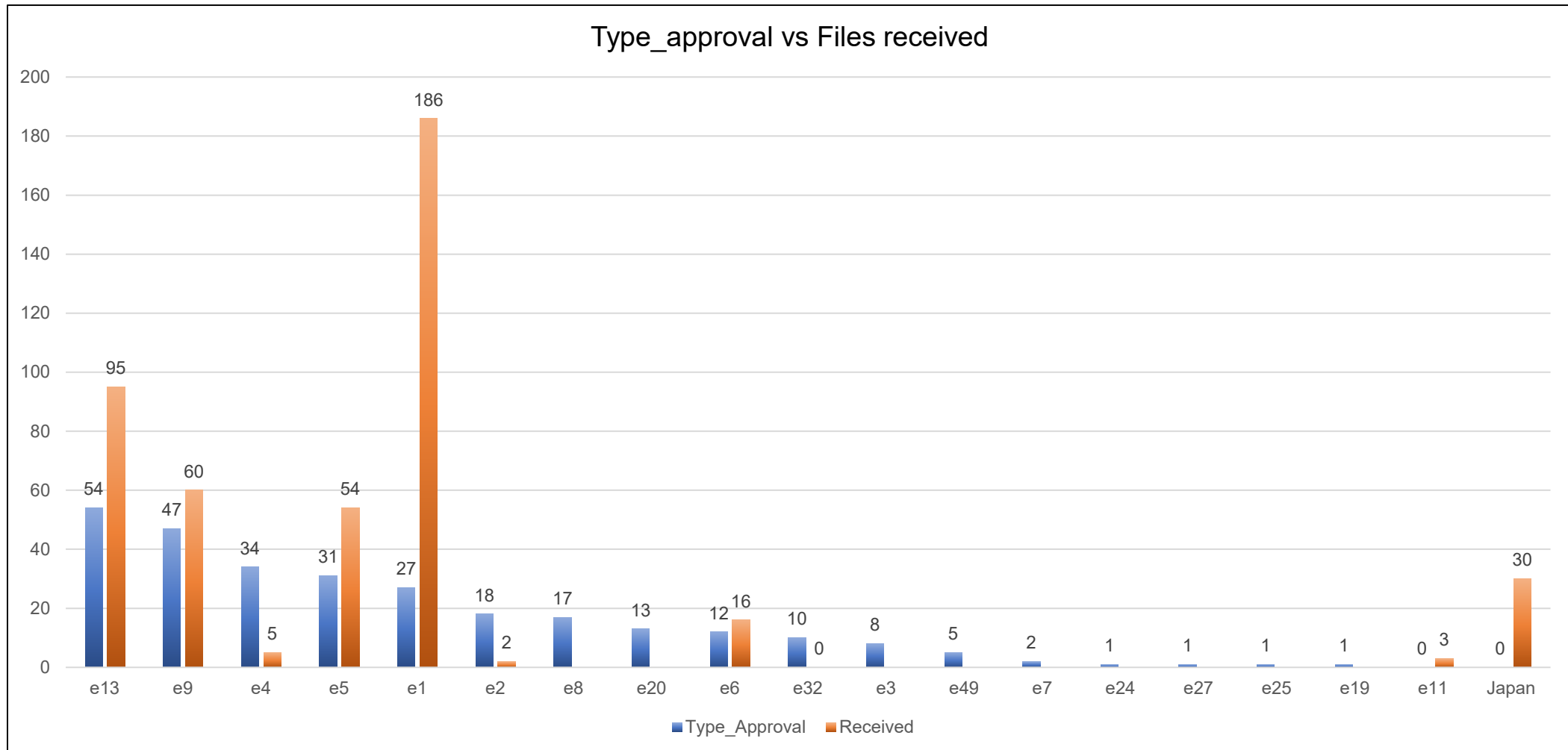
WP2



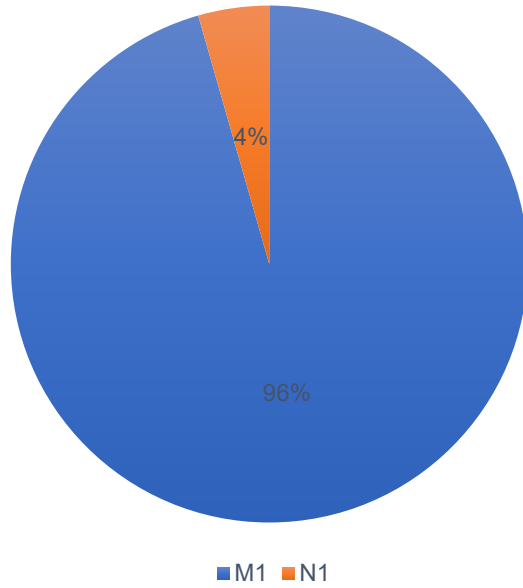
Nombre de Fichier	Étiquettes de colonnes		Total général
Étiquettes de lignes	N	O	
DE		181	181
LU		99	99
SE		54	54
ES LCOE		34	34
ES IDIADA		26	26
JP JAMA		24	24
BE	2	16	18
JP MLIT/NTSEL	1	6	7
NL	2	5	7
UK		3	3
FR		2	2
VW CV		1	1
Total général	5	451	456



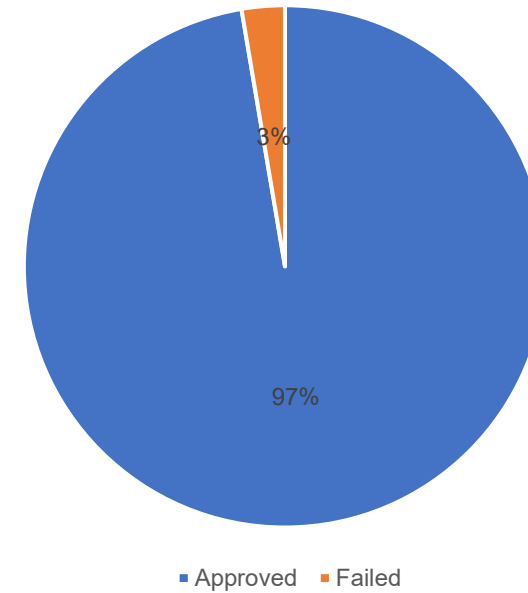
Around **800** files were expected when the program started, but only **451** have been collected

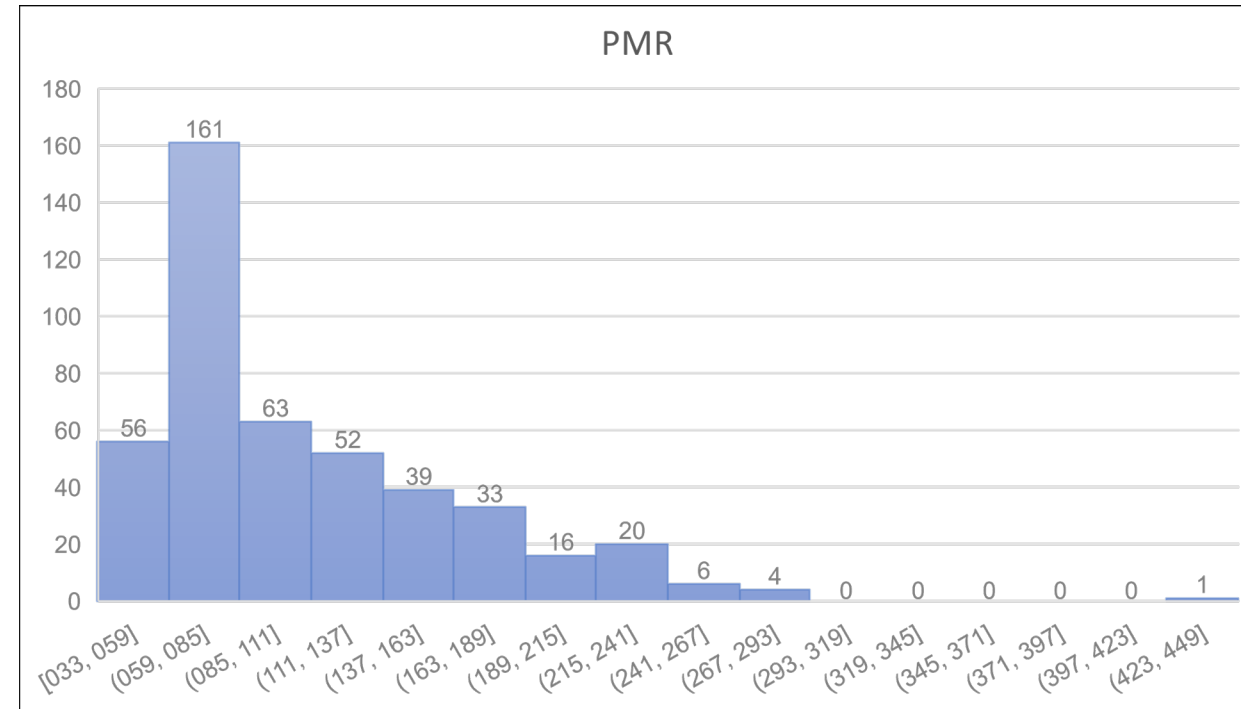
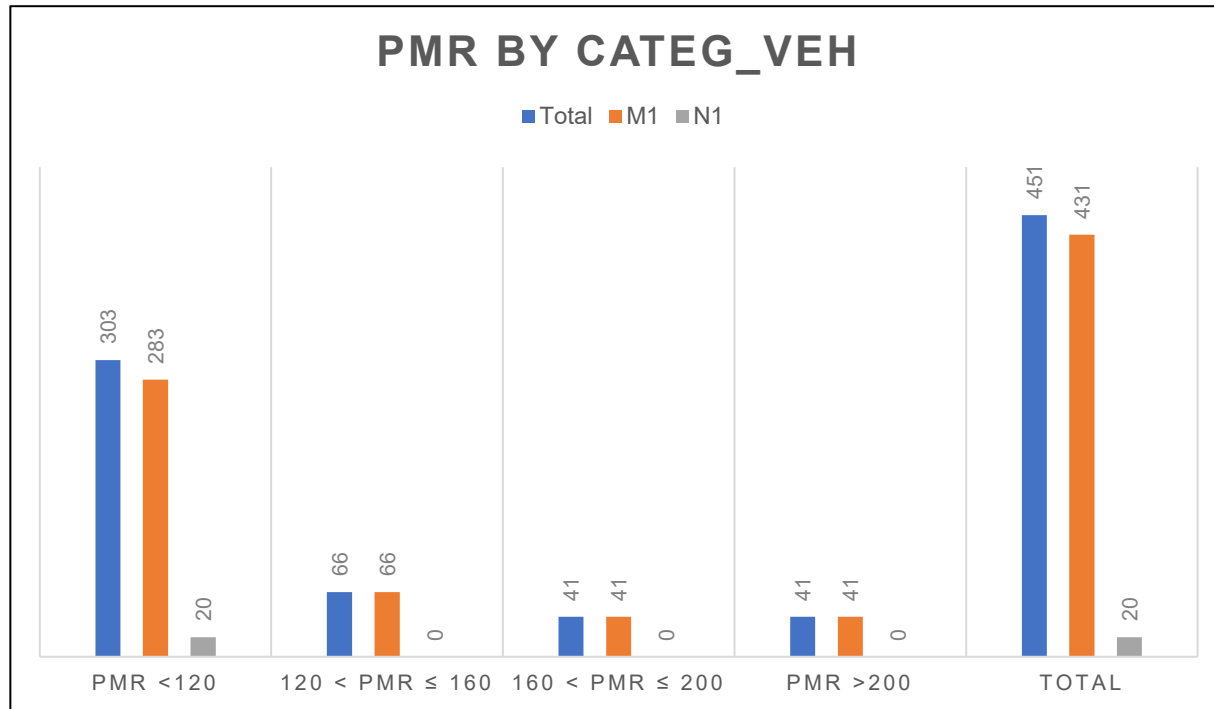


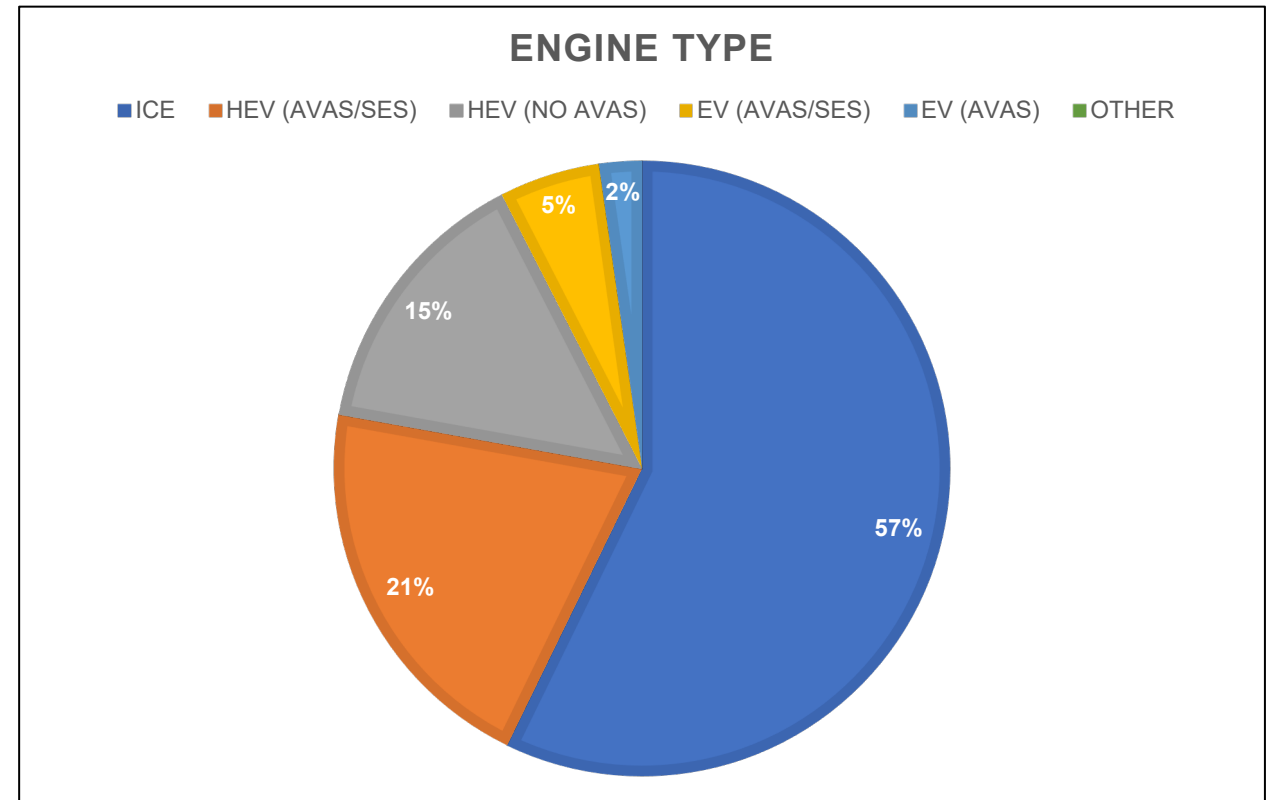
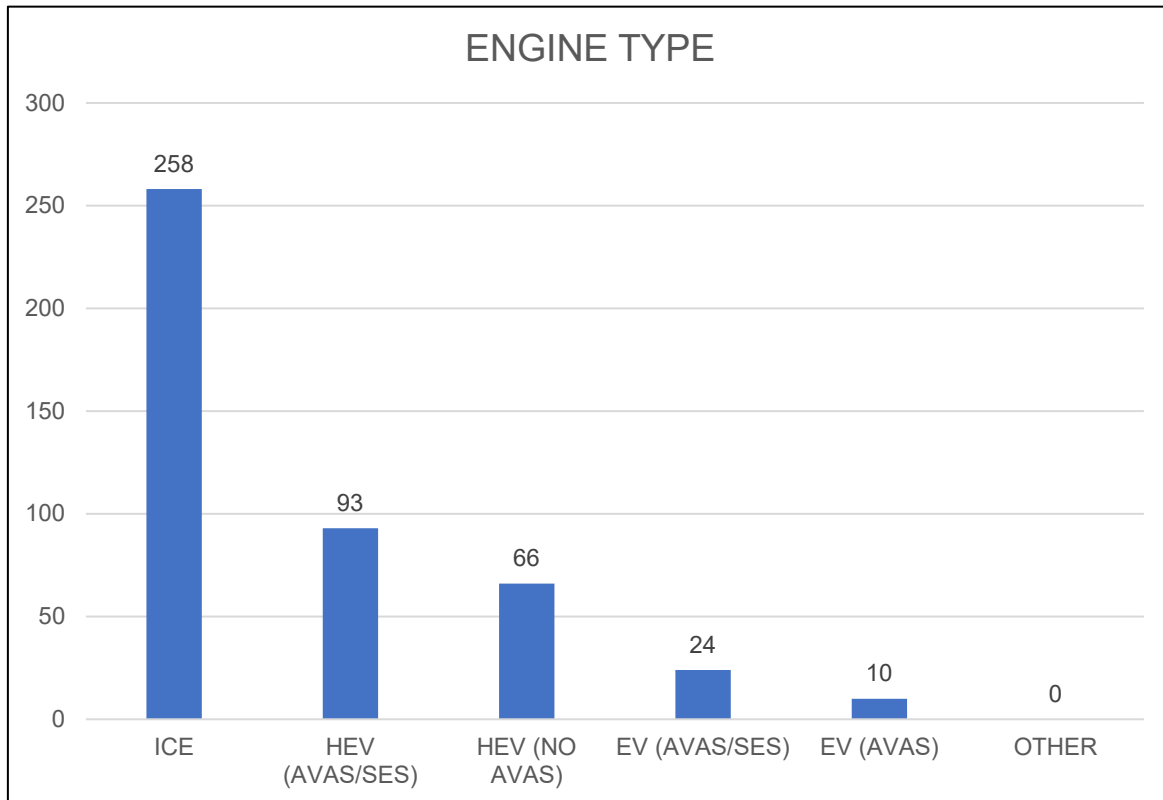
Categ veh



CONFORMITY CHECK

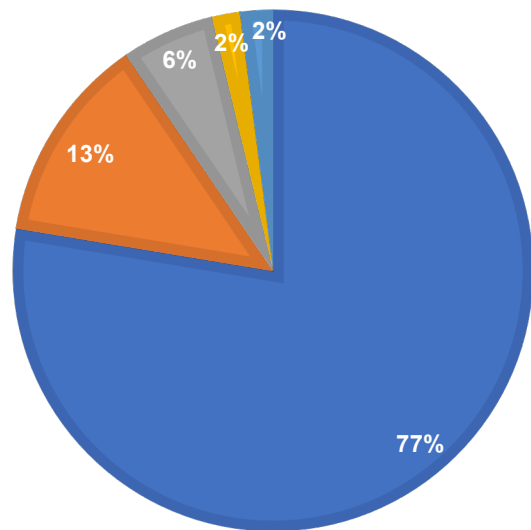




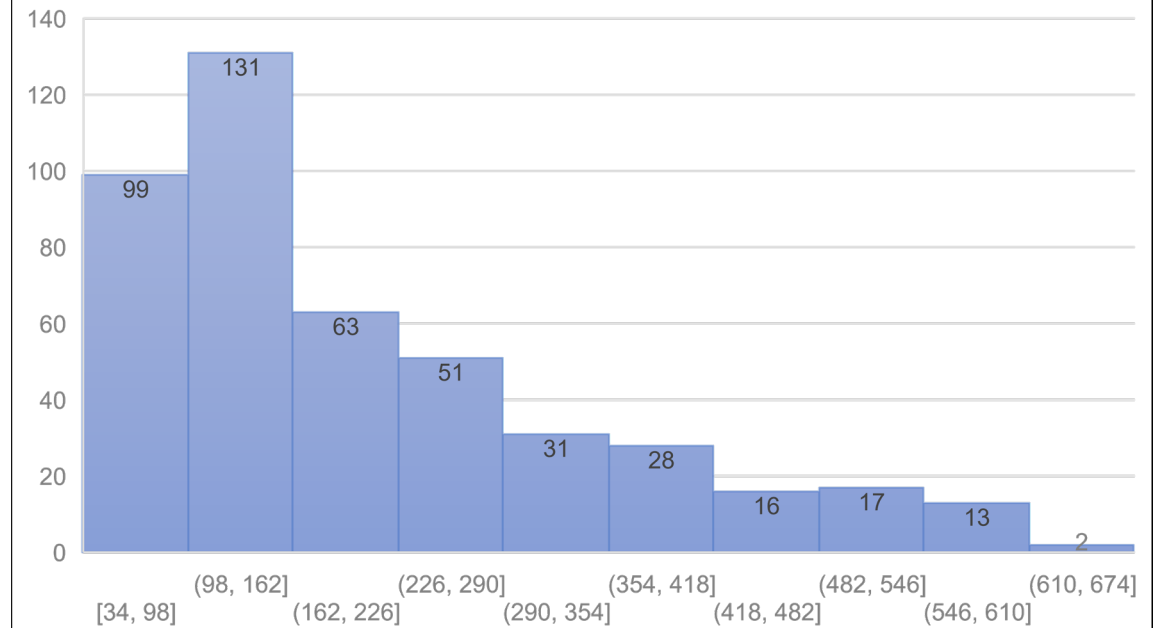


TRANSMISSION TYPE

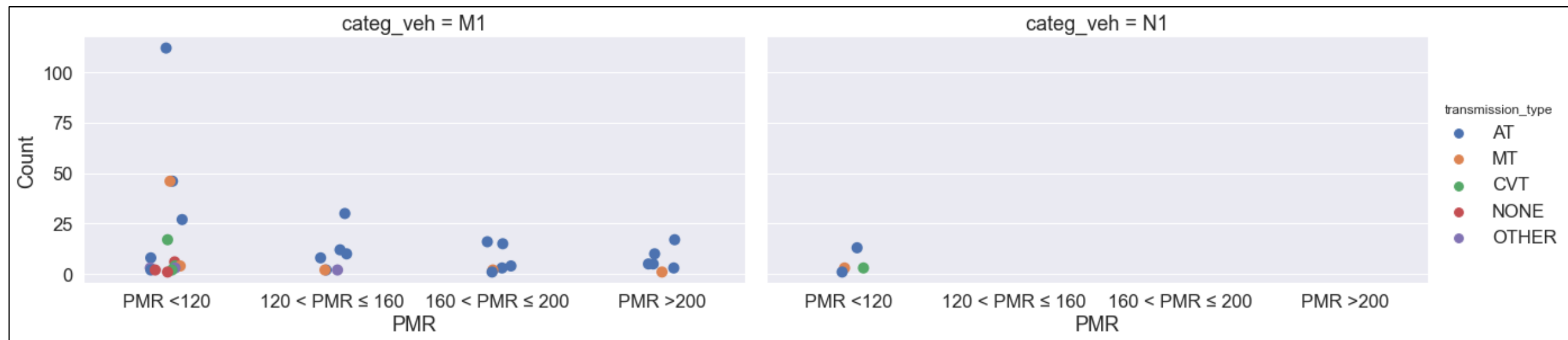
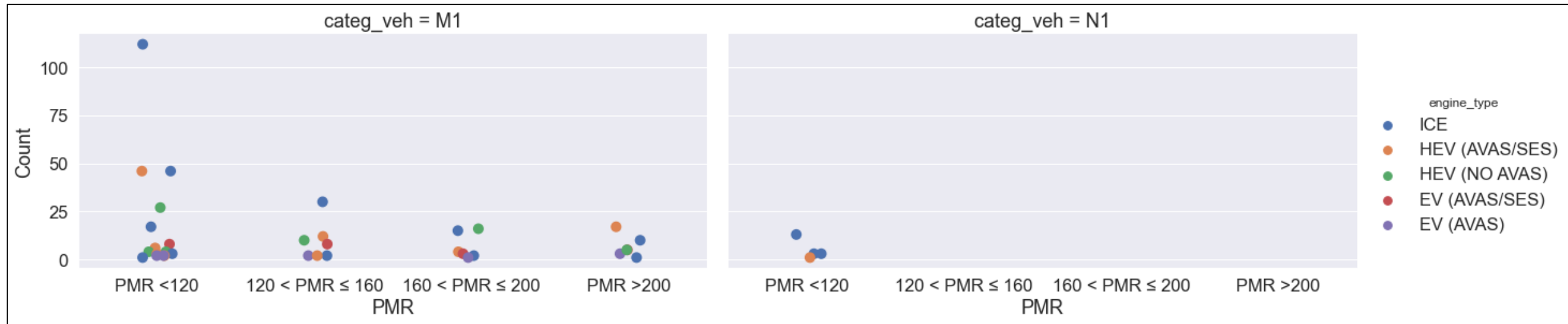
■ AT ■ MT ■ CVT ■ OTHER ■ NONE

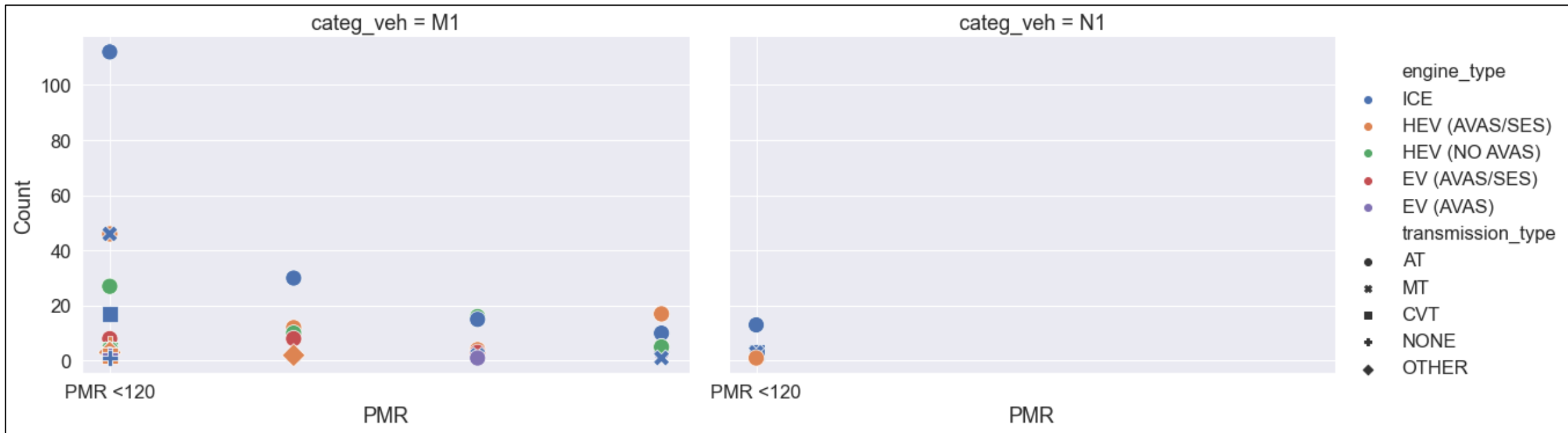


Combined Power



Study on ASEP – WP.2 – Analysis of the data collected to date





- How to check the number of missing files still to arrive? Communication from type approval authorities to their TS representative?
- Some CP sent only mandatory 451 including extension. Representative database? **75%** of all data are coming from two type approval authorities (not extensions)
- Extension of the collection period until the end of October.
- Extensions of the actual mandatory RD-ASEP testing period?
- Conclusions and possible RD-ASEP Method improvements once collection is finish

- How can we check the number of missing files that are yet to arrive?
Possible communication from type approval authorities to their TS representatives.
- 62% of all data are coming from two type approval authorities. (mandatory and voluntary files)
- There has been an extension of the collection period until the end of October.
- Can we extend the current mandatory RD-ASEP testing period if the group considers we do not have enough data to cover all vehicle technologies?
- Conclusions and potential improvements to the RD-ASEP method can be drawn once the collection is complete.



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