

Meeting Minutes PMP Webconference

27th April 2023, 12:00-14:30 CET

- DRAFT -

0. Introduction & Welcome

ca. 80 participants were welcomed by Barouch Giechaskiel (BG, JRC, PMP Chairman) and Rainer Vogt (RV, OICA/Ford/Technical Secretary PMP). BG noted that for F2F meetings at UN Geneva no remote connection is possible anymore. There is no F2F PMP meeting in June. Around end of May the next PMP meeting (Webex) will be scheduled.

1. Review Meeting Minutes last PMP meeting 09.01.2023

RV reviewed the meeting minutes of the last PMP Meeting, 09.01.2023 which are available at the UNECE website. Comments may be sent to RV/BG within the next two weeks.

2. PMP update (ToR, GRPE)

ToR will expire in June '23.

BG stated that the extended topics will be for

Brakes: (I) LDV friction share coefficient (II) adaption to future tech (III) Real world cycles (IV) HDV

Tires/ Road: continue monitoring of projects on-going projects

Exhaust: No new topics are expected. Continue monitoring current measurement and calibration procedures. Brake calibration procedures might need assessment.

Marcel Mathissen (MM, OICA/Ford): Is a 2nd brake ILS included in the new TOR?
BG confirmed, it is included in the detailed version of the ToR.

3. TF4 update

Jürgen von Wild (JvW, OICA/BMW) presented the status of TF-4 work (see slides).

Ravi Vedula (RvE, Brakes India): How does pressure by CAN compare to external sensors, peaks appear to be a bit higher?

JvW: Further analysis in TF-4 is ongoing, the differences are marginal.

Philipp Eichler (PE, UBA): How is "cherry picking" avoided? RV and JvW explained the proposal. "Cherry picking" is not possible because the table values can be used only if the (estimated by the OEM) case specific coefficients are lower. If the estimation would be close to the table value the OEM will have to apply the individual method, to avoid the risk of exceeding the emission limit – TF-4 will continue on this.

RV (OICA/Ford) introduced the proposed timing plan (last slide). The aim is to submit the draft to the GRPE in June.

4. Presentations on brakes projects

I.) "A note on brake particle emissions in regenerative braking or cycle with extra-high for second development of real-world cycle/s for use in laboratories" was presented by Hiroyuki Hagino (HH, JARI).

Test should be possible by third party, issue with 110 km/h speed limit in Japan. Data from emission testing on brake dyno with various regenerative levels was shown.

There is a good correlation of friction share and PM emissions.

There is a concern of overestimating TPN during Full Friction Braking due to volatile particles formation.

PM10, PM2.5, and TPN10 were compared for tests on modified WLTP brake cycle, i.e. excluding speed above 110 km/h. Particle Emissions of WLTP-Brake Cycle excluding Extra High were within measurement variability.

JvW (OICA/BMW): What does "Run 4 / 5" mean?

HH (JARI): Average is shown, and addition the run 4 and 5 after concluding tests to check stability.

RV (OICA,Ford) and RVe(Brakes India): What is the origin of vehicle brake torque?

HH (JARI): It is from CAN logging of vehicle data. It is the torque signal at CAN, which was available for some vehicle

RVe (Brakes India): What is the blue line?

(HH, JASIC): Blue line is the friction torque applied to brake dyno.

II. *"Experimental influence analysis of the sampling of passenger car brake particle emissions on a dynamometer"* was presented by Christiana Loranca (CL, Continental).

The reported slides on the setup and sampling summarize recent work at Continental. Outlet and inlet geometry showed small variances (max. 9% on emission results for cases outside the current GTR proposal).

RVe(Brakes India): 1. Did you measure PM2.5 before and after the bend; 2. Was the duct made of SS with electropolishing or other? 3. Was cooling airflow meeting all requirements stated in the GTR?

CL, (Continental): PM2.5 was not measured. Ducts were made of stainless steel, but not electropolished. Only geometric parameters were investigated.

Christoph von Weidinger (CW, AVL): Has the flow uniformity criterion in the cross section upstream the brake disc as actually defined in the GTR been fulfilled for all geometric variations?

CL: No this was not measured due to the time frame of the project.

Hans-Joachim Schulz (HS, Catalytic Instruments): Did you measure as well PN in all tests?

CL: No.

PE(UBA): What any clean up measured? Did you perform in between tests on the remaining parts of the assembly? Any deposits observed?

CL: Cleaning was mainly done by purging.

Why did the emission factor increase over time? 4.2 to 4.8 mg/km (+12%)

CL: No explanation.

Mohsen Kazemimanesh (MK, NPL): What was the median particle size in the reference config? Maybe size selected particle measurements (rather than PM10) is a better metric to see the effects of geometric variations on particle losses?

CL: No PM size distribution measurement was possible. Thanked for the good suggestion.

Carlos Agudelo (LINK, CA): Asked about the trend in the repeatability tests.

CL: the brake was not changed during experiment.

CA (Link): What was the air flow?

CL: Air flow was 500 m³/h. Only for the 800mm enclosure the air flow was 800 m³/h

Heinz Bacher (HB, OICA, BMW): Why was there a water droplet removal filter?

CL: to protect the flow sensor.

CW (AVL): The disc temperatures remained within the GTR's specs for all tests?

CL: This was not checked for all configurations. For reference configuration it passed.

Kenji Abe (KA, JAMA/Toyota): When you change test sequence, Pad and Disc is new or continued use? How do you think the impact of disc surface roughness on BPE?

To be replied via e-mail.

5. Calibration update (exhaust emissions)

BG (JRC) presented exhaust emissions slides. The calibration material topic did not close. For 23 nm the material has some effect and there are different proposals on how to address the topic without impacting the current market status.

Brakes: calibration material may be soot-like, emery oil, silver.

Adoption of PCRFB needed due to larger brake particles? Effect is expected to be small

RVE(Brakes India): Why is soot preferred as calibration material? For 10nm CPC no large influence. It is closer to what is actually measured,

Christian Hafermeyer (CH, AIP): Suggest to add a comment that soot-like particles – should be diffusion flame soot.

Determine a correction factor of soot calibration efficiencies to Emery Oil would be welcomed.

BG: Spark-generated soot did not have differences as calibration material; only practical difficulties for small sizes.

HS (Catalytic Instruments): Silver particles would have advantage.

BG: it is included and may be tested in round robin exercise.

6. Any other Business

None