PMP procedure: Regenerative Braking

Initial proposal on next steps for TF4

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Overview

- TF 4 to be established in GRPE PMP group (kick-off at next PMP meeting).
- Goal: Generalize PMP procedure to electrified vehicles with regenerative braking.

- When to be finalized?
  - PMP deadline March 2022: “Adaptation of the proposed methodology to include regenerative braking and – to the possible extent – future technologies” (T. Grigoratos, Webconf, 24th MAR 2021)
  - This is a very ambitious target

- How many active members?
  - Suggesting to have a small, manageable group contributing actively
  - the results of the TF 4 will be shared in a timely manner within the PMP group

- TF needs expertise from…
  - OEM’s (Brakes with support of powertrain department)
  - Dyno manufacturers
  - EC representative (alignment with whole PMP approach,…(legal issues))
  - …
Based on PMP particle emission test procedure - Same cycle and sampling approach

Run on brake dynos with enhanced capabilities for simulation of brake regeneration

Applicable for all types of electrified vehicles with different levels of regen capability

Reflecting main influencing factors /boundary conditions
- Climatic conditions
- Battery state of charge
- Braking systems (parallel vs. series brakes)
- One pedal/two pedal driving
- Etc.

In a first version the method should be reflecting typical drive train conditions.
Second step expand the method to reflect additional influencing factors

Different regen strategies for each OEM/carline. Regen strategy proprietary
- How to enable testing by third parties?

Proposal must be open and ensure replication of the vehicle regen strategy
Enabler

- **Proposed approach:**
  - Brake community proposes simplified methodology for regen testing
  - Rely on literature/norms for the method definition whenever possible
  - Discussion of approach with Powertrain development. Agreement on realistic boundary conditions
  - Estimate to which degree this approach represents real vehicle behavior: target tbd. xx%
  - Team decision (UNECE PMP Group) if this is a feasible/reasonable approach
  - Conduct measurement campaign to test robustness of the procedure