Actions of the inland transport sector to join the global fight against climate change

INLAND TRANSPORT COMMITTEE

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Brake dust emissions globally harmonized methodology

Brief description of UN GTR No. 24 and other non-exhaust activities at the UNECE World Forum for the Harmonization of Vehicle regulations (WP.29)

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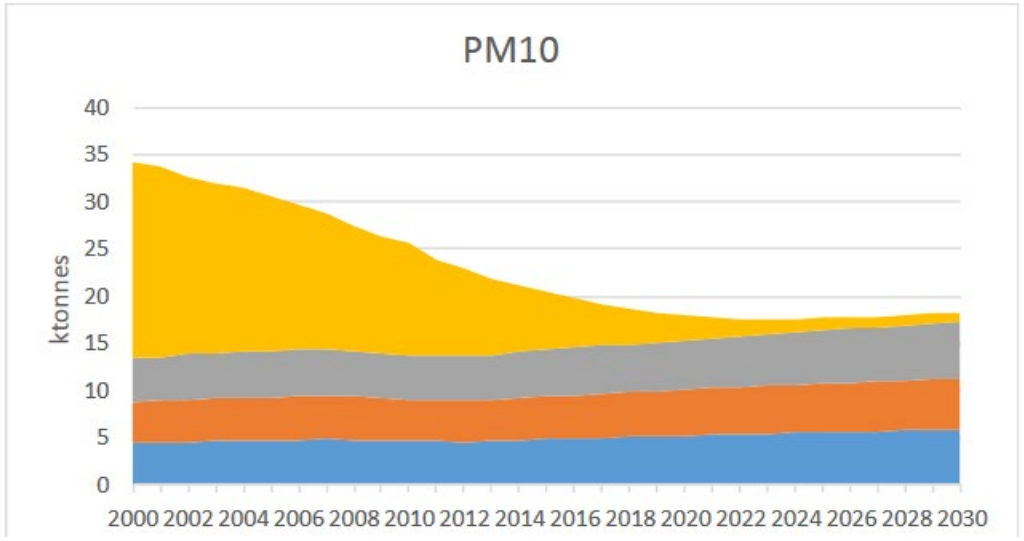
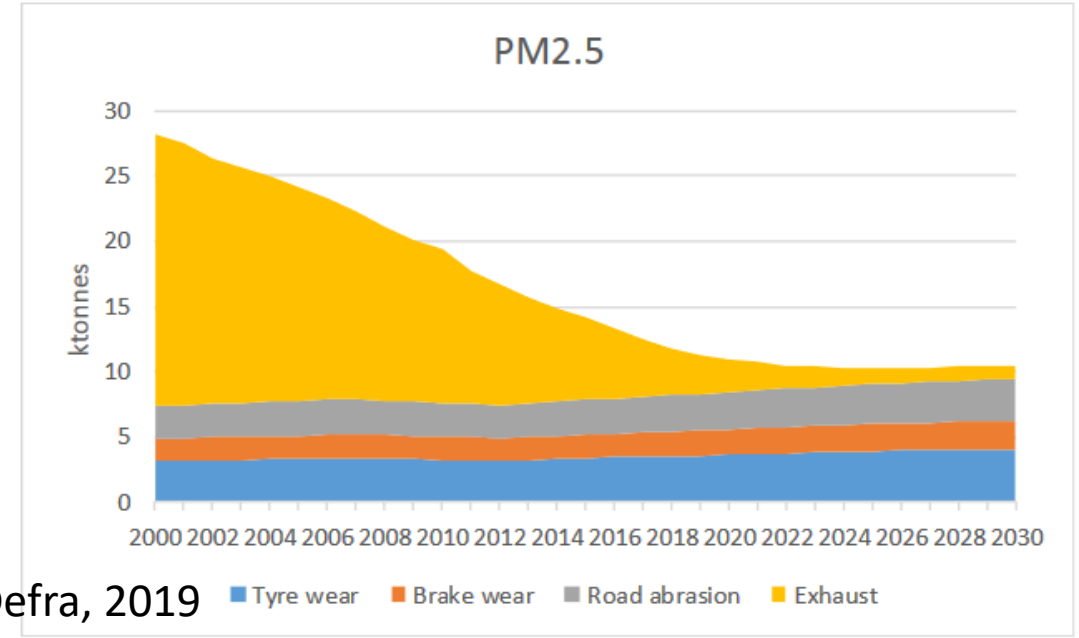
- Air pollution from cars moving away from tailpipe
  - Emission limits and no tailpipe vehicles lowered (particulate) emissions from powertrain
  - Contribution from non-exhaust sources is rapidly growing
  - Different sources of airborne non exhaust air pollution from road vehicles
- UN GTR No. 24 on brake emissions
  - Brief description of harmonized lab test
  - Potential technologies to lower brake dust emissions
  - Regulatory applications Regulatory push to incentivize zero tailpipe emissions vehicles
- Update on tyre abrasions procedure development
- Conclusions

Particulate emissions from engines drastically reduced

- Emissions limits have greatly contributed to the reduction of tailpipe airborne particulate emuissions
  - Wide deployment of particulate filters from Euro 5 / Euro 6 for diesel / gasoline engines
  - Latest technologies, such battery EVs, have no tailpipe emissions
  - Share of particulate emissions coming from the powertrain plummeted in latest emissions inventories, and expected to be marginal by 2030





Source, UK Defra, 2019

Non-exhaust now dominating air pollution from road vehicle

- Other sources of particulates now need to be looked at, as their contribution is now major
  - WP.29 scope limited to the design and construction of the vehicle
  - Activities on brake emissions measurement methodology started in 2016
  - Political call for potential regulatory application made in 2021
  - First version of UN GTR No, 24 adopted in June 2023
  - Tyre abrasion also being looked at

Source, UK Defra, 2019

UN GTR No. 24 on Laboratory Measurement of Brake Emissions for Light-Duty Vehicles

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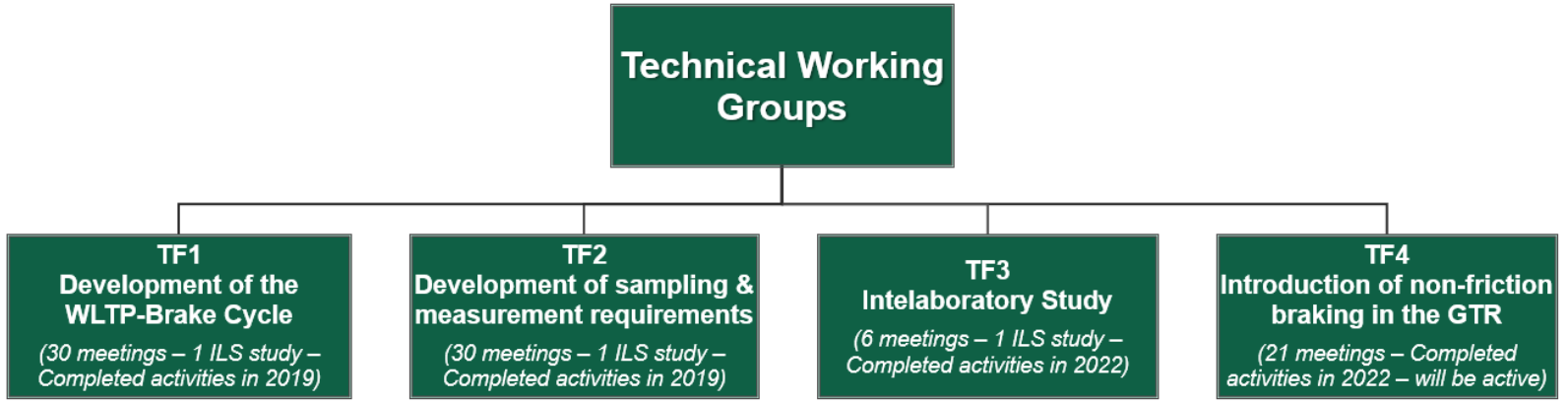
- UN GTR No. 24 defined harmonized methodology to measure brake dust emissions of light duty vehicles (cars and vans)
- Performed as part of the WP.29/GRPE/PMP group, chaired by the EU Commission/JRC



- ✓ More than 100 technical group meetings, two completed Interlaboratory campaigns (ILS), and numerous testing campaigns that supported with data over the last years;
- ✓ 23 non-exhaust related PMP meetings (physical and virtual) with more that 60 technical presentations on the topic of brake emissions that supported with data the method development;
- ✓ 1 dedicated workshop *"Towards a regulation on brake wear emissions"* organized at the 82nd GRPE session with the participation of more than 200 stakeholders.

European Commission

Test Setup

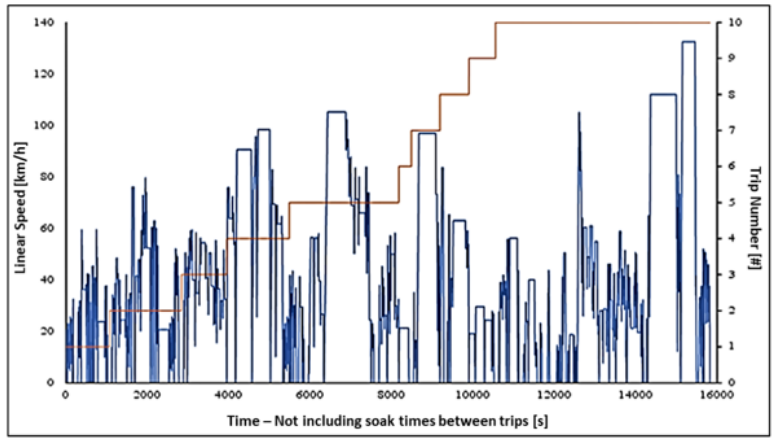
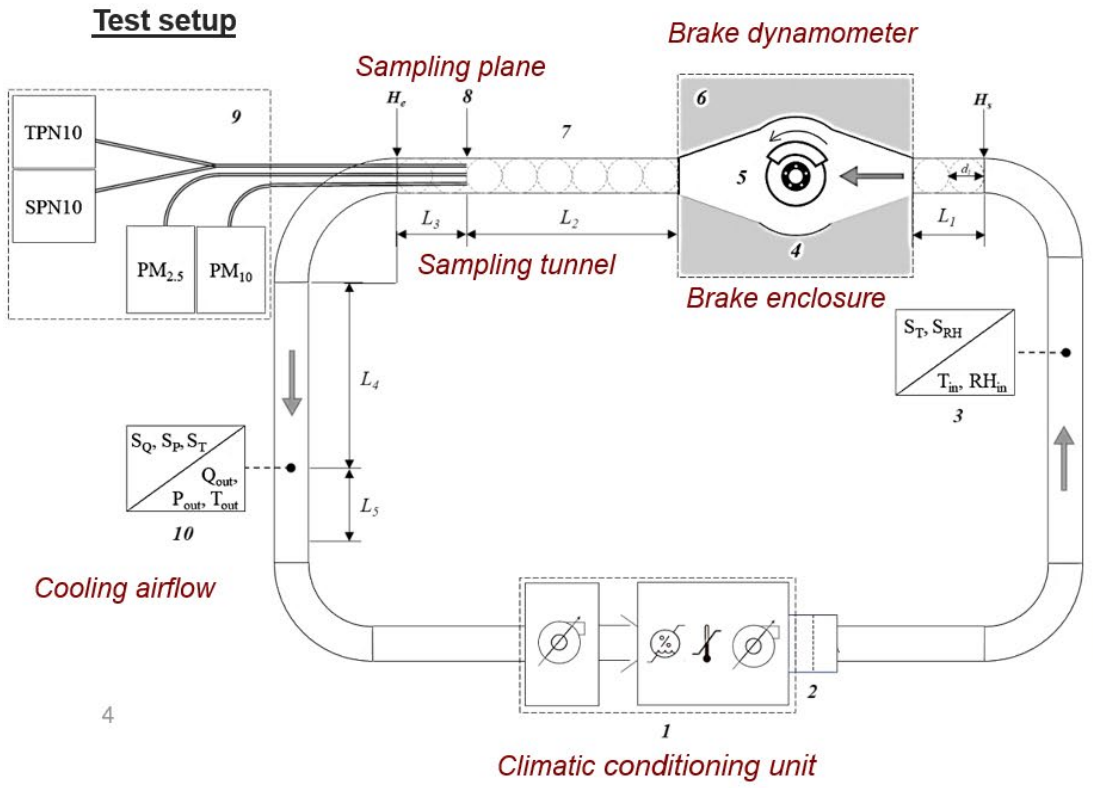
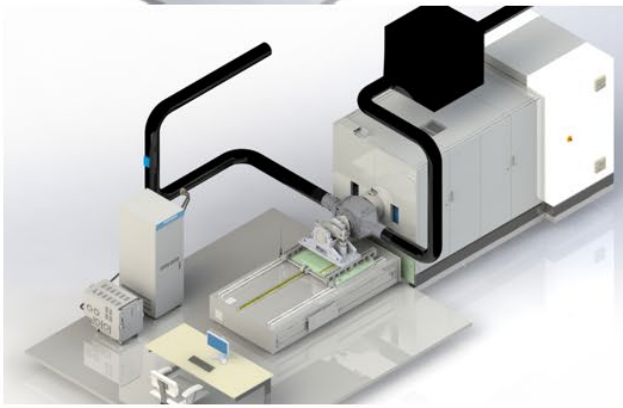


Figure 9.1. Time-resolved vehicle speed for the WLTP-Brake cycle

- 192km lab test
- Component (disc+pads) test only
- Non friction braking considered
- Mass only
- Chemical composition of brake dust not considered

UN GTR 24 setup





Technologies to reduce brake dust – 1- Reduce source of emissions

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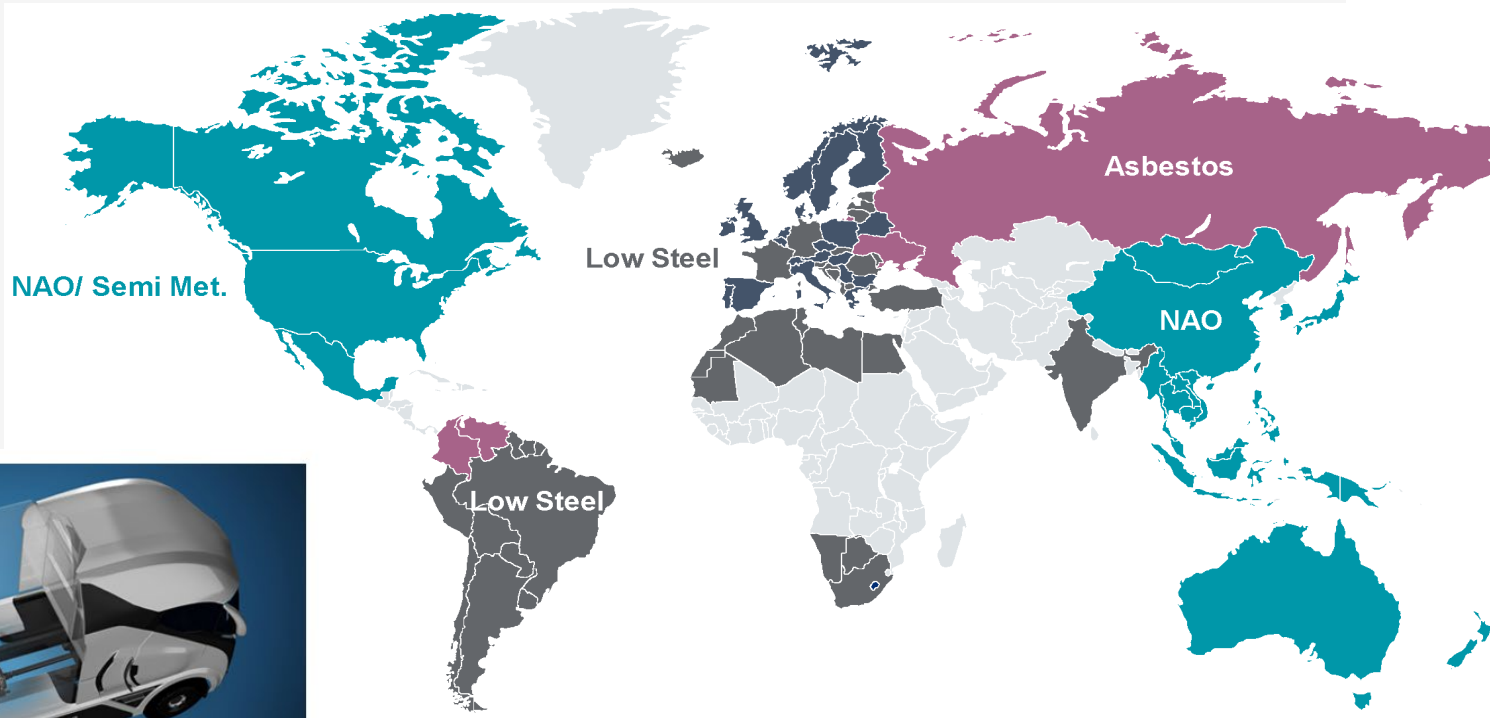
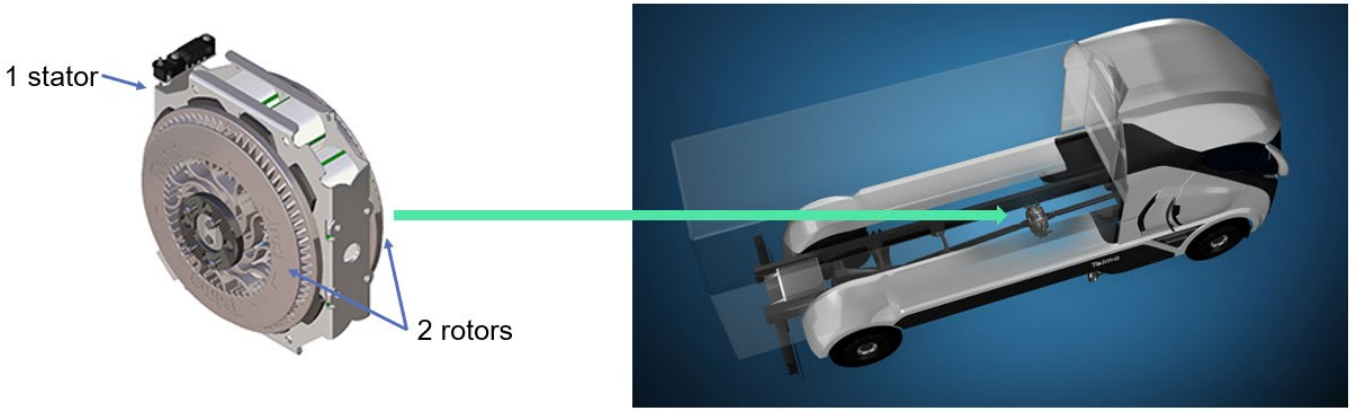
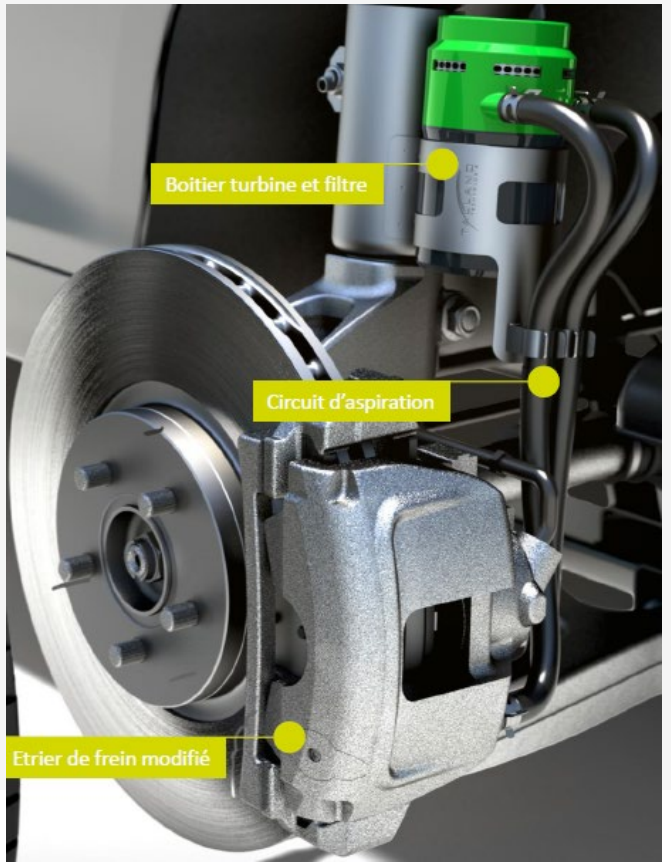
- Material substitution; e.g. from low steel to non asbestos organic
- Non friction braking
- Regenerative braking
- Electro magnetic braking
- Disc size, enclosed system (drum)





Technologies to reduce brake dust – 2- Capture emissions once emittied

- Filtering technologies



UN GTR No. 24 in national legislation

- UN GTR No. 24 adopted by Australia, China, European Union, India, Japan, Norway, Russian Federation, South Africa, and United Kingdom in June 2023
- EU included UN GTR No. 24 in Euro 7 proposal
- Other CPs plan to be confirmed

Tyre abrasion

- Procedure to measure tyre abrasion also being developed at WP.29
- Final text expected to be adopted in 2024
- Mass loss measured in two test types:
  - On-road test (8000km vehicle convoy)
  - Drum test in laboratory (5000 km on tyre test rig)

- Also included in Euro 7 proposal
- More information on draft methodology available here:
- GRBP-78-26

Next Steps - Conclusions

- Non exhaust particulate emissions now at the centre of attention for road vehicle particulate emissions
- Robust methodologies now finalized for regulatory limit deployment
- Only looking at mass, toxicity of dust composition not considered at this stage
- Road wear and resuspension outside of the scope of WP.29
- Happy to receive further information from LRTAP, EMEP Steering Body and Working Group on Effects about any evidence on toxicity of dust composition of brake and tyre, and where focus should be put on
- Any room for collaboration on this?

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Thank you!