ENCOURAGING THE REALIZATION OF A MODERN FLEET,
ENHANCING NAVIGATION SAFETY AND FOSTERING INNOVATIONS
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Modernization of engines in the road transport sector

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for Harmonization of Vehicle Regulations
I. Introduction
   I. UN multilateral agreements on vehicle regulations
   II. Air pollution and climate and UN regulatory provisions
II. Heavy road vehicles: Technologies in place
III. Policies in place for pollutant and GHG emissions
IV. Next steps / conclusion
The World Forum for Harmonization of Vehicle Regulations (WP.29)

- UNECE Sustainable Transport Division: secretariat to WP.29 for more than 60 years
- WP.29 is:
  - the unique worldwide regulatory forum for the automotive sector
  - administrating three Multilateral UN Agreements

**Certification regulations**

**1958 Agreement** – Type Approval Regulations with mutual recognition of the type approvals

**1998 Agreement** – Global Technical Regulations

**In Use PTI regulations**

**1997 Agreement** – Periodical Technical Inspections of Wheeled Vehicles and the Reciprocal Recognition of Such Inspection
What is WP.29 doing?

- Emissions of pollutants and CO₂
- General safety
- Passive safety
- Noise and tyres
- Automated/autonomous and connected vehicles
- Lighting and light signalling
Air pollution and climate impact from vehicles: UNECE WP.29 regulatory work

- Exhaust emissions contain gaseous and solid particulates having an impact on:
  - Air quality => SDG 3
  - Climate and greenhouse effect => SDG 13
- Pollutant emissions covered since the 1970s
  - Emissions limits on given test => UN Regulations Nos. 49, 83, 96 / UN GTRs Nos. 2, 4, 11, 15
- CO2 emissions looked at more recently
  - Corporate average targets => UN Regulation No. 101 / UN GTRs Nos. 2, 4, 11, 15
Techniques to improve emissions from trucks

• To reduce air pollution:
  • EGR, SCR, DPF: engine and after treatment technologies to reduce harmful emissions of NOx, particulates, CO, HC

• To reduce GHG emissions:
  • Engine and also vehicle technologies

Source: MAN
Source: DAF
Emission limit evolution by vehicle type

• Emission limits shows good improvement over time for all applications
  IWVs improvements delayed but significant (Based on EU legislation)

*: emission limits similar to UN Regulations Nos. 49 and 83
## Policies in place – emissions tests

- **Air pollution: selected test conditions differences (EU tests)**

<table>
<thead>
<tr>
<th></th>
<th>Trucks*</th>
<th>Inland Water Vessels</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emission test</strong></td>
<td>Engine only on laboratory</td>
<td>Engine only on laboratory</td>
</tr>
<tr>
<td><strong>Real life test</strong></td>
<td>Laboratory, engine only test now complemented with on-road tests using PEMS: In service conformity</td>
<td>In Service Monitoring for certain NRMM categories; Pilot projects for IWV ?</td>
</tr>
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<td><strong>Conformity factor</strong></td>
<td>1.5</td>
<td>(2.0, control area)</td>
</tr>
<tr>
<td><strong>Durability</strong></td>
<td>700 000 km / 7 years</td>
<td>10 000 hours</td>
</tr>
</tbody>
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*: procedure similar to UN Regulation No. 49
Policies in place – GHG emissions

• In many regions across the globe, trucks CO2 emissions are regulated:
  • China, Japan, India, USA, and EU since 2019 have CO2/ Fuel efficiency standard for trucks

Source: ICCT
Considerations for energy efficiency / CO2 emissions for NRMMs

• EU Stage V introduced provisions on CO2 emissions from NRMM engines:

4. Manufacturers shall make available to OEMs the value of the carbon dioxide (CO₂) emissions determined during the EU type-approval process and shall instruct the OEMs to communicate that information, together with explanatory information on the test conditions, to the end-user of the non-road mobile machinery in which the engine is intended to be installed.

• Limited data availability of real-life CO2 from NRMM / IWVs at big scale
• E.g. research project on agricultural tractor in Switzerland
Conclusions

• Pollutant emissions control technologies commercially available at reasonable costs for all on-road / off-road applications

• IWVs catching up with on-road applications

• Limited knowledge and awareness on real life CO2/ energy efficiency from NRMMs / IWVs

• Share of CO2 emissions from NRMM (including IWVs) rising, considering the topic likely important in the near future
Thank you

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