Diesel Emission Controls and Fuel Saving Technologies

Talking Freight Webinar May 2019

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Topics

- Background
- Emission Control Standards
- Diesel Emission Controls
- Evaluating Technology Performance
- Fuel Saving Technologies

THE STATES

Background

- Improving public health and air quality
- Reducing exposure to pollutants
- Reducing diesel engine emissions
 - HC, CO, NOx, CO2, and Particulate matter (PM)
- Health Benefits: studies show reducing PM2.5 prolongs life and promotes health
 - Fewer missed work days
 - Fewer visits to health care providers
 - Reduction in asthma symptoms
 - Increased average life expectancy at birth
 - Prevent premature deaths



Freight Sectors Are Projected to Grow

Transportation energy demand growth driven by commerce Global sector demand – million oil-equivalent barrels per day (MBDOE)



U.S. Environmental Protection Agency



Cleaner Truck Initiative

• November 13, 2018, EPA Administrator Andrew Wheeler announced the "Cleaner Trucks Initiative" (CTI) to address emissions from new heavy-duty trucks and engines

Nationwide NOx Emissions Reductions

- Work to closely align CARB and Federal long-term programs
- Continue technical coordination with CARB and industry

• Ensure In-Use Emissions Reductions

- New in-use protocol that covers "all" in-use operation
- Conducting and contributing to multiple technology demonstration programs
- Regulatory useful life and warranty that reflect current operating life

• Streamline & Modernize Requirements

- Accelerated aging protocol for diesel aftertreatment systems
- Incentives for advanced technologies: 0 gram NOx

• Effective EPA Compliance & Enforcement

- Utilize onboard data streams to identify compliance concerns early







Diesel Emission Control Technologies



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Wall Flow DPF



Source: http://www.meca.org/technology/technology-details?id=6

DPF Cleaning is Critical



- Filters are designed to be cleaned.
- DPF regeneration does not remove ash.
- Excessive ash accumulation may reduce filter life and impact maintenance intervals.
- Modern engines are calibrated to optimize DPF & SCR benefits as well as fuel economy.



Testing....





Engine Dyno



Scale Model Wind Tunnel

5/15/2019

U.S. Environmental Protection Agency



Fuel Savings vs Rolling Resistance 12 Percent Reduction in Fuel Consumption LRR tires on 10 tractor & trailer 8 LRR tires on 6 tractor only LRR tires on trailer only 4 **Baseline tires** 2 y = -2.6912x + 21.234 $R^2 = 0.8965$ 0 -2 5.5 6 6.5 7.5 5 7 8 Vehicle Coefficient of Rolling Resistance, kg/ton



Fuel Savings with Trailer Aerodynamics at Different Speeds On-road





Fleet Operations





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National Clean Diesel Campaign

Working Together for Cleaner Air



References:

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Waltzer, S., Johnson, D., Wilson, J., and Wei, K., "Fuel Savings From Aerodynamic Efficiency Improvements For Combination Tractor-Trailers Relative to Vehicle Speed" SAE Technical Paper 2016-01-8133, 2016, doi: 10.4271/2016-01-8133. USEPA