

6<sup>th</sup> International CTI Conference | 19 – 20 May 2015, Stuttgart, Germany

# EMISSION REDUCTION *FOR* OFF-HIGHWAY APPLICATIONS

- Industrial/Large Engines • Marine Applications • Construction Machinery • EU Stage IV/US Tier 4 Final •
- Catalytic Solutions for Stage V • SCR Systems • DPF Regeneration • Partially Premixed Combustion •
- Enhanced NO<sub>x</sub> Reduction • Simulation of CO<sub>2</sub>, PM and NO<sub>x</sub> Emissions •
- Advanced Computational Modeling • HDD Waste Heat Recovery • SCR on Filter •

PRESENTERS  
include



## CONFERENCE DAY 1

Tuesday, 19 May 2015

9.30 – 10.15 Reception with business breakfast

10.15 – 10.30

### Welcome address by CTI and opening by the Chairman



**Prof. Dr Werner Müller**, Former Professor  
at the Internal Combustion Engines Department,  
Technical University of Kaiserslautern

## Innovative Systems and Components I

10.30 – 11.00

### Deutz Exhaust Aftertreatment (EAT) Systems for EU Stage IV/US Tier 4 Final Non-Road Mobile Machinery

- Applications and specific challenges for non-road mobile machinery
- System configuration of Deutz Stage IV exhaust aftertreatment system
- Deutz modular EAT concept
- EATS operation strategy



**Dr Stephan Schraml**,  
Head of Exhaust Aftertreatment,  
Deutz AG (Germany)

11.00 – 11.30

### Difficulties with TIER-4 construction machines without DPF regarding requirements of occupational safety and legal consequences

- Diesel engine emissions in the workplace – awareness of legal consequences
- Technical Rule TRGS-554: construction machines with DPF and regulatory health and safety measures
- TIER 4 construction machines – in series with SCR: Difficulties of an additional DPF integration and possible solutions concepts
- Retrofit with DPF behind SCR: technical features regarding regeneration and backpressure control and catalysis of emissions



**Thomas Kaltwasser**,  
Head of Business Development,  
PURltech GmbH & Co. KG (Germany)

11.30 – 12.00

### Future Concepts for Industrial Engines >56kW

- Engine architecture
- Emission concept
- Total operational costs
- Market



**Dr Vinod Rajamani**,  
Team Leader,  
FEV GmbH (Germany)

**Co-Authors: Michael Neitz, Dr Andreas Wiartalla, Henning Petry, Dr Yves Rosefort**

12.00 – 12.30 Discussion

12.30 – 2.00 Lunch Break in the Exhibition Area

2.00 – 2.30

### Exhaust Gas Cleaning of Large Marine Diesel Engines

- Legislations and regulations
- Technologies for the abatement of NO<sub>x</sub>- and SO<sub>x</sub>-emissions onboard vessels
- Examples of installations
- Future challenges



**Ralf Jürgens**,  
Head R&D,  
Envairtec GmbH (Germany)

2.30 – 3.00

### The use of Fuel Additives in the Optimization of the Exhaust Emissions Control Systems to meet the Fuel Operations Constraints and Customer Satisfaction

- The fuel additives for DPF regeneration assistance in the automotive industry
- The latest "Low Ash" fuel additives technology for EURO5, equivalent and beyond
- Benefits for off-highway applications
- Strategies in the use and management of fuel additives in off-highway applications



**Dr Thierry Seguelong**,  
Global Market Manager/Fuel Additives & Systems,  
SOLVAY Rare Earth Systems (France)

## SCR- and DPF-Applications

3.00 - 3.30

### Downsizing SCR System with Efficient Mixing

- System efficiency and downsizing – contra dictionary targets?
- Versatile location adaptation to various applications including SCR and SCR on filter
- CFD vs. real world results



**Arno Amberla,**  
Vice President Technology,  
Proventia Emission Control Oy (Finland)

3.30 - 4.00 Discussion

4.00 - 4.30 Refreshment Break in the Exhibition Area

4.30 - 5.00

### SCR on Filter, the Future for Construction Machinery?

- Advantages and disadvantages using SCR on filter for construction machinery
- Risks due to SCR on filter for heavy-duty equipment will be presented and evaluated



**Yves Hohl,**  
Research Engineer,  
Liebherr Machines Bulle (Switzerland)

5.00 - 5.30

### Enhanced NO<sub>x</sub> Reduction for SCR Systems with NH<sub>3</sub> Generator as enabler for NO<sub>x</sub> Emission Targets in a Compact Package and Variant Diversity

- Advantages of AdBlue® based Ammonia Generator Technology
- Applied for new developments of future engine generations and retrofitting/"upgrading" of vehicle or NRMM inventory
- Validation on engine and chassis dynos
- Validation on a field studies of farming machinery - Example: Medium Tractor



**Dr. Jan Margraf,**  
Project Manager SCR-Technology,  
Twintec Technologie GmbH, (Germany)

5.30 - 6.00

### Modular Airless SCR Systems For Large Engines

- Tenneco has developed a modular, airless SCR system for large engines (>560kW)
- The modular design can cover a wide range of engine power and different applications (Marine, Genset, Loco,...)
- Different catalyst technologies for different applications



**Marc Sommerfeld,**  
Director Engineering,  
Tenneco (Germany)

6.00 - 6.30 Closing Remarks

7.00

### GET TOGETHER

At the end of the first conference day CTI invites you to a social get-together. Take the opportunity to expand and strengthen your network in an informal and relaxed atmosphere.



## CONFERENCE DAY 2

Wednesday, 20 May 2015

9.00 - 9.30 Reception with coffee and tea

9.30 - 10.00

### KEYNOTE

#### Challenges for Future Emission Concepts

- Global market with different requirements and constraints
- Second life of mobile machinery and for export in regions with lower emission requirements



**François Jaussi,**  
Head of Department Product Management Diesel Engines & Hydraulics, Liebherr Machines Bulle SA (Suisse)



## Simulation as Development Tool

10.00 – 10.30

### Simulation of CO<sub>2</sub>, PM and NO<sub>x</sub> Emissions in Consideration of the Complete Drivetrain

- Fuel consumption and performance calculation
- Influence of different working cycles and gradients
- Break down of individual power losses for axles and transmissions as well as impacts on CO<sub>2</sub>-emissions and performance
- NO<sub>x</sub> and PM-emissions with consideration of complete drivetrain
- Presentation of improvements



**Dr Bastian Volpert,**  
Manager Off-Highway, Advanced Engineering and Design,  
ZF Friedrichshafen AG (Germany)

10.30 – 11.00

### Emission Reduction Strategies using Advanced Computational Modeling and Simulation

- Mitigating emissions at source – combustion operating strategy, impact of fuel, EGR, injection timing, split ratios, intelligent design of experiments
- Mitigating emissions using advanced aftertreatment modelling
- Focusing on mitigating PM emissions in terms



**Dr Jethro Akroyd,**  
Principal Engineer,  
cmcl innovations (United Kingdom)

11.00 – 11.30 Discussion

11.30 – 12.00 Refreshment Break in the Exhibition Area

12.00 – 12.30

### Simulation Driven Emission Reduction for Marine Diesel Engines

- Meeting IMO Tier III
- In cylinder combustion simulation
- Feasible simulation workflows
- Benefits and limitations of simulation driven development



**Dr Carsten Schmalhorst,**  
CAD Engineer,  
AVL Deutschland GmbH (Germany)

**Co-Authors:** Ibrahim Najar, LKV, Uni Rostock; **Dr Christian Fink**, Lehrstuhl für Kolbenmaschinen und Verbrennungsmotoren, Universität Rostock;  
**M.Sc. Rafal Pyszczek**, Warsaw University of Technology

## Innovative Systems and Components II

12.30 – 1.00

### Heavy Duty Diesel Waste Heat Recovery Technology – Organic Rankine Cycle

- Overview of waste heat recovery technologies
- Recent developments on ORC approach
- Fuel economy and GHG impact



**Dr Swami Nathan Subramanian,**  
Senior Engineering Specialist,  
Eaton Corporation (USA)

1.00 – 1.30 Discussion

1.30 – 2.30 Lunch Break in the Exhibition Area



2.30 – 3.00

### Partially premixed combustion (PPC) for low emissions and high efficiency

- Introduction to low temperature combustion (LTC)
- Reaching 50% brake efficiency with Euro VI tailpipe emissions without emissions aftertreatment system
- Extended fuel flexibility paving the way for alternative fuels



**Dr Martin Tunér,**  
Associate Professor,  
Lund University (Sweden)

3.00 – 3.30

### Catalytic Solutions for Stage V

- Drivers & requirements resulting from upcoming Stage V legislation
- System designs for optimum packaging
- Catalyst technologies of choice



**Dr Andreas Geisselmann,**  
Senior Manager Europe – Product Management HDD,  
Umicore AG & Co KG (Germany)

3.30 Closing Remarks by the Chairman  
End of the International CTI Conference "Off-Highway"

## EXHIBITORS



**Twintec AG** is the parent company of Twintec Technology GmbH, Baumot AG and Interkat Katalysatoren GmbH. Twintec is a leading supplier of products for the after-treatment of exhaust gases such as the SCR systems and active and passive diesel particulate filter for installation at manufacturers and for retrofitting to existing licensed vehicles. In addition, Twintec offers catalytic coating for various other industrial applications, via its subsidiary company Interkat GmbH.

### **Twintec Technologie GmbH,**

Eduard-Rhein-Strasse 21-23, 53639 Königswinter, Germany | [www.twintec.de](http://www.twintec.de)



Mannheim-based Thermamax Hochtemperaturdämmungen GmbH, Thermamax Inc., with headquarters in Aurora/Illinois, and the Chinese Taicang Thermamax High Temperature Insulation Equipment Co., Ltd. are recognized worldwide as specialists for the design and manufacture of thermal and acoustic insulation systems for engine compartments and exhaust lines for diesel and gasoline engines, fuel cells, and electric drive systems.

### **Thermamax Hochtemperaturdämmungen GmbH**

Ölhafenstraße 20-28, 68169 Mannheim, Germany | [www.thermamax.com](http://www.thermamax.com)



**Proventia** is an emission control technology company, providing customized exhaust aftertreatment solutions for diesel engines. We offer DPF, SCR and DEF mixing expertise and supply complete EAT systems for global OEMs and retrofit projects. Proventia is an agile and flexible partner for designing and supplying challenging EAT systems.

### **Proventia Emission Control Oy**

Tietotie 1, FI-90460 Oulunsalo, Finland | [www.proventia.com](http://www.proventia.com)



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## Infoline +49 (0)2 11.96 86-39 01

If you have any questions about the forum, we will be pleased to help you.

### Content and conception:



Elisa Ansar  
Conference Manager

[elisa.ansar@car-training-institute.com](mailto:elisa.ansar@car-training-institute.com)

### Customer Service and Registration:



Volker Altenbeck

Phone: +49 (0) 211.9686 - 39 01  
[registration@car-training-institute.com](mailto:registration@car-training-institute.com)

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The fee covers full conference documents.

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### Conference Venue and Accomodation

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Please arrange the room reservation directly with the hotel quoting the reference

"CTI Conference".

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Postfach 11 12 34

40512 Düsseldorf

Germany

Phone +49 (0)2 11. 96 86 – 39 01

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