12TH INTERNATIONAL CONFERENCE ON TURBOCHARGERS AND TURBOCHARGING
PROGRAMME

Tuesday 17 May 2016

08:30 **Registration and Refreshments**	
England Suite	
09:00 **Chair's Welcome & Introduction** *Dr Kian Banisoleiman, Lloyd's Register EMEA*	
09:10 **Keynote - Honda's New Turbo Engine Series and Global Strategy Abstract** Honda has started production of newly developed turbo-GDI engines in 2015. Key technologies of them and global strategy overview will be introduced, as well as the technology of small diesel with sequential twin turbocharger, and new fuel cell power train with electric supercharger. *Tomonori Niizato, Senior Chief Engineer, Technology Development Division 3, Automobile R&D Center, Honda R&D Co.,Ltd*	
09:40 Change over (time for delegates to swap rooms)	
England Suite	**India Suite**
Session 1Ai: Compressor: Flow Range Enhancement Design, Applications and Matching *Chair: Peter Davies, Honeywell Garrett*	**Session 1Bi: Compressor: Surge Line Measurement and Interaction** *Chair: Dr Jan-Christoph Haag, MAN Diesel & Turbo*
09:50 Investigation of Performance and Flow Mechanism of a Non-axisymmetric Casing Treatment in Centrifugal Compressor for Turbochargers *Baotong Wang, IHI Corporation, Japan*	**09:50** Bidirectional Flow Measurement Based on the Differential Pressure Method for Surge Analysis on a Small Centrifugal Compressor *Moritz Werner, Technische Universität Berlin, Germany*
10:10 Global Optimization of Recirculation Flow Type Casing Treatment in Centrifugal Compressors of Turbochargers *Min Thaw Tun, Nagasaki University, Japan*	**10:10** Turbo Charger Compressor Inlet and Outlet Pipe Length and Volume, and the Effects on the Characteristics and Location of Surge *Matthew Simon Whittlesea, Cummins Turbo Technologies, UK*
10:30 **Q&A Session**	**10:30** **Q&A Session**
11:00 **Networking Refreshment Break**	
England Suite	**India Suite**
Session 1Aii: Compressor: Flow Range Enhancement Design, Applications and Matching *Chair: Dr Geoff Capon, Ford*	**Session 1Bii: Compressor: Surge Line Measurement and Interaction** *Chair: Takashi Otobe, Honda R&D*
11:30 Turbocharger Compressor Map Enhancement for Highly Efficient Combustion Engines *Tobias Czapka, Volkswagen AG, Germany*	**11:30** Experimental Investigation of Upstream Installation Effects on the Turbocharger Compressor Map *Bertrand Kerres, KTH Royal Institute of Technology, Sweden*
11:50 Aerodynamic Design of a High Flow and High Pressure Ratio Centrifugal Compressor for a Marine-use Turbocharger *Chihiro Mikami, IHI Corporation, Japan*	**11:50** Influence of the Hot Gas Test Bench Piping System on the Surge Line of an Automotive Turbocharger Compressor *Christoph Schäfer, Continental Automotive GmbH, Germany*
12:10 **Q&A Session**	**12:10** **Q&A Session**
12:40 **Networking Lunch**	

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England Suite	India Suite
Session 2A: Supercharging, Turbocompound, V/G & 2-Stage *Chair: Dr Ennio Codan, ABB*	**Session 2B: Gas Stand and Novel Testing Methods** *Chair: Peter Newton, Imperial College London*
13:40 Axial Groove Casing Treatment in an Automotive Turbocharger Centrifugal Compressor *Andre Starke, IHI Charging Systems International GmbH, Germany*	**13:40** The E-drive: An Isentropic Compressor Performance Test Rig *Philip Parma, Marco Bergmann, BorgWarner Turbo Systems Engineering GmbH, Germany*
14:00 Ultra High Efficiency Two-stage Turbocharging System *Rob Cadle, Honeywell Turbo Technologies, USA*	**14:00** Determine the Isentropic Turbine Efficiency due to Adiabatic Measurements, and the Validation of the Conditions via a New Criterion *Rainer Zimmermann, Technische Universität Berlin, Germany*
14:20 VTG Turbocharger Evolution of BorgWarner Turbo Systems *Ralf Christmann, BorgWarner Turbo Systems, Germany*	**14:20** An Approach to Turbine Housing Validation through the Measurement of Residual Strains using Neutron Diffraction and Operationally Induced Strains using High Temperature Strain Gauges *Katy Gannon, BorgWarner Turbo Systems and The University of Huddersfield, UK*
14:40 **Q&A Session**	**14:40** **Q&A Session**
15:10 **Networking Refreshment Break**	
England Suite	
Session 3: Advanced Simulation *Chair: Prof Joerg Seume, Liebniz Universitaet Hannover*	
15:40 Obtaining Bulk Flow Based Heat Transfer Coefficients for Thermal Evaluation of Turbochargers *Aliihsan Karamavruc, BorgWarner Inc., USA*	
16:00 Numerical Investigation of the Effect of Different Nozzle Clearance at Hub and Shroud Side on Variable Nozzle Turbine Performance *Xin Shi, Beijing Institute of Technology, China*	
16:20 **Q&A Session**	
16:50 **Chair's Closing Remarks** *Dr Kian Banisoleiman, Lloyd's Register EMEA*	
17:00 **Close of day 1**	
18:45 **Conference Networking Drinks Reception and Dinner on the Elizabethan Boat (Embark at Millbank Pier)** **Drinks Reception Sponsored by Honeywell** PARTNER SPONSOR Honeywell	

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Wednesday 18 May 2016

08:30
Registration and Refreshments

England Suite

09:00
Chair's Welcome & Introduction
Dr Kian Banisoleiman, Lloyd's Register EMEA

09:10
Keynote - The Role of Turbocharging on Fuel Economy
Improving fuel economy is an essential target for commercial vehicles for reasons of competitive freight transport and for passenger cars to comply with stringent CO2-emission regulations. The role of turbocharging to achieve lower fuel consumption is derived:
• Loss analysis from a Diesel engine powered heavy duty truck, detailing the engine losses with an energy balance method
• Fuel economy improvement derived from the loss analysis through high air/fuel ratio and appropriate exhaust gas recirculation
• Achievement of high air/fuel ratio via high boost pressure with good turbo system efficiency
• Downspeeding of the truck engine implies new challenges on transient response
• Downsizing of passenger car engines in the context of hybrid electric vehicles
Concluding that turbocharging and turbocharger systems remain to play a key role in enabling good fuel economy.
Dipl.-Ing. Heijo Oelschlegel, Senior Manager Commercial Vehicle Powertrain Research, Daimler AG

09:40
Change over (time for delegates to swap rooms)

England Suite	India Suite
Session 4Ai - Bearings, Seals and Rotordynamic Design *Chair: Prof Roland Barr, Technische Universität Berlin*	**Session 4Bi: Materials, Housing, Burst Containment, EGR and Fatigue Life** *Chair: Dr Herbert Schmuttermair, MAN Diesel & Turbo*
09:50 Heat Flow In a Turbocharger Shaft and its Impact on the Bearing System *Thorsten Kleine Sextro, Leibniz Universitaet Hannover, Germany*	**09:50** Explicit Dynamic Finite Element Simulation of Turbocharger Containment and Wheel Burst *Lin Wang, Cummins Turbo Technologies, UK*
10:10 Experimental and Numerical Analysis of Sealing Ring of Turbocharger *Chaochen Ma, Beijing Institute of Technology, China*	**10:10** An Improved Approach to HCF Development for Vaneless Turbine Stages *William Smith, Honeywell Turbo Technologies, USA*
10:30 **Q&A Session**	**10:30** **Q&A Session**

11:00
Networking Refreshment Break

England Suite	India Suite
Session 4Aii - Bearings, Seals and Rotordynamic Design *Chair: Steve Birnie, Borgwarner*	**Session 4Bii: Materials, Housing, Burst Containment, EGR and Fatigue Life** *Chair: Dr Dietmar Filsinger, IHI*
11:30 The Effect of Oil Film Instability on Power Losses Prediction of Turbocharger Rotor-fully Floating Ring Bearing System *Liang Tian, Cummins Turbo Technologies, UK*	**11:30** The Development of a Long Route EGR Turbocharger for Commercial Engine Applications *Michael Burkinshaw, Cummins Turbo Technologies, UK*

11:50 A Valid Method of Gas Foil Bearing Parameter Estimation: A Model Anchored on Experimental Data *Robert Hoffmann, Berlin Institute of Technology, Germany*	**11:50** Development of a High Temperature Turbocharger for Heavy Duty applications *Andrew Sullivan, Cummins Turbo Technologies, UK*
12:10 **Q&A Session**	**12:10** **Q&A Session**
12:40 **Networking Lunch**	
England Suite	**India Suite**
Session 5Ai: Novel Application: Euro 7 and Electric Assist plus EBoosting and Down Speeding, Waste Heat Recovery *Chair: Dr Elias Chebli, Porsche Motorsport*	**Session 5B: Turbine: Unsteady Flow** *Chair: Michael Dolton, Cummins Turbo Technologies*
13:40 Low Inertia Centrifugal Compressor Wheels: Influence of Back Disk Cavity on Aerodynamic Losses and Axial Thrust Load *Tore Fischer, Leibniz Universität Hannover, Germany*	**13:40** The Development of a Novel Unsteady Flow Control Method: Controlling the Rotating Nozzle Ring *Kun Cao, Imperial College London, UK*
14:00 Investigation of an Electrically Assisted Turbocharger with Energy Recovery for a Heavy Duty Diesel Engine *Ahmed Rezk, University of Huddersfield, UK*	**14:00** The Next Generation of Pulse Optimized Multi-Scroll Turbines for Automotive Applications - DualVolute and TwinScroll *Marc Gugau, BorgWarner Turbo Systems, Germany*
14:20 Design of Compressor for Electrically Decoupled Turbocharger in Downsized Gasoline Engine by 3D Inverse Design *Irfan Md Ghazaly, University College London, UK*	**14:20** Analyses of Flow Structure through Radial Turbine Twin-Entry Volute under Pulsatile Flows *Adel Ghenaiet, University of Sciences and Technology USTHB, Algeria*
14:40 **Q&A Session**	**14:40** **Q&A Session**
15:10 **Networking Refreshment Break**	
England Suite	
Session 5Aii: Novel Application: Euro 7 and Electric Assist plus EBoosting and Down Speeding, Waste Heat Recovery *Chair: Per-Inge Larsson, SCANIA CV*	
15:40 A High-Performance Electric Supercharger to Improve Low-End Torque and Transient Response in a Heavily Downsized Engine *Bryn Richards, Aeristech Limited, UK*	
16:00 Performance Testing of an Electrically Assisted Turbocharger on a Heavy Duty Diesel Engine *Edward Winward, Caterpillar, UK*	
16:20 Design of a Turbine-Generator-Unit for Commercial Vehicle ORC Applications *Joerg R. Seume, Leibniz University Hannover, Germany*	
16:40 **Q&A Session**	
17:10 **Chair's Closing Remarks** *Dr Kian Banisoleiman, Lloyd's Register EMEA*	
17:20 **Close of Conference**	