

engine expo 2009



FINAL PROGRAM

Messe Stuttgart



FREE-TO-ATTEND **OPEN TECHNOLOGY** **FORUM**

16, 17, 18 JUNE 2009

MESSE STUTTGART, STUTTGART, GERMANY

www.engine-expo.com

FREE-TO-ATTEND

OPEN TECHNOLOGY FORUM

INTRODUCTION

This year **Engine Expo 2009** celebrates its 11th anniversary as one of the most important events in the engine design and manufacturing calendar. With leading companies from around the world exhibiting the latest engine components, materials and manufacturing technologies, along with a free-to-attend Open Technology Forum plus the International Engine of the Year Awards, Engine Expo is the must-attend event for car, truck and bus engine design and manufacturing teams in 2009.

Forum topics include:

- Future internal combustion engine technology
- Engine downsizing – trends & optimisation technologies
- Lightweighting technology
- Powertrain – engine & transmission developments
- Evolution of affordable hybrid technologies for the mass market
- The all-electric vehicle – long-term solutions
- Bio-diesel & second-generation biotechnology

It's a seated forum...

but it's regularly standing room only!

THE INTERNATIONAL ENGINE OF THE YEAR AWARDS 2009



The highly acclaimed International Engine of the Year Awards take place on the second day of Engine Expo. The awards have become some of the most sought-after accolades in the industry, with the winners often using the logo as a centerpiece of their television and advertising campaigns. The ceremony attracts the most senior engine designers and executives, VIPs and journalists from all over the world, and takes place in an open-seated area within the exhibition halls. The awards are a highlight of Engine Expo, and create an extra networking opportunity for visitors and exhibitors to meet with many of the engine industry's top design and engineering people.

AWARDS CATEGORIES

The International Engine of the Year Awards feature 11 awards categories plus the most coveted prize: The International Engine of the Year.

- Best New Engine of the Year
- Best Fuel Economy
- Best Performance Engine
- Sub 1-litre
- 1-litre to 1.4-litre
- 1.4-litre to 1.8-litre
- 1.8-litre to 2-litre
- 2-litre to 2.5-litre
- 2.5-litre to 3-litre
- 3-litre to 4-litre
- Above 4-litre



Fritz Steinparzer, BMW official, collects the International Engine of the Year Award 2008 for the 3-litre twin turbo



The packed audience waits in anticipation to see which car maker has won the much-coveted International Engine of the Year Award



The International Engine of the Year trophies. Will BMW retain the ultimate accolade in 2009?

DAY 1 MORNING SESSION

AN INDUSTRY PERSPECTIVE



Moderator – Urban Carlson, CEO, Cargine Engineering AB

10.00: The car of the future – a long-term perspective to sustainable transportation

IHS Global Insight – Tom De Vleeschauwe, associate director, automotive consulting

Recent analysis by IHS-Global Insight concerning future demand for transportation/mobility indicated that some major concerns are lying ahead of us. If our current economic model of mobility is maintained, there will be three billion vehicles on the roads of the world by 2035. One can only imagine what this future world will be like, considering the mobility challenges we already face today when there are only 800 million vehicles in use globally. The automotive industry as we know it today will struggle to cope, and it is likely that all conventional wisdom will have to be questioned. What alternative solutions do we have available, and will there be different solutions for different regions? Will our current vehicle purchase pattern continue, or will we optimise our vehicle demand in line with our most frequent usage demands? These issues and more will be uncovered as we identify the path to the car of the future.

10.25: Low-cost ECU strategies for emerging markets

Robert Bosch India (RBEI) – Ramakrishna Donakonda, product line architect

Due to pressure from OEMs to reduce input costs without compromising on functionality, suppliers are required to provide solutions to reduce costs of development and integration of their components into the vehicle. In this presentation, we will discuss expectations of the emerging markets and the challenges and solutions in the development of a low cost Engine Control Unit (ECU) for these markets.

FUTURE INTERNAL COMBUSTION ENGINE TECHNOLOGY

10.50: Automotive engines – an obvious choice for the off-road market

PSA-Peugeot Citroën Moteurs – Dominique Desportes, technical director

Off-road pollutant regulations are becoming more and more stringent and tend to reach automotive regulation severity. Automotive technology will be required in the future with a competitive advantage for diesel automotive engines.

11.15: Increase the design freedom in the heart of the combustion engine

Sulzer Metco AG – Adrian Zaugg, head of new business

Surface solutions and their potential impact through increased design freedom for the engine designer or when

the secondary benefit has a bigger impact than primary technology focus.

11.40: Homogeneous Charge Compression Ignition engine – the need for society

Government Polytechnic, India – Professor Sanjay Harip, automobile engineering

The Homogenous Charge Compression Ignition (HCCI) engine offers significant benefits due to its high efficiency and ultra-low emissions. In this engine, the heat of compression ignites a homogeneous mixture. Benefits are near zero NOx and soot emission. HCCI is an alternative piston engine combustion process that provides efficiencies as high as CID (compression-ignition, direct-injection) engines while, unlike CID engines, producing ultra-low oxides of NOx and particulate matter (PM) emissions.

12.05: KiBox – a new combustion analysis system for in-vehicle operation

Kistler Instrumente AG – Heinz Jenny, head of electronics development

The KiBox from Kistler Instrumente AG is a new combustion analysis system, specifically designed for in-vehicle operation. All results are calculated in real time with cycle data synchronously transferred to INCA.

12.30: Advanced steels for the internal combustion engines of the future

Eramet Alliage – Angelos Germidis, application development

Innovative grades involving innovative processes need to be considered to meet increasing demands on combustion engines, particularly concerning temperature, fatigue, wear, corrosion resistance or other specific properties.

12.55: Microholes feasibility with regard to diesel and gasoline direct-injection needs

Posalux SA – Philippe Gaze, division manager

One of the key issues for further developments in the internal combustion engine is the possibility to achieve microholes in the nozzles for both gasoline and diesel direct injection. Several technologies and their suitability are described.

13.20: Novel combustion cycle involving oxygen and water

Petronas Research SB – Azmi Osman, staff engineer

The use of oxygen in the novel cycle improves combustion efficiency and reduces engine raw emissions. Water, on the other hand, is crucial in maximising combustion heat absorption and maximising gas expansion in the expansion stroke.

13.45:

Lunchtime review

Discover the history of epoch-making inventions

Grau Schnittmodelle - Johannes Grau, managing director

All visitors to Engine Expo and the other three adjoining automotive events are invited to take an exciting review, back in time to the roots of bikes and cars. The story begins in Germany and Engine expo and all other relevant automotive events are placed right in the centre of this historic area. Come and discover many new sights of the past, present & future.

DAY 1 AFTERNOON SESSION

ENGINE DOWNSIZING – TRENDS & OPTIMISATION TECHNOLOGIES



Moderator – Urban Carlson, CEO, Cargine Engineering AB

14.00: TVS supercharging for downsizing

Eaton Corporation – Robert Walling, manager

Supercharging has been synonymous with high-power, high-performance vehicles for decades. But with Eaton's new TVS technology, superchargers are a great solution to boost the power and low-end torque of small engines too.

14.25: Downsizing – probability and use of new technologies – new components – new competencies – new customers

Schlegel und Partner GmbH – Holger Richter, partner

Downsizing will bring many changes regarding the design of new engines. Some are obvious; however, there are technologies not currently in focus which might become critical in the future. The degree of relevance will be discussed.

14.50: A case study of standardisation and downsizing variants of fasteners in contemporary diesel engines

Nissan Ashokleyland – Saravanan Subramanian, deputy manager - strategic sourcing & Suresh Bagavathy Subramanian, deputy manager, product development

Focusing on variety reduction, commonality across models/standardisation is the order of the day for better-value engineered fasteners design. This is an often-overlooked but important area, in which it is critical to achieve uniqueness of design.

15.15: Latest generation of aluminum cylinder liners for downsizing engines

Peak Werkstoff GmbH – Andreas Storz, key account manager

The presentation will discuss new alloy development for increased combustion pressures, co-extruded bond liner to help thermal management and block stiffness, and optimised honing texture for reduced friction.

LIGHTWEIGHT TECHNOLOGY

15.40: Composite materials for engine components

Menzolit – Peter Stachel, technical director

Fiber-reinforced materials are low in weight and high in strength. Current applications include oil pans, valve covers and throttle bodies. Those materials provide excellent net shaped precision. Flatness and sealing precision is excellent.

16.05: New development in thermoset water pumps – innovations to CO₂ and weight reduction

Vyncolit NV – Martin Schoessler, regional sales and marketing

The speech describes the new OEM water pump, which is controllable (short heat-up phase, less energy consumption), weight reduced and complete build of thermoset under full load in the belt drive. This new world engine of a big OEM is the newest diesel engine on the market, due for release at the beginning of 2009. With a small fuel consumption close to 5L/100km and a torque up to 500Nm with 204 horsepower, it is the most innovative engine on the market.

16.30: Finish



DAY 2 MORNING SESSION

POWERTRAIN – ENGINE & TRANSMISSION DEVELOPMENTS



Moderator – Dr Rui Chen, senior lecturer, Department of Aeronautical and Automotive Engineering, Loughborough University, UK

10.10: The Aston Martin One-77 V12 engine
Aston Martin – Dr Brian Fitzsimons, chief engineer

This unique and exclusive vehicle demands an equally special engine at its heart. This is the story of how the One-77 V12 engine was conceived and developed from the current Aston Martin V12 engine, to be the ultimate expression of V12 power, beauty and soul.

10.35: Subaru Boxer Diesel – first four-cylinder horizontal opposed diesel engine

Fuji Heavy Industries Ltd (Subaru) – Nakajima Yoshinori, general manager, 1st power unit research & experiment department, Subaru engineering division

This presentation will introduce the world's first boxer diesel engine for mass-produced passenger cars, and its development status.

11.00: Simulation of vibration fatigue for transient loaded engine and automotive components

DTech Steyr – Stefan Kaindl, manager branch office

The presentation shows the development of a crank drive and an engine bracket using a new simulation method for vibration fatigue. The simulation applies for different development stages, from concept phase to a fully functional virtual prototype.

11.25: HVOF and HVSFS coatings for reduction of wear and friction in cylinder liners

IFKB, Stuttgart University – Johannes Rauch, scientific assistant

Aluminum and gray cast cylinder liners have been coated with different (nano) materials to reduce friction and wear by HVOF and HVSFS. The tribological behavior, especially under poor lubrication conditions, was tested and compared with standard liners. Results will be discussed.

11.50: Efficient and powerful small engines from Hyundai – the key to low CO₂ and driving fun

Hyundai Motor Company – Dr Sunghwan Cho, director

This presentation will explain the various technical aspects of the recent small gasoline and diesel engine. The future improvement plan with advanced technologies will also be addressed, emphasizing the compatibility between fuel economy and driving pleasure.

12.15: Quasi-Constant Volume (QCV) spark ignition combustion

Loughborough University, UK – Dr Rui Chen, senior lecturer

The QCV, achieved by varying the crank angular velocity, enables reductions in piston velocity around the TDC region. Experimental results showed improvements in engine fuel consumption and power output with the QCV over conventional cycles.

12.40: High-performance polymers for turbo charger systems

Ticona GmbH – Matthias Schuemann, diploma engineer

This review will discuss how increasing charge air pressure and temperature require the use of Fortron PPS, i.e. for charge air ducts.

13.05: The advantages and benefits of using flexible printed circuits in gearbox control units

Freudenberg Mekttec Europa – Christian Schrotz, marketing manager

Technology-wise, environment-wise, this presentation will give examples of serial applications for OEMs within Europe.

DAY 2 – AFTERNOON

14.00: INTERNATIONAL ENGINE OF THE YEAR AWARDS



After awards review

Discover the history of epoch-making inventions

Grau Schnittmodelle - Johannes Grau, managing director

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DAY 3 MORNING SESSION

EVOLUTION OF AFFORDABLE HYBRID TECHNOLOGIES FOR THE MASS MARKET

Moderator – Chris Harrison, director of Ford Component Sales, **Ford Motor Company**

10.00: Engine control optimisation – without the support of the OEM

Pi-Shurlok Ltd & MIRA Ltd – **Paul Feetenby**, systems engineering manager & **Dr Les Smith**, senior powertrain consultant

The OEMs and major Tier 1s do not release engine management system (EMS) strategy to a third party, so the development of new features is generally not possible. In contrast, an open-architecture engine EMS enables the development and calibration of any number of new feature control strategies. This paper presents a case study showing how a commercially available open architecture EMS has been used to develop an engine controller for a hybrid vehicle application.

10.25: Development and application of a flywheel hybrid

Prodrive Automotive Tech – **David Rolett**, principal engineer

High-speed flywheel hybrid system application into a premium road car. Plus an overview of potential benefits and challenges. The presentation will focus on technology overview, simulation results, control strategy, exhaust emissions reduction and packaging.

10.50: Bi-fuel conversion brings hydrogen fuel to existing ICE technology

Revolve Technologies Limited – **Paul Turner**, technical director of product development

The presentation will discuss Revolve Technologies' on-going bi-fuel H2ICE programme which demonstrates that hydrogen as a fuel – and the associated modifications, componentry and vehicle equipment – are a practical, viable and efficient option in a base vehicle powered by a conventional internal combustion engine.

11.15: Partial Power System (PPS) – a battery-free hybrid powertrain application for a 52-seat bus

fka - Forschungsgesellschaft Kraftfahrwesen GmbH – **Kai Scholz-Starke**, development engineer

The PPS system is a hybrid powertrain without a main battery pack for system operation. A simulation study has been carried out on a 52-seat bus with realistic urban driving cycle, with a focus on fuel economy and emission reduction potential.

THE ALL-ELECTRIC VEHICLE – LONG-TERM SOLUTIONS

11.40: FAST 2025 – the future of alternative drives value creation

Oliver Wyman – **Christian Kleinhans**, partner automotive

In-depth study of future value creation for alternative drives, with a focus on PHEVs and EVs. Key topics covered will be: cost developments, OEM and supplier shares, new players/partnerships, areas of action (brands, programs, technologies, etc.).

12.05: All-electric vehicle – the long-term solution to sustainable transportation?

PwC Automotive Institute – **Liang Cheng**, analyst

Electric vehicles are currently receiving plenty of attention due to the host of positive drivers and the progress of enabling technologies. However, technological and infrastructural barriers must be overcome before EVs achieve mainstream acceptance – these will be presented.

BIODIESEL & SECOND-GENERATION BIOTECHNOLOGY



12.30: New fuels require new surface solutions

Sulzer Metaplas GmbH – **Dr Thomas auf dem Brinke**, project manager BD

The use of biofuels – or at least their addition to regular fuels – demands higher corrosive resistance on engine components due to their higher reactivity. Surface solutions for different components will be presented.

12.55: Biodiesel in India – an emission and environmental perspective

Indian Oil Corporation Ltd – **Sachin Chugh**, research officer

This presentation will cover the Indian biodiesel industry, challenges and opportunities, the use of biodiesel from non-edible oils in India, the oil industry's contribution in promoting biodiesel and key policies and initiatives from the government of India.

13.20: How to cope with the consequences of the applied emission reduction regimes on the surface of a cylinder

Sulzer Metco AG – **Dr Peter Ernst**, head automotive venture

A versatile solution, capable of dealing with the various requirements resulting from corrosion resistance, friction and wear on the cylinder surface, will be explained.

13.45:

Lunchtime review

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Grau Schnittmodelle - **Johannes Grau**, managing director

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This program may be subject to change

EXHIBITING COMPANIES

Regular updates available online at: www.engine-expo.com

ACTech GmbH | adaptronic Pruftechnik GmbH | Asimco Technologies UK Ltd | Astremo Powertrain AG | Ateliers des Janves | Aumet Oy | AVL Schrick GmbH | AxynTeC Dunnschichttechnik GmbH | Behineh Sabz Company | Bogra Technologies | Bowman Power Group Ltd | Brace Automotive | BSG Bodensee Steuergerate GmbH | Capricorn Automotive GmbH | Cargine Engineering AB | CD-adapco | Ceratizit Luxembourg s.a.r.l | CX-Gruppe GmbH | Dr. Hartmut Klose | DTECH STEYR - Dynamics & Technology Services GmbH | EFD Induction GmbH | Eltro GmbH | ETS-P Test Fuels | Everest Team | Fomet S.p.A | FreudenburgDichtungs und Schwingungstechnik GmbH & Co KG | Giant Lion Know How Co Ltd | Global Insight | Grunewald GmbH & Co KG | heat2power | Helvoet Rubber & Plastic Technologies nv | Hidria | Hitchiner France | Hofstetter GmbH Co Kg | Honda R&D | Hutchinson - Transmission Systems | Ilmor Engineering Ltd | Interface Solutions Inc | Iranian Pavilion | Johannes Grau Schnittmodelle | Kamat Pumpen GmbH | Kirpart A.S | LS Kunststofftechnologie GmbH | Magna Powertrain | MAPE Spa | Menzolit Compounds | Mov'eo (French Autotomotive Cluster) | Nagel Maschinen und Werkzeugfabrik GmbH | NanoFocus AG | Neuteq Europe Ltd | O Stain Precision Casting Co Ltd | Optel Thevon | Panhard General Defense | Paulstra - Oils Seals Division | Peak Werkstoff GmbH | R.G.RAY Corporation | Revolve Technologies | Rhone Alpes Automotive Cluster | Sapaic Industries | Scherzinger Pump Technology | Scion-Sprays Ltd | Scuderi Group LLC | Seine-Maritime | Senior Automotive | Shell Casting Srl | SM Srl | Special Purpose Equipment Ltd | Strovirny Poldi | Sulzer Metco AG | Tamboli Castings Limited | Ticona GmbH | Titeflex Corporation | TM4 | Trijekt GmbH | Vyncolit | Winsert Inc | Zeon Europe GmbH

Stuttgart events

Engine Expo is not open to the general public. Entrance to it and the adjoining Vehicle Dynamics Expo, European Automotive Components Expo, Crash Test Expo and Automotive Testing Expo is **FREE**.

automotive
testing expo 2009
Hall 1
europe

VEHICLE DYNAMICS
EXPO 2009
Hall 3

CRASHTEST EXPO
EUROPE 2009
Main concourse

EUROPEAN
AUTOMOTIVE
COMPONENTS
EXPO '09
Hall 3



Opening times

Tuesday 16 June 2009	9.00hrs-17.00hrs
Wednesday 17 June 2009	9.00hrs-17.00hrs
Thursday 18 June 2009	9.00hrs-16.00hrs



To avoid queuing at the registration area for your official entry badge, please **register online now** and your badge will be posted to you before the show.



MORE INFORMATION

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for OE powertrain design, production,
components and technology

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CONTACT DETAILS

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