# PRESS RELEASE

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# A completely new medium speed engine heads Ricardo presentations at CIMAC 2016

## A bumper total of five papers comprise the Ricardo technical contribution to the 28th CIMAC World Congress on combustion engine technology for ship propulsion, power generation and railway traction, to be hosted on 6-10 June in Helsinki, Finland

Foremost amongst the Ricardo papers is *Introducing a Completely New Medium Speed Engine.* This paper describes a completely new medium speed engine design produced in collaboration with a leading engine manufacturer, intended to address the increasing worldwide demand for decentralized power solutions. Just 18 months after commencing the initial layout design calculations, a production intent full-scale engine achieved its first fired run at the engine manufacturer's development test facility. The engine has a market entry power rating of 530 kW/cyl, initially employing single stage turbocharging, and is designed to operate at up to 250 bar peak firing pressure. The initial production engine will run on heavy fuel oil or marine gas oil, with further natural gas and dual fuel variants already under development, supported by an architecture of common major components.

A second Ricardo paper covers firing order options for large multi-cylinder engines. With potentially thousands of firing order options available, *Firing Order Optimisation on Large Bore Engines for Gas Exchange, Mechanical Loading and Fuel Consumption Improvement*, will describe a methodology for optimizing the gas exchange and mechanical loading on crankshafts and bearings. A rapid optimization tool can be used to identify a reduced list of options that can then be investigated in higher fidelity through detailed analytical tools. This provides the potential during clean-sheet engine design to minimize component geometries, reducing frictional losses and enabling gains in fuel consumption – for example, through balancing the cylinder-to-cylinder

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combustion performance to reduce the coefficient of variation on maximum cylinder pressure and exhaust temperature.

The increasingly demanding efficiency requirements placed on high BMEP gas engines are encouraging the development of lean burn combustion systems, which are characterized by a very efficient combustion and long operating intervals while keeping the NOx emissions at a very low level. A further Ricardo paper, *Pre-Chamber design criteria for high efficiency gas engines*, describes a design process and design criteria for efficient combustion, based on the company's experience and guidelines that are applied in the design and evaluation of gas engines with pre-chambers. The paper will in particular focus on pre-chamber features such as nozzle design, spark plug position and interaction between the cylinder and pre-chamber flow.

Two further Ricardo papers will be presented as poster sessions. The first of these, *A modular alternative to large scale combined cycle power*, describes how a step change in reciprocating engine efficiency from today's levels may be achieved through the implementation of a Ricardo split-cycle engine concept. The split-cycle engine separates the compression cycle from the combustion and expansion cycles which, in addition to allowing each cylinder to be optimized, enables waste heat from the exhaust gas to be captured and transferred to the compressed intake air in a highly effective manner, as the charge air moves between the two cylinders. The concept provides a significant opportunity to reduce the through life cost and environmental impact of energy generated. The paper describes the use of this split-cycle concept in high and medium speed engines for power generation to achieve efficiencies of 60 percent from units of 1–30 MW mechanical output.

The final Ricardo paper, *Analysis and Testing the Impact of Large Volumes of Water in Diesel Fuel Oil*, addresses the issue of water contamination of diesel fuel, a particularly crucial consideration for back-up power systems. The paper provides in-depth research, analysis and testing results of the impact of significant volumes of water contamination on the ability of large, medium-speed diesel engines to successfully start and operate under emergency conditions. Analytical and empirical results are described for those conditions where there is no known analysis or operating experience.

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“Ricardo is proud to be making a significant technical contribution to the CIMAC World Congress again in 2016,” commented Simon Brewster, Ricardo director of industrial engines. “Large and medium speed engines are fundamental to the needs of distributed power generation, marine propulsion, rail traction and emergency back-up power provision the world over. Less obvious to the general public than their much smaller passenger car, truck and bus equivalents, these engines are the power behind the economy of both the industrialized and developing world. As these paper presentations demonstrate, Ricardo remains at the forefront of technology development in this crucial market sector, and is working with partners in all parts of the world to create new more fuel efficient and environmentally sustainable solutions.”

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**NOTES TO EDITORS:**

**Ricardo plc** is a global, world-class, multi-industry consultancy for engineering, technology, project innovation and strategy. Our people are committed to providing outstanding value through quality engineering solutions focused on high efficiency, low emission, class-leading product innovation and robust strategic implementation. With a century of delivering excellence and value through technology, our client list includes the world's major transportation original equipment manufacturers, supply chain organizations, energy companies, financial institutions and governments. Guided by our corporate values of respect, integrity, creativity & innovation and passion, we enable our customers to achieve sustainable growth and commercial success. For more information, visit www.ricardo.com.

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