

PRELIMINARY PROGRAM

**CIMAC** 19  
CONGRESS  
VANCOUVER, JUNE 10-14, 2019

# Meeting the Future of Combustion Engines

## 29th CIMAC WORLD CONGRESS

Combustion Engine Technology for Ship Propulsion | Power Generation | Rail Traction







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# Join us in Vancouver

The International Council on Combustion Engines – CIMAC – cordially invites you to the 29th CIMAC Congress from 10 to 14 June 2019 in Vancouver, Canada.

This is the first time that the Congress is taking place in Canada, and 46 years have passed since the Congress was last held in North America (Washington) in 1973. During that time, the combustion engine has been advanced into a stronger position than ever, as one of the chief sources of energy conversion for powering ships, power plants and rail locomotives, among others. Nowadays our industry is facing tremendous challenges, however: In addition to increasing requirements regarding emissions, we must deal with the upcoming revolution of shipping through digitalisation, while the most important (and most challenging) change will likely come from the matter of climate change. It is the responsibility of our industry to find CO<sub>2</sub>-neutral solutions for ship and rail propulsion as well as power generation, in particular for those applications in which the flexibility and high power of internal-combustion engines is necessary. Although we know it is possible in principle, such as with synthetic fuels, a great deal still needs to be developed – and the Congress in Vancouver will give us the opportunity to discuss the best solutions for the future.

The 2019 Congress will once again bring together the leading experts from engine manufacturers, component and system suppliers, rail, marine and power plant operators and users, technical universities, classification societies, and oil companies around the globe. The presentations will highlight the latest developments in products and technologies and the value that they bring to the customer; they will elaborate on the scientific research that creates the foundation for the next generation of engines and address the needs of the markets to ensure a sustainable, environmentally and economically sound future. Additionally, the Congress offers a unique opportunity to generate business and build lasting networks. In panel discussions and keynote speeches, we will be challenged to broaden our perspectives. Customer benefits and value will be strongly emphasized during the Congress. This is clearly an opportunity that will help in making the right decisions for the future.

Vancouver welcomes you in mid-June. It is a city on the sea with influences from both east and west, full of potential, and surrounded by natural beauty. The Congress venue is located on the beautiful waterfront of downtown Vancouver, with a view of the mountains of British Columbia. While the optional tours will give you the chance to visit this natural beauty as well as a vivid city, the technical tours will showcase a number of interesting companies and places in and around Vancouver, the global maritime business hub.

CIMAC as well as the US NMA and our Canadian corporate members are looking forward to welcoming all of you to the 2019 Congress in Vancouver. In addition to providing the opportunity to experience British Columbia and its natural beauty, we will do our utmost to meet your expectations regarding the Congress.

**Once again – Welcome!**



**Hannu Mäntymaa**  
Vice-President Technical Program



**Marko Dekena**  
Vice-President Technical Program

# Welcome to Vancouver!

I hope you enjoy this wonderful city while networking and participating in the CIMAC Congress. Vancouver has much to offer: A vibrant downtown with excellent restaurants and coffee shops; scenic beaches, waterfronts and parks; museums; a great variety of upscale shopping; and nearby nature areas.

The welcome reception will be hosted at the Vancouver Aquarium, one of the city's top attractions. The social program highlights some "don't miss" attractions such as Granville Island, Capilano Suspension Bridge, Grouse Mountain, and Fly Over Canada. With so much to do and see in Vancouver, we have kept the social program flexible to enable you to create a personal experience following your interests.

The guest program has a hospitality suite where you can get together with others and plan your adventures. A representative from Vancouver Tourism will be available to provide an overview of things to do.

On Friday, be sure to sample the diverse industrial side of Vancouver with half-day tours of some of the area's companies from engine and fuel system suppliers, to energy providers, to key transportation companies.

**On behalf of the United States National Member Association and Teekay Shipping, the Canadian National Member, I hope you enjoy your visit to Vancouver!**



**Tim Callahan**  
CIMAC Congress 2019 President



**Fred Richardson**  
Representative of CIMAC Congress  
Hosting Organization

CONGRESS OVERVIEW

Day	Time	Acitivties
Monday June 10, 2019	10:00 – 11:30	Opening Ceremony
	12:00 – 13:00	Lunch
	13:30 – 15:00	Technical Sessions
	15:00 – 15:30	Coffee Break
	15:30 – 17:00	Technical Sessions
	18:30	Welcome Reception in the Vancouver Aquarium
Tuesday June 11, 2019	09:00 – 17:00	Poster Sessions
	09:00 – 10:30	Technical Sessions
	10:30 – 11:00	Coffee Break
	11:00 – 12:30	Technical Sessions
	12:30 – 13:30	Lunch
	13:30 – 15:00	Technical Sessions
	15:00 – 15:30	Coffee Break
	15:30 – 17:00	Panel - Sulphur Cap 2020
	18:30	ABB Evening
	09:00 – 17:00	Poster Sessions
Wednesday June 12, 2019	09:00 – 10:30	Technical Sessions
	10:30 – 11:00	Coffee Break
	11:00 – 12:30	Technical Sessions
	12:30 – 13:30	Lunch
	13:30 – 15:00	Panel - Digitalization
	15:00 – 15:30	Coffee Break
	15:30 – 16:30	Collin Trust sponsored Keynote Speech
	16:30 – 17:00	Panel - Defossilization
	09:00 – 17:00	Poster Sessions
	09:00 – 10:30	Technical Sessions
Thursday June 13, 2019	10:30 – 11:00	Coffee Break
	11:00 – 12:30	Technical Sessions
	12:30 – 13:30	Lunch
	13:30 – 15:00	Technical Sessions
	15:00 – 15:30	Coffee Break
	15:30 – 17:00	Final Panel
	18:30	Gala Dinner
	09:00 – 14:00	Half-day Technical Tours
	09:00 – 17:00	Full-day Technical Tours
Friday June 14, 2019		

Optional Tours  
June 11 – 13, 2019

TOPICS AND SESSIONS

1. Digitalization and Connectivity – What it means to different applications

1.1 Session 1  
1.2 Session 2  
1.3 Panel - Digitalization
2. System Integration, Electrification and Hybridization – for Rail, Power and Marine Applications

2.1 Hybrid Drives - Basic technologies  
2.2 Performance Improvement Technologies  
2.3 Marine Hybrid Applications
3. Electronic Support – Controls, Automation, Measurement & Monitoring

3.1 Measurement & Monitoring  
3.2 Performance Optimizations  
3.3 Control Systems
4. Emission Reduction Technologies – What’s in store for the future

4.1 PM Reduction  
4.2 Engine Measures 1  
4.3 Engine Measures 2  
4.4 Methane  
4.5 SCR 1  
4.6 SCR 2
5. Low Carbon Combustion – What are the alternative fuels for the future

5.1 Low Flashpoint Fuels  
5.2 Liquid and Hydrogen  
5.3 Renewable Fuels  
5.4 Panel - Defossilization
6. Sulphur Cap 2020 – Strategies to deal with regulatory requirements

6.1 New Scrubbing & Lubricant Technologies  
6.2 Fuels 2020 & Expected Performance  
6.3 Panel - Sulphur Cap 2020
7. Case Studies from Operators – Lessons to be learned

7.1 Sulphur Cap  
7.2 Users Experience
8. Future Challenges and Ideas for Future Developments – Regulations, Environment, Global Trends

8.1 Session 1  
8.2 Session 2
9. New Engine Developments

9.1 Diesel - Medium and High-Speed Engines  
9.2 Diesel - Low Speed Engines  
9.3 Diesel - Locomotive Engines  
9.4 Gas & Dual Fuel - Engine and System Level Development  
9.5 Gas & Dual Fuel - Field Experience and Application Challenges  
9.6 Gas & Dual Fuel - Dual Fuel Combustion  
9.7 Gas & Dual Fuel - Engine Development I  
9.8 Gas & Dual Fuel - Engine Development II
10. Latest Engine Component Developments

10.1 Fuel Injection & Gas Admission - Common Rail Developments  
10.2 Fuel Injection & Gas Admission - Gas Applications  
10.3 Components & Tribology - Piston and Liner  
10.4 Components & Tribology - Different Components  
10.5 Components & Tribology - Engine Systems  
10.6 Components & Tribology - Lubricants  
10.7 Turbochargers & Air-/Exhaust Management - Advanced Air Management and Methodologies  
10.8 Turbochargers & Air-/Exhaust Management - New Products and Aplications
11. Basic Research & Advanced Engineering – Technologies, Materials & Tools for Future Engines

11.1 Visualizations  
11.2 Mechanics  
11.3 Simulation  
11.4 Ignition Concepts

Monday - June 10, 2019

13:30 – 15:00

Ballroom A	Ballroom B	ABB Room (1st Floor)	AVL Room (1st Floor)
<div>9New Engine Developments - Diesel</div> <div>9-1Medium- and High-Speed Engines</div> <div>Chair: Beran, Robert (AVL List)</div> <div>293MAN ES – The new 4x/60 Engine Family - The Energy Driver for All Applications</div> <div>Alexander Rest, MAN Energy Solutions</div> <div>163Development of NIIGATA new slow-speed diesel engine 34RT -"The evolution of the Galapagos engine"-</div> <div>Tatsuya Kitajima, Niigata Power Systems</div> <div>415Operational in Service</div> <div>Experiences and Extension of the Rolls-Royce Bergen B3x:45 Engine Family</div> <div>Leif-Arne Skarbø, Bergen Engines, a Rolls-Royce Power Systems Company</div> <div>301Next Generation High Speed Engines – Advanced Design Features Enabling Highest Engine Efficiency</div> <div>Guenter Figer, AVL List</div> <div>272MAN175D - High Speed Engine Family</div> <div>Thomas Seidl, MAN Energy Solutions</div>	<div>11Basic Research &amp; Advanced Engineering - Technologies, Materials &amp; Tools for Future Engines</div> <div>11-1Visualizations</div> <div>Chair: Wimmer, Andreas (Large Engines Competence Center)</div> <div>404Fuel Flexible Injection System – How to handle a fuel spectrum from diesel-like fuels to alcohols</div> <div>Andreas Schmid, Winterthur Gas &amp; Diesel</div> <div>166Interpretation of Ignition and Combustion in a Full-Optical High-Pressure-Dual-Fuel (HPDF) Engine using 3D-CFD Methods</div> <div>Stephanie Frankl, Technical University of Munich</div> <div>439Identification and Quantification of Abnormal Combustion in Natural Gas Engines</div> <div>Garrett Anderson, Southwest Research Institute</div> <div>397Simultaneous visualization of Chemiluminescence and Natural Luminosity of Dual Fuel combustion in an Optical Diesel Engine</div> <div>Qiang Cheng, Aalto University</div>	<div>10Latest Engine Component Developments - Components &amp; Tribology</div> <div>10-3Tribology: Piston and Liner</div> <div>Chair: Flynn, Paul (HorsePower Consulting)</div> <div>416Tribological development of piston assembly in marine diesel engines based on theoretical analysis and experimental verification (revised and final released)</div> <div>yihu tang, Shanghai Marine Diesel Engine Research Institute</div> <div>384Distribution and Influence on Lubrication Performance of Gas Pressure in Groove of Piston Ring Pack</div> <div>Xiuyi Lv, Harbin Engineering University</div> <div>031A Comparative Study on Scuffing Properties of Plasma Spray Coating and HVOF Coating on Piston Ring Sliding Surface</div> <div>Minoru Kawanishi, RIKEN Corporation</div> <div>478Cylinder Head development for High Speed Diesel Engines - Methodology and Challenges</div> <div>Bechir Mokdad, Liebherr-Components Colmar</div>	<div>10Latest Engine Component Developments - Fuel Injection &amp; Gas Admission</div> <div>10-1Common Rail Developments</div> <div>Chair: Takahata, Yasuyuki (Yanmar)</div> <div>073Investigation and Evaluation of a New Double -Valves Controlled Fuel Pressure Amplification Common Rail System on Hydraulic Test Bench and 2-Stroke Engine</div> <div>Frank Zhang, China Shipbuilding Power Engineering Institute</div> <div>267Detailed Characterisation and Service Experience of OMT Injectors for Dual-Fuel Medium- and Low-Speed Engines</div> <div>Marco Coppo, OMT - Officine Meccaniche Torino</div> <div>477250 MPa Common Rail Injector for the EMD 1010J3 Tier 4 Locomotive Application (#318 Reviewed)</div> <div>Ricardo Cadavid, Woodward</div> <div>119New Injector Family for High Pressure Gas and Low Caloric Liquid Fuels</div> <div>Clemens Senghaas, Woodward L'Orange</div>

Monday - June 10, 2019

15:30 – 17:00

Ballroom A	Ballroom B	ABB Room (1st Floor)	AVL Room (1st Floor)
<div>9New Engine Developments - Diesel</div> <div>9-2Low Speed Engines</div> <div>Chair: Takasaki, Koji (Kyushu University)</div> <div>223Development and maturing of MAN B&amp;W two-stroke Mk 10 design platform and alternative fuel design</div> <div>Susanne Kindt, MAN Energy Solutions</div> <div>357Increasing the Efficiency of Large Two-Stroke Diesel Engines for lower GHG Emissions</div> <div>Daniel Schaepper, Winterthur Gas &amp; Diesel</div> <div>137THE LATEST TECHNOLOGIES OF J-ENG UE ENGINE</div> <div>Chikara Matsuda, Japan Engine Corporation</div> <div>169Performance and Emission results from the MAN B&amp;W LGI-P low-speed engine operating on LPG</div> <div>Stefan Mayer, MAN Energy Solutions</div>	<div>11Basic Research &amp; Advanced Engineering - Technologies, Materials &amp; Tools for Future Engines</div> <div>11-2Mechanics</div> <div>Chair: Schlemmer-Kelling, Udo (FEV Group)</div> <div>087Online coupled piston ring dynamics in quasi 2D and 3D CFD simulations of the piston ring pack</div> <div>Stefan Held, Technical University of Munich, Chair of Internal Combustion Engines</div> <div>049Capabilities of Transient Simulations in the Torsional Vibration Damper Selection</div> <div>Klaus Prenninger, Geislinger</div> <div>092eta-up – Reduction of Friction Losses of Medium-Speed Marine Diesel Engines</div> <div>Marko Püschel, FVTR</div> <div>424The development of a variable compression ratio (VCR) on a large 2-stroke slow speed engine; the joint development approach of IHI, DU and WinGD</div> <div>Dominik Schneider, Winterthur Gas &amp; Diesel</div> <div>257Variable Compression Ratio Technology for Dual-Fuel Engines</div> <div>Christopher Marten, Institute for Combustion Engines VKA, RWTH Aachen University</div>	<div>10Latest Engine Component Developments - Components &amp; Tribology</div> <div>10-4Tribology: Different Components</div> <div>Chair: Rabe, Rom (University of Flensburg)</div> <div>408A novel approach to estimate valve wear: Numerical simulation based on test series using a unique tribological test rig</div> <div>Jan-Peter Edelmann, Märkisches Werk</div> <div>338Increasing Safety with SOLAS compliant Cladding Insulation Systems – A Retrofit Case Study</div> <div>Dirk Balthasar, Thermamax</div> <div>412Future of static sealing solutions in engine industry -Short history of static sealing, best practices learned and a look at future solutions</div> <div>Jukka Sunila, TT Gaskets</div> <div>282Correlation between flow and fluid parameters for hydraulic filter element's lifetime</div> <div>Jaganmohan Rao Gorle, Parker Hannifin</div> <div>454Influence of Topring Coating and Oil Specification on Crank Angle Resolved Piston Group Friction in Medium Duty Diesel Engines</div> <div>Florian Pohlmann-Tasche, Institute for Technical Combustion, University of Hamburg</div>	<div>10Latest Engine Component Developments - Fuel Injection &amp; Gas Admission</div> <div>10-2Gas Applications</div> <div>Chair: Nordrik, Rune (Rolls-Royce Power Systems)</div> <div>392Design of a new condensate gas fuel injection system for Wärtsilä engines</div> <div>David Jay, Wärtsilä</div> <div>277Novel LPG fuel supply system for MAN B&amp;W LGI-P engines: design challenges and performance results</div> <div>Roberto Comelli, Alfa Laval Tumba</div> <div>292Current challenges in operation of MPI valves for Large Engines – Derived benefits for engine application by usage of an integrated development approach</div> <div>Peter Christiner, Robert Bosch</div> <div>179Detailed Assessment of an Innovative Combined Gas-Diesel Injector for Diesel Ignited High-pressure Gas Direct Injection Combustion Concepts</div> <div>Christoph Redtenbacher, LEC</div>

Tuesday - June 11, 2019

09:00 – 10:30

Ballroom A	Ballroom B	ABB Room (1st Floor)	AVL Room (1st Floor)
<div>6 Sulphur Cap 2020 - Strategies to deal with regulatory requirements</div> <div>6-1 New Scrubbing &amp; Lubricant Technologies</div> <div>Chair: Wik, Christer (Wärtsilä)</div> <div>294 Dry Scrubbing Technology: Improvement of Desulfurization Agent and Cleaning Technology</div> <div>Uwe Etzien, FVTR</div> <div>015 The science of compliance</div> <div>David Atkinson, Parker Kittiwake</div> <div>230 Optimization study of exhaust gas cleaning system based on sodium-alkali method</div> <div>JingJing Huang, China Shipbuilding Power Engineering Institute</div> <div>047 Additive and Lubricant Solutions Enabling a New Era of Cleaner Emission Compliance</div> <div>Ian Bown, The Lubrizol Corporation</div>	<div>9 New Engine Developments - Gas &amp; Dual Fuel</div> <div>9-4 Engine and System Level Development</div> <div>Chair: Schneider, Dominik (Winterthur Gas &amp; Diesel )</div> <div>050 Study on the Influence of Prechamber Structure on the Knock of a Marine Low-Speed Dual-Fuel Engine</div> <div>Guo Hao, Harbin Engineering University</div> <div>071 An Investigation into the Gas-Mode Start Strategies for a Marine Medium-Speed Micro-Pilot-Ignition Dual-Fuel Engine</div> <div>Xianquan Zheng, Wuhan University of Technology</div> <div>079 Numerical Study on Ignition Delay of Lubricating Oil Droplet Auto-Ignition Under Natural Gas Engine In-cylinder Conditions</div> <div>Zixin Wang, Dalian University of Technology</div> <div>258 Optimization of the Dual Fuel micro pilot combustion process for commercial applications</div> <div>Marius Hoff, Caterpillar Motoren</div>	<div>4 Emission Reduction Technologies - What's in store for the future</div> <div>4-1 PM Reduction</div> <div>Chair: Ralf Marquard</div> <div>007 Particulate Emission Characteristics of Tugboat Main Engine based on Real Ship Test</div> <div>Dengguo Liu, School of Automotive Studies, Tongji University,Shanghai Environmental Monitoring Center</div> <div>361 Integration and matching of Diesel Particulate Filters for ABC medium speed engines</div> <div>Koen Christianen, Anglo Belgian Corporation</div> <div>323 Characteristics of Particulate Matter Emissions from a Low-Speed Marine Diesel Engine</div> <div>Hao Jiang, Shanghai Jiao Tong University</div> <div>395 Investigation on particle size distribution in transient operating strategies on a medium-speed four-stroke large diesel engine</div> <div>Michael Reska, University of Rostock, Chair of Technical Thermodynamics</div>	<div>3 Electronic Support - Controls, Automation, Measurement &amp; Monitoring</div> <div>3-1 Measurement &amp; Monitoring</div> <div>Chair: Östman, Fredrik (Wärtsilä)</div> <div>026 Improving efficiency and emissions of Otto gas engines, by continuously monitoring fuel gas quality.</div> <div>Patrice FLOT, CMR Group</div> <div>016 New development of an extremely robust cylinder pressure sensor for thermodynamic control concepts on high efficient gas engines</div> <div>Stefan Neumann, IMES</div> <div>285 Development and Application of a Physically-assisted Virtual Sensor (PVS) for NOx Emissions</div> <div>Panagiotis Kyrtatos, Vir2sense</div> <div>220 A New Technological Approach to On-board Bearing Condition Monitoring</div> <div>Gunther Hager, Miba Gleitlager</div>

10:30 – 11:00 Coffee Break

Tuesday - June 11, 2019

11:00 – 12:30

Ballroom A	Ballroom B	ABB Room (1st Floor)	AVL Room (1st Floor)
<div>6 Sulphur Cap 2020 - Strategies to deal with regulatory requirements</div> <div>6-2 Fuels 2020 &amp; Expected Performance</div> <div>Chair: Aabo, Kjeld (MAN Energy Solutions)</div> <div>374 Fuel 2020 – Are you ready for the 0.50%S fuel cap?</div> <div>Dorthe Marie Sveistrup Jacobsen, MAN Energy Solutions</div> <div>090 Estimation of ignition and combustion quality of low-sulfur marine fuel after 2020</div> <div>Koji Takasaki, Kyushu University</div> <div>450 Effect of sulphur content on bunker fuels performance in the medium speed engine</div> <div>Sami Nyyssönen, VTT Technical Research Centre of Finland</div> <div>203 ClassNK's Actions on advising the use of Very Low Sulphur Fuel Oil compliant with the SOx regulation from 2020</div> <div>Sho Ichikawa, Nippon Kaiji Kyokai</div>	<div>9 New Engine Developments - Gas &amp; Dual Fuel</div> <div>9-5 Field Experience and Application Challenges</div> <div>Chair: Osborne, Dustin (Southwest Research Institute)</div> <div>093 Enhanced flexibility in gas engine operation for marine and power generation demanding applications</div> <div>Diego Delneri, Wärtsilä</div> <div>094 Impact of liquefied natural gas quality and weathering on engine performances over a journey using a thermodynamic fuel system model</div> <div>Jonas Thiaucourt, LHEEA research lab. - Ecole Centrale Nantes (Eng. School, France)</div> <div>423 Service experience of WinGD's Low Pressure Dual-Fuel 2stroke engines - the X-DF engine generation in the field</div> <div>Adrian Siegfried, Winterthur Gas &amp; Diesel</div> <div>457 The M46 DFready, a Dual Fuel Engine concept for a high efficient liquid mode operation during or before the installation of the gas supply system</div> <div>Eike Joachim Sixel, Caterpillar</div>	<div>4 Emission Reduction Technologies - What's in store for the future</div> <div>4-2 Engine Measures 1</div> <div>Chair: Heuser, Peter (FEV Group)</div> <div>224 Field Experience of Kawasaki Green Gas Engine and Maintenance System utilizing Predictive Diagnosis System</div> <div>Takayuki Imai, Kawasaki Heavy Industries</div> <div>210 Engine controls as part of a Smart Marine Ecosystem</div> <div>Jonatan Rösgren, Wärtsilä</div> <div>246 Control system development and performance optimization for micro-pilot ignited gas engine</div> <div>Guofeng Zhao, Harbin Engineering University</div> <div>109 Gas online quality measurement for optimized engine control</div> <div>Kaj Portin, Wärtsilä</div>	<div>3 Electronic Support - Controls, Automation, Measurement &amp; Monitoring</div> <div>3-2 Performance Optimizations</div> <div>Chair: Boom, Rick (Woodward)</div> <div>333 Water Cooled Internal EGR, a novel technology for reaching IMO Tier III emission</div> <div>Martin Axelsson, Wärtsilä</div> <div>006 GE Transportation Tier 4 Marine Diesel Engine Development</div> <div>Jason Ozolins, GE Transportation</div> <div>296 Potential of Pilot- and Post-Injection Strategies in Large Diesel Engines Using Maritime Fuels</div> <div>Benjamin Stengel, University of Rostock</div> <div>060 A China I-compliant medium-speed marine diesel engine using two-stage turbocharging system</div> <div>Xiannan Li, Shanghai Marine Diesel Engine Research Institute</div> <div>168 NOx reduction to Tier III levels on MAN B&amp;W LGI low-speed engines by water addition to either methanol or conventional diesel fuel oil</div> <div>Stefan Mayer, MAN Energy Solutions</div>

12:30 – 13:30 Lunch



Tuesday - June 11, 2019

13:30 – 15:00

Ballroom A	Ballroom B	ABB Room (1st Floor)	AVL Room (1st Floor)
<div>7</div> <div>Case Studies from Operators - Lessons to be learned</div> <div>7-1 Sulphur Cap</div> <div>Chair: Rojgaard, Charlotte (Bureau Veritas VeriFuel)</div> <div>095</div> <div>An Investigation into the cause of high wear-rates in jerk type fuel injection pumps on engines burning an ultra-low sulphur fuel oil with elevated TAN levels.</div> <div>Joseph Stainsby, LLOYD's Register EMEA</div> <div>353</div> <div>Exhaust gas emissions characterization of medium speed stationary engines burning low sulphur RMG380, using gravimetric methods</div> <div>Francisco Fernandez-Vacas, Endesa Generación</div> <div>264</div> <div>Fuel of the future - service experience with a new 0.5% sulfur marine fuel</div> <div>Ron Jukes, Chevron Oronite</div> <div>055</div> <div>MAN-ES laboratory, engine and injection investigations of representative 0.50% sulfur fuel blends</div> <div>Johann Wloka, MAN Energy Solutions</div>	<div>9</div> <div>New Engine Developments - Gas &amp; Dual Fuel</div> <div>9-6 Dual Fuel Combustion</div> <div>Chair: Hiltner, Joel (Hiltner Combustion)</div> <div>204</div> <div>Simulation study on the influence of natural gas and diesel injector position on combustion and emission of marine dual fuel engine</div> <div>Lu Rui, Jiangsu University</div> <div>317</div> <div>Controlled Multi-staged Combustion Strategy for Overcoming Load Limitations of Fuel Flexible Gas / Diesel Engines</div> <div>Suraj Nair, Woodward</div> <div>364</div> <div>Investigation of the Dual Fuel Combustion Process with different Pilot Injector Positions</div> <div>Björn Henke, University of Rostock</div> <div>407</div> <div>Impact of Cetane Number on a Lean Diesel-Methane Dual Fuel Combustion</div> <div>Zeeshan Ahmad, Department of Mechanical engineering, Aalto University, Finland</div>	<div>4</div> <div>Emission Reduction Technologies - What's in store for the future</div> <div>4-3 Engine Measures 2</div> <div>Chair: Frigge, Patrick (Innio)</div> <div>008</div> <div>Research and optimization of low-speed two-stroke engines using high pressure EGR with cylinder bypass</div> <div>Dawei Wang, Shanghai Jiao Tong University</div> <div>186</div> <div>The latest technologies of NOx emission control for marine engines</div> <div>Takahiro Nakagawa, Japan Engine Corporation</div> <div>399</div> <div>Particle and gaseous emissions from marine engines utilizing various fuels and after-treatment systems</div> <div>Kati Lehtoranta, VTT Technical Research Centre of Finland</div> <div>144</div> <div>Tier III Emission Development of Marine Medium Speed Diesel Engine Base on Virtual Calibration Method</div> <div>Dongming Zhang, Shanghai Marine Diesel Engine Research Institute</div> <div>159</div> <div>EPA Tier 4, Euro Stage 5 and beyond. What Diesel Engine Emissions are feasible with State of the Art Fuel Injection Systems and existing Exhaust After Treatment</div> <div>Christoph Kendlbacher, Robert Bosch Powertrain Solutions</div>	<div>3</div> <div>Electronic Support - Controls, Automation, Measurement &amp; Monitoring</div> <div>3-3 Control Systems</div> <div>Chair: Åkerman, Jonas (Wärtsilä)</div> <div>165</div> <div>WiCE – New Engine Control System for 2-stroke Engines</div> <div>Wolfgang Östreicher, Winterthur Gas &amp; Diesel</div> <div>385</div> <div>LECM as the Next Gen Engine Control Platform for changing times in Large Engine Market.</div> <div>Sai Venkataramanan, Woodward</div> <div>061</div> <div>Active Disturbance Rejection Control for Rail Pressure of Common Rail System on Marine Diesel Engine</div> <div>Jiancun Hu, Shanghai Jiao Tong University</div> <div>172</div> <div>Emissions reduction through sophisticated control strategies</div> <div>Mathias Moser, MAN Energy Solutions</div>
15:00 – 15:30	Coffee Break		

Tuesday - June 11, 2019

15:30 – 17:00

Ballroom A	ABB Room (1st Floor)	AVL Room (1st Floor)
<div>6</div> <div>Sulphur Cap 2020 - Strategies to deal with regulatory requirements</div> <div>Panel - Sulphur Cap 2020</div>	<div>4</div> <div>Emission Reduction Technologies - What's in store for the future</div> <div>4-4 Methane</div> <div>Chair: Vlaskos, Ioannis (Winterthur Gas &amp; Diesel)</div> <div>240</div> <div>Pre-Turbine Catalytic Methane Oxidation for Lean Burn Natural Gas Engines</div> <div>Christoph Haas, MTU Friedrichshafen</div> <div>214</div> <div>Catalytic Oxidation of Ultra-lean CH4 in the exhaust of Natural Gas Engine</div> <div>Ke Li, Shanghai JiaoTong University</div> <div>196</div> <div>Measures for reducing the methane slip of open chamber lean burn gas engines with focus on a novel patent pending after-treatment concept</div> <div>Peter Koch, Western Norway University of Applied Sciences</div> <div>110</div> <div>Controlling methane slip from marine low pressure lean-burn dual fuel engines using a non-thermal plasma catalyst system</div> <div>Majed Shreka, Harbin Engineering University</div> <div>398</div> <div>Recent insights into how catalytic after-treatment can be used to resolve Methane Slip from Lean Burn Natural Gas Engines</div> <div>Joseph McCarney, Johnson Matthey</div>	<div>10</div> <div>Latest Engine Component Developments - Components &amp; Tribology</div> <div>10-5 Tribology: Engine Systems</div> <div>Chair: Aufischer, Rainer (Miba Gleitlager)</div> <div>005</div> <div>WinGD X-DF engine tribology research: Impact of Cylinder Oil Formulation Parameters</div> <div>Konrad Räss, Winterthur Gas &amp; Diesel</div> <div>326</div> <div>Enterprise: a reduced-scale, flexible fuel, single-cylinder crosshead marine diesel research engine</div> <div>Brian Kaul, Oak Ridge National Laboratory</div> <div>329</div> <div>Key device technologies to realize the Unprecedented Variable Compression Ratio System of 2 stroke engine</div> <div>Yutaka Masuda, IHI Corporation</div> <div>437</div> <div>Impact of sulphur cap 2020 on 2-stroke engine tribology aspects</div> <div>Konrad Räss, Winterthur Gas &amp; Diesel</div> <div>273</div> <div>Retrofit technologies to comply with new legislation</div> <div>Sangram Kishore Nanda, Wärtsilä</div>
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	076	Pushing the limits in turbocharger development with advanced numerical simulations Stefan Weihard, MAN Energy Solutions
	251	R&D for the next 100 years in Niigata Power Systems Shinsuke Takahashi, Niigata Power Systems
	288	Various applications with DUATRON electronic engine control unit Erich Vogt, DUAP
	034	Simulation of transient operation of a large two-stroke marine diesel engine equipped with a high-pressure SCR aftertreatment system in heavy weather conditions Michael Foteinos, National Technical University of Athens
	367	Methane catalyst regeneration with hydrogen addition Sonja Heikkilä, University of Vaasa
	455	Medium speed engine with low NOx & PM emissions for EPA Tier 4 and EU Stage V Daniel Peitz, Hug Engineering
	343	Minimizing Black Carbon Emissions by Optimizing Fuel Injection and Enhancing Ignition and Combustion with Multi-functional, Organometallic Fuel Additives Albert Leyson, Drew Marine
	430	WinGD X-engine portfolio evolution – Sustainable design for 2-stroke propulsion Alexander Brueckl, Winterthur Gas & Diesel

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Exhibition Hall

6	Sulphur Cap 2020 – Strategies to deal with regulatory requirements	181	Evaluation of Combustion Characteristics of Ultra Low Sulphur Fuel Oil by Using OCA (Optical Combustion Analyzer) and a Two Stroke Test Diesel Engine Eiji TOMITA, Okayama University
		369	The impact of emission regulations and technologies on the specifications and on the use of marine lubricants - View from CIMAC WG Marine Lubricants Dorthe Marie Sveistrup Jacobsen, MAN Energy Solutions
9	New Engine Developments – Gas & Dual Fuel Engine Development	009	Improvement of the NOx-thermal efficiency trade off and kept the fluctuation level of the COV_IMEP by Lean mixture pre-chamber Yoshinori Kaji, Daihatsu Diesel MFG
		100	Pre-combustion chamber design scheme analysis for a typical marine low speed dual fuel engine Teng Liu , China Shipbuilding Power Engineering Institute
		162	Development of Low Speed Four Stroke Gas Engine Satoru Higashikawa, The Hanshin Diesel Works
		167	Dynamic behavior research of marine natural gas engine propulsion system based on knocking prediction La Xiang, Harbin Engineering University
		171	The effects of injection timing on low-speed marine engines fueled with HPDI natural gas Haifeng Liu, Tianjin University
		173	Development of stable combustion technology for the world's largest bore diameter gas engine Tomoaki Kizuka, Kawasaki Heavy Industries
		175	Performance Development of High Efficient Low Emission Marine Gas Engine - M23G Xiang Li, Shanghai Marine Diesel Engine Research Institute
		190	GHG Reduction Strategy Using Throttle and EGR in a Heavy-Duty Dual-Fuel Engine Choongsik Bae, KAIST (Korea Advanced Institute of Science and Technology)
		208	Pre-chamber Ignition and Flame Development Process on a Large 2-stroke Dual Fuel Engine Ying Ye, Tianjin University
		234	Effects of pre-chamber configuration on Jet Controlled Compression Ignition engine performance Hua Tian, Dalian University of Technology
		242	Experimental investigations of cylinder-to-cylinder variations in marine hydrogen-natural gas engines Harsh Sapra, Delft University of Technology
		383	NMHC and NMNEHC Measurements of a Spark-Ignited CNG-Fueled EMD GP38-2 Switch Locomotive Dustin Osborne, Southwest Research Institute
		393	Research on Dynamic Performance Optimization of Marine LNG Engine Propulsion Power System Liwen Xu, Shanghai Marine Diesel Engine Research Institute
		422	Cost Effective and Reliable Solutions for Gas Engines in Stationary and Mobile Applications Using Advanced Passive Prechamber Technologies Emmanuella Sotiropoulou, Prometheus Applied Technologies
		443	Experimental Study on Torch Flame Behavior and Abnormal Combustion Process in Pre-Chamber Type Gas Engines Hiroshi Tashima, Kyushu University
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		201	12MV390MF—Development of the New 10MW Class Medium Speed Engine for Genset Use Qian Xia, China Shipbuilding Power Engineering Institute
		048	Research on vibration characteristics and vibration reduction method of free-piston linear generator Jingyi Tian, Beijing Institute of Technology
		177	Movement and heat transfer characteristics of oil oscillating in cooling oil cavity Yang Liu, Beijing Institute of Technology
		429	Performance Test Development of New Medium Speed Power Station Diesel Engine Liang Zheng, Shanghai Marine Diesel Engine Research Institute
10	Latest Engine Component Developments – Turbochargers & Air-/Exhaust Management	269	Analysis of Fluctuation of Cycle Fuel Injection Quantity in Multiple Injection Cycles of the High Pressure Common Rail Injection System Wei yunpeng, Harbin Engineering University
		078	Multi-mode turbocharging system for low-speed two-stroke engines with low BSFC and Tier III Lei Shi, Shanghai Jiaotong University
10	Latest Engine Component Developments – Fuel Injection & Gas Admission	038	Simulation modeling of a high pressure common rail injector based on bond graph theory Yun Bai, Harbin Engineering University
		098	Effects of gas injection strategy on the injection residue and combustion characteristics of natural gas engine Zhenting Liu, Harbin Engineering University
		120	Study of three-component surrogate of diesel on sprays and atomization under transcritical and supercritical conditions Xingcai Lu, Shanghai Jiao Tong University
		085	Development of Hydraulic-Driven High Pressure LNG Pump for Fuel Gas Supply System of ME-GI Engine Kouichi Namba, Mitsui E&S Machinery
		161	Retrofitting with cutting-edge electronic fuel injection technology creates new horizons for vintage icebreaker main engines Mario Kühfusz, Heinzmann
		185	Hole-to-hole injection characteristics simulation of a double layer 8-hole diesel engine injector Fuqiang Luo, Jiangsu University
		289	Simulation Characteristics Analysis of Ultra-High-Pressure Common Rail Fuel Injection System for Marine Medium Speed Diesel Engine Wang Yingjie, Wuhan University of Technology
		304	Optical study on liquid-phase penetration and ignition characteristics of wall-impinging diesel spray under different altitudes Chengguan Wang, Tongji University
		448	Experimental and Numerical Investigation of String-Type Cavitation and Spray in Multi-Nozzle Diesel Nozzles Genmiao Guo, Jiangsu University

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COUPLINGS AND DAMPERS. BUILT TO LAST.

Wednesday - June 12, 201909:00 – 10:30

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<div>5</div> <div>Low Carbon Combustion - What are the alternative fuels for the future</div> <div>5-1</div> <div>Low Flashpoint Fuels</div> <div>Chair: Rojgaard, Charlotte (Bureau Veritas VeriFuel)</div> <div>362</div> <div>ABC's dual fuel engines running on renewable fuels like methanol and hydrogen</div> <div>Koen Christianen, Anglo Belgian Corporation</div> <div>013</div> <div>Using Methanol in Dual Fuel Operation in a Compression Ignition Engine: Results of Bench Tests</div> <div>Jeroen Dierickx, Ghent University</div> <div>438</div> <div>A Numerical Investigation on the Combustion of a Turbulent Jet Ignition Marine Engine Fueled with Methanol</div> <div>Xianyin Leng, Jiangsu University</div> <div>189</div> <div>Combustion of biofuel and biogas in a marine engine</div> <div>Sumito Nishio, National Institute of Maritime, Port and Aviation Technology</div> <div>063</div> <div>Methane slip summarized: lab vs. field data</div> <div>Sergey Ushakov, Norwegian University of Science and Technology</div>	<div>1</div> <div>Digitalization and Connectivity - What it means to different applications</div> <div>1-1</div> <div>Digitalization - Session 1</div> <div>Chair: Steigert, Tim (Innio)</div> <div>228</div> <div>Digitalization &amp; IoT technologies drives development of Large two-stroke Marine Diesel Engines</div> <div>Torbjoern Moeller, MAN Energy Solutions</div> <div>275</div> <div>Two- and Four-Stroke Engine Manuals of 2019 3D maintenance instructions with augmented reality - the next generation of engine manuals</div> <div>Peter Dan Petersen, MAN Energy Solutions</div> <div>435</div> <div>MAN Energy Solutions digital offerings for 4-stroke marine- and stationary applications</div> <div>Gerhard Stix, MAN Energy Solutions</div> <div>266</div> <div>Fuel Injection 4.0: The Intelligent Injector and Data Analytics by OMT Enable Performance Drift Compensation and Condition-Based Maintenance</div> <div>Marco Coppo, OMT - Officine Meccaniche Torino</div> <div>444</div> <div>Advanced Virtual Power Plants optimizing Gas engine revenue</div> <div>Martin Greve, AVAT Automation</div>	<div>4</div> <div>Emission Reduction Technologies - What's in store for the future</div> <div>4-5</div> <div>SCR 1</div> <div>Chair: Chatterjee, Daniel (Rolls-Royce Power Systems)</div> <div>081</div> <div>MAN Energy Solutions – A Global Update on Emission Reduction Technology</div> <div>Daniel Struckmeier, MAN Energy Solutions</div> <div>276</div> <div>YANMAR solutions for environmental regulations after 2020</div> <div>Shunji Hamaoka, Yanmar</div> <div>401</div> <div>Marine Application: Meeting IMO III / EPA Tier 4 Regulations Challenges And Solutions From The View Of A Solution Provider</div> <div>Michael Drews, Rolls-Royce Power Systems</div> <div>452</div> <div>SCR for high sulfur HFO post 2020</div> <div>Kristoffer Sandelin, Hug Engineering</div> <div>265</div> <div>Development of New Compact-type SCR System for Two-stroke Diesel Engines</div> <div>Hideyuki Fujita, Hitachi Zosen Corporation</div>	<div>10</div> <div>Latest Engine Component Developments - Turbochargers &amp; Air-/Exhaust Management</div> <div>10-7</div> <div>Advanced Air Management and Methodologies</div> <div>Chair: Rofka, Christoph (ABB Turbo Systems)</div> <div>176</div> <div>Modeling turbocharging solutions: Impact on highly transient lean-burn gas engine operation</div> <div>Dino Imhof, ABB Turbo Systems</div> <div>302</div> <div>How to develop containment safety for turbochargers</div> <div>Frank Grießhaber, MAN Energy Solutions</div> <div>313</div> <div>Fully Variable Intake Valve Train – Advanced Air Management for Improved Dynamic Performance of Large Bore Gas Engines</div> <div>Jan Zelenka, LEC</div> <div>158</div> <div>Engine enhancement possibilities with modern air management systems</div> <div>Raphael Ryser, ABB Turbo Systems</div> <div>227</div> <div>Development of New Generation Turbo Hydraulic System Optimized for Electronically Controlled Engines</div> <div>Nobuyuki Sakairi, Mitsui E&amp;S Machinery</div>

10:30 – 11:00Coffee Break

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12:30 – 13:30Lunch



Wednesday - June 12, 2019

13:30 – 15:00

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<div><div>5</div><div>Low Carbon Combustion - What are the alternative fuels for the future</div><div>5-3</div><div>Renewable Fuels</div><div>Chair: Knafl, Alexander (MAN Energy Solutions)</div><div>461</div><div>Alternative fuels and technologies</div><div>Torsten Mundt, DNVGL</div><div>449</div><div>Power-to-X: The Key for the Maritime Energy Transition</div><div>Matthias Auer, MAN Energy Solutions</div><div>104</div><div>The HyMethShip Project: Innovative Emission Free Propulsion for Ships</div><div>Jan Zelenka, LEC</div><div>458</div><div>Potential of Paraffinic Fuels for the Maritime Energy Transition</div><div>Bert Buchholz, University of Rostock</div></div>	<div><div>1</div><div>Digitalization and Connectivity - What it means to different applications</div><div>Panel - Digitalization</div></div>
13:30 – 15:00	Panel - Digitalization
15:00 – 15:30	Coffee Break
15:30 – 16:30	Ballrooms Options for Decarbonization of Marine Transport Collin Trust sponsored Keynote Speech
16:30 – 17:00	Ballrooms Panel - Defossilization

Wednesday - June 12, 2019

Exhibition Hall
<div>Speakers Corner (Gas &amp; DF)</div> <div><div>096</div><div>A Universal Stationary Gas Engine Oil</div><div>Virginia Carrick, The Lubrizol Corporation</div></div> <div><div>215</div><div>Latest Solution for Utilizing Various Types of Gas Fuel in Daihatsu Diesel</div><div>Yoshitaka Takayama, Daihatsu Diesel MFG</div></div> <div><div>221</div><div>Caterpillar Motoren - MaK - medium speed engine portfolio for marine and electric power applications</div><div>Andreas Banck, Caterpillar Motoren</div></div> <div><div>225</div><div>Development of next generation high performance KG version2 gas engine with two stage turbo-charging system</div><div>Takashi Horie, Kawasaki Heavy Industries</div></div> <div><div>233</div><div>the new development and the overview features of M23G medium speed gas engine,Combustion system design, air-fuel ratio control and engine safety control</div><div>Lan Yan, Shanghai Marine Diesel Engine Research Institute</div></div> <div><div>295</div><div>Development of dual fuel engine (EY26DF)</div><div>Koichi Hirose, Yanmar</div></div> <div><div>305</div><div>Unique Dual Fuel IMO TIER III engines: L23/30DF &amp; L28/32DF</div><div>Hans-Philipp Walther, MAN Energy Solutions</div></div> <div><div>350</div><div>X-DF low gas pressure low-speed main engines: the game changer for LNG-fuelled shipping. Low emissions, low investment costs, low operating costs.</div><div>Carmelo Cartalemi, Winterthur Gas &amp; Diesel</div></div> <div><div>421</div><div>Smart solutions based on Wärtsilä 31 for the future Marine Industry</div><div>Ulf Astrand, Wärtsilä</div></div> <div><div>434</div><div>Development of a New Lubricating Oil for use in Modern High Efficiency Gas Engines</div><div>Jonathan Hughes, Infineum UK</div></div>

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		027	Reducing instrumentation system cost on engine thanks to digital sensors Patrice FLOT, CMR Group
		052	Research on Faults Diagnosis for Diesel Engine Injector Based on EEMD-AR Spectrum Technology Hongzi Fei, Harbin Engineering University
		346	Development of a Hardware-in-the-Loop simulation platform for a Marine Dual-fuel Engine Qinpeng Wang, Wuhan University of Technology
4	Emission Reduction Technologies – What’s in store for the future	291	Behavior of a water droplet colliding with a vortex ring in non-steady gas flow Toshio Takiya, Hitachi Zosen Corporation
		097	Multi-mode Combustion strategies of an Inland River Marine Dual Fuel Engine Liping Yang, Harbin Engineering University
		339	Effect of Fuel-Air Mixing on the Combustion and Emission of a Low-Speed Two-Stroke Marine Diesel Engine Huaiyin Wang, Tianjin University
		147	Design and analysis of the waste heat recovery systems for marine low-speed two-stroke diesel engine with high pressure selective catalytic reduction system Zukang Hu, Harbin Engineering University
		080	Hardware-in-the-Loop Simulation of the Control Strategy for Marine SCR System Hui Zhao, Harbin Engineering University
		018	Effectiveness of bipolar charged coagulation on ultrafine particle emissions from compression ignition internal combustion engine exhaust Junheng Liu, Jiangsu University
		043	Numerical investigation of NOx reduction technology lines under large two-stroke marine diesel engine using integrated CFD-chemical kinetics Xiuxiu Sun, Tianjin University
		143	Numerical Study on the Technical Routines to Meet Tier III Regulation of a Low-speed Marine Diesel Engine Hu Wang, Tianjin University
		197	Experimental study on the combustion and emission characteristics of the marine LNG engine with reformed exhaust gas recirculation Gesheng Li, Wuhan University of Technology
		278	The Performance Analysis of Selective Catalytic Reduction System in a Pre-Turbo Position for Low-Speed 2-Stroke Engine XINGYU LIANG, Tianjin University
		184	Gas injection timing optimization for combustion and emission improvement in a multi-point injection marine gas engine under low load Changhao Lu, Harbin Engineering University
		445	Performance and Emission Results of the Premixed Diffusion Collaborative Combustion Engine Fueled with Methanol/Diesel Dual Fuel YANG WANG, Dalian University of Technology
		086	On-board vessel power generation in four maritime futures: scenarios for vessel propulsion in 2040 Sebastiaan Bleuanus, Wärtsilä

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Exhibition Hall

4	Emission Reduction Technologies - What’s in store for the future	195	Research on EGR Mechanism of NOx Reduction on a Large-bore Marine Diesel Engine by 3D-CFD Simulation Xingyu Liang, Tianjin University
		118	A study on soot formation and oxidation characteristics of diesel jet flame and the dominant factor affecting the length of diesel jet flame Akihiko Azetsu, Tokai University
		064	Removal of NOx and SOx from Simulated Ship Emissions by Combing Electrolyzed Seawater with Ultraviolet Irradiation Shaolong Yang, Huazhong University of Science and Technology
		188	Reduction of PM and BC Emissions from Marine Diesel Engines Using ESP-Cyclone System Hidetsugu Sasaki, Tokyo University of Marine Science and Technology
		260	Experimental study on the effects on de-NOx performance and Catalyst regeneration with application of Plasma burner in marine SCR system Jaehwan Jang, STX Engine
		046	Simulation and evaluation on the vaporizermixer of high-pressure SCR system in a marine diesel Chong Xia, Harbin Engineering University
		182	Next-generation concept engines to meet stronger environmental restrictions Kazuyuki Maeda, National Fisheries University
		111	umerical analysis of the influence of intake composition on combustion and emission performance in a two-stroke marine diesel engine Xingcai Lu, Shanghai Jiao Tong University
		033	Simulation study of stratified EGR system using high pressure exhaust gas recirculation Zhanguang Wang, Harbin Engineering University China
		121	Ignition studies of liquid marine fuels with different ignition analyzers Michaela Hissa, University of Vaasa
5	Low Carbon Combustion – What are the alternative fuels for the future	402	Optical characterization of novel engine fuels: propane, hexane, kerosene, and methanol Ossi Kaario, Aalto University
		475	Experimental Study of Combustion Instability of LPG as Marine Fuel Junfeng Yang, University of Leeds
		360	Tailored Fuels for Marine and Locomotive Applications Benedikt Heuser, FEV Europe
10	Latest Engine Component Developments – Components & Tribology - Simulation	468	Modeling fuel economy in crosshead marine diesel engines Andrew Satterfield, ExxonMobil
		237	Integrated Multi-Disciplines Simulation Applied to Piston in R&D Process Mei Li, Shanghai Marine Diesel Engine Research Institute
		253	A numerical analysis and profile design for piston skirt to enhance the tribological performance of heavy duty diesel engine Xuan Ma, Harbin Engineering University
		325	Finite Element Structure Simulation Intergrated Casting Information Yunqing Dong, Shanghai Marine Diesel Engine Research Institute
		351	Thermal Load Analysis Using CFD-FEA Method of An Oscillating Cooling Diesel Engine Piston Jinlong Mao, Shanghai Marine Diesel Engine Research Insititute
		112	Fatigue Reliability Analysis of Bolts of a Low Speed Machine Piston Jianan Xu, College of Mechanical & Electrical Engineering, Harbin Engineering University
		479	Investigation of lubricant transport along cylinder liner in large two-stroke marine diesel engines Rathesan Ravendran, Aalborg University



Thursday - June 13, 2019

09:00 – 10:30

Ballroom A	Ballroom B	ABB Room (1st Floor)	AVL Room (1st Floor)
<div>7</div> <div>Case Studies from Operators - Lessons to be learned</div> <div>7-2</div> <div>Users Experience</div> <div>Chair: Jakobsen, Ole Graa (Maersk Line)</div> <div>469</div> <div>SHORT ROUTE LNG FERRIES, Field Experience with ‘Salish’ Class Ferries</div> <div>Magnus Kronholm, Wärtsilä</div> <div>300</div> <div>Service experience on G95ME-C9.5 MAN B&amp;W two-stroke engines in relation to cylinder condition</div> <div>Jesper Mark Pedersen, MAN Energy Solutions</div> <div>281</div> <div>Increasing performance in the dawn of a digital area. A chemical tankers’ shipowner experience</div> <div>Jose Gonzalez, Stolt Tankers</div> <div>465</div> <div>Hybrid marine propulsion systems for demanding applications – The challenge of integrating new technologies to bring innovation and value to operators</div> <div>Leonardo Ferrero, Wärtsilä</div> <div>286</div> <div>The latest field experience of Mitsubishi Gas engines</div> <div>Hiroshi Yoshizumi, Mitsubishi Heavy Industries Engine &amp; Turbochargers</div>	<div>2</div> <div>System Integration, Electrification and Hybridization - for Rail, Power, and Marine applications</div> <div>2-1</div> <div>Hybrid Drives - Basic technologies</div> <div>Chair: Müller, Stefan (MTU Friedrichshafen)</div> <div>117</div> <div>Hybrid energy- and propulsion system for vessels in timetable operation</div> <div>Martin Einsiedler, Shiptec</div> <div>193</div> <div>Electric Drive Systems For Marine Propulsion – What Can We Learn From The Vehicle Business?</div> <div>Udo Schlemmer Kelling, FEV Group</div> <div>311</div> <div>A Perspective on Energy Storage in Heavy Haul Ground Freight Transport Applications</div> <div>Thomas Lavertu, GE Global Research</div> <div>389</div> <div>Application and Evaluation of Marine Hybrid Propulsion System</div> <div>Huan Tu, China Classification Society</div> <div>391</div> <div>SOFC Systems for Marine Applications</div> <div>Juergen Rechberger, AVL List</div>	<div>9</div> <div>New Engine Developments - Gas &amp; Dual Fuel</div> <div>9-7</div> <div>Gas &amp; Dual Fuel Engine Development</div> <div>Chair: Montgomery, David (Caterpillar)</div> <div>331</div> <div>MTU Series 4000 for Natural Gas Operation in Ships - Challenges for high Speed Gas Engines in Mobile Applications</div> <div>Peter Kunz, Rolls-Royce Power Systems</div> <div>380</div> <div>Increased output and reduced operating costs for a stoichiometric gas engine through miller cycle combustion, improved components cooling, and updated controls</div> <div>Robert McDowell, GE Distributed Power</div> <div>396</div> <div>Highly transient load response</div> <div>Alexander Leitner-Audouï, Innio</div> <div>425</div> <div>WinGD 12X92DF, the development of the most powerful Otto engine ever</div> <div>Dominik Schneider, Winterthur Gas &amp; Diesel</div>	<div>11</div> <div>Basic Research &amp; Advanced Engineering - Technologies, Materials &amp; Tools for Future Engines</div> <div>11-3</div> <div>Simulation</div> <div>Chair: Weisser, German (Winterthur Gas &amp; Diesel))</div> <div>019</div> <div>Phenomenological combustion description for medium-speed dual-fuel engines</div> <div>Hyunchun Park, Hyundai Heavy Industries / ETH Zurich</div> <div>241</div> <div>A Simplified Kinetic Auto-Ignition Model for Cycle Simulation of Gas Engines</div> <div>Kevin Hoag, Southwest Research Institute</div> <div>356</div> <div>Auto-ignition Characteristics of Various Gaseous Fuels and Prediction Model of Ignition Delay for Gas Engines</div> <div>Kenta Miyauchi, IHI Corporation</div> <div>417</div> <div>Large-eddy simulation on the influence of diesel pilot quantity on the methane-air ignition process in dual-fuel engines</div> <div>Heikki Kahila, Aalto University, School of Engineering</div>
10:30 – 11:00	Coffee Break		

Thursday - June 13, 2019

11:00 – 12:30

Ballroom A	Ballroom B	ABB Room (1st Floor)	AVL Room (1st Floor)
<div>8</div> <div>Future Challenges and Ideas for Future Developments - Regulations, Environment, Global Trends</div> <div>8-1</div> <div>Session 1</div> <div>Chair: Gust, Edgar (Zollern BHW Gleitlager)</div> <div>366</div> <div>Bearing Challenges on High Performance Gas Engines</div> <div>Gunther Hager, Miba Gleitlager</div> <div>433</div> <div>The Next Generation of High Speed Engines: Targets and Enablers</div> <div>Erwin Reichert, FEV Group</div> <div>428</div> <div>Statistical method for lifetime estimation of engine components with large fluctuations in loading</div> <div>Rune Nordrik, Rolls-Royce Power Systems</div> <div>032</div> <div>Simulation of Marine Hybrid Systems: An Effective Tool in Streamlining Design, Operation and Classification</div> <div>Ben Rogers, Ricardo</div> <div>216</div> <div>Large Diesel- and Gas-engines: too aged to be modern?</div> <div>Christoph Mathey, ABB Turbo Systems</div>	<div>2</div> <div>System Integration, Electrification and Hybridization - for Rail, Power, and Marine applications</div> <div>2-2</div> <div>Performance Improvement Technologies</div> <div>Chair: Boletis, Elias (Wärtsilä)</div> <div>024</div> <div>CHP - market demand and optimized solutions with the Caterpillar G20CM34 10 MW gas engine</div> <div>Michael Sturm, Caterpillar Motoren</div> <div>068</div> <div>Model-based control system development and virtual pre-calibration for a medium-speed marine diesel engine with HPCR system</div> <div>Ying Hu, Wuhan University of Technology</div> <div>141</div> <div>Design and Application of Ship Propulsion System Matching Platform with Low Speed Engine</div> <div>Yu Ding, Harbin Engineering University</div> <div>337</div> <div>Influence of Power Management on Energy Effectiveness and Exhaust Emissions of Ocean-going Cargo Ship</div> <div>Congbiao Sui, Delft University of Technology</div> <div>464</div> <div>Hybridization of engines and batteries at MAN Energy Solutions</div> <div>Moritz Henke, MAN Energy Solutions</div> <div>474</div> <div>Combining fuzzy modelling and Bayesian Network (BN) approach to assess two-stroke engine performance</div> <div>Muhammad Usman, Lloyd's Register EMEA</div>	<div>9</div> <div>New Engine Developments - Gas &amp; Dual Fuel</div> <div>9-8</div> <div>Gas and Dual Fuel Engine Development II</div> <div>Chair: Eric Dillen (GE)</div> <div>207</div> <div>Performance improvement of spark-ignited medium speed gas engine 28AGS</div> <div>Takanori Kuroiwa, Niigata Power Systems</div> <div>017</div> <div>New Development HiMSEN Engine with 2-Stage Turbocharging System, H54DFV &amp; H32CV</div> <div>Seonghun Lee, Hyundai Heavy Industries</div> <div>262</div> <div>Advanced Combustion Strategy for Medium Speed Dual Fuel Engine</div> <div>Kazuteru Toshinaga, Yanmar</div> <div>446</div> <div>Development of dual fuel engine ignited by electronic micro pilot fuel injection system</div> <div>Lei Wang, Ningbo C.S.I. Power &amp; Machinery Group</div>	<div>11</div> <div>Basic Research &amp; Advanced Engineering - Technologies, Materials &amp; Tools for Future Engines</div> <div>11-4</div> <div>Ignition Concepts</div> <div>Chair: Buchholz, Bert (University of Rostock)</div> <div>314</div> <div>Ignition Concepts for Large Bore Gas Engines – A Comparison of Spark, Laser and Diesel Pilot Ignition</div> <div>Jan Zelenka, LEC</div> <div>133</div> <div>Modeling and Measurement of Combustion and Emissions Formation in Gas Engine Pre-Chambers</div> <div>Andrew Loetz, Hiltner Combustion Systems</div> <div>187</div> <div>Direct measurement of heat loss on combustion chamber wall in gas engine with pre-chamber</div> <div>Kazuyuki Koda, Yanmar</div> <div>255</div> <div>Visualization study on ignition and combustion processes of natural gas premixture ignited by a pre-chamber</div> <div>Jiangping Tian, Dalian University of Technology</div>
12:30 – 13:30	Lunch		

Thursday - June 13, 2019

13:30 – 15:00

Ballroom A	Ballroom B	ABB Room (1st Floor)	AVL Room (1st Floor)
<div><div>8</div><div>Future Challenges and Ideas for Future Developments - Regulations, Environment, Global Trends</div><div>8-2</div><div>Session 2</div><div>Chair: Tonon, Paolo (ABB Turbo Systems)</div><div>470</div><div>Canadian Port Authority Perspective and Role in the Adoption of a Cleaner Supply Chain within the Port of Vancouver</div><div>Gary Olszewski, Vancouver Fraser Port Authority</div><div>125</div><div>Particulate emissions – evaluations of measurement setups and different fuels</div><div>Christer Wik, Wärtsilä</div><div>283</div><div>Novel Water Cleaning System for NOx Reduction by Exhaust Gas Recirculation (EGR)</div><div>Shinya Tanehashi, Alfa Laval Tumba</div><div>460</div><div>Overcoming the conflict of EEDI and minimum power for save operation in adverse weather, the Shaft Power Limitation - concept</div><div>Torsten Mundt, DNVGL</div><div>377</div><div>The weight of the operation to achieve 2050 target from a liner perspective.</div><div>Philippe RENAUD, CMA Ships - CMA CGM Group</div></div>	<div><div>2</div><div>System Integration, Electrification and Hybridization - for Rail, Power, and Marine applications</div><div>2-3</div><div>Marine Hybrid Applications</div><div>Chair: Mohr, Hinrich (AVL List)</div><div>011</div><div>Battery hybrid ocean going cargo ships</div><div>Carina Kern, MAN Energy Solutions</div><div>153</div><div>Simulation-driven design of a fully integrated vessel hybrid power system</div><div>Juho Könnö, Wärtsilä</div><div>263</div><div>Optimizing Marine Hybrid Propulsion Systems by Multi-Domain System Simulation</div><div>Robert Strasser, AVL List</div><div>411</div><div>Holistic functional design and system testing: Hybrid road ferry</div><div>Erik-Jan Boonen, Damen Shipyards</div></div>	<div><div>9</div><div>New Engine Developments - Diesel</div><div>9-3</div><div>Locomotive Engines</div><div>Chair: Itoh, Yasuhiro (Niigata Power Systems)</div><div>051</div><div>Development of Low-fuel Consumption and Low-emission Locomotive Engine</div><div>Youfeng Li, CRRC Qishuyan</div><div>376</div><div>The all-New D180 Engine – a World-Class, high Performance Engine</div><div>Thomas Kammerdiener, AVL List</div><div>239</div><div>GE Transportation Dual Fuel Locomotive Development</div><div>Daniel Yerace, GE Transportation</div></div>	<div><div>10</div><div>Latest Engine Component Developments - Components &amp; Tribology</div><div>10-6</div><div>Tribology: Lubricants</div><div>Chair: Koch, Franz (hofer powertrain)</div><div>035</div><div>Lubrication of marine diesel engines in a complex fuel world</div><div>Luc Verbeeke, Chevron</div><div>232</div><div>Lubricant for Natural Gas and Diesel Engines</div><div>Isabella Goldmints, Infineum USA</div><div>238</div><div>Engine Oils for Improved Fuel Economy and Oil Consumption in Railroad Service</div><div>Fred Girshick, Infineum USA</div><div>306</div><div>The Development of a 40 BN Cylinder Oil and Experience with a Variety of Low Sulphur Marine Fuels Meeting IMO's 2020 Sulphur Cap – Shell Alexia 40.</div><div>Luis Garcia, Shell Global Solutions</div><div>309</div><div>Latest generation of high performance gas engine oils – Tackling reliability challenges and extending oil life in modern highly efficient gas engines</div><div>Luis Garcia, Shell Global Solutions</div><div>358</div><div>Meeting New Performance Challenges – The Additive Contribution</div><div>Marco Corradi, Infineum UK</div><div>226</div><div>The challenge of CO2 emissions reduction: the contribution of a new lubricant designed for improved fuel efficiency in 4-stroke medium speed marine engine</div><div>Catherine Amblard, Total</div><div>030</div><div>Development of fuel-efficient marine engine oils that help reduce CO2 emissions</div><div>Keisuke Kaneko, JXTG Nippon Oil &amp; Energy Corporation</div></div>
15:00 – 15:30	Coffee Break		
15:30 – 17:00	Final Panel		
18:30	Gala Dinner		

Thursday - June 13, 2019

Exhibition Hall
<div>Speakers Corner</div> <div><div>010</div><div>Closed Crankcase Ventilation (CCV) for large engines generates substantial benefits: Technically, economically as well as ecologically.</div><div>Remo Oppliger, UT99</div></div> <div><div>324</div><div>Low Temperature Ammonia Formation for SCR of NOx</div><div>Mansour Masoudi, Emissol</div></div> <div><div>312</div><div>Evaluation of Machine Learning and Genetic Algorithms for Piston Bowl Design</div><div>Adam Klingbeil, GE Global Research</div></div> <div><div>308</div><div>Integrated analysis approach for large gas engine development</div><div>Jan Majer, Ricardo</div></div> <div><div>004</div><div>The HERCULES (2004-2018) program of R&amp;D in large engine technologies</div><div>Nikolaos Kyrtaos, National Technical University of Athens</div></div> <div><div>252</div><div>Research on fatigue fracture caused by wear phenomena of internal thread of a diagonally split connecting rod</div><div>Takehiro Noda, Yanmar</div></div> <div><div>347</div><div>Additives Fuels and Ships a Case Study</div><div>Michael Banning, Innospec</div></div> <div><div>023</div><div>Service experience with ester based EAL for stern tubes - investigations on lubrication and statistics from used oil analysis.</div><div>Jean-Philippe Roman, Total Lubmarine</div></div>



Thursday - June 13, 2019

09:00 – 17:00

Exhibition Hall

2	System Integration, Electrification and Hybridization – for Rail, Power, and Marine applications	021	Diagnosis of Abnormal Operational Conditions and Performance Enhancement of Marine Fuel Cells Tatsumi Kitahara, Kyushu University
		029	Research on Safety Protection System of Deep Sea Drilling Vessel Jia Zheng, Shanghai Marine Diesel Engine Research Institute
		040	Study on energy saving of ship parallel gas-battery hybrid power system Liyun Fan, Harbin Engineering University
		042	Power-split strategies for hybrid diesel-electric marine power plant using predictive control and transient load preview Nikolaos Planakis, National Technical University of Athens
		053	Battery-hybrid propulsion system for environmental friendly fishing vessels Steffen Co, MAN Energy Solutions
		136	Research on Optimal Design and Practical Use of an Electronically Controlled Cylinder Lubrication System for the Large Low-speed Two-stroke Engine Yuhai HE, School of Energy and Power Engineering, Wuhan University of Technology
		140	Free piston linear generator based on magnetic force control methods Yunqi Liu, Beijing Institute of Technology
		148	Design of Liquefied Natural Gas Supply System for Marine Nature Gas Engine and Integration Platform Development Hongkai Ben, Harbin Engineering University
		206	Transient Energetic Analysis of Hybrid Drivetrains Conrad Gierow, FVTR
		245	Experimental Study of Combustion Instability of LPG as Marine Fuel Junfeng Yang, University of Leeds
		303	Operating Profile Effect to the Lifetime of Hybrid Powertrain by Using Thermomechanical Fatigue Analysis and Wärtsilä Digital Design Platform Tero Frondelius, Wärtsilä
		414	Further opportunities for Integration of Propulsion System with energy storage system. Aihua Qiu, Shanghai Marine Diesel Engine Research Institute
8	Future Challenges and Ideas for Future Developments – Regulations, Environment, Global Trends	476	A Review of Energy Efficiency Improvement Strategies for All-Electric Ships Chalermkiat Nuchturee, Shanghai Jiao Tong University
		059	Waste heat recovery of marine engine by organic Rankine cycle with zeotropic mixtures Enhua Wang, Beijing Institute of Technology
		132	Marine Engine Emission Regulations in China I Introduction, Comparison and Impact Analysis Wei Lei, China Classification Society
		082	Experimental studies on black carbon emission characteristics of marine engines Gunfeel Moon, Korean Register

Thursday - June 13, 2019

09:00 – 17:00

Exhibition Hall

10	Latest Engine Component Developments – Components & Tribology - Bearings	146	Fatigue Characteristic Analysis on Connecting Rod Assembly of Low Speed Marine Diesel Engine Zining Yu, Harbin Engineering University
		044	A study of axial profile influence on engine main bearing performance and its optimization Peirong REN, Beijing Institute of Technology
		122	Design and research of full-scale bearing fatigue test system for large scale low-speed machine based on hydraulic control Chen Guangku, Harbin Engineering University
		212	High Performance Tin-Based Adaptive Multilayer Overlay for Medium and High-Speed Diesel Engine Journal Bearings Yi Zhang, Daido Metal
		322	Study on Fretting Wear of crankshaft bearing bush of diesel engine Congcong Xu, Shanghai Marine Diesel Engine Research Institute
		403	HJ common rail lubrication system Nikolaj Kristensen, Hans Jensen Lubricators
		410	Hot box sealing systems to improve fire safety in engine rooms - Case summary: Wärtsilä Spray Protection Sealing Assembly Jukka Sunila, TT Gaskets
		406	Technical Cleanliness of Fuel and Lubricating Oil Systems before Commissioning Stefan Schmitz, Boll & Kirch Filterbau
		372	Studies on Mechanism of Lubricating Oil Consumption for Diesel Engines Lubricated with Low Viscosity Oils Mitsuhiro Soejima, Kyushu Sangyo University
		334	Contaminants in Trunk Piston Engine Oil and Their Effect on Tribological Performance Jicheng Piao, PetroChina Dalian Lubricating Oil R&D Institute
		371	Profitable monitoring of cylinder liner wear in low-speed engines Daniel Grunditz, Chris-Marine
		352	Eliminating the Reprotoxicity of MDCLs Without Compromising Performance Alexander Coxon, Infineum UK
11	Basic Research & Advanced Engineering – Technologies, Materials & Tools for Future Engines	194	Experimental Study of Plasma-Assisted Combustion for Natural Gas Engine Hirofumi Hashimoto, Daihatsu Diesel MFG
		062	Study on Acoustic and Vibration Prediction and Structural Optimization Design of an Oil Pan Zhang Bo, China Shipbuilding Power Engineering Institute
		310	The Opposed-Piston Engine: Reducing Emissions In Marine, Power Generation and Locomotive Engines Andrew Schreck, Achates Power
		330	Abnormal Combustion Behavior in Pre-mixed Combustion Two-Stroke Gas Engine Takayuki Hirose, IHI Corporation
		355	Experimental And Simulation Analysis of Influence of Combustion System Parameters on Marine Diesel Engine Thermal Load Li Hongmei, Shanghai Marine Diesel Engine Research Institute
		382	No Pipeline Design and Manufacture of a Marine Diesel Engine Liting Li, Shanghai Marine Diesel Engine Research Institute
		387	Towards Predictive Dual-Fuel Combustion and Pre-Chamber Modeling for Large Two-Stroke Engines in the Scope of 0D/1D Simulation Markus Wenig, Winterthur Gas & Diesel
		307	A novel method for rapid thermal analysis of large engines Jan Majer, Ricardo



## OPTIONAL TOURS JUNE 11 – 13, 2019

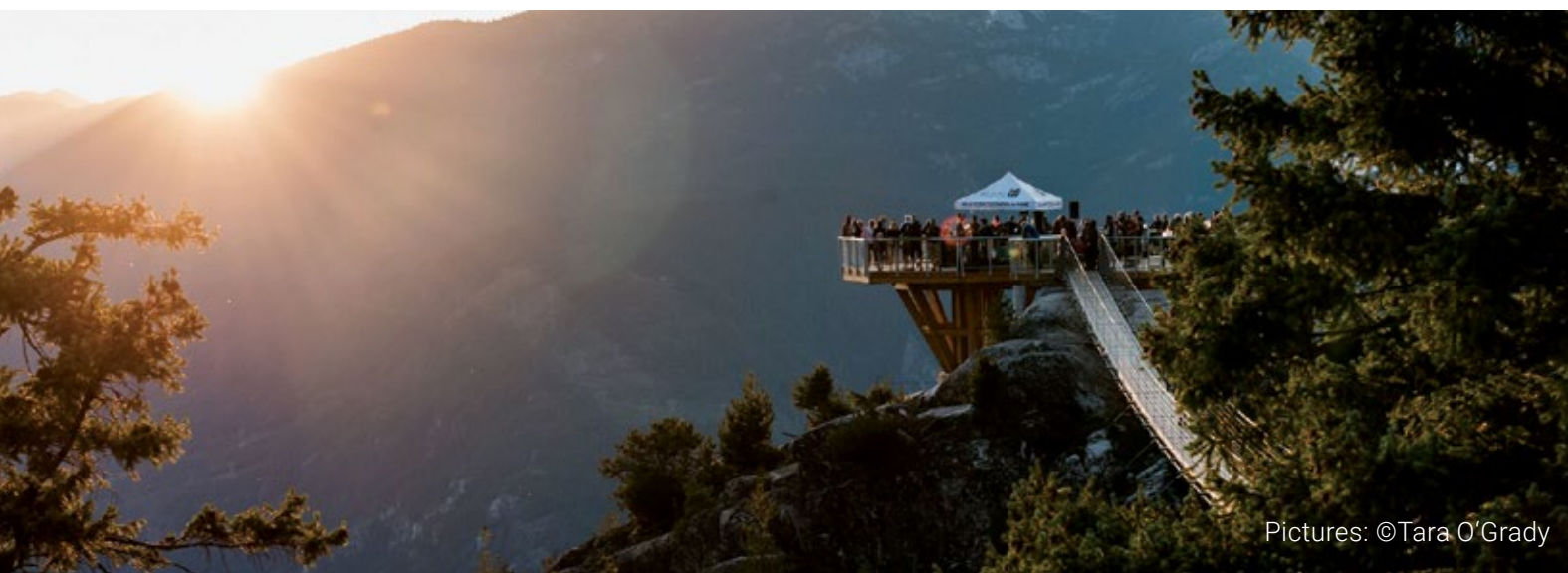
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### Explore Vancouver!

Vancouver is a vibrant city with lots of things to see and do. Galleries and public exhibits for art enthusiasts, historical sites and districts for history buffs, and scenic hiking trails and botanical gardens for nature lovers are just a small sampling of the city's diverse attractions. From colorful downtown neighborhoods, to culturally diverse suburbs and mountainside districts, there's plenty to explore!

- have a look around Vancouver with a 360 degree view at [Vancouver lookout](#)
- visit the [Chinese garden](#) or the [museum of Vancouver](#)
- make a trip to the [Sea to Sky Gondola](#) outside of Vancouver to have a magnificent view of the majestic coastal forest and surrounding mountains. Once at the top, many adventures await.
- try the [Capilano Suspension Bridge Park](#) high above the Capilano River
- experience an extraordinary view from the Peak of Vancouver on top of [Grouse Mountain](#). You can either hike up the mountain or use the gondola.

CIMAC Congress will provide a get-together meeting room with information's about the city, sightseeing tours and excursions with daily tips. You will get the chance to connect with others, to explore Vancouver and its surroundings together.



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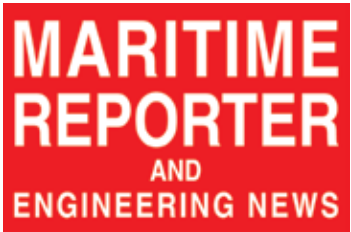
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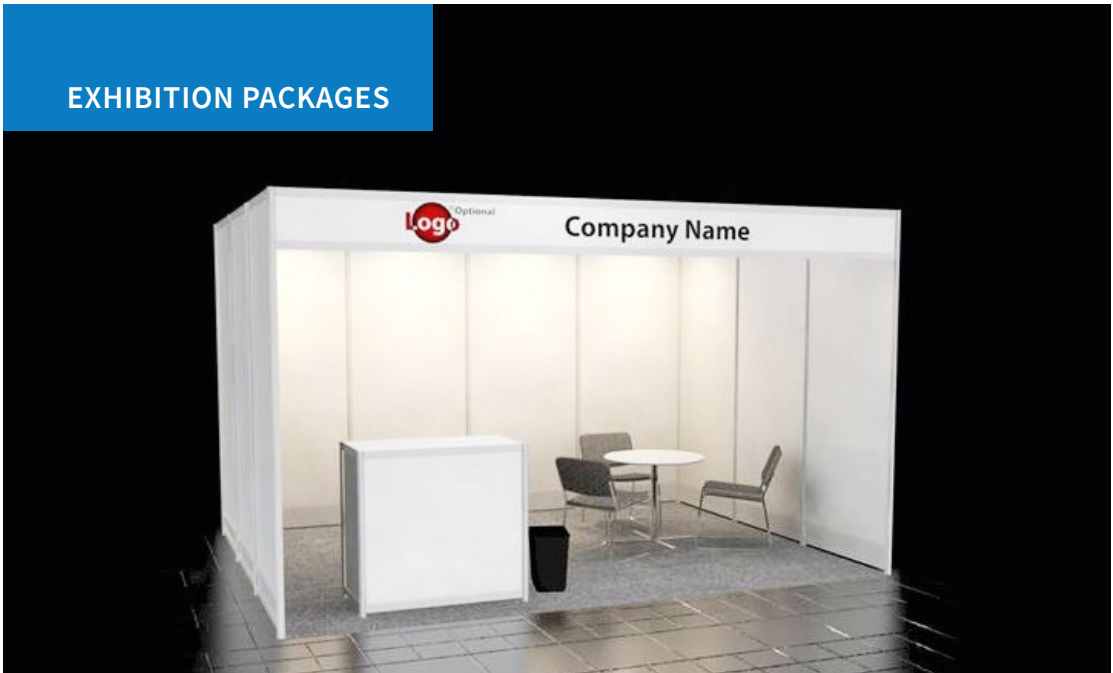
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We are pleased to inform you about the excellent opportunity to present your company at the accompanying exhibition of the 29th CIMAC World Congress, which will be held in the Vancouver Convention Centre, Vancouver, Canada. The exhibition takes place from **10 until 13 June 2019**.

For the application forms please visit [www.cimaccongress.com](http://www.cimaccongress.com)

For any questions regarding the exhibition, please contact [Ms. Sybille Lang](#)  
CIMAC Project Team



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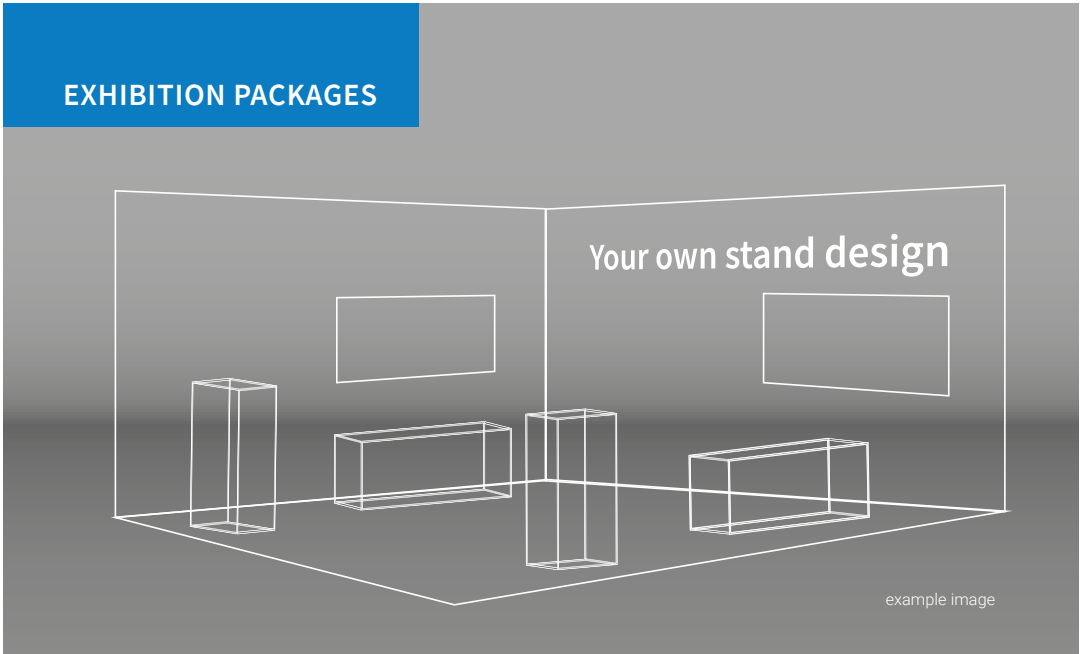
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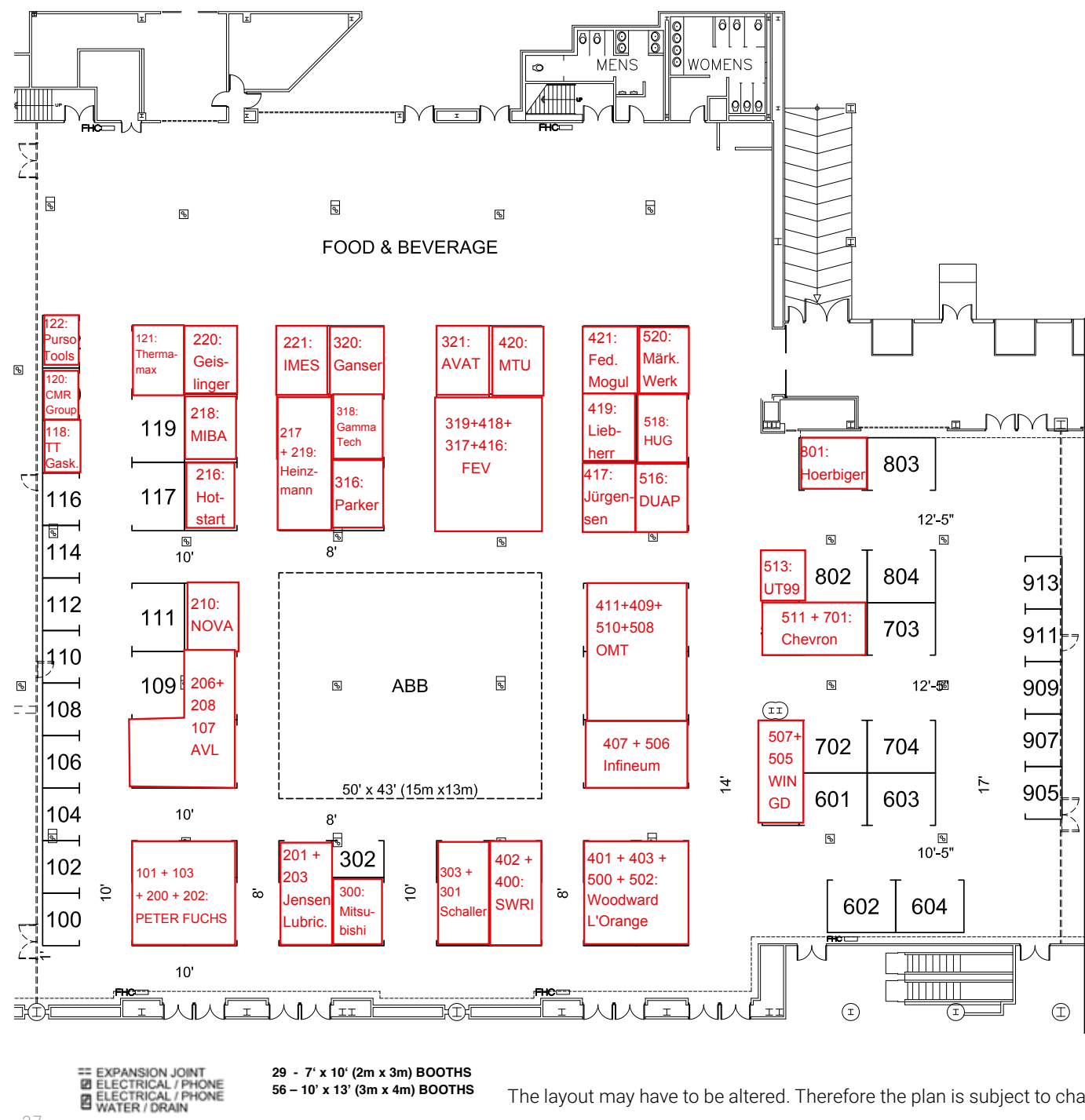


HALL LAYOUT



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East Building: Hall A & Ballroom C







## Vancouver

Cradled amid skyscraping mountains and sparkling ocean, scenic Vancouver is one of the world’s premier meeting and convention destinations. World-renowned cuisine, luxury hotels and unique venues – including the two-time winner of “World’s Best Convention Centre” – all add up to an unforgettable conference experience. Visitors experience a modern, cosmopolitan city that blends culture and landscape.

With so much to experience in Vancouver, you will be well-entertained during your conference off time. Galleries and public exhibits for art enthusiasts, historical sites and districts for history buffs, and scenic hiking trails and botanical gardens for nature lovers are just a small sampling of the city’s diverse attractions.

The late-night scene in Vancouver is a thriving mix of lounges, laid-back pubs and energetic music venues. Some of the trendiest lounges are found in many of the downtown hotels. Live music is never hard to find in Vancouver. Local bands and international touring acts set up regularly in the clubs and venues around town.

## Vancouver Basics

- Population: 603,500 City of Vancouver and 2.5 million Metro Vancouver
- Languages Spoken: English and French are Canada’s two official languages. English is the predominant language spoken in British Columbia
- Climate: Metro Vancouver has a very mild climate. In winter, it rarely snows in the city; summers are warm with cooler evenings
- Time Zone: Vancouver is in the Pacific Time Zone. Daylight time (clocks move one hour ahead) is in effect from the second Sunday in March until the first Sunday in November

For more information about Vancouver please download here: [Vancouver Official Visitors’ Guide](#)

## Traveling to Vancouver

### ■ Accessibility

Vancouver makes things easy with its reliable, clean, green and efficient public transportation network; its variety of coach companies providing group travel options; and its world-class network of ferries designed to move people and cars throughout the surrounding region with comfort and ease.

### ■ By plane

- 25 minutes south of downtown Vancouver (9.3 miles / 15 km)
- Transfer service to downtown via Canada Line light rapid system (\$9.10 CND)
- 43 airlines servicing the destination
- Download [Destination Map](#) and Flying Times to Vancouver

More Information please see [Vancouver International Airport](#) Website

### ■ By car & train

- Three hour drive from Seattle across Canada/U.S. border
- VIA Rail, Amtrak and Rocky Mountaineer all offer rail service to and from Vancouver

### ■ By Public Transit & Coach

- TransLink operates over 100 public buses, the Canada Line and the SeaBus
- Fares range from \$2.85 to \$5.60 CND
- Canada Line station are wheelchair accessible
- Scenic SeaBus connects North Vancouver to Vancouver in 12 minutes
- Vancouver has many affordable and efficient coach companies for various group sizes



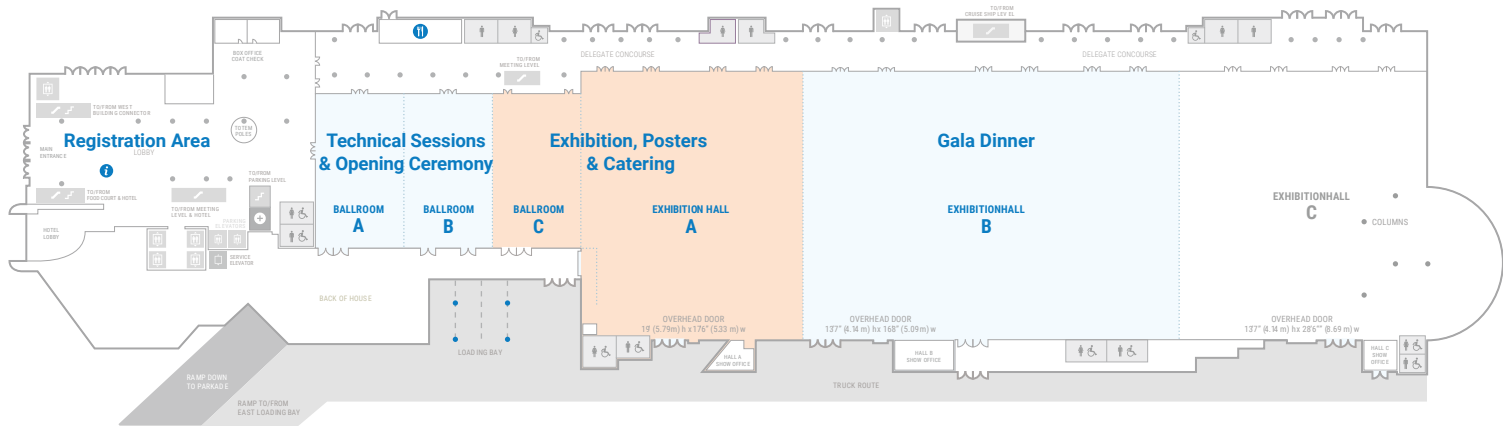


CONGRESS VENUE

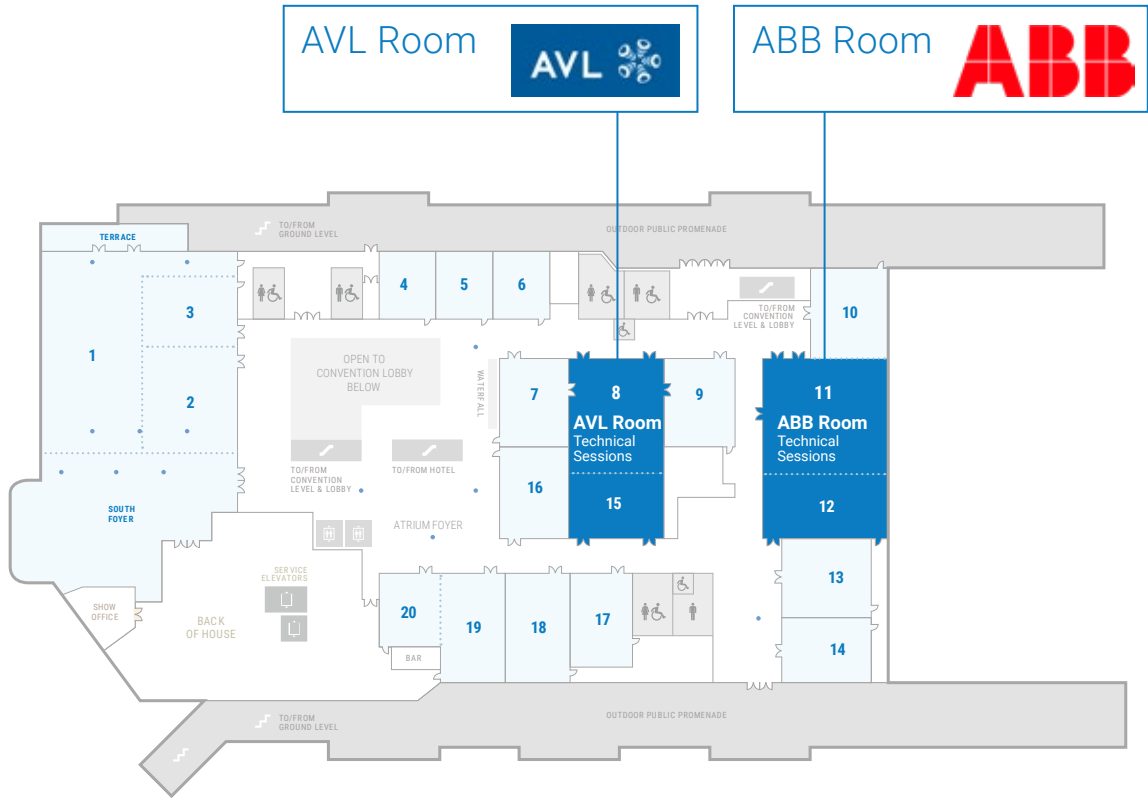


FLOOR PLANS

East Exhibition Level  
Ground Floor



East Meeting Level  
1st Floor



The award-winning Vancouver Convention Centre is located in the heart of downtown Vancouver where everything is accessible – from hotel accommodations to a great variety of restaurants, entertainment, retail and recreational options. Located at Vancouver’s downtown waterfront with a dramatic mountain backdrop Vancouver Convention Centre offers one of the most beautiful settings in the world.

Vancouver Convention Centre  
East Building  
1055 Canada Place  
Vancouver  
V6C 0C3  
Canada

[www.vancouverconventioncentre.com](http://www.vancouverconventioncentre.com)



Tourism Vancouver / Vancouver Convention Centre, Photographer: Kristopher Grunert



# ACCOMMODATION

Allotments  
already  
sold out

For all Congress participants special room rates have been arranged in the following hotels. Please make your reservation directly in the hotel of your choice by using the appropriate keyword. We recommend an early reservation due to room limitations. For further details about the hotels please access the hotel links.

1

## Hotel Pan Pacific

Suite 300-999, Canada Place Vancouver, British Columbia  
V6C 3B5, Canada

Telephone +1 604 662 8111  
Toll-Free 1 800 663 1515 (Within Canada)  
Toll-Free 1 800 937 1515 (Within USA)  
Toll-Free 1 800 514 9086 (Within Mexico)

Email [info@panpacificvancouver.com](mailto:info@panpacificvancouver.com)  
<https://www.panpacific.com/en/hotels-and-resorts/pp-vancouver.html>

**Room rates:**  
Deluxe Harbour Double / Deluxe Harbour King: **\$349.00 CAD** per night  
Premier Double / Premier King: **\$399.00 CAD** per night

The above rates are quoted in Canadian funds and are net; room rates are subject to taxes

**Reservations ID:** CIMAC619 (Please quote to the Reservations Agent)  
**Reservations Due Date:** May 10, 2019



2

## Hotel Coast Coal Harbour

1180 West Hastings Street  
Vancouver, BC V6E 4R5, Canada

Telephone +1 604-697-0202

<https://www.coasthotels.com/hotels/bc/vancouver/coast-coal-harbour-hotel/>

**Room rates:**  
Comfort Room One King Bed or Two Double Beds: **\$269.00 CAD** per night

The above rates are quoted in Canadian funds and are net; room rates are subject to taxes

**Reservations ID:** CCC-GFC6224 or Meeting Name „2019 International Council on Combustion Engines Technology“  
**Booking Website:** <https://aws.passkey.com/e/49468132>  
**Reservations Due Date:** May 10, 2019



3

## Hotel Pinnacle Vancouver Harbourfront

1133 West Hastings Street  
Vancouver, BC V6E 3T3, Canada

Telephone +1 604-689-9211

Email [Vancouver.info@pinnaclehotels.ca](mailto:Vancouver.info@pinnaclehotels.ca)  
<https://www.pinnacleharbourfronthotel.com>

**Room rates:**  
City Side Single/Double: **\$239.00 CAD** per night

The above rates are quoted in Canadian funds and are net; room rates are subject to taxes

**Reservations Direct Phone:** +1-844-337-3118 or +1-604-689-9211  
**Booking Website:** <https://aws.passkey.com/event/49590929/owner/2075/home>  
**Reservations Due Date:** May 9, 2019





# MAP OF VANCOUVER

- 1

Hotel Pan Pacific

Suite 300-999, Canada Place Vancouver, British Columbia V6C 3B5, Canada
- 2

Hotel Coast Coal Harbour

1180 West Hastings Street  
Vancouver, BC V6E 4R5, Canada
- 3

Hotel Pinnacle Vancouver Harbourfront

1133 West Hastings Street  
Vancouver, BC V6E 3T3, Canada



- A

Vancouver Convention Centre
- B

Vancouver Aquarium – Welcome Reception





REGISTRATION

Ticketshop

You can register for the 29th CIMAC World Congress online by using the ticketshop. Please follow the link: [Ticketshop](#)

Opening Hours Information Desk

Sunday	June 09	14:00 – 18:00
Monday	June 10	08:00 – 18:00
Tuesday	June 11	08:00 – 18:00
Wednesday	June 12	08:00 – 18:00
Thursday	June 13	08:00 – 18:00

Registration Fees\*

	Euro / €	CND / \$	USD / \$
CIMAC Members	€ 1,790	\$ 2,680	\$ 2,200
Non-members	€ 1,980	\$ 2,990	\$ 2,450
Speakers	€ 1,490	\$ 2,250	\$ 1,840
Students	on invitation only		
Accompanying persons	€ 350	\$ 530	\$ 430
One-Day Ticket	€ 750	\$ 1,130	\$ 920
Exhibition Ticket per day	€ 50	\$ 80	\$ 60
Gala Dinner only	€ 250	\$ 380	\$ 300

\*No subject to Canadian GST (VAT) under FCTIP.

The prices in Euro are binding. Dollar prices may vary and are for orientation only.

The Congress fee for **CIMAC members, non-members** and **speakers** includes: participation in the scientific program, admission to the exhibition, the Opening Ceremony, the Welcome Reception, ABB Evening and the Gala Dinner. Additional Congress components, such as the accompanying program (optional tours, technical tours) must be booked and paid for separately. The Congress documents (program, Congress bag, participant

badge) as well as catering during breaks are included in the Congress fee.

Students have the above mentioned services included - except the participation in the Gala Dinner.

The participation fee for **accompanying persons** includes: admission to the exhibition, coffee breaks and lunch, Opening Ceremony, Welcome Reception, ABB Evening and Gala Dinner, this ticket does NOT include the scientific program.

SCHEDULE

Day	Time	Acitivties
Sunday June 9, 2019	14:00 – 18:00	Congress Information Desk
	14:00 – 18:00	Speakers' Preparation
Monday June 10, 2019	08:00 – 18:00	Congress Information Desk
	10:00 – 18:00	Speakers' Preparation
	10:00 – 17:00	Exhibition
	10:00 – 11:30	Opening Ceremony
	13:30 – 17:00	Technical Sessions
	18:30	Welcome Reception
Tuesday June 11, 2019	08:00 – 18:00	Congress Information Desk
	08:00 – 18:00	Speakers' Preparation
	08:30 – 17:00	Exhibition
	09:00 – 17:00	Poster Sessions
	09:00 – 17:00	Technical Sessions
Wednesday June 12, 2019	18:30	ABB Evening
	08:30 – 18:00	Congress Information Desk
	08:00 – 18:00	Speakers' Preparation
	09:00 – 17:00	Exhibition
	09:00 – 17:00	Poster Sessions
	09:00 – 17:00	Technical Sessions
Thursday June 13, 2019	15:30 – 16:30	Collin Trust sponsored Key Note Speech
	08:00 – 18:00	Congress Information Desk
	08:00 – 15:00	Speakers' Preparation
	08:30 – 17:00	Exhibition
	09:00 – 17:00	Poster Sessions
	09:00 – 17:00	Technical Sessions
	15:30 – 17:00	Final Panel
Friday June 14, 2019	18:30	Gala Dinner
	09:00 – 14:00	Half-day Technical Tours
	09:00 – 17:00	Full-day Technical Tours



# ANNOUNCEMENT 30TH CIMAC CONGRESS

On behalf of CIMAC, the South Korean National Members Associations, we are happy to announce **Busan** as the host city for the 2022 Congress.

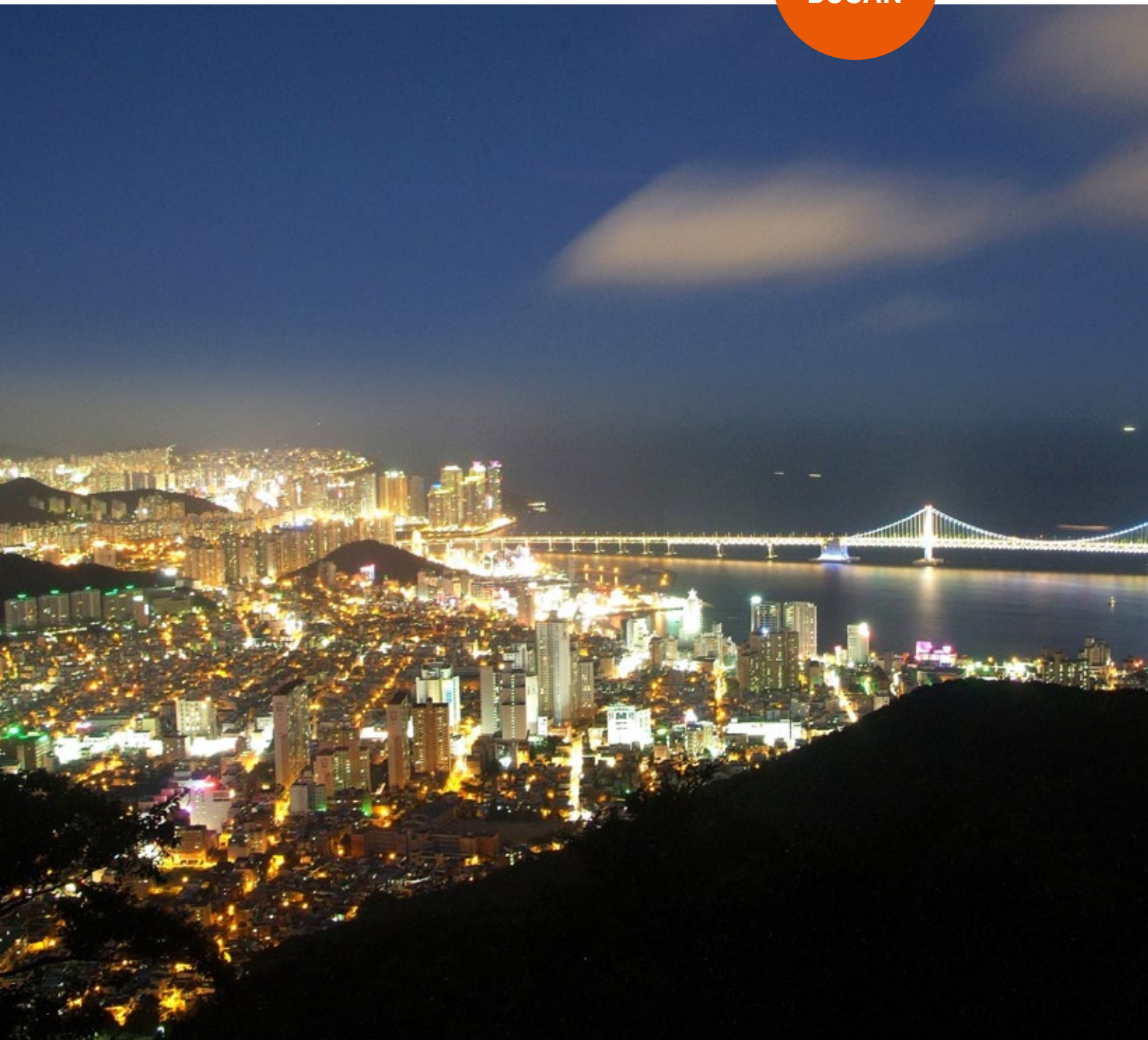
Busan is Korea's representative tourist city with over 3 million foreign visitors a year. From the Haeundae Beach to the beautiful natural environment, visitors can enjoy all four seasons.

It provides a variety of marine tour programs, shopping experiences and other cultural activities.

These have all combined to make Busan a world class tourist city for lodging and relaxation.

**Busan looks forward to welcoming CIMAC delegates in 2022!**

**2022  
BUSAN**





# QUICK FACTS

Accommodation	Informations about selected Hotels in <a href="#">Vancouver</a> please see page <a href="#">39</a> .
Cancellation of Congress Participation	Cancellations of participation are only possible up to <b>30 April 2019</b> at the latest. On cancellation of participation, the participation fee will be refunded minus the administrative charge amounting to € 180. Cancellations or refunds at a later date are not possible. There shall be no refunds of participation fees for non-attendance without a cancellation within the stipulated period.
CIMAC	CIMAC is the non-commercial sponsor of the 29th CIMAC World Congress in Vancouver. For further informations on CIMAC please visit the website at <a href="http://www.cimac.com/">http://www.cimac.com/</a>
CIMAC Membership	If you are uncertain about your membership status or want to apply for a membership, please contact the CIMAC Central Secretariat – <a href="mailto:info@cimac.com">info@cimac.com</a>
Congress Catering	Catering stations will be integrated in the exhibition area. During the coffee breaks and lunch break participants will be provided with food and drinks. Enjoy regional and international cuisine!
Congress Documents	Please bring your mobile ticket ready on your mobile phone or tablet with you or print out your e-ticket legibly on a sheet on paper. Your personal badge is your entrance ticket to all sessions, the exhibition and the social events. Please, remember to wear your badge at the congress and the social events at every time. Congress bags will be provided in the registration area in the Convention Centre.
Contact for Questions	For questions regarding the technical Program, please contact CIMAC Central Secretariat. For questions regarding the congress, sponsoring and exhibition, please contact the Main and the Co-Organizer of the congress. Contact details see page <a href="#">53</a> .
Cloakroom	Participants may leave their belongings in the designated area.
Language	The official language of the Congress is English. No translation will be provided.
Newsletter	For the subscription of the CIMAC Newsletter please fill out the form on CIMAC website: <a href="http://www.cimac.com/publication-press/newsletter-subscription/index.html">http://www.cimac.com/publication-press/newsletter-subscription/index.html</a>

Mobile App	A mobile app will be available for downloading in <a href="#">Goolge Play</a> and <a href="#">Apple App Store</a> for all congress participants in early spring time. The app contains the actual technical Program, general informations, floor plans and furthermore.
Optional Tours	For participating in the optional tours, please visit our hospitality room at the congress. Please see pages <a href="#">29</a> .
Social Media	Fans and followers will find the CIMAC Congress on <a href="#">LinkedIn</a> and <a href="#">Twitter</a> .
Speakers' Preparation Room	All presentations can be checked and delivered to the speaker's preparation room at least 2 hours prior to speaker's session. Presentations being held during a morning session should be checked at the end of the day before. Speakers are kindly requested to follow the instructions of the chairperson and strictly keep to the time of their presentation.
Technical Program	Admission to all sessions of the technical Program is only possible with a valid congress ticket. The congress ticket for <b>CIMAC members, non members, speakers and students</b> includes: congress badge, congress bag, admission to all sessions and the exhibition, coffee breaks and lunch, Opening Ceremony, Welcome Reception, ABB Evening, Gala Dinner (except students).  The registration for <b>accompanying persons</b> includes: admission to the exhibition, coffee breaks and lunch, Opening Ceremony, Welcome Reception, ABB Evening, Gala Dinner.
Technical Tours	Separate registration is required for participation in the technical tours. Registration will be available in the beginning of 2019 on the congress website.
Ticketshop	Tickets are only sold online via our <a href="#">Ticketshop</a> and only payable via credit card. Print your ticket or bring it along on your mobile device.
WIFI	Free WIFI is available at Vancouver Convention Centre. Login and password will be announced on-site.





**Main Organizer Congress:**  
**Gesellschaft zur Förderung des  
Maschinenbaues mbH (GzF)**  
a VDMA group company

Lyoner Straße 18  
60528 Frankfurt am Main  
Germany

Contact: Nicole Potz  
Phone: +49 69 6603-1143  
Fax: +49 69 6603-2843  
Email: congress@cimac.com  
Web: www.cimaccongress.com  
www.gzf-expo.de

**Co-Organizer Congress:**  
**CIMAC National Member Association**  
12001 Network Blvd, Ste 110,  
San Antonio, TX 78249

Contact: Timothy Callahan  
Email: timothy.callahan@swri.org



**Co-Organizer Exhibition:**  
**Hamburg Messe und Congress  
International GmbH**  
Messeplatz 1  
20357 Hamburg  
Germany  
Contact: Sybille Lang  
Phone: +49 40 3569-2293  
Fax: +49 40 3569-692293  
Email: cimac@hamburg-messe.de  
Web: www.hamburg-messe.de/en/visitors/trade-fairs-abroad



**Non-Commercial Sponsor:**  
**CIMAC**  
Lyoner Strasse 18  
60528 Frankfurt am Main  
Germany

Contact: Anirudh Thekke Purayil  
Phone: +49 69 6603-1149  
Fax: +49 69 6603-2149  
Email: info@cimac.com  
Web: www.cimac.com



CIMAC: the Global Forum for Large Engines and their Applications

Originally founded in Paris in 1951, CIMAC has become **the leading global association of the internal combustion machinery industry**. It is a non-profit association bringing together and re pre-senting the large engine industry to regulators and standardising bodies. In addition to promoting the work of National Member Associations, it supports information exchange and understanding across the large combustion engine industry including:

- Builders of large diesel, gas and dual-fuel engines
- Users of large engines such as owners and operators of ships, power plants, locomotives etc.
- Systems and component suppliers
- Fuel and lubricant suppliers, including oil companies
- Classification societies and other regulatory bodies
- Academic institutions, consultant engineers, scientists
- Other service providers

CIMAC’s Mission is to:

- › promote exchange of scientific and technical information via its Congresses, CIMAC Circles and CIMAC CASCADES events
- › improve understanding between engine manufacturers and engine users
- › improve understanding between engine manufacturers and their suppliers
- › focus upon and promote the work and activities of National Member Associations
- › promote exchange on technological developments in a pre-competition state, e.g. in its Working Group meetings
- › contribute to internationally applied technological standards and publications
- › collaborate with other international associations

CIMAC Membership

CIMAC members currently come from **26 countries** across North and South America, Asia and Europe. Membership can take three forms:

- Membership of the official CIMAC National Member Association in your country
- Membership of National Member Groups
- Corporate Membership for individual companies

Please see page 53 for CIMAC contact details.

CIMAC Working Groups: the Consensus Seekers

CIMAC Working Groups are the heart of CIMAC. Led by **international specialists** from CIMAC member organisations, they seek solutions to industry-wide technical issues.

They interface with legislators, standards organisations, and regulators such as the classification societies to develop a united CIMAC recommendation or a position paper, representing the industry as a whole, on a pre-competitive, pre-legislative basis. They have a distinguished record of issuing guidance and published media articles on a wide range of crucial subjects relating to the operation of large diesel, gas and dual-fuel engines.

Consequently, CIMAC Working Group activities encompass the environmental compatibility, efficiency and safety of large engines and their applications.

CIMAC Working Groups currently cover these vital areas of engine technology and operation:

- Classification
  - Crankshaft Rules
  - Electronics & Software Systems
  - Exhaust Emissions Control
  - Fuels
- Gas Engines
  - Inland Waterway Vessels
  - Marine Lubricants
  - System Integration
  - Users

CIMAC Events

The CIMAC Congress represents the culmination of all CIMAC activities, being held every three years, each time in a different member country. Spanning the globe as well as all technology aspects, the Congress is **a unique gathering of key industry decision makers**, including engine owners and operators, researchers and developers, and representatives from the engine, component and consumables industries.

The Congress programme centres on the **presentation of technical papers** on engine research, development, application engineering on the original equipment side, and engine operation and maintenance on the end-user side. This is complemented by a social program which promotes friendship and networking among engine builders and engine users.

CIMAC Circles are panel discussions involving CIMAC members debating topical issues. They are hosted at key industry events around the world at least once a year.

CIMAC CASCADES promote the advancement of young engineers and their careers. The events enable them to meet with leading industry experts to exchange information, network and present their projects.

Person	Company	Place
Aabo, Kjeld	MAN Energy Solutions	Copenhagen, Denmark
Abidin, Zainal	Southwest Research Institute	Texas, USA
Åkerman, Jonas	Wärtsilä	Vaasa, Finland
Aufischer, Rainer	Miba Gleitlager	Laakirchen, Austria
Bartholomä, Klaus	MAN Energy Solutions	Augsburg, Germany
Beran, Robert	AVL List	Graz, Austria
Boletis, Elias	Wärtsilä	Vaasa, Finland
Boom, Rick	Woodward	Amsterdam, Netherlands
Buchholz, Bert	University of Rostock	Rostock, Germany
Chatterjee, Daniel	Rolls-Royce Power Systems	Friedrichshafen, Germany
Dillen, Eric	General Electric	Illinois, United States
Flynn, Paul	HorsePower Consulting	Pennsylvania, USA
Frigge, Patrick	Innio	Jenbach, Austria
Gust, Edgar	Zollern BHW Gleitlager	Braunschweig, Germany
Heuser, Peter	FEV Group	Aachen, Germany
Hiltner, Joel	Hiltner Combustion Systems	Washington, USA
Itoh, Yasuhiro	Niigata Power Systems	Tokyo, Japan
Jacobs, Tim	Texas A&M University	Texas, USA
Jakobsen, Ole Graa	Maersk Line	Copenhagen, Denmark
Knafl, Alexander	MAN Energy Solutions	Augsburg, Germany
Koch, Franz	hofer powertrain	Nürtingen, Germany
Mohr, Hinrich	AVL List	Graz, Austria
Montgomery, David	Caterpillar	Illinois, United States
Müller, Stefan	MTU Friedrichshafen	Friedrichshafen, Germany
Müller-Baum, Peter	CIMAC	Frankfurt, Germany
Nordrik, Rune	Rolls-Royce Power Systems	Hyllkje, Norway
Osborne, Dustin	Southwest Research Institute	Texas, USA
Östman, Fredrik	Wärtsilä	Vaasa, Finland
Rabe, Rom	University of Flensburg	Flensburg, Germany
Ralf Marquard	N.N	N.N
Ritscher, Bert	Caterpillar Marine	Kiel, Germany
Rofka, Christoph	ABB Turbo Systems	Baden, Switzerland
Rojgaard, Charlotte	Bureau Veritas VeriFuel	Copenhagen, Denmark
Schlemmer-Kelling, Udo	FEV Group	Aachen, Germany
Schneiter, Dominik	WINGD	Winterthur, Switzerland
Steigert, Tim	Innio	Jenbach, Austria
Steve Fritz	Southwest Research Institute	Texas, USA
Takahata, Yasuyuki	Yanmar	Osaka, Japan
Takasaki, Koji	Kyushu University	Fukuoka, Japan
Tanaka, Ichiro	Mitsui	Tokyo, Japan
Tonon, Paolo	ABB Turbo Systems	Baden, Switzerland
Vlaskos, Ioannis	Winterthur Gas & Diesel	Winterthur, Switzerland
Wachtmeister, Georg	Technical University of Munich	Munich, Germany
Weisser, German	Winterthur Gas & Diesel	Winterthur, Switzerland
Wik, Christer	Wärtsilä	Vaasa, Finland
Wimmer, Andreas	LEC (Large Engines Competence Center)	Graz, Austria

# CONGRESS ORGANISING COMMITTEE



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**Winterthur Gas & Diesel**  
Switzerland



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CIMAC Vice-President Technical  
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Ibsen B.

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Frostell P.

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Riom E.  
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Blythe N.

National Member Associations

Country	NMA
Austria	FMMI
China	CSICE
Denmark	CIMAC DANMARKS NATIONALE KOMITÉ
Finland	The Federation of Finnish Technology Industries
France	Profluid
Germany	Deutsches Nationales CIMAC Komitee
India	CIMAC India
Japan	JICEF
Republic of Korea	KOFCE
Netherlands	CIMAC NMA NL p.a. Techno Fysica
Norway	CIMAC NMA Norway, c/o Peter Koch
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Switzerland	Swissmem
United Kingdom	Mark Fooks, c/o Daido Metal.
United States	Tim Callahan, c/o Southwest Research Institute

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Country	NMA
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	Anglo Belgian Corporation N.V.
	Chevron Belgium NV
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	Petróleo Brasileiro S.A. (PETROBRAS)
Canada	Teekay Shipping (Canada) Ltd.
Croatia	AVL – AST d.o.o.
Czech Republic	PBS Turbo s.r.o.
Greece	Aegean Marine Petroleum SA
	Metis Cyberspace Technology SA
Italy	O.M.T. Officine Meccaniche Torino S.p.A.
Monaco	Transocean Maritime Agencies
Poland	Celsa ‚Huta Ostrowiec‘
Russian Federation	LLK INTERNATIONAL
	OAO Kolomensky Zavod
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	Maritec Pte Ltd.
Spain	Dresser-Rand GUASCOR
	Sidenor Forgings & Castings S.L.U.



