

Gasfuelled CONFERENCE ships2011



26-27 October 2011 | Intel Hotels | Rotterdam Centre | Rotterdam | The Netherlands

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Conference Programme

INNOVATIVE FUEL SOLUTIONS TO REDUCE EMISSIONS AND COSTS

Increasingly tough environmental regulations mean that further investment to reduce emissions in the shipping industry is needed now. However, this focus on green issues and environmental legislation potentially increases costs. Switching to cleaner fuels could be the solution, and with an abundant supply of natural gas, LNG is becoming the most promising maritime fuel.

Held in association with The Motorship and supported by SEAaT, VDR and SSA, this event will continue discussions started at the first event held in Hamburg in October 2010.



THE GAS FUELLED SHIPS CONFERENCE IS A MERCATOR MEDIA LTD EVENT

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Who should attend:

The 2nd Gas Fuelled Ships Conference is aimed at industry professionals who are looking to gain valuable information on using LNG as a maritime fuel and will include: ship owners, ship operators, engine manufacturers, LNG carriers, shipbuilders, classification societies, ship designers, ship yards and port & terminal operators. In particular: marine engineers, marine

superintendents, technical managers, maritime lecturers/professors, research team leaders, CEOs and MDs, shipowners, ship operators and managers, shipowners' technical departments who deal with fuel and lubricant issues, fuel and lubricant manufacturers and suppliers and individuals and organisations who are involved in emission control technologies.

DAY 1 – WEDNESDAY, 26 October 2011

08.00 Registration and coffee

08.45 **Chairman's Welcome**
Chairman, tbc

09.00 **KEYNOTE ADDRESS:**
Per A. Brinchmann, Vice President Technical, Wilh. Wilhelmsen ASA

SESSION 1 – Safety and technical challenges

09.20 Safety aspect when using LNG as ship fuel
Torill Grimstad Osberg, Principal Approval Engineer, Det Norske Veritas
The first car and passenger ferry running on LNG has been in operation for more than a decade with DNV involvement from the start. Class rules for gas fuelled ships were already in place in 2001, and DNV has closely followed up the design and construction of all LNG fuelled ships in operation so far (not counting LNG carriers). This presentation will cover the main safety challenges when introducing LNG/ CNG or other low flashpoint fuels for ships. The status and main challenges of the IMO work will be outlined, including the discussion about locating LNG fuel tanks under accommodation.

09.40 Gas-as-fuel for ships – is it the new alternative fuel? Technical challenges and perspectives
Benjamin Scholz, Process- and Gas Technology, Strategic Research and Development, Germanischer Lloyd
In the recent past, gas as fuel for ships was not permitted except for LNG tankers using boil-off gas. This usage of gas in main engines is regulated in the IGC-Code. But there is light at the end of the tunnel. Since 2000 a few vessels fuelled by LNG have come into service. In addition to the storage requirements for LNG onboard, the following technical challenges and perspectives for this alternative fuel will be presented: recent overview of rules & regulations and the development including timelines, status of harmonisation of IGC – and draft IGF-Codes; brief overview of advantages of gas as fuel; brief overview of the recent gas supply opportunities; and LNG tank concepts for different ship types & sizes.

10.00 Benefits and challenges of the use of natural gas as fuel
Bruno Dabouis, Vice President of the Marine Division, Bureau Veritas
This presentation will recall the technical and safety challenges in terms of propulsion reliability, safety of gas bunkering, storage and handling. It will then describe and comment on the regulatory developments undertaken by the IMO for the elaboration of the IGF code and by Bureau Veritas in its rules in order to address the use of natural gas for the propulsion of ships other than LNG carriers. It will also introduce the main issues and the possible solutions for the gas fuel propulsion of selected vessel types such as ferries, cruise vessels, container vessels, cargo ships and supply vessels and will conclude with the future perspectives of natural gas fuel propulsion.

10.20 A US perspective on rules for natural gas fuelled vessels
Timothy E. Meyers, Professional Engineer, Design and Engineering Standards, US Coast Guard
The US Coast Guard has conducted a systematic review of rules and guidelines concerning the design and construction of natural gas fuelled vessels. The International Gas Carrier Code and experience with liquefied natural gas (LNG) carriers form the basis of USCG's understanding of a gas fuelled engine arrangement. Several important topics concerning design philosophy will be presented; they include: the use of inherently gas-safe versus emergency shut down concepts in system design, natural gas fuel tank location, bunkering arrangements, and the acceptance of certain foreign-flagged natural gas fuelled vessel designs for operation in US waters.

10.40-10.50 Q&A

10.50-11.20 Coffee break – Sponsored by



SESSION 2 – Technical issues with LNG propulsion

11.20 Integrated cylinder pressure measurement for gas engine control
Stefan Neumann, President, IMES
Closed loop control based on cylinder pressure measurement has been investigated for over 20 years. The purpose of this presentation is to show the large amount of information that can be interpreted from the cylinder pressure curve and used to evaluate a cylinder pressure based closed loop engine control. IMES has successfully developed its type HTT cylinder pressure sensor for serial production, which was introduced for the first time at the CIMAC Congress in 2001. A modular electronic concept for data acquisition and visualisation of combustion data for application on Diesel and gas engines was developed together with Wärtsilä Service Finland.

11.40 50% reduction of pilot fuel possible with water in fuel emulsion
Thomas Porep, Managing Director, Lehmann & Michels
Lehmann & Michels has successfully managed to halve the amount of pilot fuel required by dual fuel gas engines. Tests on a dual fuel Pielstick engine used for stationary power generation showed that the exhaust gas temperatures were considerably reduced and

therefore lessened the thermal load of the engine at the same power output. This reduced thermal load can actually enable the operator to increase the maximum power output of the engine. The presentation will explain the Lehmann & Michels experience with water in fuel emulsifying systems.

12.00 Conversion of large-bore diesel engines for heavy fuel oil and natural gas dual fuel operation

Jorge M.G. Antunes, CEO TecnoVeritas Asia Pacific Plc, and TecnoVeritas Portugal Ltd, TecnoVeritas

Due to potential fuel efficiency and exhaust gas emissions advantages, interest in dual fuel operation of internal combustion engines is increasing. This presentation describes the conversion of two 4.5MW marine Diesel engines, modified to use a combination of natural gas and heavy fuel oil. The development of the engine monitoring and management system is described, including the use of knock measurement to control the amount of natural gas used. Experimental results are presented, showing the performance of the engines under different modes of operation.

12.20-12.30 Q&A

12.30-13.45 Lunch break

SESSION 3 – Emission aspects of LNG fuels

13.45 Exhaust Gas Emissions from LNG fuelled Vessels – Abatement technologies for the reduction of Methane Emissions

Ralf Jurgens, Head of R&D Department, Couple Systems
Liquefied natural gas is a promising fuel for use by the maritime industry. Dual fuel engines will play a major role for ship owners operating vessels mainly sailing in ECAs. However, questions concerning the infrastructure of LNG supply and the storage onboard a vessel still need to be answered. Beside this, the problem of GHG emissions which is predominantly methane (CH₄) slip must be recognised. This presentation will discuss the two available technologies that could be used in the exhaust gas of a dual-fuel engine: a catalyst similar to an SCR system for the reduction of NO_x; and thermal post-combustion where the methane slip is completely combusted.

14.05 Assessing the dependence of carbon dioxide emission reduction potential of natural gas on the size and topology of container carriers and other ship types

John Calleya, Research Student, Department of Mechanical Engineering, University College London
Many emission reduction and fuel saving claims for natural gas published by manufacturers may be optimistic, and reference points used in designs may only apply to a specific ship type, size and speed. This presentation will describe a holistic ship model that is representative of an existing container carrier, in order to quantify the potential fuel and emission reduction savings of natural gas when compared to oil-based fuels. It will discuss how the arrangement and topology, design speed, operating speed and size of the ship affects the projected cost and emissions savings achieved by using natural gas. The application of natural gas will be examined for both the retrofitting of existing ships and also to more significant changes, which would only be viable for a new build.

14.25 Shipping in the gas age. Conversion of a vessel from HFO to gas operation – a case study

Giulio Tirelli, Manager Mktg. & Appl. Development, Wärtsilä
During the last Gas Fuelled Ships conference, Wärtsilä introduced the first marine conversion project, converting the ship Bit Viking to shift operations from HFO to gas. In the current presentation, reflecting the situation one year later, the hands-on experience gained on the field is reported in an extended format. Real gas systems, onboard installation, engine conversions, vessel upgrades and Wärtsilä capabilities in project execution are the central focus of this presentation.

14.45 -14.55 Q&A

14.55-15.25 Coffee break – Sponsored by



SESSION 4 – Future technology using LNG power

15.25 B9 Ships – Sail and Virtual Bio-methane Powered Coastal Vessels

David Surplus, Chairman, B9 Energy Group
The maritime industry is under increasing pressure to reduce carbon dioxide CO₂ emissions on a global scale. One important method of achieving this is to deploy renewable energy technologies on ships. The B9 Energy Group from Northern Ireland is developing a novel combination of wind power and bio-methane fuelled engines to allow coastal shipping to operate with zero fossil fuel consumption. This presentation will discuss a method for balancing the quantity of bio-methane produced from the anaerobic digestion of organic waste with the quantity of LNG that is burned onboard the ship so that environmental performance can be delivered without the need for small scale liquefaction.

Networking Drinks Reception – 26 October 2011

Regular attendees at conferences know how important the networking opportunities at events are: old acquaintances are renewed, new ones are made, new partnerships and fresh ideas are formed and business is done! At the end of the first day of the Gas Fuelled Ships Conference, delegates will have the opportunity to continue discussions started during the day and to network with participants at

the event. Held in the Inntel Hotel Rotterdam's Panoramic room, which gives fantastic views of the Erasmus bridge and the skyline of Rotterdam, this 4 star hotel is located on a unique and prominent spot at the bank of the Maas river. Almost every room in the hotel guarantees you a magnificent view on the water so delegates will be able to enjoy the fabulous views whilst continuing to build relationships with participants at the Conference.



15.45 Future logistics of LNG fuel

Marco Andreola, LNG Fuelled Marine Systems – Campaign Manager Technological and Business Development, Rolls-Royce

If LNG is to become a feasible option for vessel propulsion in the future, the whole supply chain, including the infrastructure and multi-user availability, will become a key factor.

The presentation describes design concepts for advanced LNG logistic vessels that enable the costs of building and operating the infrastructure to be minimised, while increasing flexibility for end users.

16.05 paper and speaker tbc

16.25 Extended discussion

NETWORKING DRINKS RECEPTION

DAY 2 – THURSDAY, 27 October 2011

08.00 Registration & coffee

08.30 Brief resume of Day One

SESSION 5 – Application of LNG fuels

08.45 LNG as a fuel for wind turbine installation vessels

Jort Brouwer, Director/Senior Naval Architect, Dutch Offshore Innovators

DOI has developed a novel vessel concept for the installation of offshore wind turbine foundations. The vessel differentiates itself from existing installation vessels because installation work is carried out while the vessel remains in floating condition. One disadvantage of the current widely-used jack-up type installation vessel is its sensitivity to weight. This presentation will also discuss the advantages of using LNG as fuel for this type of vessel: LNG offers distinctive economic benefits for the vessel operator; who can use the LNG feature as a selling point when tendering for contracts; emissions are cut drastically.

09.05 LNG Fuel ISO Tank Container

Dr. Jochen Schmidt-Luessmann, Senior Cryogenic and Mechanical Engineer, Marine Service

Currently, the lack of LNG bunkering infrastructure is the major obstacle for introduction of gas-fuelled shipping outside of Norway. In order to establish the LNG fuel supply infrastructure without having to resort to massive investments in new bunkering infrastructure, Marine Service and partners developed the LNG fuel ISO tank container. Once loaded onboard the vessel, the LNG tank container is connected to the ship's LNG fuel system, thus becoming an LNG bunker tank.

09.25 Application of LNG fuels to large commercial ships

ShinHyung Kim, Principal Research Engineer, Daewoo Shipbuilding & Marine Engineering

With rising oil price and stronger emission regulation, realisation of the LNG fuelled large commercial ship is now timely. DSME, as an innovative leading shipbuilder, has developed an effective fuel gas supply system which has been adopted by MAN Diesel & Turbo for its two-stroke dual fuel Diesel engine, which was demonstrated for the first time in May 2011. DSME has also carried out basic engineering studies for LNG fuelled VLCCs, containerships and VLOCs in collaboration with the major classification societies. This presentation will discuss the economic and environmental advantages of LNG fuelled large commercial vessels.

09.45 The concept of MAN ME-GI high pressure gas engine

Speaker tbc, MAN Diesel & Turbo

The presentation will explain the concept of the MAN Diesel ME-GI high pressure gas engine. The presentation will also outline the setup of MAN's research platform with its 4T50ME-GI engine and the first gas supply system test results will be discussed. The test gas engine was established in order to achieve new knowledge on engine optimisation, control, monitoring and emissions control. A number of tests are to be carried out, including functional tests of the gas engine platform, tests for compliance with current emission legislation and tests for optimisation of the engine concept with regard to fuel economy.

10.05 Gas-Fuelled Large Container Vessel with SPB Tank

Speaker tbc, IHI Marine United

IHI Marine United (IHIMU) has developed a conceptual design for a gas fuelled 10,000TEU container vessel applying the SPB gas fuel tank, one of IHIMU's unique technologies. The SPB (self-support prismatic IMO type B) tank was developed by IHIMU in 1983, approved by classification societies as a cargo tank, and has been applied to LNGC, LPG-FSO, LPG-FPSO among other vessel types. The SPB tank can be applied to LNG floating terminals, LNG onshore storage tanks, and LNG offshore gravity based structures as LNG storage tanks and to LNG fuel gas tanks. This presentation will describe the conversion of SPB cargo containment technology to fuel gas tanks.

10.25-10.35 Q&A

10.35-11.05 Coffee break

SESSION 6 – Economics of LNG fuels

11.05 LNG powered ships: energy, environmental and economic analysis

R. Taccani, F. Burel, S. Clemente, Department of Mechanical Engineering and Naval Architecture, University of Trieste

This presentation will focus on the economic analysis that allows assessment of the benefits of LNG propulsion. From the environmental point of view the effects of LNG propulsion on noxious emissions are accounted for. On the basis of the analysis it has been possible to determine that the most appropriate vessels are tanker, bulk carrier and ro-ro. In all the considered cases the break even point was found to be shorter than three years.

11.25 LNG for ship fuel: Availability and competitiveness

Aksel Skjervheim, Head of Fuel Markets, Gasnor

This paper will look at the availability of LNG for fuel in Europe as well as the pricing of LNG and an economic comparison of LNG with MGO and HFO. It will also illustrate, with some practical examples, how bunkering can be done.

11.45-12.00 Q&A

12.00-13.15 Lunch break

SESSION 7 – Bunkering & Refuelling

13.15 LNG Bunkering: Bridging large and small scale LNG

Max Vauthier, Founder and President, LNG Brokers

Despite upcoming environmental regulations and incentives for the use of LNG in shipping, many shipowners are still awaiting strong signals for the physical availability of LNG at major ports in the future, as well as long-term price visibility allowing the recovery of the extra cost of building and operating LNG-fuelled ships. This presentation will explain the need for building the new mid-stream infrastructure and ships that will act as a 'bridge' between large-scale facilities and end-users. The timing for building new LNG-fuelled ships can be aligned with the coming into force of ECA regulations.

13.35 LNG fuel gas systems for ships other than gas carriers – shipboard systems and infrastructure

Hans-Christian Haarmann-Kühn, Head of Engineering, TGE Marine Gas Engineering

Technical solutions for barge-based satellite terminals, LNG feeder ships to supply LNG to the very large scale LNG export/import terminals and bunker ships to bring LNG to the 'end-user' need to be designed, built and operated. TGE has been developing several studies in that area by transferring the vast experience from liquefied LPG/ethylene carriers to LNG ships. The world's first combined LNG/LPG-carrier designed by TGE has been in operation for more than two years now, proving TGE's capabilities in the design of such ships. The presentation will show possible solutions for onboard LNG storage and processing developed for different storage volumes and gas consumers.

13.55 LNG Bunkering Study and Newbuilding Market Outlook for LNG Fuelled Ships

Jesper Aagesen, Naval Architect, M.Sc. Senior Surveyor, Ship Design Specialist, Lloyd's Register

As a response to increasing developments in emission regulations and their impacts on shipping globally, Lloyd's Register has commissioned a number of studies with the aim of understanding how a LNG bunkering infrastructure may develop. The overall concept for the studies has been to review the case for LNG as a ship propulsion fuel for deep-sea shipping. The main aim of the study is to assess and identify key likely ports and locations globally for LNG bunkering infrastructure facilities and compare them with current bunkering patterns. The studies are due to be completed by end of December 2011, an interim report on the findings will be presented.

14.15 LNG bunkering for the future: assessing critical factors and issues when increasing capacity

Andy Alderson, Deputy Managing Director, Hart, Fenton & Company

LNG bunkering has been successfully undertaken by transferring shore based 'Satellite LNG station' technology to small ferries and offshore vessels however the quantities are limited and supply is consistent. When developing an LNG bunkering infrastructure involving larger quantities of LNG and ship to ship transfer then there are limitations in using the shore base technology. The solution may not be to scale up the shore based solutions but to scale down existing technology. This briefing will look at the issues faced and outline the solutions based on the experience of existing LNG Transportation industry.

14.35-14.50 Extended Q&A

14.50 Round up by Chairman

15.00 Conference Close

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