International Conference
Power & Propulsion Alternatives for Ships
23 January 2019,
RINA HQ, London, UK

www.rina.org.uk/Power_Propulsion_Alternatives

Call Catherine on +44 (0) 20 7235 4622 or email conference@rina.org.uk
In recent years there has been a growing trend toward the adoption of liquefied Natural Gas (LNG) as marine fuel and consideration of other fuels as alternatives to the traditional marine fuel oils, driven by the introduction of new environmental regulations. Such fuels have different properties and as a result different storage arrangements need to be assessed for use with these fuels. Therefore, gas engines are different from oil engines in that they have no crankshaft, pistons and connecting rods. Instead of using it for generating electrical power, the hydrogen is used in a fuel cell for ship propulsion. The aim of Renewable Power Stations enabling Hydrogen Fuelled Shipping (the “System”) is to decimate carbon emissions and waste heat from shipping. This paper will describe the technical constructs and economic benefits inherent to this approach and how it can provide a more sustainable and competitive solution for shipping. Future research will be needed to assess the feasibility and technical viability of decarbonisation of the shipping sector, including the development of new technologies and policies to support the transition.
Towards Electrically Propelled Ro-Ro Passenger Fleet in the Adriatic Sea  
Maja Perčić, Ivica Ančić, Nikola Vladimir, University of Zagreb, Croatia

With the recent introduction of new requirements for ships energy efficiency within MARPOL Annex VI, as well as continuous rise of fuel price, there is a growing interest by both shipyards and shipowners to save the fuel. Even though the primary targets of the new regulation introduced by MEPC are large oceangoing vessels, the incentive to increase energy efficiency is emphasized for smaller vessels, especially those operating in short sea shipping, particularly ro-ro passenger fleet. The presented work focuses on the applicability of electric propulsion in this ship type, considering the operational requirements and the energy efficiency potential. Simulations of various vessel configurations are performed, considering different propulsion systems and operating conditions. The results show that electric propulsion can significantly reduce fuel consumption and emissions, making it a promising technology for this type of vessels.

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16:20 - 16:50 Modern Rotor Sail technology helps ships save fuel and reduce emissions - performance and experiences from recent installations  
Jukko Kurkela, Norsepower Oy Ltd, Finland

Norsepower’s modern Rotor Sails are pioneering auxiliary wind propulsion for the global maritime industry. The Rotor Sail is a modernized Flettner rotor which has proven its capability to reduce fuel consumption and emissions in real-world conditions. The system employs novel power management algorithms developed with Hardware-in-the-Loop (HIL) modelling techniques. Capable of interfacing energy storage with multiple power sources and leads, the algorithms seek to maximise overall efficiency by improving prime-mover operational envelopes, hence reducing emissions and fuel consumption of naval ships. The research aims to develop an Optimal Control Strategy (OCS) for hybrid marine power plants. The architecture of the research marine power plant is briefly discussed and a simple plant model is generated. The system is capable of operating in the highest fuel economy zone, without compromising overall performance. Finally, the applicability of the proposed OCS is validated through real-time simulations with a number of test cases using a HIL simulation platform.

15:00 - 15:20 Coffee

Chris Watts, Babcock International Group, UK

An Agile Power Management System for marine vessels is presented by a Babcock-led consortium with the University of Warwick (WMG) and Potenza Technology Ltd. The aim of the consortium is to develop an optimised energy management strategy to enable first-class marine vessels to achieve maximum operational efficiency, compliance with the latest guidance and legislation for marine applications. The system approach is novel due to its ability to utilise all the power sources available, allowing interconnection of the power management system, addressing operational envelopes, hence reducing emissions and fuel consumption of naval ships. The research aims to develop an Optimal Control Strategy (OCS) for hybrid marine power plants. The architecture of the research marine power plant is briefly discussed and a simple plant model is generated. The OCS is developed based on a novel fuel consumption minimisation considering the system states, such as generators’ fuel consumption and dynamics, battery state of charge and power demands. The generators can be used to charge the batteries when power demand is low and then this battery energy can be deployed as necessary during periods of high power demand. Thus the generators are able to operate under optimal operating conditions, conserving fuel and lowering emissions. The system is capable of operating in the highest fuel economy zone, without compromising overall performance. Finally, the applicability of the proposed OCS is validated through real-time simulations with a number of test cases using a HIL simulation platform.

15:50 - 16:20 Investigation of Auxiliary Power Potentials of Solar Photovoltaic Applications on Dry Bulk Carrier Ships  
Wanda Saidyleigh, Aykut I Ölçer, Raphael Baumler, World Maritime University, Sweden

The increase in world seaborne trade over the past decade due to global economic and population expansion has resulted in a corresponding increase of world shipping fleet with even greater size and power requirements. The bulk of the ships use cheap and widely available fossil fuels, mainly oil for operation but which has deleterious effects on the environment. In the shipping sector, the International Maritime Organization (IMO), responding to the global call to reduce greenhouse gas emissions from international shipping, has adopted technical and operational measures. These are to ensure efficient energy management on ships and have led to the application of many innovative technologies including the use of renewable energies and alternative fuels on ships to minimize fossil fuel consumption and reduce emissions. In this paper, we present a case study of the application of solar technology which utilizes a universal, renewable energy resource on the largest ship type in international shipping. In this research, we focus on investigating the potential of Solar Photovoltaic technology on dry bulk carriers using a developed methodology based on Levelized Cost of Energy concept as the basis for comparison. The results of this research can be used to guide decision makers about the potentials of Solar Photovoltaic technology on dry bulk carriers in general whilst its developed methodology may be useful in the specific context for determining which ships and under what circumstances solar PV would be an optimal option.

Nicko van der Kolk, Giovanni Bordogna, Paul Desprairies, TUDelft, the Netherlands

Wind-assisted propulsion for commercial ships is again attracting attention as a response to increasingly stringent environmental regulations. It also represents a market tool for voyage optimisation and an economic analysis to demonstrate commercial viability. The case study is performed for a trans-Atlantic route, with both EU and US markets in mind. The presentation will also describe Norsepower’s Rotor Sail design and applicability for various ship types and operational envelopes, hence reducing emissions and fuel consumption of naval ships. The research aims to develop an Optimal Control Strategy (OCS) for hybrid marine power plants. The architecture of the research marine power plant is briefly discussed and a simple plant model is generated. The OCS is developed based on a novel fuel consumption minimisation considering the system states, such as generators’ fuel consumption and dynamics, battery state of charge and power demands. The generators can be used to charge the batteries when power demand is low and then this battery energy can be deployed as necessary during periods of high power demand. Thus the generators are able to operate under optimal operating conditions, conserving fuel and lowering emissions. The system is capable of operating in the highest fuel economy zone, without compromising overall performance. Finally, the applicability of the proposed OCS is validated through real-time simulations with a number of test cases using a HIL simulation platform.

17:00 - General Discussion & Drinks Reception

mm and may be subject to change
POWER & PROPULSION ALTERNATIVES FOR SHIPS

23rd January 2019, RINA HQ, London, UK
To register, simply complete all sections of this form and return it with your payment to:
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I am unable to attend the conference, please reserve me _____ set(s) of Conference proceedings

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*VAT: VAT will not be charged on any cancellation fee issued irrespective of the country the delegate resides in. Delegates from outside the UK may be entitled to reclaim this cost.

VENUE

The venue for the conference is: RINA HQ, 8-9 Northumberland Street, London, WC2N 5DA, UK

EVENING DRINKS RECEPTION

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ACCOMMODATION

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A number of sponsored places at this conference are available for Student Members of RINA. For more information, please contact Nick Cox, Professional Affairs, RINA on Tel: +44 (0)20 7235 4622 or e-mail: membership@rina.org.uk.

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If you are interested in any of these promotional opportunities please contact John Payten at JP Media Services, jpayten@jpmediaservices.com to discuss your individual requirements.

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