

Efficient Shipping in the Greenhouse Gas Era

Friday, October 23, 2.30p -4.30p

Moderators

Keith Michel, Herbert Engineering Corp.

Bruce Russell, Marine Lead, International Council on Clean Transportation

Mitigation of climate change through reduction in CO₂ emissions will require a global effort affecting all industries. Although shipping is a highly efficient mode for transporting cargo, expansion of international trade arising from globalization has led to substantial increases in CO₂ emissions from ocean shipping. IMO is progressing towards a mandatory CO₂ design index to be applied to new ships. Meanwhile, the maritime industry continues to seek and refine methods for improving fuel efficiency and the environmental performance of ships.

At this panel session, presentations will cover the background to CO₂ emissions from shipping and the work being done at IMO, explore the challenges in developing effective design practices to achieve desired emission reductions, and review some of the innovative energy efficiency developments being deployed by one of the world's leading shipowners.

The first presentation will provide background on scientific assessments of impacts of CO₂ emissions on climate change, international policy initiatives to reduce greenhouse gas emissions, and the design and operating indices now under development at IMO. This will include an overview of the various enforcement mechanisms (cap and trade, fuel levy, etc.) being discussed at IMO. This overview on climate changes and greenhouse gas emissions from ships will be presented by **Phil Grossweiler** of M&H Energy Services. Phil recently served as an ASME Congressional Fellow, providing input to Congresswoman Heather Wilson on energy security and climate change related issues.

A.P. Moller-Maersk is embarked on a comprehensive program of technical and operational measures with the goal of making the APMM fleet the most environmentally friendly while ensuring cost effective operation. Energy efficiency enhancement technologies are targeted at both retrofitting of existing vessels and standards for new ships. Developments include new types of propellers, drag reduction, automated control of prime movers, and waste heat recovery systems. Operational measures such as ultra low load steaming, hull cleanings, ballasting optimization, and voyage planning are being implemented. The performance of vessels is carefully monitored, providing feedback on the success of the various measures. This wide ranging program is presented in the technical paper, "An integrated approach towards cost-effective operation of ships with reduced GHG emissions", co-authored by a team from Maersk Maritime Technology division (**Jan Otto de Kat**, Bo-Cerup Simonsen, Soren P. Arnberg, Palle B. Laursen, Lars R. Pedersen, and Jacob Buus Petersen).

As a contribution to SNAME's Ad Hoc Panel on Greenhouse Gas Emissions and Ship Efficiency, the American Bureau of Shipping and Herbert Engineering Corp. are co-sponsoring a study to assess the effectiveness of the proposed IMO Energy Efficiency Design Index (EEDI) in encouraging optimization of design. The paper, "Design Optimization to Mitigate CO₂ Emissions", summarizes the first phase of this study. The paper is co-authored by **Kirsi Tikka** and Yoshi Ozaki of ABS, and John Larkin and Keith Michel of HEC. A parametric series of designs of containerships, oil tankers, and LNG carriers are evaluated. The impact of design variations on CO₂ emissions is analyzed.

These include changes to principal particulars, service speed, deadweight, and propulsion plant configuration (ex. single screw vs. twin screw, redundant systems). The influence of these changes on the calculated EEDI, on the projected level of CO₂ emissions, and on *required freight rate* provide an indication of the effectiveness of the EEDI in encouraging cost-effective reduction of CO₂ emissions.