Leading the way; Making a difference

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MARENER
International Conference on Maritime Energy Management

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INTERTANKO

International Association of Independent Tanker Owners

INTERTANKO

Members
Lead the continuous improvement of the tanker industry’s performance
Strive to achieve the goals of:
ZERO fatalities
ZERO pollution
ZERO detentions
Deliver the highest quality services to meet their stakeholders’ expectations
Promote the availability and use of personnel with the best marine skills and competencies
Tanker Shipping

complex jobs, machinery & equipment, difficult environments
expectations constantly adapting

Technology Development
Rules and Regulations
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**Environmental Concerns**

- **Life Cycle:** Newbuilding, Decommissioning, Recycling
- **VOCs:** Volatile Organic Compounds
- **CO2/GHG:** NOx, SOx, PM
- **Noise**
- **Loss of containment**
- **Ballast water**
- **Whales**
- **Biofouling**
- **Toxic Antifouling**
- **Solid Waste**
- **Waste water**
- **Slops**

**Quality Tanker Shipping**

Zero Fatalities, Zero Pollution, Zero Detentions

**Greenhouse Gas Emissions**
- CO₂
- Methane etc.

**Marpol Annex VI**

Air Emissions
- SO₂
- NO₂
- PM
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SOx Emission Limits & ECAs

January 1st 2012, Global Sulphur limit 3.50%

August 2012, US & Canada Sulphur limit 1.00%
Global Cap 0.50%

ECA Limit 0.10%

Emission Reductions

Energy Efficient Designs & Operations

Lower fuel consumption per tonne-mile

Cheaper Operations & Reduced Emissions
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GHG Emission Reductions

- IMO - EEDI (new buildings) & SEEMP (all ships)
- SEEMP - no target for GHG emissions reduction
- Amend MARPOL Annex VI additional technical & operational measures to improve efficiency of ships in operation

Three step phase-in legislation
Phase I – data monitoring, reporting and verification (MRV)
NOW UNDERWAY: IMO rule development
EU regs adopted & enforced 1 July 2015
Phase II – trial period (verification of enforceability of target)
Phase III – enforcement
- Newbuilding Energy Efficiency Standards:
  - 10% BETTER IF BUILT IN 2015
  - 20% BETTER IF BUILT IN 2020
  - 30% BETTER IF BUILT IN 2025

- SEEMP = high improvement - 19% Reduction to global CO₂ emissions contribution in just 5 years

Fact:
CO₂ Emissions from Shipping reduced at much higher rate than landbased

Source: IMO 3rd GHG Study (2014)

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**Vessel Efficiency**

<table>
<thead>
<tr>
<th>SHIP RESISTANCE</th>
<th>Fuel Savings / Applicable Voyage</th>
<th>Yearly Fuel Potential</th>
<th>Combined</th>
<th>Potential Emissions Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hull/Propeller Optimization (CIPER)</td>
<td>1.5 %</td>
<td>8.3%</td>
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</tbody>
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<table>
<thead>
<tr>
<th>PROPULSION</th>
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<tbody>
<tr>
<td>Propeller Boss Cap Fin</td>
<td>5% (tiden passage)</td>
<td>15%</td>
<td></td>
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</tr>
<tr>
<td>Engine Data</td>
<td>2%</td>
<td>8%</td>
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<thead>
<tr>
<th>OPERATIONS</th>
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</thead>
<tbody>
<tr>
<td>Cargo Routing</td>
<td>20% where applicable</td>
<td>1.0%</td>
<td></td>
<td></td>
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<tr>
<td>Trim Optimization</td>
<td>1% (specific voyages)</td>
<td>0.2%</td>
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</tr>
<tr>
<td>Optimum Weather Routing</td>
<td>2% (trans-oceanic voyages)</td>
<td>0.8%</td>
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</tr>
<tr>
<td>Speed Optimization</td>
<td>20% (slow steaming on select voyages)</td>
<td>1.4%</td>
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</table>

From ship design (EEDI) to operations (SEEMP)

~140,000 tonnes of Fuel
~426,000 tonnes of CO₂

Source: TK
Initiatives to reduce emissions

Best practice guidance TEEMP

Co-operation between members and other stakeholders
- Company TEEMP
- Voyage optimisation
- Propulsion resistance management
- Machinery optimisation
- Cargo handling optimisation

Virtual Arrival

- Reduce emissions by adapting vessel speed to terminal slots
- Uses inefficiencies in the market, but does not affect the market
- Reduces port congestion and contributes to improve safety

Co-operation between OCIMF and INTERTANKO
Executive Summary

The study investigates the CO₂ emissions and other relevant data collected over a five-year period from 11 “identical ships”, namely ships:

- built according to the same design
- built by the same shipyard
- operated by the same ship management company
- having similar systems for measuring and obtaining data.

These ships have same Estimated Index Values but they have variable operational performance as expressed through their annual EEDIs. Since these ships are identical and operated by the same ship operator, they do represent a unique opportunity to better understand their CO₂ emissions and to identify the impact that some important environmental, commercial and contractual factors have on their operational performance. To that extent, this study provides direct measurable challenges and data to determine a simple methodology to assess the operational efficiency of a ship.

The data collected reveals a poor relationship between individual ships’ total annual CO₂ emissions and their EEDI values. In one case, the ship with the highest amount of CO₂ emissions over one year was also the ship with the lowest (lowest) EEDI.

Up to 64% of the variation in EEDI values is due to contractual factors such as speed, total amount of cargo carried and the share between laden and ballast voyages. The remaining 36% of the variability on the EEDI values could be attributed to the environmental conditions (sea state and the climate in which the ship operated), the commercial conditions (fuel, nature of cargo, the fuel price of fuel used at the