Possibilities for Radical Decrease of GHG Emissions

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Can a Digital Disruption in shipping lead to radical decrease in GHG emissions?
At NAPA we help to improve the Technical and Operational performance of safe ships.
**Technical Performance**

- Focusing on technical capabilities of the ship:
  - Hull form and propulsion machinery
  - Energy saving devices and equipment
  - Maintenance of the ship

- Affects the fuel consumption and GHG emissions over the life cycle of the ship

- Double digit reduction in GHG emissions and fuel consumption is reality
20 % REDUCTION OF CONSUMPTION WHEN OPTIMIZED FOR REAL OPERATIONAL PROFILE

Reference:
DESIGN OPTIMIZATION FOR OPERATIONAL PROFILE – WHAT CAN BE ACHIEVED FOR BULKY HULLS?
J Henrichs & al, Energy Efficient Ships, 4th November 2015, Rotterdam, The Netherlands
A 7 % Case for a modern bulk carrier

- Longitudinal study of operational profile of modern bulk carrier
- Very modern and technically high performing design
- Most of the time the ship operates very far from the design point!
- 7 % “too high” GHG emissions over the entire lifecycle

Deep and early co-operation unlocks this potential
Operational Performance

- Defined as operational performance of the shipping company
  - Utilization of cargo capacity
  - Scheduling of ship
  - Routing of ship
  - **Voyage Execution**

- **Affects the fuel consumption of a individual ships voyage**

- Double digit reduction in GHG emissions and fuel consumption is reality (emissions / transported cargo)
Big differences in performance indicates big potential

- Ships with same level of Technical performance show **huge differences in Operational Performance**
- Up to one third of the emissions of a bottom performer is due to his level of Operational Performance

Reference: Haifeng Wang and Nic Lutsey, _Long-term potential for increased shipping efficiency through the adoption of industry-Leading practices_, 2013
What if even the best can still improve? How much?
Example Voyage - not a bottom performer
10% off from Optimal

• The voyage was optimized retrospectively by:
  • Creating a detailed model of the ship
  • The speed along the route was optimized

• Taking into account:
  • Wind, waves and currents
  • Loading of ship
  • Water depths
Why is the value chain this inefficient?
### Inefficient Ecosystem

The current state of Marine and Shipping Ecosystem is very

- complex
- fragmented
- has parties with conflicting interest
- hides inefficiencies

**Reference:** Positioning Report

Analysis of the current marine industry structure and a vision for a renewed marine industry ecosystem

*Abo Akademi University 2015 – REBUS Program*
Example: Excess 42 000 tons of CO2 and 7 000 000 USD

Ship owner:
- Pays for hull maintenance
- Pays performance penalty

Cargo owner:
- Pays for fuel
- Does not have access to accurate analysis

Calculated at 61.8 rpm

Power loss index

EntryTime

Normalized data
- Power loss index
-1 std
+1 std
Maintenance
The possibilities are there, if we are ready to change

- Most of that data is still proprietary and confidential
- Open data is increasing all the time for the benefit of the whole value chain and our climate
- Inertia of the maritime ecosystem is huge. It will change gradually or in one burst by an outsider

Global VLCC Fleet since December 1st 2016
Summary

• Monumental possibilities for increased efficiency and decrease of GHG emissions exists
• Scattered reporting and paper-based logs still mainstream
• Conflict of interest and sub optimization increases inertia in the ecosystem
• IT and Data enablers for Efficiency in Shipping Value Chain
• Open and transparent information will be the game changer (bringing shipping closer to a Perfect Market)!
It is not IF, but HOW and WHEN we will have the BIG CHANGE