Fuel Saving on Bulk Carriers

By

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• Scorpio Ship Management s.a.m is the technical arm of Scorpio Group

• 200 Nbs ordered from 2011; tankers, bulkers, gas carriers, containers

• 75 bulkers ordered ranging from Ultramax through Kamsarmax up to Capes

• All NB vessels have enhanced fuel efficiency design/features
Ship opportunities: Eco Ship

Fuel Efficiency

- Hull form
- Propeller
- Main engine
- Hull roughness
- Fuel efficiency devices
Ship opportunities: Eco Ship ➡ Fuel Efficiency

- Reconsideration of main dimensions and service profile
- Service speed, block coefficient, bulbous bow
- LCB position/form factor, wave resistance, wake fraction
Rw/Rt % decreases → entrance angle increases, bow volume increases, Lcb moves forward, lower friction resistance, better wake field aft.
Lower and stable wake fraction positively influences propeller efficiency and reduce noise and vibration.
Ship opportunities: Eco Ship

Fuel Efficiency

- Higher diameter $\rightarrow$ higher efficiency
- \( \frac{Ae}{Ao} \), improved cavitation design moving out from standard wing profiles
- Tip rake or winglet for limiting the tip vortex effect
- Modification of radial pitch/area distribution (skew, 3 blades)
Propeller

Tip rake on pressure side

Better distribution of areas where ↑ efficiency increases

Wing profile fine tuned for improved ← cavitation
Moving along constant ship speed curve toward lower revs/higher propeller D, power req. decreases due to overall higher efficiency of the propulsion system.
Ship opportunities: Eco Ship

⇒ Fuel Efficiency

- Balance between lower SFOC and lower revs
- Electronic control (injection timing and injection profile)
- Engine tuning (ECT, EGB, VTA) and type (gas engine/scrubber) depending by service profile and percentage in ECA
- Super long stroke for better coupling with high dia propellers
- Challenges: matching of new propeller curve with engine load diagram
Selection of proper engine tuning basis service profile including percentage in ballast as opposed to laden might improve SFOC by 5 g*kW/hr (3%)
Ship opportunities: Eco Ship

Fuel Efficiency

- Silyl acrylate, Biocide free, Low friction post silyl acrylate
- Friction resistance account for 65% of total resistance for large low speed tankers/bulkers
- Target reduction of hull roughness to below 50 microns and the maintenance of it through the 5 years service life
Ship opportunities: Eco Ship

Fuel Efficiency

- Duct (Mewis or other) to ameliorate wake field
- Pre/post swirl device (fins, PCBF, twisted rudder) to recover rotational energy
- Full spade rudder to reduce hull resistance
- Rudder bulb to reduce losses due to propeller cap vortex
Ship opportunities: Eco Ship

→ Fuel Efficiency

- Frequency controlled electric consumers
- Waste energy recovery (economizer for DDGG)
- Electric fuel/oil heater
Overall Results and Conclusions: EEDI

**Efficiency of Transportation**

**CO2 Emission Reduction**

SBI prospective energy efficiency design index - IMO required

- Hudong kmax: -17.80%
- Mitsui umax: -19.41%
- Chengxi umax: -22.56%
- Imabari umax: -20.34%
- Nygz kmax: -21.11%
- Nacks/Dacks umax: -21.76%
- SWS kmax: -15.33%
Offen Group

Offen Group is one of the leading ship managers/owners and providers of shipping services worldwide.

Manager of 111 vessels (own & third party)

- 73 containerships (450,000 TEU)
- 26 product tankers
- 11 capesize bulkers, 1 Kamsarmax
- Overall 8.7 Mio. tdw.
- Average age of all vessels: 6.7 years
- Existing charter contracts until 2027
- Contracted Charter over USD 4 bn
Offen Tankers/ Bulkers are dynamic growing, first class shipmanagers

26 tankers
- 16 Handymax (8 Scorpio)
- 10 MR (2 Scorpio)
Overall 1,108,600 tdw
Average age: 3.8 years

12 bulkers
- 11 Capaesize (7 Scorpio)
- 1 Kamsarmax (1 Scorpio)
Overall 2,062,000 tdw
Average age: 1.9 years
Offen Bulkers

Offen Tankers

Work Safety

Wages

Working Hours

Carbon Footprint

NOx, CO₂, SOx

Emissions

SEEMP

Tier III

EEOI

ECAs

Environmental issues

SEEMP
Energy saving – What to do?

- Identify Potentials
- Smart Data Collection
- Link to existing Data
- New Hardware, like Flowmeters
- Data Transmission, Software
- KPIs
- Crew Training
### Voyage Information

- **Vessel**: STI Wembley
- **Voyage Number**: 1501
- **Voyage Leg**: 1

### Departure Info

- **Departure Date**: 12/01/2015 19:00
- **Departure Port**: Tuapse
- **Dep. Country**: Russia

### Arrival Info

- **Arrival Date**: 14/01/2015 13:00
- **Arrival Port**: 
- **Arr. Country**: 

### Charterer Info

- **Charterer**: Stena Weco
- **Agent**: Sealine

### Cargo Info

- **Cargo**: Gasoil
- **Quant**: 30000
- **State**: 

### Crew Info

- **Master**: Gusev Sergei
- **Chief Eng.**: Cvetkovs Valeris

### Agreed Consumptions

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### Agreed Speed (Knots)

| Value | 13  |