MARITIME

Ballast-free concept designs

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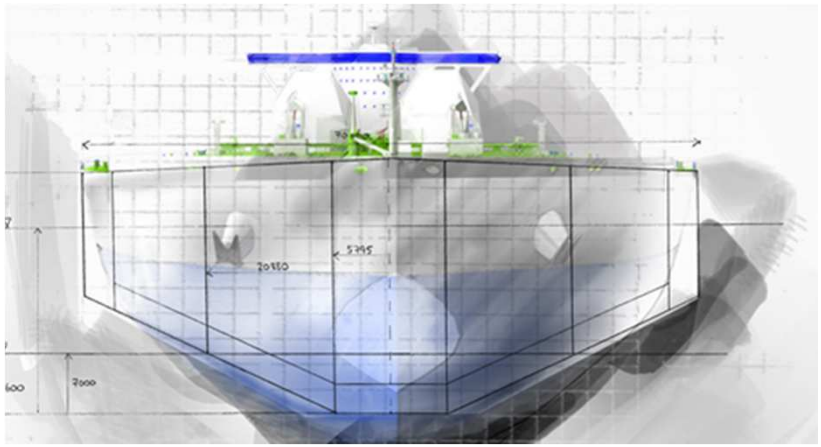
The ideal world of ballast-freedom

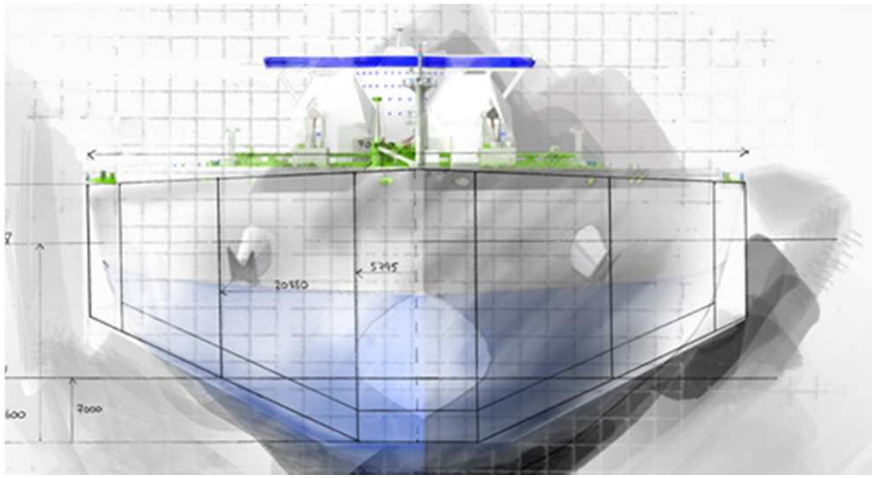
- Carry less or no ballast water
- Less complexity compared to BWTS
- No corrosion, no coating expenses
- Fuel savings promised up to 20%
- Corresponding less emissions to air
- Higher return speed potential
- Green branding

Main design characteristics

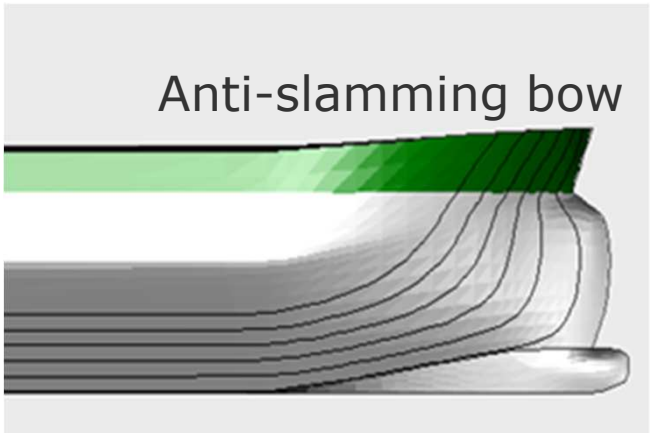
- Prismatic hull to enable bow and prop immersion
- Longitudinal tanks to neutralize bending moments during loading and discharging



The VLCC Triality concept

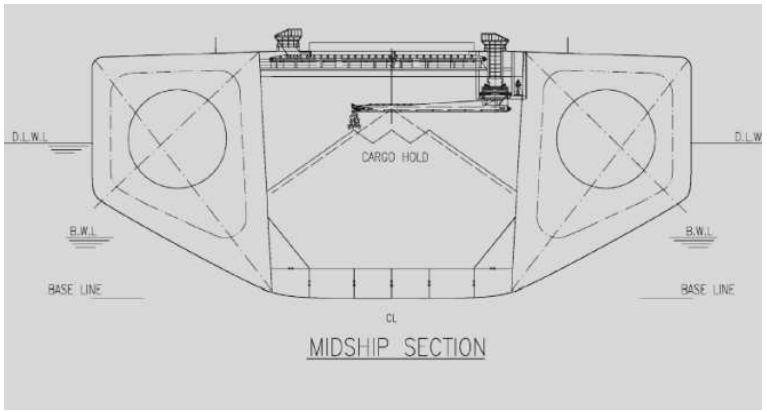


- 30% less energy consumption in empty condition (compared to a ballasted VLCC)
- 15% average fuel savings annually (conservative)

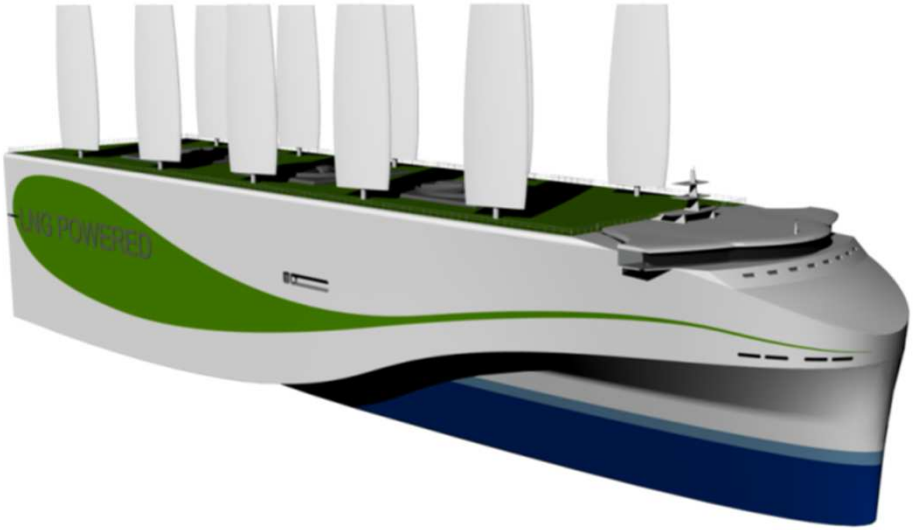


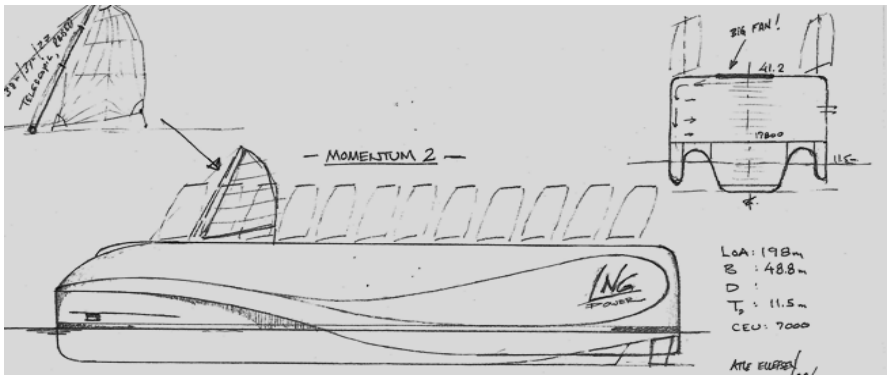
Ballast-free bulk carriers – the Ecore concept

- Shallow draught Very Large Bulk Carrier: 250,000 TDW, **ballast need reduced by 30%**
- Wider beam, self-unloading gear, to control bending moments, **V-shaped hull**
- Less steel weight and ballast capacity = **6.5% energy savings**



Ballast-free car carriers: the Momentum concept





- **Momentum reduces its resistance by 19.5 % at 50% payload**
- **Reduction of resistance when partially loaded ensures fuel efficiency in all loading conditions**

Comments

- To achieve ballast-freedom, we have to design our ships differently from what we do today
- There are no technological barriers against building ballast-free ships
- Compared to ships of equivalent main dimensions, ballast-free ships will have higher building costs and deviate from current yard comfort zones
- Different ship types will have different solutions (depending on volume or weight-dominated cargo, speed, itinerary)
- Explore all modern hull design optimisation methods to reduce ballast if not eliminate
- If materialized, Cost / benefit analysis of a ballast-free solution benchmarked against a BWTS solution needs to be case by case

Concluding remarks

Innovation

explore ideas and concepts which "break the mould" to come up with sustainable designs which comply with up-coming regulations while ensuring safety, operability, cost-competitiveness

Collaboration

Leadership

DNV GL

advantage through innovation

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