



大连船舶重工集团有限公司
DALIAN SHIPBUILDING INDUSTRY CO., LTD.

DSIC Research and Design on Less Ballast Water Ships

Bao Yan/Senior Engineer
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SUMMARY



DSIC OVERVIEW

Embracing Centennial Success
Forging World Class Shipyard

CORE BUSINESS

MILITARY SHIPS

*CIVIL SHIP
NEWBUILDING*

HEAVY INDUSTRY

*SHIP REPAIRING
AND
SHIP RECYCLING*

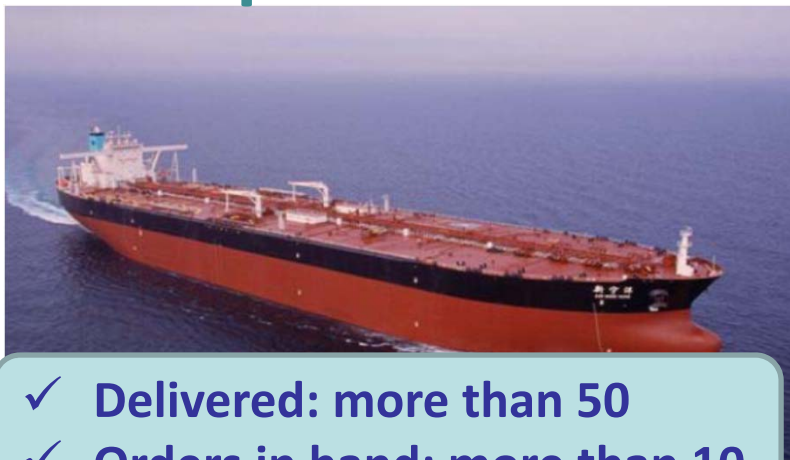
*OFFSHORE ENGINEERING
AND
CONSTRUCTION*



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DSIC OVERVIEW

VLCC Experience



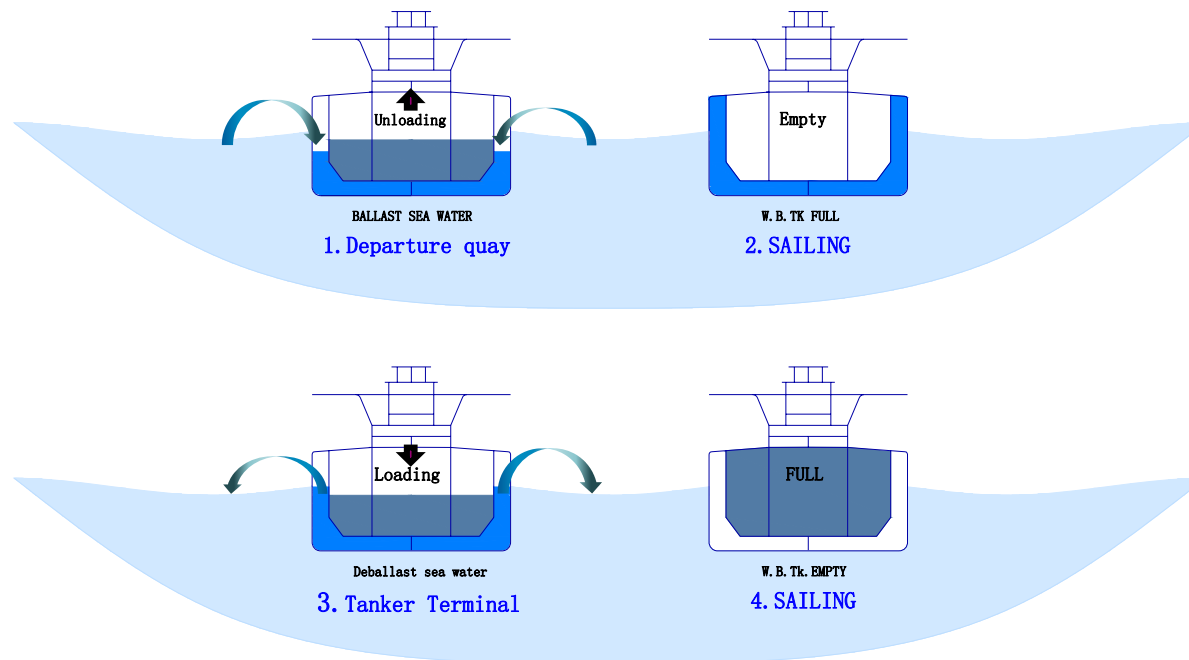
- ✓ Delivered: more than 50
- ✓ Orders in hand: more than 10



Ideas of Less Ballast Water Ships

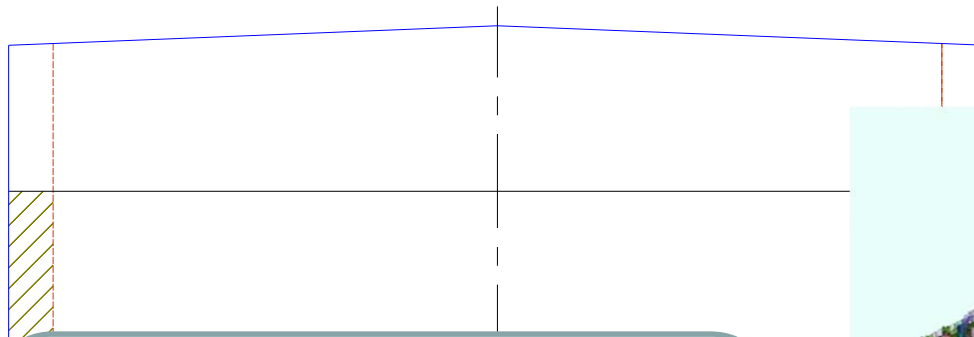
Disadvantage of Ballast Water

- ✓ The invasion of ballast-spread species;
- ✓ Energy loss in ballast water transporting.

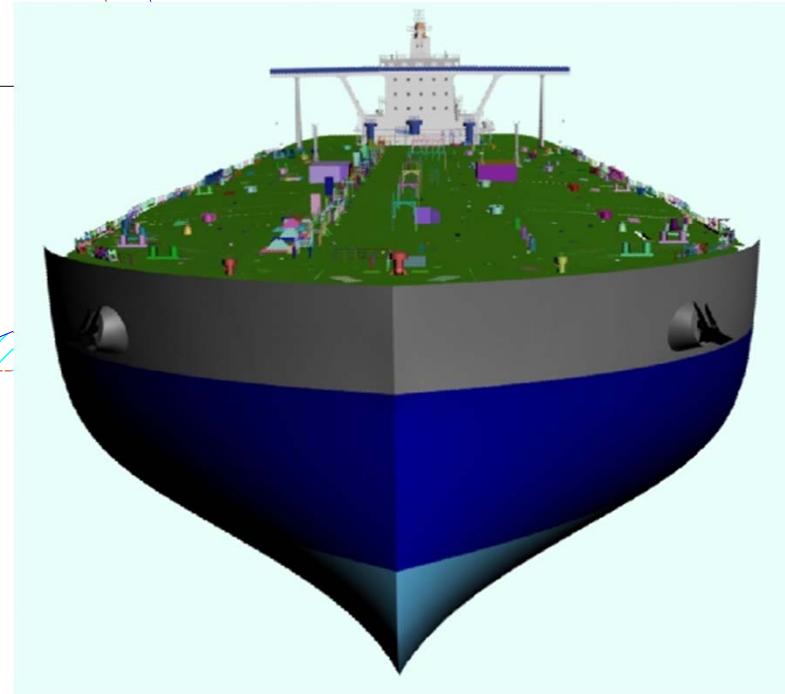


Ideas of Less Ballast Water Ships

Inclined Bottom with Narrower Flat Part



- ✓ About 50% ballast water can be reduced
- ✓ More energy can be saved in ballast condition sailing
- ✓ All the current rules and regulations are fulfilled
- ✓ Feasibility for construction



VLCC Solution

Capacity & Deadweight

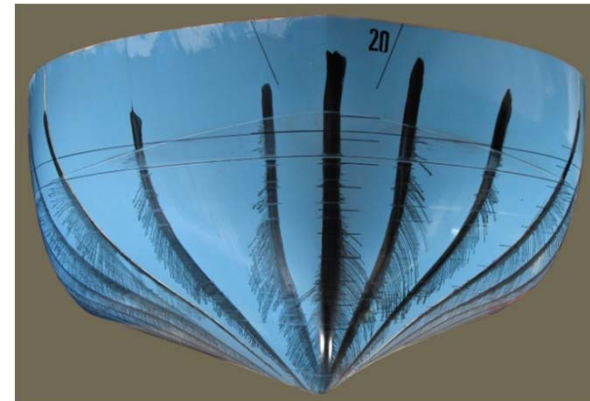
| Capacity & Deadweight | | |
|-----------------------------------|--------------------------|--------------------------------|
| | Conventional VLCC | Less Ballast Water VLCC |
| COT Capacity (m3) | 354,000 | 357,000 |
| WBT Capacity (m3) | 100,000 | 50,000 |
| DWT at Scantling Draft (t) | 320,000 | 320,000 |

VLCC Solution

Hull Form Optimized and Model Test

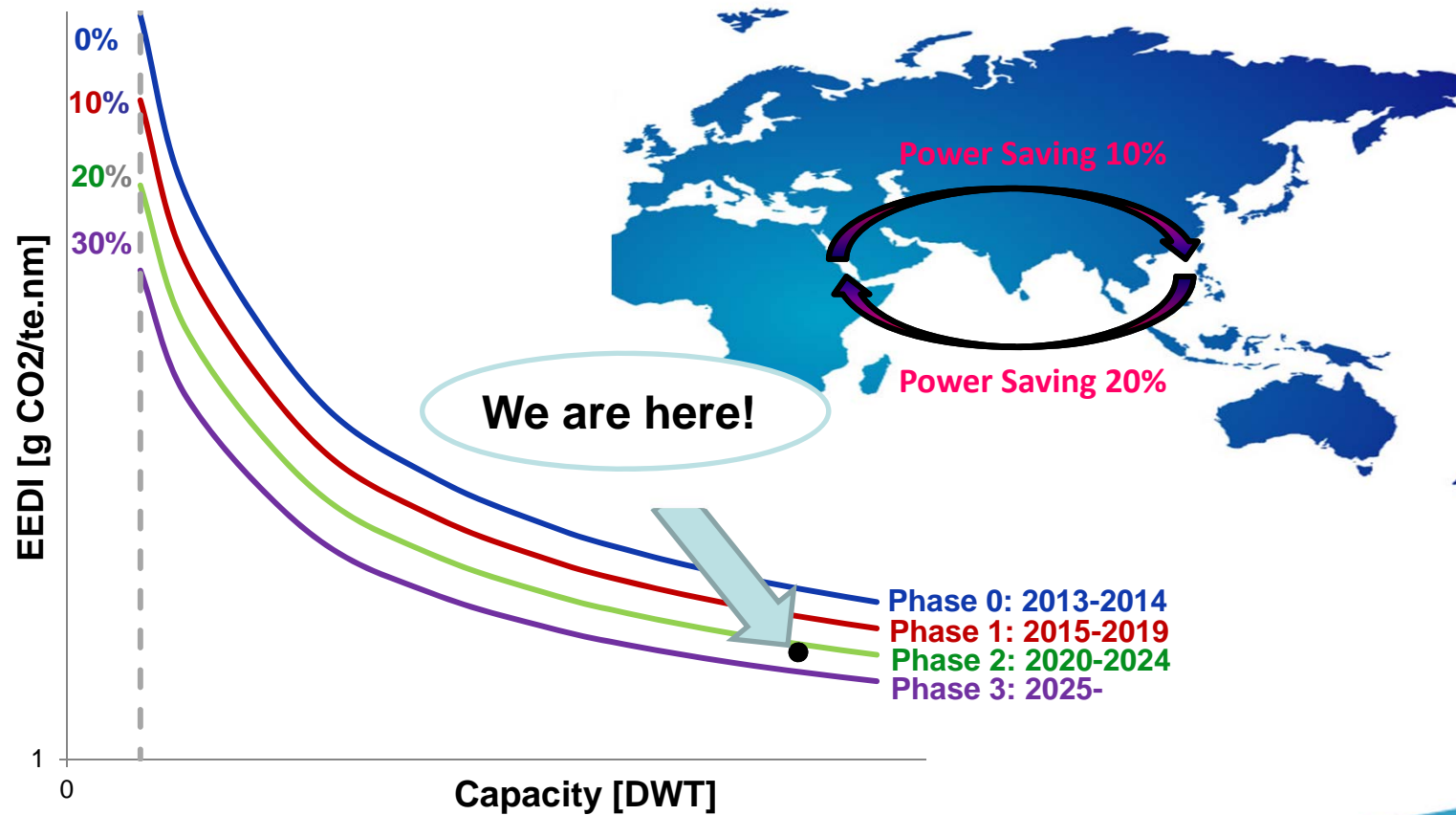


✓ Lots of research works and model test have been done



VLCC Solution

EEDI & Power Saving

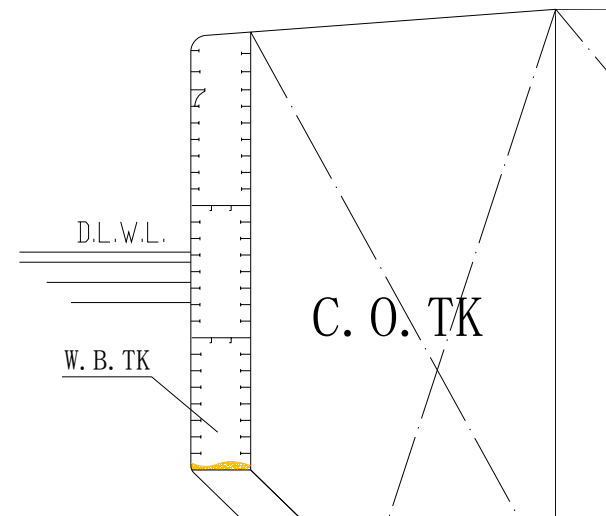
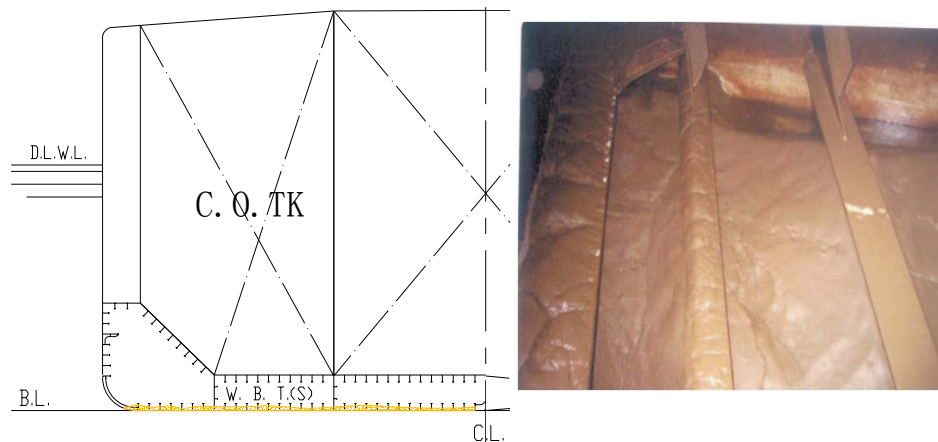


Less Ballast Water Ships—VLCC

Tank Arrangement

Conventional VLC

- tank arrangement result in sedimentation;

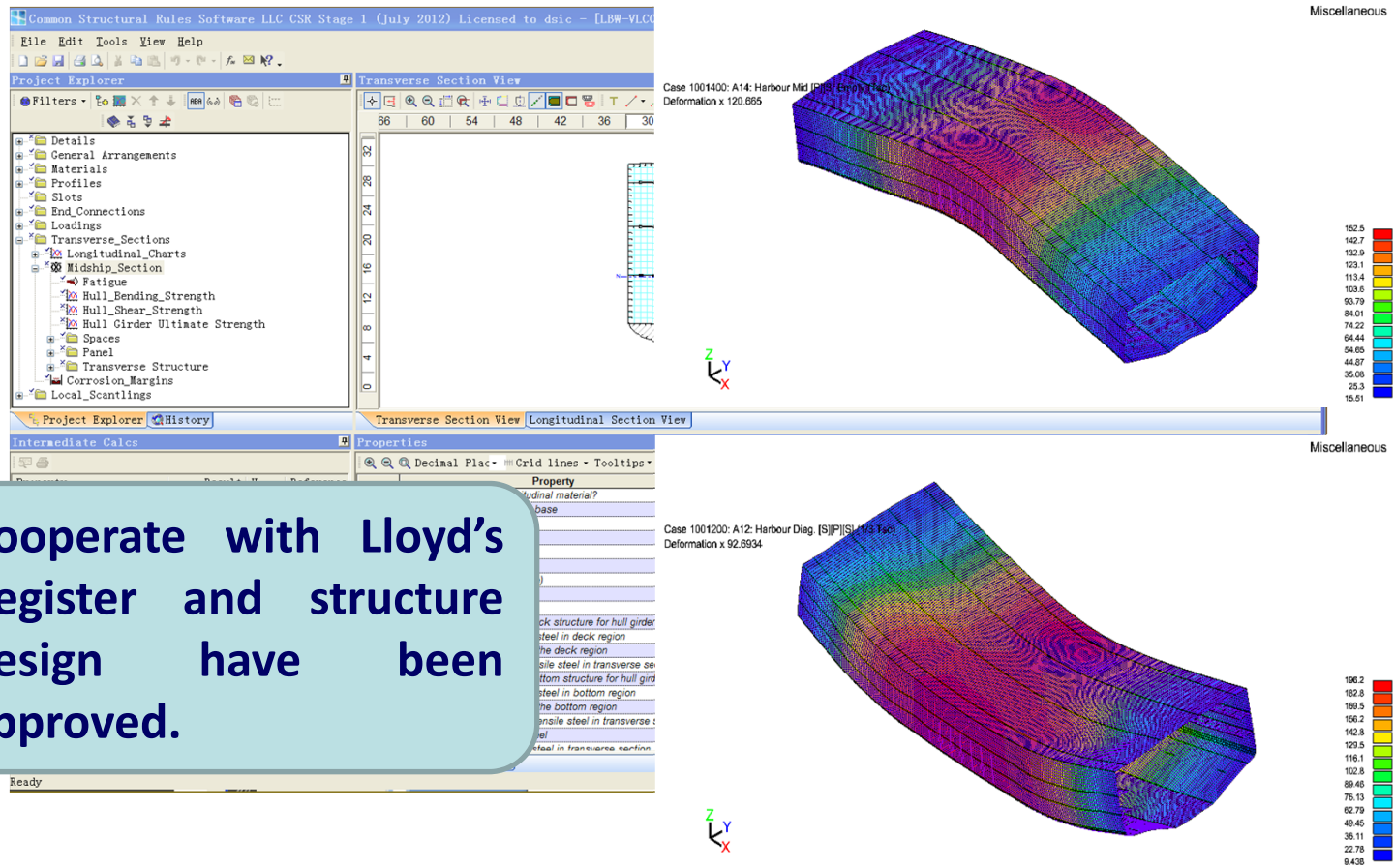


Less Ballast Water VLCC

- ✓ Only wing water ballast tanks to be arranged;
- ✓ Flat bottom of ballast water tank to be used;
- ✓ Easy for cleaning.

VLCC Solution

Approved Structure Design



Cooperate with Lloyd's Register and structure design have been approved.

VLCC Solution

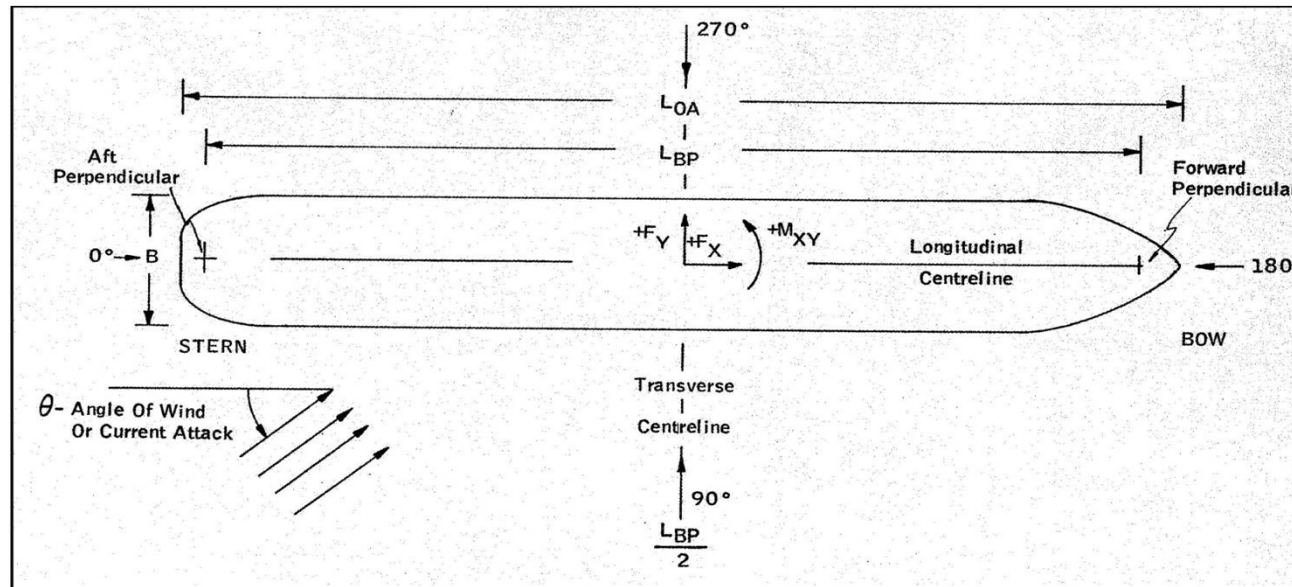
The Feasibility for Load and Unload

- ✓ Method of SPM
- ✓ Port marine loading arms also can be used



VLCC Solution

The Feasibility for Mooring



Typical MBLs of Steel Wire Rope is similar to conventional VLCC.

Summary

✓ Total Volume of Ballast Water: Reduced 50%.

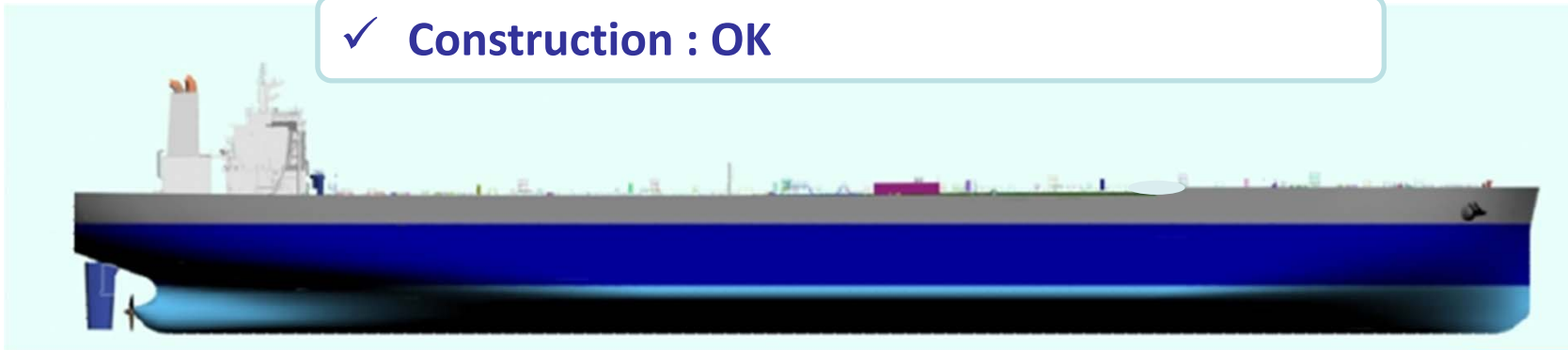
✓ Rules and Regulations : OK

✓ EEDI : Phase 2

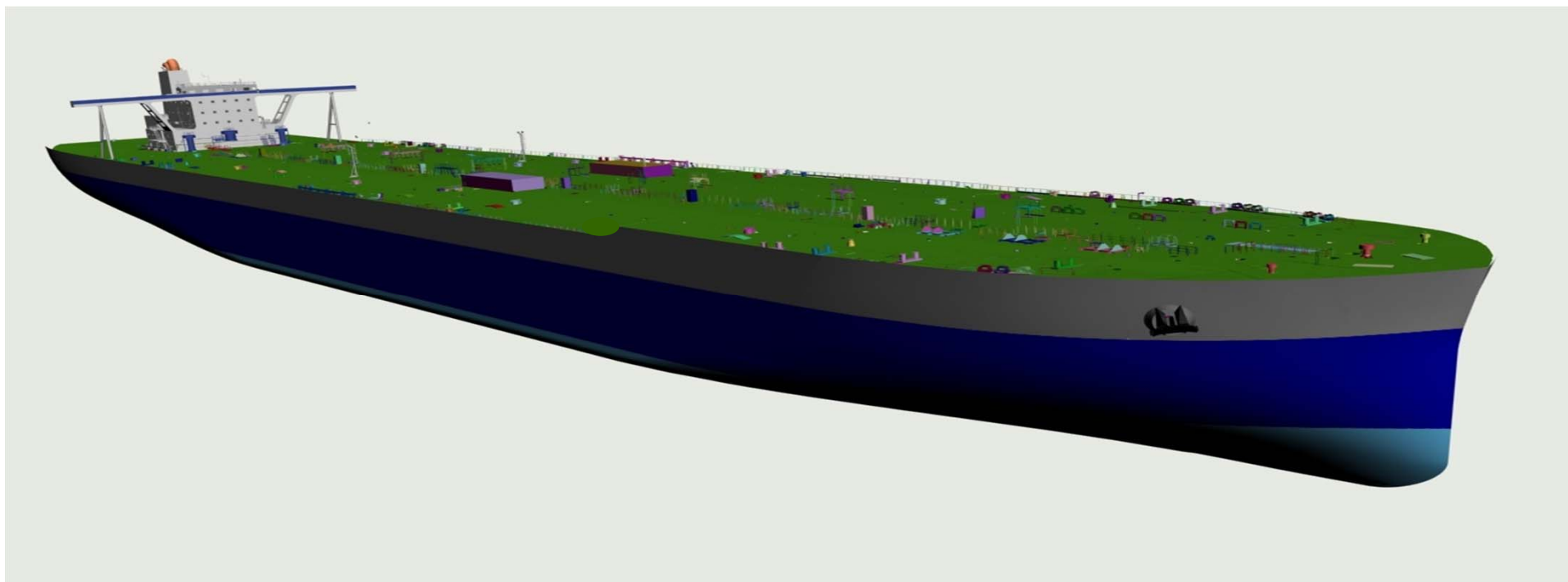
✓ Maintenance: Easy for cleaning

✓ Operating : OK

✓ Construction : OK



THANK YOU FOR ATTENTION!



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