The Next Generation of Offshore Construction Vessels

Andrew Loh
Wärtsilä Ship Design Singapore

Agenda

- Introduction of Wärtsilä Ship Design
- Overview
- OCV Design Trends
  - Case studies

Wärtsilä Ship Design chosen for offshore maintenance vessel

Wärtsilä Corporation, Press release, 5 April 2016 at 11 am EET

Wärtsilä has been awarded the contract to provide the design for a new jack-up lift vessel. The contract was signed in March with a well known Chinese yard and there is an option for three more vessels. The Wärtsilä design is developed in collaboration with Altis, a consultancy company specialising in the lift boat market.
"Wärtsilä was chosen to design this new series of vessels because of our expertise, as well as our strong track record in the offshore market. Furthermore, our global engineering and project development services mean that we can be a valuable local partner to both the yard and the owner," says Riku-Pekka Hägg, Vice President, Ship Design, Wärtsilä Marine Solutions.

The 70.5 metre long vessel can accommodate 250 people and will be capable of operating in water depths of up to 75 metres. It is scheduled for delivery to the customer in September, 2017.

Wärtsilä to supply ship design for new type deep water dive support vessel

Wärtsilä Corporation, Press release, 17 February 2016 at 9.30 am EET

Wärtsilä has signed a contract with Shanghai Bestway Marine Engineering Design Co Ltd to design a new type of deep water dive support vessel. The ship is to be built for China state-owned Shanghai Salvage Bureau (SSB), one of the largest professional salvage companies in China. The contract with Wärtsilä was signed in January.
"For a complex vessel design such as this involving the needed sub-sea equipment, both extensive experience and broad know-how are absolutely essential. Wärtsilä was selected because of our strengths in both these areas. This contract highlights once again the value of the proven, sophisticated, and integrated system designs that Wärtsilä produces for the global marine market," says Riku-Pekka Hägg, Vice President, Ship Design, Wärtsilä Marine Solutions.

"The new vessel will certainly be the most sophisticated asset in our fleet. It will carry out operations in very deep waters and in often difficult conditions. We believe the Wärtsilä design will meet all our requirements for successful operations," says Mr Huang Yan, Director of Deep Diving Technology Development Center, SSB.

WÄRTSILÄ SHIP DESIGN

GLOBAL PRESENCE

- Global strategic footprint to meet customers' demands
- Close to the customer anywhere
- Proven track record with over 4,000 vessels built, including the most advanced offshore construction and LNG powered ships

OUR SERVICES

OUR SERVICES

WÄRTSILÄ

WÄRTSILÄ SHIP DESIGN SERVICES

- Support throughout the design process:
  - Complete design package Initial + Basic + Detailed design
- Design consultancy
  - Concept Design
  - Feasibility studies
  - Conversions
  - Retrofits
  - Upgrades
  - Modifications

OUR SERVICES

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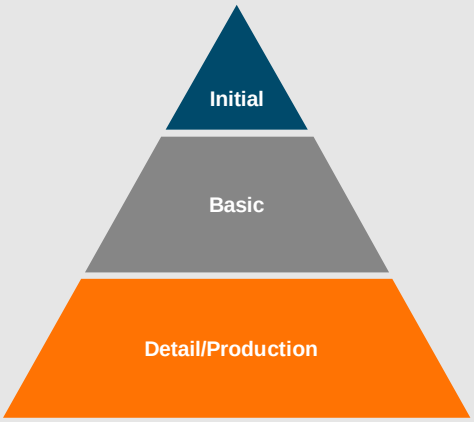
COMPLETE DESIGN PACKAGE



1. Initial Design
   - General arrangement
   - Building specification
   - Hull form and hydrodynamics
   - Stability
   - Lightship
   - Structural arrangement
2. Basic Design
   - Structural drawings
   - Arrangement drawings
   - Ship common systems
   - Final stability
3. Detail Design
   - Production design
   - NC cutting info
   - Spool drawings
   - Coordination drawings

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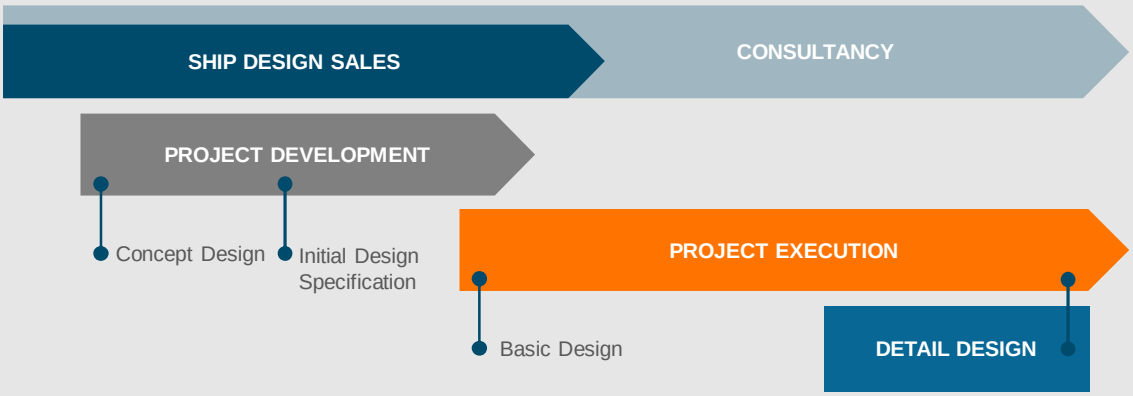
THE SHIP DESIGN PROCESS



OUR SERVICES

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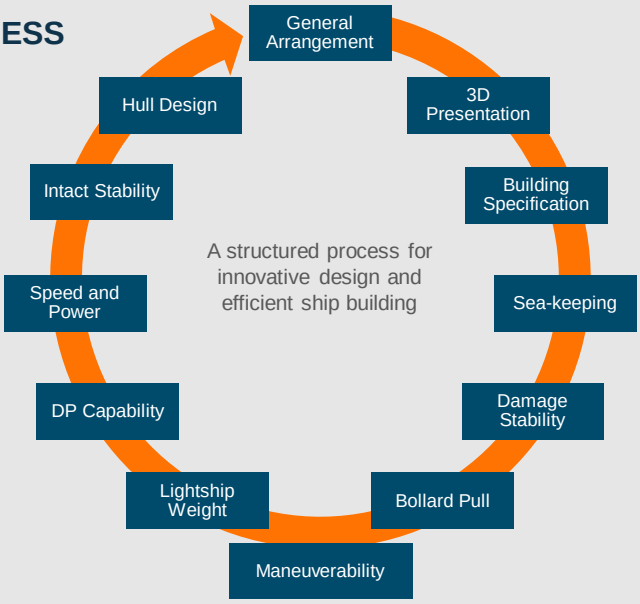
DESIGN PROCESS



OVERVIEW

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Offshore Construction Vessel during current times of low oil prices

- The current challenging environment has driven charter rates down.
- The installation bases of offshore infrastructures are ageing with over half of the facilities now close to or beyond their original design life.
- Inspection, maintenance and repair (IMR) vessels would be required.
- Long term vessel charters given out with an overview of requirements/activities. Vessels are matched with activities for such a campaign.

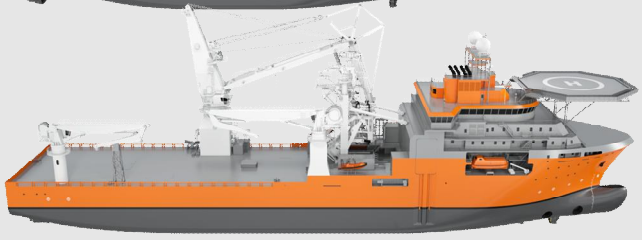
DESIGN TRENDS

OFFSHORE CONSTRUCTION VESSELS 90-160M

Offshore Construction Vessel Design Trends

- VS 4202 OCV
- LOA: 90m, B=21-22m
- 60-150 t AHC crane
- 60-90 men
- ERN (99, 99, 99, 99)
- 2 x WROV
- 800 m2 deck
- 7,2 x 7,2 moonpool

- VS 4228 OCV
- LOA: 125 m, B=25m
- 150-250 t AHC crane
- 110-120 men
- ERN (99, 99, 99, 99)
- 2 x WROV
- 1400 m2
- 7,2 x 7,2 moonpool



- VS 4285 OCV
- LOA: 160 m, B=32 m
- 400-900 t AHC crane
- 120-140 men
- ERN (99, 99, 99, 99)
- 2 x WROV in hangar
- 2500 m2 deck
- 7,2 x 7,2 moonpool
- 4000-7000 t carousel

Offshore Construction Vessel Design Trends

- Drive to make vessel Multi-Purpose. Designed for flexibility.
- Vessel design being made modular where certain sections can be changed out to suit the charter needs.
- Use of PSV with large deck area as a Lite Construction Vessel.
- Vessels getting sophisticated;
  - ➢Dynamic positioning system – at least DP class 2.
  - ➢Diesel electric, hybrid, advance systems to reduce fuel consumption.
- Future considerations;
  - ➢Duel Fuel. Vessel running on LNG.
  - ➢Operation in Emission Control Areas.

GEOTECHNICAL RESEARCH VESSEL – HAI YANG SHI YOU - 708

- Primary
  - Derrick
  - Crane
- Secondary
  - Under deck capacities
  - Deck area
  - Accommodation
  - Helicopter deck
  - DP redundancy

PIPELAYING VESSEL PLV – DEEP ENERGY

- Primary
  - Lay system layout
    - Reels
    - Tower
    - Cranes
    - Plets
  - Speed
- Secondary
  - ROV
  - Helideck
  - DP redundancy
  - Accommodation

INSPECTION, MAINTENANCEAND REPAIR – NORMAND SUBSEA

- Primary
  - ROV
  - Moonpools
  - Deck area
  - Speed
- Secondary
  - Helicopter deck
  - Vessel motions
  - DP Redundancy

Case Study

Heavy Construction Flexlay Vessel - Seven Arctic

SEVEN ARCTIC – HCV UNDER CONSTRUCTION AT HHI

- Primary
  - **900 t crane**
  - Lay system
  - Deck area
- Secondary
  - Speed
  - Helicopter deck
  - Vessel motions
  - DP Redundancy

SEVEN ARCTIC – HCV UNDER CONSTRUCTION AT HHI

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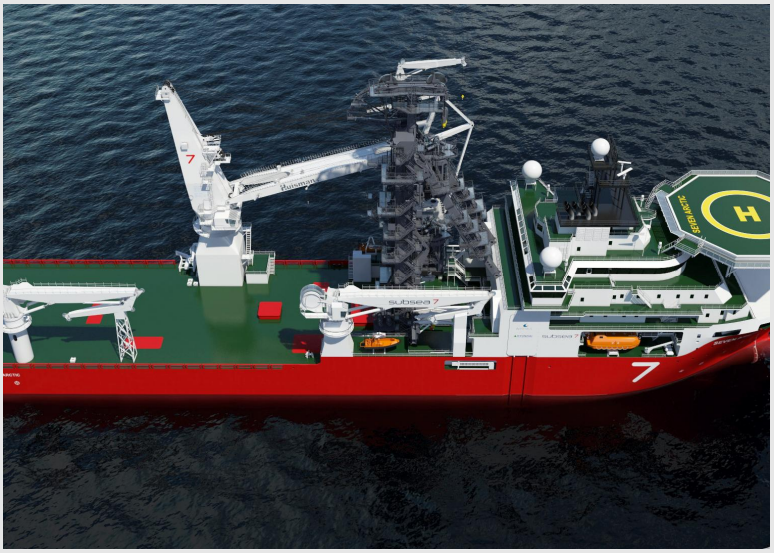

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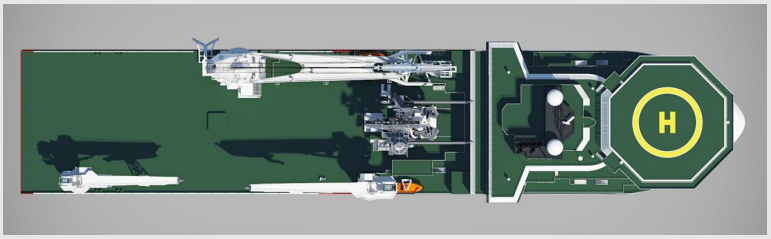

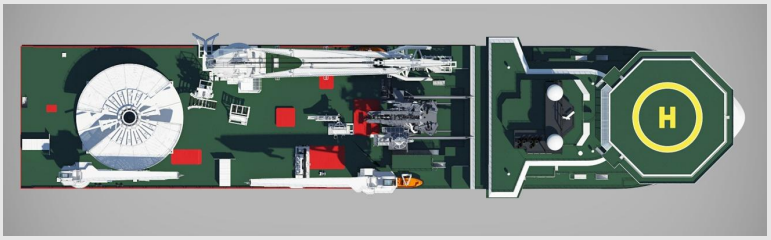

THANK YOU

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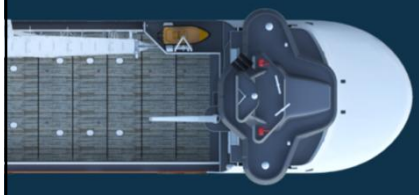

Andrew Loh
GM- Sales
Mail: andrew.loh@wartsila.com
Singapore

WSD SELF-ELEVATING MULTI-PURPOSE LIFT BOAT / WORKOVER UNIT

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Design Highlights

- Designed to operate in open waters or alongside fixed offshore platforms up to a max 75m water depth.
- Targeted operating area such as offshore China, Middle East, Asia and Gulf of Mexico.
- Capable of supporting various offshore operation including maintenance, repair, upgrades, removal of seabed structures and lite well intervention.
- Self-propelled with DPS-2 capability.
- Heavy lifting capability of 200MT.

Key parameters

Loa:	70.50 m
Breadth:	40.0 m
Speed:	6 knots @ 3.7m draft
Cargo Deck area:	1200 m^2
Accommodation:	250 persons

DIVING SUPPORT AND PIPELAYING VESSEL VS 4235PLCV

WÄRTSILÄ

Main functions

- Salvage operations
- Diving support for 24 divers
- Heavy lift to deep water
- General subsea construction
- Multilay capabilities
  - Rigid pipelay
  - Flexible pipelay
  - Umbilical lay
  - Cable lay
- ROV operations

Key parameters

Loa:	177.0 m
Breadth:	32.0 m
Depth:	13.5 m
Speed:	15.0 knots
Deck area:	2600 m^2
Accommodation:	180 persons

Other information

SPS code, Construction moonpool, DP 3, DNV / CCS class.
Owner: Shanghai Salvage and Towage
Designer: Wärtsilä Ship Design in cooperation with Shanghai Bestway Engineering
VS no: 5120