WÄRTSILÄ

WÄRTSILÄ **Ship Design**

Engineering Services
Hydrodynamics

PRODUCT LEAFLET

Wärtsilä Ship Design offers various hydrodynamic engineering services, including Computational Fluid Dynamics (CFD) calculations, Seakeeping calculations, DP-related calculations and Propulsion System optimisation. These are essential when developing a new design or planning a retrofit.

SHIP DESIGN ENGINEERING SERVICES

Wärtsilä Ship Design's engineering services offer support throughout the entire project; from the initial evaluation phase and tendering, during the entire design phase, and on to the vessel's construction and delivery. We offer a full project scope, from simple vessel modifications or equipment integration, to a complete full-scale project.

For complete projects, Wärtsilä Ship Design can handle everything from Front End Engineering and Design (FEED), through class and flag approvals, all the way to engineering the installation and supervising the construction.

HULL/PROPULSION OPTIMISATION

In order to achieve the highest possible efficiency and lowest possible fuel consumption, the ship's hull and propulsion system need to be fully optimised. Our designs are based on extensive experience gained over several decades and from the use of both model testing and full scale sea trials. The latest developments in simulation technology also allow for the use of Computational Fluid Dynamics (CFD) to predict performance and to recommend potential areas for improvement, already at a very early stage of the design process. Such a unique combination of expertise and experience with CFD simulations enable us to shorten the development cycle, while providing a more efficient hull and propulsion system than was previously attainable.

DYNAMIC POSITIONING

For vessels where it is essential to remain within specified positional limits, Wärtsilä Ship Design ensures that the design incorporates Dynamic Positioning capabilities for both normal and failure scenarios. We make it possible to achieve the highest DNVGL Environmental Regularity Number (ERN) and the best Lloyd's Register Performance Capability Rating (PCR).

We arrange the correct dimensioning and optimal layout of the thrusters taking into account the vessel's operational profile. This is based upon calculations, including:

- Dynamic Positioning capability plots
- Calculations of wind, wave, current and/or additional forces (pipe laying, mooring, etc.)
- Static allocation calculations
- Requirements for DP Class 1, 2 and 3
- Power utilisation calculations

SEAKEEPING

For a vessel to be able to operate effectively in the most challenging conditions, its seakeeping capabilities must be first class. To ensure that, Wärtsilä Ship Design utilizes a number of dedicated tools, such as:

- 2D strip theory RAO's calculations
- Potential theory RAO's calculations
- Wave diffraction RAO's calculations (CFD)
- Short and long-term Statistical analysis of ship's response in 6-DoF
- Calculations for different points of interest on the vessel (cranes, winches, etc.)
- Operational limits analysis
- Survival accelerations

CONSULTANCY

Wärtsilä has provided marine consultancy and ship design services for more than 50 years, and thus we have both the experience and the in-house know-how needed to help our customers to make the best decision for the benefit of their businesses.

SERVICES SUPPORTING THE ULTIMATE DESIGN SOLUTION

High quality ship designs can only be achieved through the use of the latest technologies and the most advanced design tools. Wärtsilä's leading global position in this field is the result of decades of experience backed up by the use of the latest methods, including Computational Fluid Dynamics (CFD). Our field of expertise includes:

- Design, analyses and optimisation of pumping systems
- NORSOK Standard C-004/CAP-437 helideck safety analyses
- Winterization studies
- Exhaust gas flow/dispersion analyses
- Thermal and thermodynamical analyses
- Ventilation analyses
- Design, analysis and optimisation of heating arrangements (e.g. heating coils, heat exchangers, etc.)
- General confined-flow analyses (e.g. flow through pipes, hull passages, valves, etc.)
- Mooring analyses

Fig.1 Wake fraction

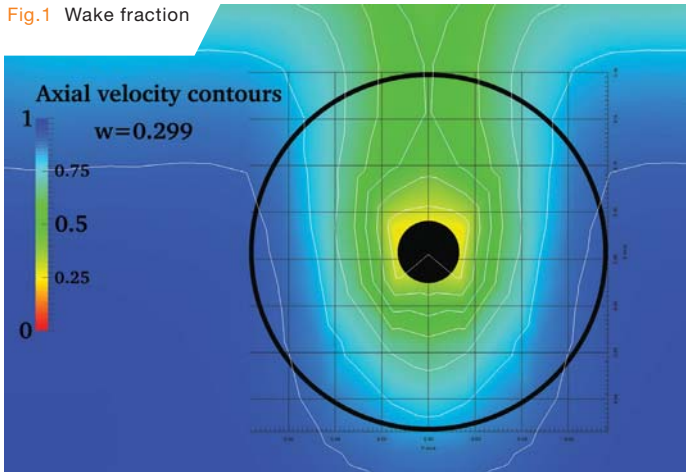


Fig.2 Free surface

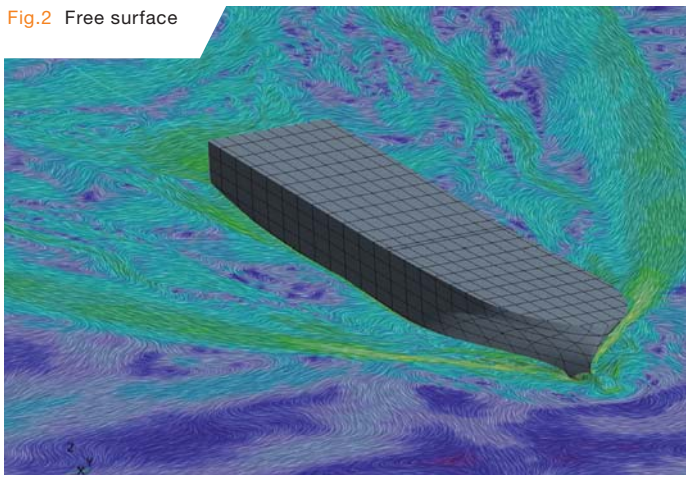


Fig.3 Pressure distribution

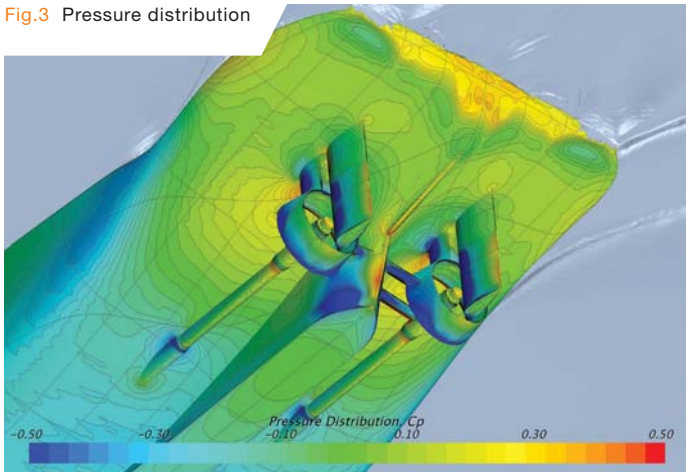
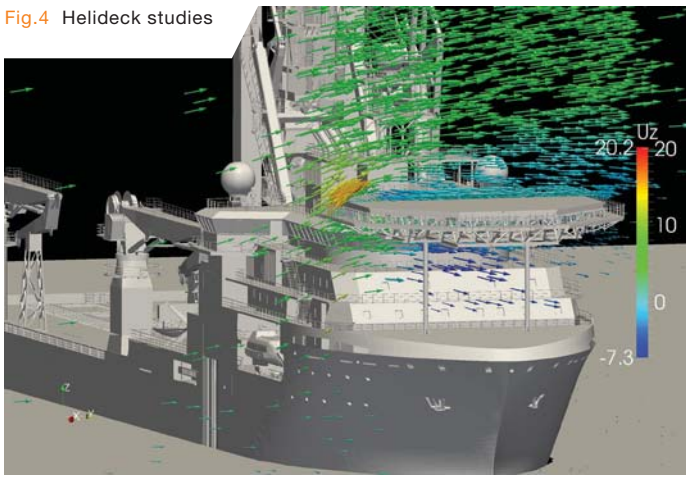


Fig.4 Helideck studies



wartsila.com/shipdesign **shipdesign@wartsila.com**

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