

WÄRTSILÄ

Propulsion Services



# WÄRTSILÄ PROPULSION SERVICES

Wärtsilä Propulsion Services cover the following:

- Delivery of original spare parts
- Propeller repair
- Worldwide field service
- Overhaul of all propulsion systems
- Retrofitting controls
- Retrofitting tunnel thrusters, steerable thrusters and controllable pitch propellers
- Propulsion improvement package
- Repair of propellers and seals (seal bonding included), also performed underwater
- Delivery of spare sub-assemblies, such as underwater removable parts, lower gearboxes and hubs.

Our philosophy is to serve customers throughout the lifecycle of their installation, from the first discussions during the design phase of a vessel to the end of its operational life. This means taking responsibility, rather than just supplying parts promptly or sending a maintenance specialist to fix a problem.

We provide complete propulsion and related systems services globally, covering both Wärtsilä and other manufacturers.



## PROPULSION SPARE PARTS

We supply all Original Equipment Manufacturer (OEM) parts for LIPS and Wichmann propulsion systems as well as for Deep Sea Seals and Japan Marine Technology shaft seal and bearing systems.

Our specialized spare parts staff takes care of all questions and requests regarding spare parts. We can also advise on materials required for system overhauls as well as on the emergency stock that should be stored on board a vessel.

Spare parts are available in the Wärtsilä warehouses. Special bearings, O-rings, gear sets and pre-machined parts are available at

these warehouses. Our goal is to ensure that the requested hardware parts are shipped within the shortest possible timeframe.

### SEALS AND BEARINGS

Wärtsilä is the world's leading supplier of marine engineered sealing, bearing and sterntube systems. Wärtsilä is the only supplier in the world to offer a full range of both radial and axial seal types, commonly known as face and lip seals for any type and size of ship, whether naval or commercial.

The products are reliable, efficient and easy to maintain through Wärtsilä's global service network. The range of seals, bearings and sterntubes is unequalled in the market.





## PROPULSION FIELD SERVICE

We have supplied different kinds of propulsion systems for decades. It goes without saying that a huge installed base of propulsion systems makes a dedicated service network essential.

Our field service philosophy is proactive - involving operation support, and preventive and predictive maintenance. Our extensive worldwide team of propulsion service

professionals enable us to provide outstanding field service support – anywhere, at anytime. Our goal is to reduce the downtime of a vessel to the shortest possible.

Wärtsilä puts together the technical expertise of our worldwide organization to meet the requirements of your business. You can expect your local Wärtsilä office to respond rapidly and to give immediate attention to all your questions.

Our 24-hour service help desk is manned by experts in the service industry, and is able

to solve minor operational issues by phone. In case of more complicated and time-consuming issues, they will arrange the attendance of a highly skilled field service engineer. The Wärtsilä field service engineer supervises at site or at ship repair yards and co-operates with the yard or independent companies in the industry. Our field service engineers undergo continual training to be ready to take responsibility for any maintenance task or repair, both mechanical and electronic.



## METALLURGICAL REPAIR

We can carry out various metallurgical repairs: welding, straightening, grinding, polishing etc. for both Wärtsilä installations and those of other manufacturers.

A propeller is a vulnerable piece of equipment that can be seriously damaged by underwater objects. For all propeller or propeller blade damage, we have a team of expert technicians at your disposal.

The propeller can often be repaired while still fitted on the shaft. This means that cutting and grinding can be carried out at ship repair yards, in dry dock or at pier side at trimmed position. The work can even be done offshore, depending on the weather conditions.

Besides repairs and standard cleaning of the hull and propeller we can also propose propeller modifications, calculated and designed by our hydrodynamic specialist:

- Diameter reduction
- Changing the pitch by twisting the blades
- Trailing edge cutting
- And last but not least a replacement propeller of a new design

## FLYING SQUAD PROPELLER REPAIRS

Wärtsilä has a worldwide group of class-approved welding technicians available to carry out propeller repairs at local ship repair yards all over the world. We are able to cut or straighten out distortions underwater in a way that keeps propeller efficiency as high as possible.

We have specialised toolboxes available at several main hubs around the world.

These containers are fully equipped with special developed propeller repair tools and consumables. Through this container we can:

- Reduce working time
- Operate independently of shipyards
- Reduce transportation time and costs

## UNDERWATER PROPELLER REPAIRS

We offer a full range of underwater repairs, an option that decreases the vessel's downtime and eliminates the need for dry-docking. We can perform comprehensive shop-quality propeller repairs underwater, including cold straightening of bent blades, removing damaged blade sections, calculating propeller mass balance in accordance with ISO class standards and establishing hydrodynamic edge profiles.

Repairs comply with classification rules and all major repairs are supervised by an experienced propeller repair specialist or under the direction of the hydrodynamic propeller design department.

For outboard shaft seals Wärtsilä has developed a unique procedure to replace the seals underwater with the standard OEM repair guarantee.



## SYSTEM OVERHAULS

Demand for overhauls of complete installations in the shortest possible time has increased over the past few years. Wärtsilä has its own repair specialists trained and experienced in overhauling complete installations with the shortest possible downtime for the vessel under OEM quality and warranty. They repair Wärtsilä controllable pitch propellers (CPP), steerable thrusters, side thrusters and water jets; everything from the oil distribution box to the entire installation, as well as overhauling CPP

hubs, bow thrusters and steerable thrusters from other manufacturers.

The Wärtsilä repair workshop has all the special equipment and specialists at hand, as well as most of the necessary spare parts in stock. It maintains close links with the engineering department and works according to classification rules.

An overhaul by Wärtsilä cuts overhaul times and gives guaranteed quality, reducing the risk of breakdown during operation.



## PROPULSION IMPROVEMENT

Fuel prices have risen considerably in the past few years, resulting in higher ship operating costs. To maintain the economic profitability of the vessel, Wärtsilä can provide a number of solutions to save fuel.

Propellers of more modern design along with grinding and repair, and modification of heavy running propellers offer considerable hydrodynamic improvement and an attractive return on investments.

Ducted propellers, and especially the Wärtsilä high efficiency nozzle, can increase free running propeller efficiency by 15%, with a payback period of 1 to 1.5 years.

Fuel saving devices are categorized on percentage of efficiency improvement:

### UP TO 5% IMPROVEMENT

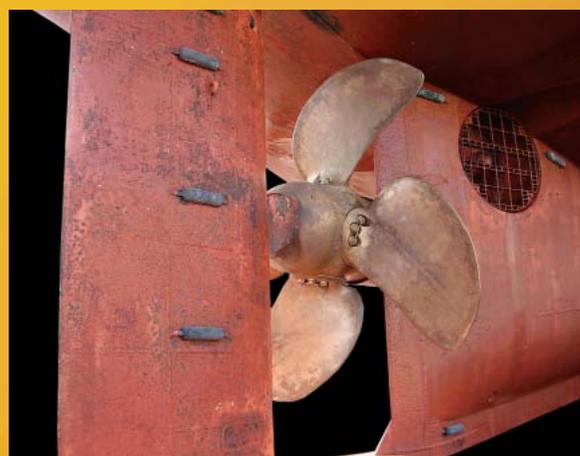
- Propeller polishing and/or repair of edge damage
- Propeller of more modern design

### UP TO 10% IMPROVEMENT

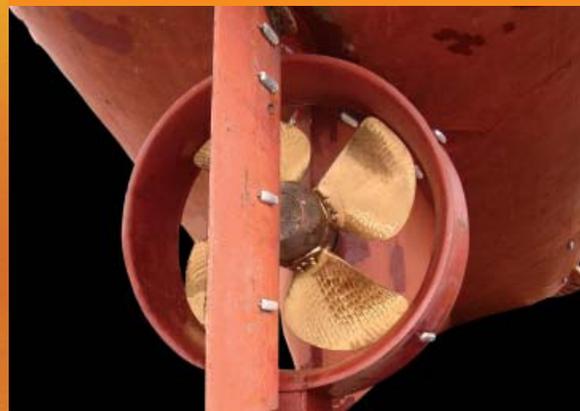
- Propeller of more modern design with increased diameter and low speed
- Efficient rudder
- Propeller - engine interaction

### UP TO 15% IMPROVEMENT

- Conversion of an open propeller to a ducted propeller



BEFORE



AFTER





## SYSTEM UPGRADES

### RETROFIT

After being in use for years, the elements of a system wear out and age, and spare parts become obsolete and scarce. This causes unexpected maintenance and repair periods, resulting in high operational cost and off hire.

A retrofit is an upgrade of an existing remote control system and/or an upgrade of the mechanical parts of the propulsion system. A retrofit optimizes the entire installation, resulting in better accuracy and an up-to-date system.

### CONTROL SYSTEM UPGRADE

A new remote control system can contribute to considerable savings:

- Decreasing fuel consumption by optimum scheduling of pitch and shaft speed
- Reducing maintenance costs by avoiding too quick loading and unloading of machinery for running-up/down
- Wave filter: more effective load control reduces wear of the engine and propulsor

We supply a full range of integrated control systems in line with IMO regulations and all classification societies. These are a compatible replacement system for all installed control systems.

Our control systems retrofit solutions are a single-source solution for all propulsion modes: controllable pitch propellers (CPP), water jets, steerable thrusters, transverse thrusters, rudder control system and joystick system. They are a tailor-made solution based on standardized components and with at least the same functionalities – reliable, easy to use and easy to install.

### MECHANICAL UPGRADES

Examples of mechanical updates are:

- Mechanical upgrade or replacement of the OD box
- Mechanical upgrade of pitch positioner
- Mechanical upgrade by means of new hub design and/or blade design
- Upgrade by means of high efficiency nozzle
- Upgrade of propeller shaft seals to environmental safe solutions
- Upgrade of hydraulic installations

## PROPULSION SYSTEM TRAINING

As a supplier of highly sophisticated propulsion and control systems, we are very aware of the importance of special training for the technical crews and maintenance engineers of vessels.

We offer you professional and very useful training courses run by a specialized team of experienced training engineers. These training courses are customized to meet your needs.

### IN-HOUSE TRAINING

We have a special training centre dedicated to training ship crews in the operation of our state-of-the-art controls systems. Groups usually of up to five people follow 3 - 5 day courses in mechanics or electronics. The courses are given on:

- LIPSTRONIC series of controls
- Hydraulic training specific for controllable pitch propellers, tunnel thrusters and steerable thrusters
- Gear box as part of CPP mechanical training
- LMP-FDT series of controls



### SPECIALLY TAILORED TRAINING PROGRAMMES

Our training staff can develop a custom-made training programme. Whenever possible crew members are offered specially tailored training related to the actual installation ordered.

### ON-BOARD

As an option, the training staff can also make arrangements for on-board training.

## FROM SERVICE TO SERVICES

Key customers have recognized us as their preferred service supplier – ensuring the availability and cost-efficient operation of their installations.

They benefit from having their entire power system and a full range of services provided by one global supplier.

We provide full service throughout the product lifecycle for both marine and power plant customers, and we are constantly developing our network and services worldwide. We are continually broadening our range of services and adding valuable products and specialist services to our portfolio. In this way we also support equipment onboard your vessel or at your installation, either by becoming the OEM or by providing non-OEM services in key ports.

Our lifecycle efficiency solutions are provided within the following services:

- Engine Services
- Electrical & Automation Services
- Propulsion Services
- Boiler Services
- Operations & Management
- Training Services
- Environmental Services

These services cover everything from basic support with parts, field service and technical support to service agreements and condition based maintenance; from installation and commissioning, performance optimization, including upgrades and conversions, to environmental solutions, technical information and online support.

The choice available to you extends from parts and maintenance services to a variety of comprehensive, customized long-term service agreements, including performance and operations & management agreements.

Our organization currently features over 11,000 dedicated services professionals in close to 70 countries.

Wärtsilä adds value to your business at every stage of the lifecycle of your installations. With us as your service partner, you receive consistently many measurable benefits such as availability, performance, productivity gains, and cost benefits. Above all, peace of mind in the knowledge that your installation is being serviced by the most experienced partner you could have – Wärtsilä.

**VISIT US AT [WWW.WARTSILA.COM/PROPULSIONSERVICES](http://WWW.WARTSILA.COM/PROPULSIONSERVICES)**



Wärtsilä is a global leader in complete lifecycle power solutions for the marine and energy markets. By emphasising technological innovation and total efficiency, Wärtsilä maximises the environmental and economic performance of the vessels and power plants of its customers. In 2009, Wärtsilä's net sales totalled EUR 5.3 billion with more than 18,000 employees. The company has operations in 160 locations in 70 countries around the world. Wärtsilä is listed on the NASDAQ OMX Helsinki, Finland.

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