



# WÄRTSILÄ SERVICES SINGAPORE

LIFECYCLE EFFICIENCY SOLUTIONS

ENERGY  
ENVIRONMENT  
ECONOMY

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WÄRTSILÄ

# WÄRTSILÄ SERVICES SINGAPORE



At Wärtsilä Singapore, we dare to innovate. In order to do so, it is vital that we keep abreast of the latest trends and developments in the marine, offshore and land-based industries in Asia Pacific and the rest of the world. Our strategic location in Singapore, one of the world's premier ship repair and ship conversion centres, gives us a distinct advantage.

Singapore is known to be a global leader in the building of jack-up rigs and the conversion of Floating Production Storage and Offloading units. It is also a niche player in the construction of customised and specialised vessels. The city-state is the

world's busiest container transshipment hub, receiving approximately 100,000 vessel calls a year. Moreover, with the increase in the world's demand of energy, land-based power plant services and products are set to increase.

Wärtsilä Singapore's well-developed capabilities combined with Wärtsilä's extensive network as a global leader in complete lifecycle power solutions set us apart as a total solutions provider for customers in the Asia Pacific region.

Read on to discover what our expertise can do for you.

**Ong Ban Leong**  
Managing Director and Senior General Manager  
Services, Wärtsilä Singapore

## WÄRTSILÄ SINGAPORE MILESTONES:

- + In 1982, Wärtsilä Power Singapore was set up as a joint venture with Keppel to market Wärtsilä engines in the Far East and to manufacture Vasa 22 engines
- + In 1986, Wärtsilä took over Keppel shares
- + In 1996, Wärtsilä merged with Sulzer Diesel
- + In 2001, Wärtsilä received certification of ISO 14001 Environmental Management System from Det Norske Veritas
- + In 2002, Wärtsilä received the Quality Class Award from the Singapore Productivity and Standards Board
- + In 2002, Wärtsilä acquired John Crane-Lips and Chuwac Engineering
- + In 2002, acquisition of marine business of MTQ and Ciserv Singapore Pte Ltd was established
- + In 2006, Wärtsilä acquired Total Automation which changed its name to Wärtsilä Automation Services Singapore
- + In 2006, Wärtsilä merged with Ciserv Singapore
- + In 2008, Wärtsilä acquired a leading naval architecture and ship design company, Conan Wu & Associates Pte Ltd (CWA), which subsequently changed its name

to Wärtsilä Ship Design Singapore Pte Ltd

- + In 2011, Wärtsilä acquired a leading seals and bearings systems manufacturer, Cedervall
- + In 2012, Wärtsilä acquired Hamworthy PLC and MMI Boiler Management Pte Ltd



## WÄRTSILÄ SINGAPORE IN BRIEF

Wärtsilä has been serving its clients in Singapore for more than 30 years. Wärtsilä Singapore Services unit has over 1,000 professionals working in Pandan Crescent, Benoi Crescent and Gul Drive, serving customers in the marine and power plant sectors.

We have three workshops in Pandan Crescent with a total floor area of 18,588 square metres for the engine servicing, overhauling, repairing and remanufacturing of marine 2-stroke and 4-stroke engines of all makes. In addition, we also have one workshop in Benoi Crescent for pumps and one workshop for Electrical & Automation services in Gul Drive which designs and builds control panels for marine, offshore and land-based industries.

A Global Logistic Centre in Benoi Crescent keeps a full range of OEM spare parts for Wärtsilä and other makes of engines as well as auxiliary and propulsion systems. We also have a wharf where we can provide mechanical engineering works and emergency repairs alongside.

With extensive workshop facilities and a highly trained and capable field services team, Wärtsilä Singapore can provide fast and efficient service 24/7, wherever needed.

Our approach and service delivery standards are based on adding value at every stage of our clients' business so that our customers can rely on us as a "Total Solutions" provider.

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# WÄRTSILÄ ENGINE SERVICES, SINGAPORE

## WORLD-LEADING ENGINE SERVICE EXPERTISE

Engine services have been the core of Wärtsilä's business for decades. The 280-strong Engine services team at Wärtsilä Singapore offers customers complete services for 2-stroke or 4-stroke engines and other engine types on the spot throughout the region.

We provide OEM services ranging from insitu machining, repairs, remanufacturing, technical support, retrofits and rebuilding to fuel conversions and environment solutions. We also offer basic and operational support, performance optimisers, environmental solutions and online support.

Our services for marine and land industries maximise the performance of equipment throughout the installation's life, enhancing the reliability, safety, availability and profitability of our customers' assets. Basic support includes OEM spare parts, field and workshop services anywhere in the world and technical services and training for all needs.



of recovering damaged crankshafts with crankpin diameters between 170 and 1020 millimetres as well as larger diameters, which are handled case by case.

Our insitu services include:

- **Machining of top and lower liner landings and on-site re-sleeving of worn down areas**
- **Removal of broken studs by drilling and machining**
- **Surface machining for flatness, for example, in turret, foundation blocks, etc.**
- **On-site welding and machining of main or auxiliary stop valves for power generation plants**
- **On-site machining of rudder taper bores and tail shafts**
- **Vertical boring on bearing pockets, pintle housing and bearing, rudder bearing housing, etc.**
- **Line boring on engines' main bearing pockets, turbine bearing pockets, etc.**
- **Milling works on pump foundations, rudder keyways, etc.**
- **Surface machining on pedestals, condenser covers, entablature landings, jackets and cylinder liners, etc. from 100 millimetres to 3.5 metres in diameter**
- **Stern tube boring works**
- **Engine crankshafts (main and crank pin journals) machining, grinding and super-polishing works**
- **Machining and reaming of coupling fit boltholes**
- **Honing works**
- **Laser alignment works**

### Remanufacturing services

Wärtsilä's remanufacturing services enable customers to achieve the maximum service life for their equipment without compromising on safety or reliability. We update older installations to meet today's technical standards, enhancing performance and allowing it to meet current regulations and requirements.

Our remanufacturing services include:

- **Components and parts remanufacturing**
- **Complete engine remanufacturing**
- **Exchange pool services with parts exchange service and sale of remanufactured parts and engines direct from our global stocks**

### Insitu services

Wärtsilä's extensive and effective range of insitu machining options get engines up and running again in the shortest possible time. We are capable

### Field services and parts

Our full range of field services include:

- **Commissioning**
- **Troubleshooting**
- **Insitu overhauling, repairs, machining, heat treatments and alignments**
- **Workshop overhauling, repair and components remanufacturing**
- **Retrofits and upgrading**
- **Complete engines remanufacturing**
- **Parts supply**

### Technical services

Our full range of technical services include:

- **Installation performance evaluations**
- **Lubricating oil, emissions and vibration analyses**
- **Investigations and wear analyses**
- **Vibration measurements and calculation analyses**
- **Material analyses**
- **Dynamic benchmarking and performance measurements**
- **Insitu and online troubleshooting with multimedia and telecommunications techniques**
- **Complete engine remanufacturing**
- **Technical support**
- **Fuel conversions**

Our workshops are equipped to remanufacture components as required and all Wärtsilä components and assemblies come with standard warranties.

Our engine services portfolio also includes maintenance at our at Pandan Crescent workshop with experienced personnel, dedicated equipment and good selection of spare parts in stock. Through Wärtsilä's E-Solutions, customers can conveniently access technical documentation and parts availability. In addition, we provide upgrades and retrofits to maximise performance and operational efficiency through the installation's life.

## WE PROVIDE A FULL RANGE OF OEM PARTS AND SERVICES FOR EQUIPMENT FROM:

- + Wärtsilä
- + Sulzer
- + DEUTZ marine engines
- + Nohab Diesel
- + Wärtsilä Diesel
- + GMT
- + Wichmann
- + SACM
- + Stork SW Diesel
- + Moteurs Duvant Crepelle
- + Nordberg
- + Poyaud
- + Bolnes



# WÄRTSILÄ ELECTRICAL & AUTOMATION SERVICES, SINGAPORE

## SUCCESSFUL AUTOMATION REQUIRES UP-TO-DATE SOLUTIONS

Wärtsilä's Electrical & Automation services in Singapore offers solutions and services for a wide range of power distribution, automation control and instrumentation systems. Our team of over 100 engineers services a global clientele in the marine, offshore, oil and petrochemical, power and utilities as well as gas storage and processing industries.

Wärtsilä Singapore's Electrical & Automation services combine the expertise of the country's two largest automation companies: Haven Automation and Total Automation.

As a result, our customers benefit from decades of experience in retrofit projects on various types of vessels; from tankers, FPSOs, LNG/C and drilling ships to pipe-laying ships and offshore support vessels. We are fully accustomed to working in shipyards under the most demanding conditions and within tight schedules.

Our extensive range of services includes on-site surveys, conceptual designs, feasibility evaluations, technical specifications, project management, production designs and class

approvals, component manufacturing, equipment supplies, manpower supplies, installations, commissioning, technical documentation and after-sales services.

In Singapore, our workshop is strategically located at Gul Drive, near Singapore's largest integrated shipyard.

Whether a job is simple or complicated, we listen to our customers, offering them tailor-made control system solutions that are safe and easy to operate. We stand out for our ability to troubleshoot and repair all types of control systems, while serving our customers 24/7.

Engineering and manpower resources are shared within Wärtsilä's Electrical & Automation services worldwide to offer customers top quality services. Our international network enables us to offer a consistently superior standard of technical expertise and responsiveness for our local, regional and global clients.



Our extensive list of references includes projects in China, Singapore, United Arab Emirates, United Kingdom and France serving customers such as Shell, BP, The Shipping Corporation of India, International Marine Transportation Limited, P&O Nedlloyd, Stolt Parcel Tankers, Golar LNG, MISC/Petronas, Keppel, MODEC Inc., SBM Offshore, McDermott, Maersk and Kuwait Oil Tanker.

### TECHNICAL EXPERTISE

Wärtsilä's Electrical & Automation services provide customers with a full scope of complex retrofitting and conversion projects in the technical areas of:

- + Design and implementation of new systems and retrofits
- + Project management
- + Turnkey projects
- + System integration
- + Technical sales (equipment and spare parts) / systems engineering
- + Manufacturing and assembly
- + Third party inspections
- + Instruments testing and calibration
- + 24-hour maintenance and repair services
- + Deployment of engineering skills to work on the high seas, offshore or on land-based sites

### CASE:

#### ON BOARD MAJOR HMI UPGRADE FROM PROTOOL PRO TO WINCC FLEXIBLE FOR WEST ALLIANCE

When the ballast control system (BCS) Human Machine Interface (HMI) of West Alliance failed in 2012, the experts of Wärtsilä Singapore's Electrical & Automation team were engaged to conduct repairs on board.

After a thorough investigation, the team uncovered the need to upgrade three HMIs with better WinCC software. They also supplied three HMIs with licenses for WinCC flexible. In addition to this work, necessary repairs on field equipment were carried out.

With less than a week to complete the repair, the team managed to bring the ship back to operation in time, within budget and without sustaining losses in production.



**“THE WORK DONE BY WÄRTSILÄ WAS HANDLED IN A VERY PROFESSIONAL AND COMPETENT MANNER. THIS INDUSTRY COULD USE MORE COMPANIES LIKE WÄRTSILÄ.”**

Harry van Dyk, Chief Electrician, West Alliance

# WÄRTSILÄ SEALS AND BEARINGS SERVICES, SINGAPORE

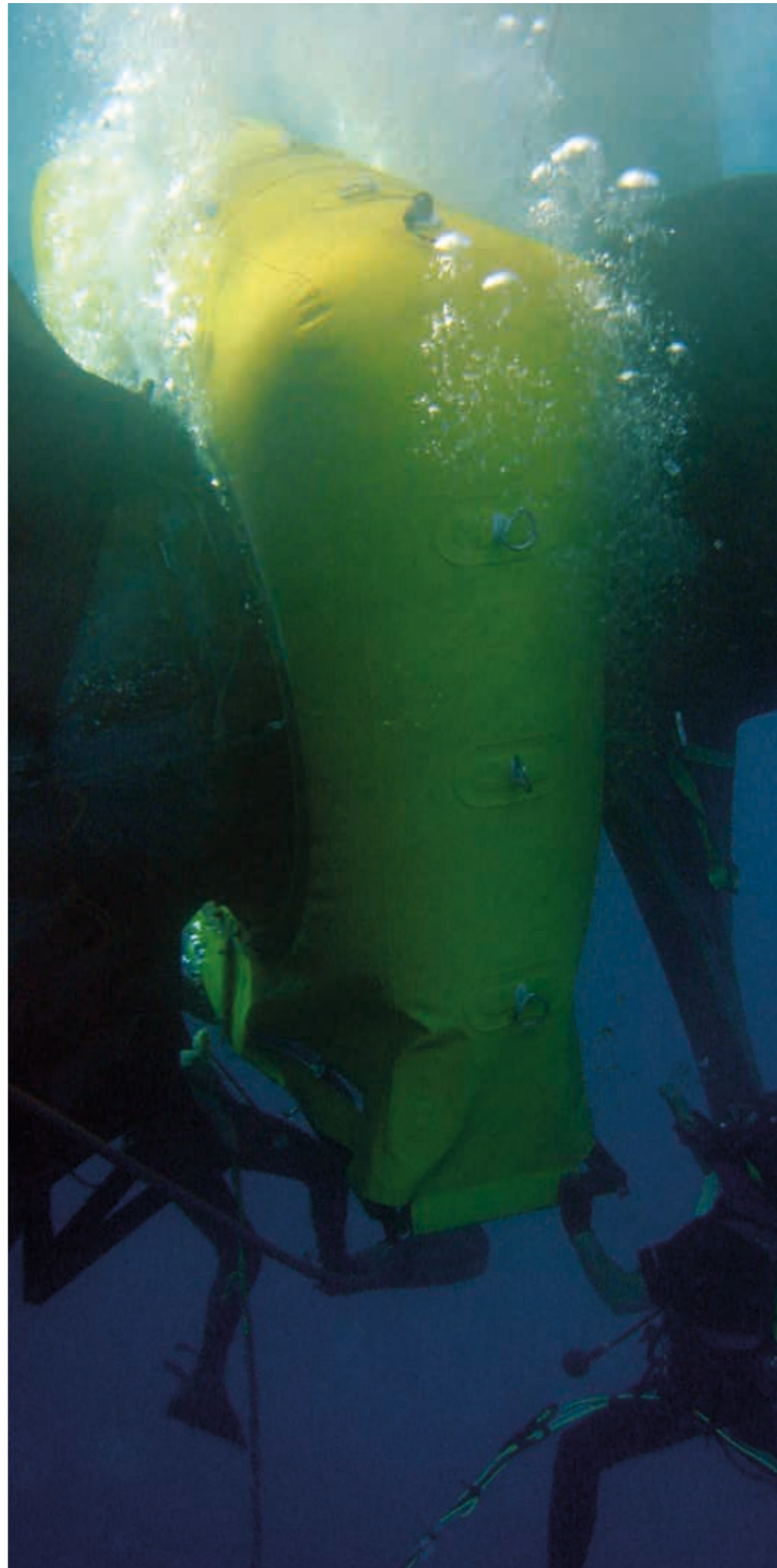
## EFFECTIVE SEALS AND BEARINGS SOLUTIONS WITH RAPID DELIVERY

Wärtsilä has one of the strongest seals and bearings service teams in Singapore, providing support to companies in Wärtsilä's network. We serve customers docking in Asia Pacific and specialise in the key markets of Singapore, Malaysia and Thailand.

Wärtsilä Singapore's Seals and Bearings services unit combines the knowledge and expertise of Japan Marine Technologies and Deep Sea Seal, companies which were acquired by Wärtsilä. Cedervall Singapore was the latest addition in 2011.

Singapore is a key market for seals and bearings services. It is also a market where customers have high expectations. Thanks to our strong team, we are equipped to provide the technical support our customers require and good stock availability in the region enables us to respond to urgent delivery needs. Furthermore, Wärtsilä's strong global network provides us with the resources to support our customers worldwide.

We provide our customers with solutions that include dismantling, assembling, commissioning and retrofitting. In addition, we offer integrated systems, packages and products that are efficient, economically sound and environmentally stable.



### CASE:

#### ON-GOING MODIFICATIONS ON VAN SPEIJK CLASS FRIGATES

In 2010, the Indonesian Navy encountered oil leakages caused by wear and tear on its Van Speijk class frigates.

To mitigate the problem, the vessels' existing stern tubes needed to be converted into brand new water lubricated ones. Highly skilled personnel from Wärtsilä Singapore's Seals and Bearings team worked alongside Wärtsilä's experts from the United Kingdom and Spain to perform the operation on the decades-old vessels.

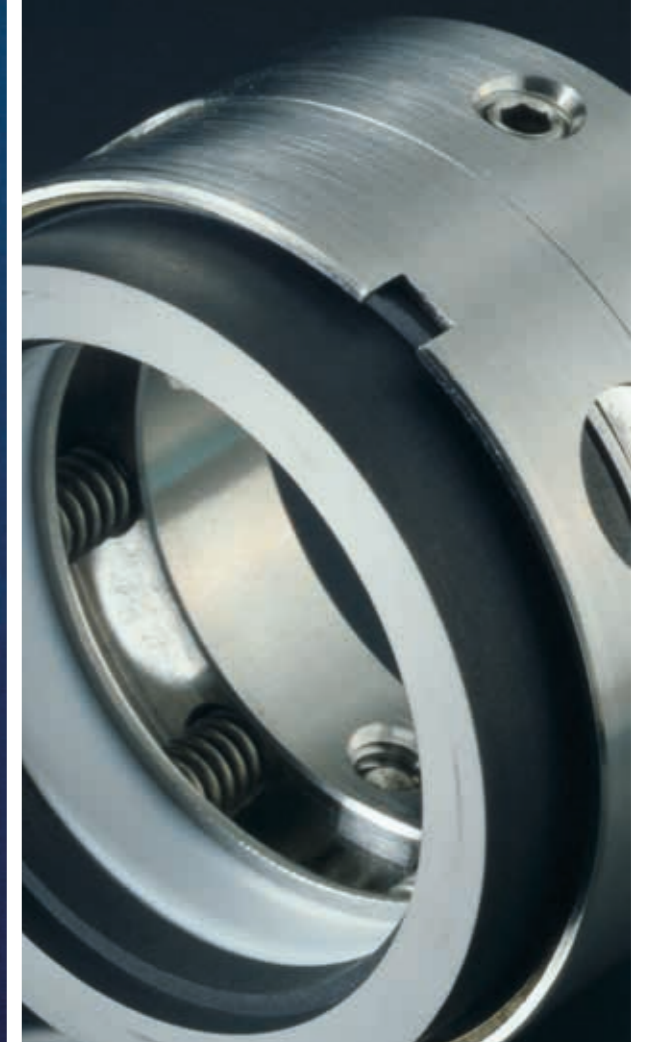
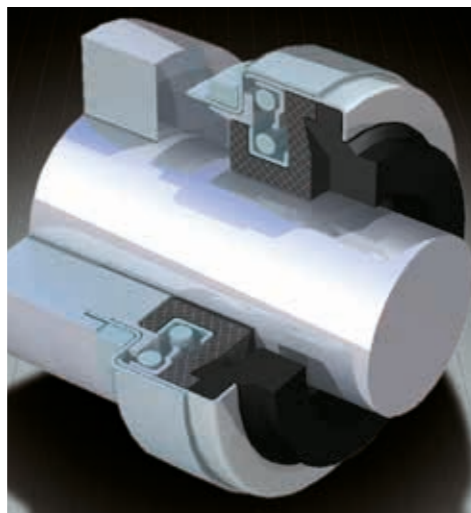
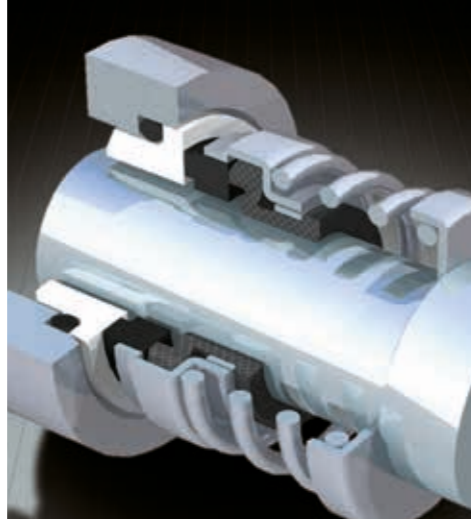
Prior to the installation, the team conducted a feasibility study during the dry-docking of one of the vessels. Two days of meetings with the customer were set aside to explain and clarify the technicalities of the operation.

Based on the thorough assessment, it was agreed that the stern tubes and seals and bearings should be replaced, and that modification work would be required on the inner hull structures. All of these were completed on the first vessel in late 2013. Wärtsilä Singapore's Seals and Bearings team's commitment, dedication and expertise ensured that the project was completed within the agreed schedule.

### TECHNICAL EXPERTISE

Wärtsilä's Seals and Bearings services offer a number of managed solutions to suit the needs of our customers. Examples of our services offering includes:

- + Underwater servicing / retrofits
- + Sterntube conversions
- + Tailored product packages
- + Performance optimisation
- + Turnkey services
- + Specialist field services
- + Upgrades / conversions
- + Seal bonding
- + New-build commissioning
- + Installation management
- + Product training
- + Project engineering consultations



# WÄRTSILÄ BOILER SERVICES, SINGAPORE

## DELIVERING RELIABLE BOILER SOLUTIONS ON LAND AND AT SEA

Wärtsilä Singapore is the first choice for boiler servicing in the Asia Pacific region, a position founded on our strong history in services and repairs for both marine and industrial customers.

Our 140-strong Boiler services team at Wärtsilä Singapore offers a comprehensive range of boiler services. With the added advantage of being strategically located at one of the world's largest ports, we are able to quickly service any boilers within Asia Pacific. Marine, industrial or power plant boilers, our expertise in boiler services and our on-hand boiler tube stocks assures customers that their boilers will

be maintained in a quick, safe, reliable and efficient way.

Wärtsilä Singapore's experienced professionals carry out comprehensive inspections and assessment services using state-of-the-art equipment and stringent procedures. For our major projects involving a variety of expertise, we also routinely undertake mechanical installation, piping, fabrication, electrical and refractory works.

For boilers, our services include thorough boiler inspections, evaluating the condition of the boiler, determining repair needs, making adjustments and replacing boilers to on-site installations. Working carefully with selected materi-

als and precise specifications, we can service and repair a damaged boiler of any brand and restore it to a fully operational status.

Our growing pool of satisfied customers includes Keppel Shipyard, Singapore Refinery, Golar LNG, Modec Offshore, Perenco, and many others. Fast project turnaround with good coordination are helping us achieve good on time completion, while upholding quality assurance.

We are certified by the American Society of Mechanical Engineers (ASME), and are fully authorised to fabricate boilers and pressure vessels, as well as carry out repairs.

### TECHNICAL EXPERTISE

Wärtsilä's Boiler services competence portfolio encompasses:

- + Inspection services
- + Boiler repairs and retubing
- + Boiler replacements
- + Tailored solutions
- + Boiler erections
- + Low sulphur fuels (boiler system conversions)
- + Service agreements



### CASE:

#### MAJOR BOILER REPAIR FOR SENOKO WASTE-TO-ENERGY PLANT

In 2012, our experts in Wärtsilä Singapore's Boiler services conducted major repair works on the Senoko Waste-to-Energy (WTE) plant's six incinerator waste heat boilers. Commissioned in 1992 at a cost of SGD 560 million on a land area of 7.5 hectares, Senoko WTE plant's boilers supply steam to drive two condensing turbine generators, offering a total power generating capacity of 56 MWe. The Senoko WTE plant addresses three important environmental issues: disposing the ever-increasing amount of commercial and domestic waste, reclaiming materials that can be recycled and generating electricity without the use of fossil fuels.

The challenges lay in completing the repair of the boilers within a tight two-year time frame, while complying with the Ministry of Manpower's strict requirements. The team had to also meet the plant's operational needs to keep a sufficient number of incinerators operating at all times. At the peak of the large-scale repair, a total of 60 experts from Wärtsilä were on-site, working around the clock to repair different sections of the boilers.

The total work scope included fabricating and installing the superheater tube bundles and furnace water wall tubes complete with all the necessary fittings. Upon completion, a hydrostatic test to 65 bars was conducted to the satisfaction of the authorized inspector and owner. Castable high alumina insulation material was "gunned" onto water wall tubes to protect the tubes and keep the furnace gas tight. Finally rock wool insulation and cladding on the boiler casing were replaced before the boiler was put back into full operation.

**"WÄRTSILÄ SINGAPORE WAS ABLE TO COMPLETE THE REPAIR WORKS EARLIER THAN THE STATED SCHEDULE. QUALITY MATERIALS AND GOOD WORKMANSHIP WERE IN EVIDENCE FROM THE WORD GO."**

Mr. Steven Lee,  
Maintenance Manager,  
Senoko Waste-to-Energy Pte Ltd.

# WÄRTSILÄ PROPULSION SERVICES, SINGAPORE

## COMPLETE PROPULSION SERVICES FOR ANY VESSEL

Wärtsilä is a leader in propulsion services in Asia Pacific. For over a decade, we have provided customers with complete propulsion and related systems services globally, covering equipment from Wärtsilä and other manufacturers.

We do more than just supply parts or send specialists to fix problems; we take responsibility in keeping our customers' propulsion systems running at optimal efficiency. We bring together the skills and expertise needed to assist customers throughout the lifecycles of their installations, from the first discussions in the design phase to the end of the vessel's operational life.

Experts at our 24-hour help desk can either solve minor issues by phone or arrange for a Wärtsilä field service engineer to intervene if the issue is more complex.

Our field service engineers are dedicated and highly skilled professionals who supervise on-site or at ship repair yards, cooperating with the yard or independent companies in the industry. They undergo continual training and are equipped to take responsibility for any maintenance task or repair, whether mechanical or electronic.

Wärtsilä Singapore's workshops are conveniently located close to the new Singapore Liquefied Natural Gas (LNG) terminal and potential reclaiming projects in Singapore, Malaysia and Indonesia where dredging activities are seen to be potential.



**“COSCO AND SEVAN HAVE EXPRESSED THEIR APPRECIATION FOR HOW THE CASE WAS SOLVED. THE WAY THE OPERATION WAS PREPARED AND EXECUTED SHOWS ONCE MORE THAT WÄRTSILÄ EMPLOYS WORLD-CLASS PERSONNEL. TOGETHER, WE WERE ABLE TO ACCOMPLISH THE IMPOSSIBLE.”**

Peter Romjin, Commissioning Coordinator in Delivery Management Field Service Propulsion, Wärtsilä Netherlands



### CASE:

#### UNDERWATER THRUSTER REPLACEMENTS ON SEVAN LOUISIANA

Wärtsilä Singapore's Propulsion services team had the challenge of replacing two of Sevan Louisiana's COSCO-418 thrusters for Wärtsilä Netherlands in October and November 2013.

The team worked closely with partners in carrying out the underwater removal and re-installation of the two thrusters according to Wärtsilä's installation procedures, which follow ISO class standards.

Wärtsilä Singapore's Propulsion services supervisor was on-site at the Singapore Western Anchorage to oversee the demanding operation. The work took place in harsh weather and sea conditions, which made safeguarding the safety of all concerned an even greater undertaking. Ultimately, with the team's energy, expertise and proactive cooperation, the task went smoothly and according to plan.

Through effective cooperation between Wärtsilä's global network, Wärtsilä Singapore's Propulsion services team and trusted partners, the job was completed successfully.



### TECHNICAL EXPERTISE

Wärtsilä's comprehensive range of Propulsion services include:

- + Delivery of original spare parts
- + Propeller repairs
- + Worldwide field services
- + Overhaul of all propulsion systems
- + Retrofitting controls, tunnel thrusters, steerable thrusters and controllable and fixed pitch propellers
- + Propulsion improvement packages
- + Repair of propellers and seals (including seal bonding), also performed underwater
- + Delivery of spare sub-assemblies, such as underwater removable parts, lower gearboxes and hubs

# WÄRTSILÄ SERVICE AGREEMENTS, SINGAPORE

## TAILORED AND FLEXIBLE SERVICE AGREEMENTS TO CATER TO OUR CUSTOMERS' NEEDS

Wärtsilä Singapore has a proven track record in operation and maintenance services. Supported by Wärtsilä's global network, our full range of services will ensure reliable performance from receiving fuel to supplying energy. Our task is to take accountability for customers' operations, giving them peace of mind and the freedom to focus on their core business.

Our service agreements are tailored to our customers' specific needs, allowing them to choose from different levels of partnership depending on their requirements. These agreements can range from simple supply agreements to multi-year operational partnerships covering every facet of the operation. Wärtsilä can manage all aspects of operation and maintaining an installation including technical and maintenance management, inspections and reporting.

In Singapore, Wärtsilä offers service agreements for marine vessels. We have gained a reputation for meeting the unique demands of our customers. These vary from providing a marine engineer who is solely dedicated to perform maintenance overhauls on-board vessels to offering a full marine and maintenance crew.

## THE SOLUTIONS IN OUR RANGE OF SERVICE AGREEMENTS

### INCLUDE:

- + Asset management for marine operations and maintenance agreements
- + Maintenance agreements
- + Technical management agreements
- + Supply agreements



### Wärtsilä Training Services

The Singapore training facility is the latest addition to the global Wärtsilä Land & Sea Academy. The facility is located near one of the world's largest shipyards, making it ideal for training crew before they take over installations. The facility is equipped with state-of-the-art simulators and the crews are taught by specialised teams of experienced engineers.

Wärtsilä has overall four training centres in Asia located in India, Korea, China and Singapore. At each of these training centres, we are able to provide the correct team of experienced Training engineers and specialists who can deliver courses to meet the individual needs of shipowners and power plant operators.

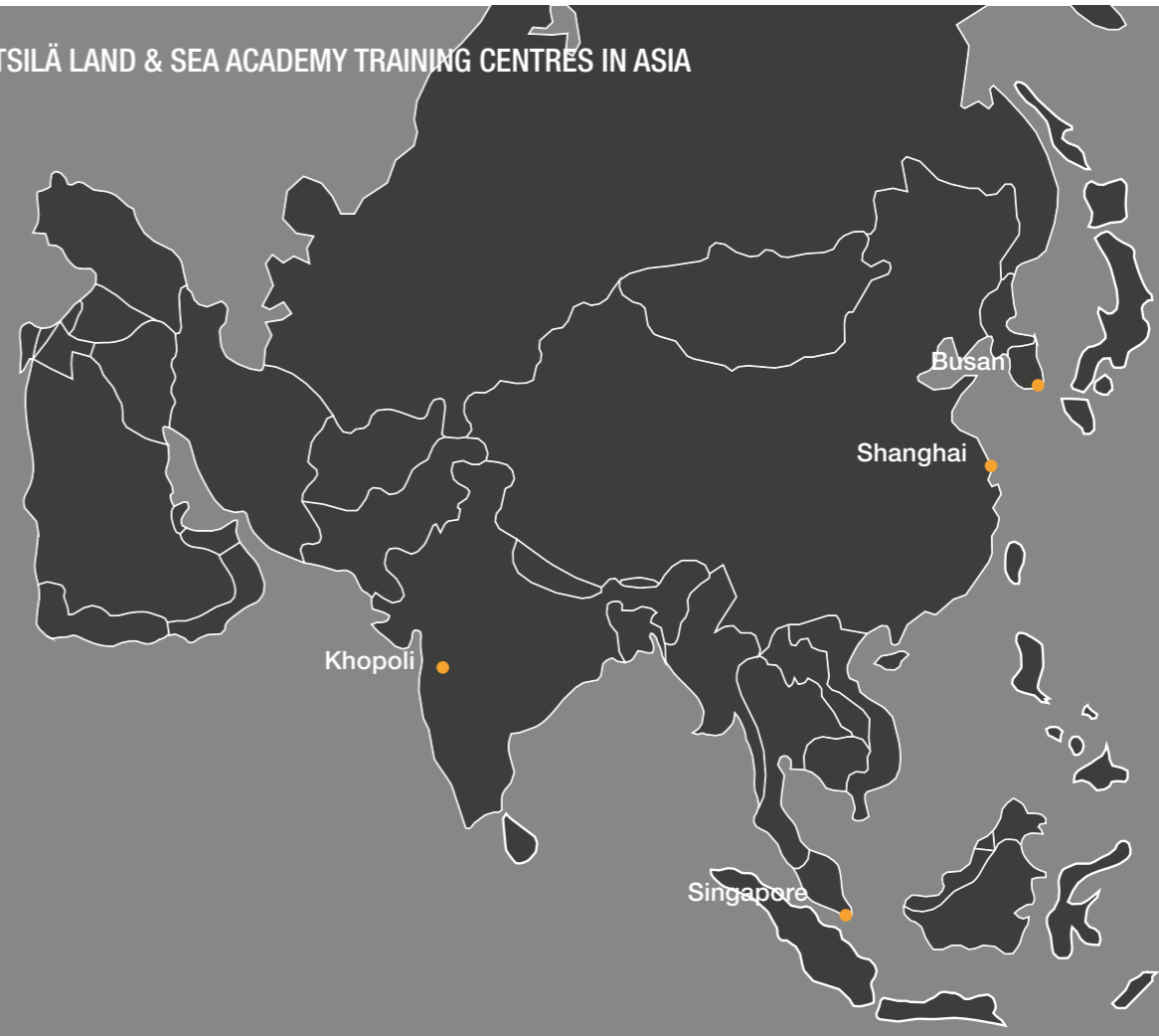
### Wärtsilä Environmental Services

Wärtsilä maximises the environmental and economic performance of the vessels and power plants of its customers. Our environmental services include comprehensive service packages, including start-ups, installations, engineering work, maintenance and repairs.

We provide an array of products and solutions that reduce different air emissions (NOx, SOx, CO, VOC) and adapt to different fuels. We can also offer complete oily water treatment systems for power plants and marine applications that meet the most stringent standards, as well as ballast water treatment (BWT) systems. These systems are vital in preventing organisms from one ecosystem from upsetting the ecological balance in another.



## WÄRTSILÄ LAND & SEA ACADEMY TRAINING CENTRES IN ASIA







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 2013, Wärtsilä's net sales totalled EUR 4.7 billion with approximately 18,700 employees. The company has operations in nearly 200 locations in 70 countries around the world. Wärtsilä is listed on the NASDAQ OMX Helsinki, Finland.

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