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International Maritime Review

Decarbonized shipping requires new solutions

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Finnish Navy's multi-role corvettes under construction

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CANADA TO THE RESCUE

The Helsinki Shipyard was in dire straits due to its Russian ownership. While there were no sanctions leveled against the owners themselves, the shipyard's plans to sell vessels to Russia dried up immediately as Russia attacked Ukraine.

In November 2023, it was announced that the Canadian marine industrial group Davie has finalized the acquisition of the assets of Finland's Helsinki Shipyard Oy (HSO). According to media reports, the deal had been in the works for about a year.

The completion of the transaction is the culmination of a series of milestones, beginning in December 2022. In March 2023, Davie exercised an exclusive option to purchase the assets of HSO. This was followed in April by the signing of a business purchase agreement, and in July Davie secured a new 50-year land lease from the City of Helsinki.

Group Davie owns Davie Shipbuilding, Canada's largest shipbuilder. Helsinki Shipyard, on the other hand, is the world's leading icebreaker and ice-class shipbuilder. Together, the companies certainly have the capability to design, build and maintain mission-critical ships – icebreakers, obviously, but also warships and ferries for government and commercial customers.

According to the deal, the Canadian and Finnish shipyards will be separate legal and operating entities, while the business headquarters will remain in Québec. Davie hopes that the transaction will create opportunities for employees, encourage collaboration, facilitate the transfer of know-how, provide access to resources, and stimulate export potential.

Kim Salmi, Managing Director for Helsinki Shipyard, calls the transaction "the best possible news" for the shipyard, its workforce and supply chain. Salmi notes that now, after months of planning, the shipyard's top priority is to rapidly return to doing what it does best – designing and building world-class ships quickly, efficiently and cost-effectively.

The details of the business purchase agreement are confidential. However, a significant proportion of the assembled funds will go to ensuring that the shipyard has working capital while it gets up and running and secures new business.

For the purposes of landing the deal, it was also important that the Canadian government looks favorably on the potential synergies resulting from the transaction – especially, since construction of icebreakers is a big priority in Canada's National Shipbuilding Strategy.

Combining forces, it is likely that Davie and HSO can deliver the critical expertise so in demand by state and commercial customers. Renowned for their leadership and expert knowledge in clean energy solutions, they also seek to contribute to the creation of more sustainable ocean-going fleet.

PETRI CHARPENTIER

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Decarbonized shipping requires new solutions – are 2G biofuels the answer?

by: SAMI J. ANTEROINEN

photo: PIXABAY

Biofuels are making waves in the marine industry – from ship-owners to engine makers, there is rising interest to get away from CO_2-heavy traditional fuels.

“Second generation biofuels can be blended with regular fuel.

Biofuels are a category of gaseous or liquid fuels generated from biomass – materials of biological origin. They can be created from various sources, or feedstocks, using a variety of processes. Presently, we are seeing the rise of the second generation biofuels which are made of non-food biomass.

On the surface, it does seem like biofuels would be – technically speaking – an easy decarbonization solution for shipping. Biofuels are, after all, suitable for all vessel types: large, small, deep-sea or short-sea, gas- or liquid-fueled, without major adjustments. Biofuels or blended biofuels would both be lower carbon alternatives to fossil fuels from a well-to-wake perspective.

Also, as biofuels can be produced around the world, and present no significant complications for bunkering, initial infrastructure would not pose a major challenge or require a great deal of money.

photo: BUREAU VERITAS

Julien Boulland, Global Market Leader for sustainable shipping at Bureau Veritas.

START WITH SUSTAINABLE

Julien Boulland, Global Market Leader for sustainable shipping at Bureau Veritas, says that biofuels must be sustainable, suitable and available in order to make a notable splash in the maritime.

"Second generation biofuels can be blended with regular fuel, with sometimes a 10–20% share – or, in some cases, as high as 50%," he says, pointing out to the fact that the sustainability factor clearly is there. With a proper sustainable production pathway in place, biofuels promise significant carbon emissions reductions in comparison to standard fossil fuels.

Suitability seems like a no-brainer, too: One of the major advantages of biofuels is the maturity of compatible engines. Vessels typically require no modification to use biofuels, making them – basically – a convenient "drop in" replacement for conventional marine fuels. This gives biofuels a leg up on most other alternative fuels – such as hydrogen, ammonia and LNG – since they all require specific engines or fuel storage and supply systems.

> **"Regarding the fuel system on board, no major modification is to be considered.**

photo: BUREAU VERITAS

Patrick Jan, Expertise Leader for Environment Innovative Engines and Alternative Fuels at Bureau Veritas.

FULL STEAM AHEAD!

Patrick Jan, Expertise Leader for Environment Innovative Engines and Alternative Fuels at Bureau Veritas, confirms that modern engines are designed and developed for continuous operation on biofuel, without retrofit and without reduction in the rated output.

"Regarding the fuel system on board, no major modification is to be considered," he says.

However, a detailed biofuel specification needs to be documented to validate this approach. "This includes, for example, the allowed maximum injection viscosity, because if this value can't be achieved with an unheated fuel, the fuel system has to be equipped with a heater," Jan says.

Since ships today are equipped with heating capabilities to inject fuels with viscosity as high as 700 cSt into the engines at the recommended viscosity (10–18 cSt, depending on type or make), means this might not be an issue at all.

VOLUME BUSINESS

But then there is the question of availability. At current production rates, biofuels are unlikely to be able to meet a large proportion of global maritime demand. In addition, competition with other sectors (such as land-based transportation and aviation) may add to availability woes.

"Availability is the big challenge, but there is lots of R&D under way to solve this issue," Boulland says. Still, there are estimates that biofuels could eventually power 30% of the global fleet.

THREE GENERATIONS OF BIOFUELS

- First generation (also known as conventional biofuels) are produced from agricultural crops, vegetable oil or food waste. Fatty-acid methyl ester (FAME) and hydrotreated vegetable oil (HVO) are the main types used in the shipping industry.
- Second generation (AKA advanced biofuels) are made of non-food biomass feedstocks like lignocellulosic biomass – residual feedstocks from forestry or crops. Their environmental impact is expected to be lower than the first generation.
- Third generation, a future generation produced from algae and microbes, will need further development before it is fit for wider uptake.

DIFFERENT TYPES OF BIOFUELS

Biofuels can be broadly categorized into three generations, some of which are ready for use in shipping, and others still maturing.

First generation

First generation or conventional biofuels are generated using agricultural crops, vegetable oil or food waste. These are the most commonly used biofuels worldwide.

Second generation

Second generation, or advanced biofuels, are produced from non-food biomass feedstocks like residual feedstocks from forestry or crops. They could have fewer negative environmental impacts relating to land use and food production.

Third generation

Third generation biofuels are a future generation of biofuels currently needing further development, produced from algae and microbes.

"Not every waste is suitable to make biofuels."

photo: BUREAU VERITAS

Andreas Ullrich, Global Market Leader, Passenger Ships & Ferries, at Bureau Veritas.

Andreas Ullrich, Global Market Leader, Passenger Ships & Ferries, at Bureau Veritas adds that government incentives can provide some needed boost to improve the situation, but the required biomass volumes are, indeed, challenging.

"Not every waste is suitable to make biofuels. In addition, there are costs involved, too: you can never forget about the price tag," Ullrich says, adding that cost structures also guide development efforts.

GLOBAL STANDARD LACKING

Taking a closer look at biofuel production pathways, there are more challenges there, starting with securing sustainably produced biomass. As it stands, there is currently no global standard to verify end-to-end green production pathways for biofuels.

Also, you need to allocate limited resources ethically, meaning that the land used for the production of biomass (or the biomass itself) may be needed to meet some other societal needs.

However, the regulatory situation for biofuels is gradually improving. The International Maritime Organization (IMO) is presently developing guidelines for the life cycle GHG analysis of marine fuels, which is expected to be the cornerstone when considering the emissions reduction potential of marine biofuels.

And while specific biofuel regulations may still be in the early stages, ship operators are already adapting their fleets to comply with IMO emissions regulations – and biofuels may be part of the solution to reducing emissions and meeting compliance requirements.

Biofuels also appear to be in line with NOx emission limits. The challenge, however, comes in proving compliance. This may require onboard emission testing or engine and fuel-specific NOx emissions validation testing. However, the IMO regula-

photo: PIXABAY

tions now consider blends of 30% biofuel or less in the same way as traditional oil-based bunkers.

TIME TO GET READY

To help the industry prepare for the use of biofuels/biofuel blends, Bureau Veritas created its BIOFUEL READY notation. It provides a set of requirements and comprehensive guidelines for the necessary documentation and testing.

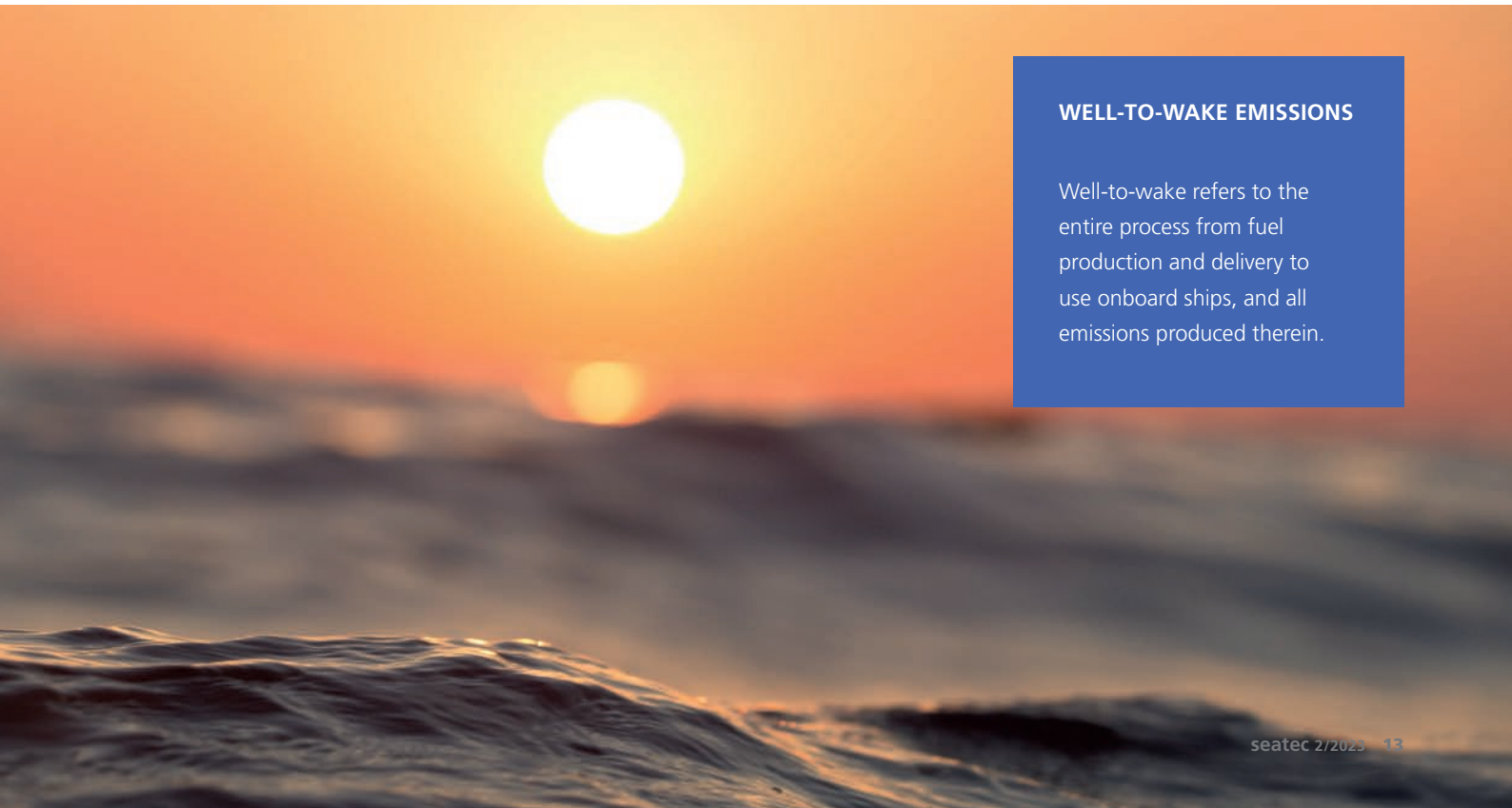
"When granting the additional class notation BIOFUEL READY, a ship memorandum is endorsed in order to record the specification of the biofuels intended to be used, the blend ratios and the types of blends, as well as the list of engines covered and their main destination, either auxiliary or propulsion," explains Patrick Jan.

Jan feels that from regulations point of view, it is crucial to have a certified biofuel, fuel quality for the engines and CO_2 equivalent for the impact on the environment, available on the market. "From operational point of view, it is the same engine operation and installation as for the distillate fuels, with fuel specification based on the ISO 8217:2017(E) standard."

DO YOUR HOMEWORK

The Bureau Veritas trio points out that it is always recommended that operators interested in operating on biofuels perform a due diligence about the ship installation, train the crew and ensure that the biofuel used either meets the requirements of ISO 8217 as well as EN 14214 (FAME) or EN 15940 (HVO).

"For non-FAME or non-HVO based products, more detailed understanding about the properties and characteristics should be sought prior to deciding if that specific biofuels should be trialled," adds Patrick Jan. ■



WELL-TO-WAKE EMISSIONS

Well-to-wake refers to the entire process from fuel production and delivery to use onboard ships, and all emissions produced therein.

Wanted: More sustainable ports

by: SAMI J. ANTEROINEN

When talking about sustainability in maritime, one can hardly ignore the ports. In the EU alone, there are over one thousand ports, handling goods in the excess of 4 billion tonnes. But just how green are they?

photo: PORT OF HELSINKI / VEIKKO SOMERPURO

"Onshore power supply will be mandatory from the year 2030 onwards, for some segments.

photo: ANDREAS SLOTTE

"During the last five years we've build our OPS system to full coverage – and it's something the liner vessels really appreciate, since these ships require lots of power and call on Helsinki daily," Andreas Slotte, Head of Sustainability at the Port of Helsinki says.

In addition to being a vital link in the worldwide shipping logistics chain, the ports play a key role in assuring a greener maritime sector. Ports handle and dispose waste from ships and can facilitate the use of alternative fuels and energy supplies. Through port call optimization, ship time spent at berth can be minimized, thus reducing the generation of associated air emissions. Lately, onshore power supply (OPS) has become a big driver in the Green Ports agenda.

Andreas Slotte, Head of Sustainability at the Port of Helsinki, points out that as EU's Fit for 55 regulation package is now taking shape, one key aspect of the package concerns onshore power supply.

"Onshore power supply will be mandatory from the year 2030 onwards, for some segments," Slotte says, adding that Port of Helsinki has been perfecting its own OPS solution in recent years: for example, in 2021 the LJ7 and LJ8 berths at West Harbour were equipped with onshore power connections and OPS at South Harbour was completed, as well.

"During the last five years we've build our OPS system to full coverage – and it's something the liner vessels really appreciate, since these ships require lots of power and call on Helsinki daily," he says.

GREEN CORRIDOR FOR TWIN CITIES

In October 2023, it was announced that Helsinki and Tallinn will create a Green Corridor to ensure and accelerate the creation of a climate neutral customer journey and maritime Green Corridor between Helsinki – Tallinn and Vuosaari – Muuga connections.

This Green Corridor is a shipping route and an umbrella for several projects at sea, and in shore operations in Helsinki and Tallinn, which aim to reduce emissions and increase the use of solutions of zero (or near zero) emissions. The partners in the Green Corridor initiative are the cities and the ports of Helsinki and Tallinn, Rederi AB Eckerö, Tallink Grupp and Viking Line as well as the Estonian Ministry of Climate.

Andreas Slotte notes that, currently, Green Corridors are being set up around the world, but rarely with so many committed partners: typically, you have two ports and a shipping line in the venture.

"In this Finland – Estonia Green Corridor, there are three shipping com-

panies which are competitors as such – but still want to contribute to sustainability together. That's pretty rare and really quite fantastic," Slotte says.

> **"Those who don't pay attention to sustainability will become irrelevant rather soon.**

ACCELERATE GREEN TRANSITION

This Green Corridor is an active one, since there are annually 9 million passengers and 2 million vehicles crossing the sea between Helsinki and Tallinn. While ferry business is still seen as a necessity for the well-being of the "Twin Cities," reduction of greenhouse gas emissions has become an urgent issue for all parties involved.

The goal of this Green Corridor is to boost the transition to a climate neutral and sustainable customer journey for both passengers and cargo of the related sea routes. This means that there will be joint roadmaps for shipping companies, cities and ports with founding – and other partners – to assist them with achieving zero-emission (and other) goals.

Activities within the Green Corridor are geared towards climate neutrality and, at the same time, increasing of passenger and cargo flow between the two countries. In addition, it is vital to strengthen the competitiveness and vitality of the corridor as well as to have some joint scientific studies carried out to enhance project activities and increase knowledge and knowledge-sharing. Joining relevant international initiatives for the development of Green Corridors is also being prepared as part of the venture.

STREAMLINING EFFORTS CONTINUE

Andreas Slotte reports that, of late, Port of Helsinki has been achieving other green goals, too. The TWIN-PORT III and TWIN-PORT IV projects, partly funded by the EU, were completed this year at Port of Helsinki. The projects led to vari-

photo: PORT OF HELSINKI / JARMO VEHKAKOSKI

ous improvements, the common thread of which was the pursuit of responsible, efficient and modern port operations and, in particular, the streamlining of ship traffic between Helsinki and Tallinn.

In fact, the name 'TWIN-PORT' refers to the shipping and port operations between Finland and Estonia via the ports of Helsinki and Tallinn.

"We have installed, for example, double ramps which are a very green investment as such, since they shorten the time in port, which in turn enables a more fuel-efficient sea voyage," explains Slotte. In addition, a new Smart Port gate system for vehicles at West Harbour and Katajanokka was introduced at the beginning of summer 2023.

STAY RELEVANT!

According to Slotte, adapting to a new, more sustainable world is simply "a must" for all the actors of the sector.

"Those who don't pay attention to sustainability will become irrelevant rather soon," he says, adding that all players must show initiative in their green pursuits and continue to go deeper and wider.

"Also, the long-term competitiveness of ports, for example, will benefit from a more sustainable approach, even if there are costs involved in the short term."

Sustainability is already a cornerstone of many a strategy drawn up by the maritime companies in recent times – and this trend will only continue and strengthen. "Shipping companies are heavily focused on sustainability. We are not going to be an interesting partner for them if we do nothing."

In trying times, there's not much money to go around – so is sustainability facing headwinds that it can't overcome right now? – Slotte feels that the answer may lie in allocating resources more wisely.

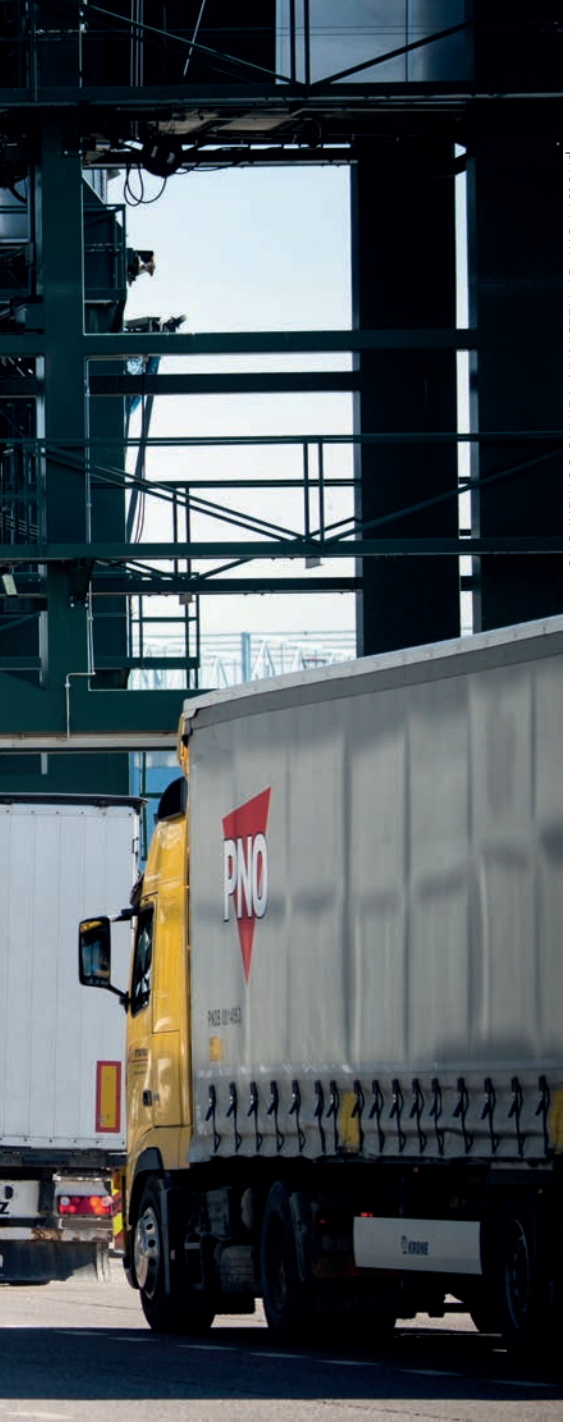


photo: PORT OF HELSINKI / VEIKKO SOMERPURO

"Green investments may not take a hit, if prioritizing is made right. Future-proofing the business must be on everybody's agenda in any case," he encourages. ■

"Shipping companies are heavily focused on sustainability.

PORT OF HELSINKI: TARGETING CARBON-NEUTRALITY

25 % reduction in vessel emissions by the year 2030

- Shore power capabilities for several berths
- Making alternative fuels available at Helsinki ports
- The continued development of an environmental program targeted at ships

60 % reduction in emissions from heavy goods vehicles by 2030

- Minimizing the use of transport vehicles at ports
- Introducing incentives to use low-emission vehicles

60 % reduction in emissions from work machines used in the harbor area by 2030

- Enabling the electrification of work machine infrastructure
- Encouraging the use of biofuels

The Port of Helsinki should be 100% carbon neutral in terms of its own emissions by 2025

- Minimizing the Port's energy consumption by modernizing heating, installing LED lighting, and increasing the use of solar panels
- Acquiring necessary energy from carbon-free sources
- Helping to lower subcontractors' carbon footprints via procurement

Use of methanol fuels will reduce ship emissions

by: ARI MONONEN
photo: UNSPLASH

With the advent of constantly tightening IMO regulations on the environmental emissions in maritime traffic, new solutions for ship fuels are sorely needed. Shipyards are starting to turn to methanol, a promising and viable "green" fuel alternative.

To reduce ship emissions, new types of non-fossil fuels are called for.

A system that supplies methanol fuel to ship engines could be useful in stopping environmental emissions of, say, SOx and NOx emissions, as well as harmful particulates.

"Pilot projects for the use of methanol in marine engines started around 2015. However, large-scale utilisation of methanol did not commence until 2022," says Mr. **John Bergman**, CEO of Auramarine based near Turku in Finland. The company has a long history of various marine fuel supply solutions.

"These days, shipyards in China and South Korea are largely resorting to methanol-fuel engines in their shipbuilding. Methanol fuels are a growing market, with many shipowners considering methanol conversions for their existing fleets."

Within Auramarine, the development of methanol supply units and other methanol-fuel solutions was started in 2020. The task was given to a team of fifteen R&D engineers.

"To cut greenhouse gas emissions, methanol is one of the most viable clean fuels.

"One of our first clients in this field is the Swedish shipowner Terntank who is currently having three new ships under construction at a Chinese shipyard. Auramarine will deliver methanol-fuel equipment for them – including automation and accessories – by June 2024. Other projects are ongoing or being finalised," Mr. Bergman mentions.

FINDING THE RIGHT VARIABLES

In an era of constantly tightened international regulations on ship emissions, increasing the use of methanol fuel in ship engines is an obvious choice.

According to Mr. Bergman, the specifications of methanol-fuel systems are typically determined on a case-by-case basis according to ship and engine types.

In Auramarine's solution, the methanol supply unit will provide methanol from the service tank to the master fuel valve while regulating the flow, pressure and temperature of the methanol. When combined with filtration, this ensures its suitability for use in engines. The system actively maintains the supply pressure within the specified tolerances in the course of any load changes.

"To cut greenhouse gas emissions, methanol is one of the most viable clean fuels," notes Bergman.

photo: AURAMARINE LTD

John Bergman, CEO, Auramarine Ltd.

"There are many variables in the design of optimal systems. Also, the overall reduction of the ship's emissions is based on several factors. Even the quality of the methanol fuel being utilisted can be relevant."

"In accordance with IMO regulations, ships running on alternative fuels need to have a back-up fuel system for MGO marine diesel oil. Even with ships utilising methanol as the main fuel type, some 5 to 10 percent of MGO is generally needed as ignition fuel. With a combination of green methanol and bio oil as ignition fuel, emissions can be significantly reduced," Bergman points out.

"When existing ships are converted for methanol fuel, possibly new fuel tanks are required. The necessary space for them just has to be found somewhere on board."

LARGE MARKETS IN ASIA

Typically, Auramarine will deliver the methanol supply system hardware – apart from the fuel tanks – as well as the fueling system with methanol supply pipes, junctions, balancing pumps, sensors, valve units, and automation, including software.

"Quite a lot of automation is required. Methanol is a fuel with a low

Auramarine Methanol Supply Unit.

photo: AURAMARINE LTD

temperature flash-point so the automation systems need to be approved by the marine shipping classification company. This type of automation is Auramarine's core expertise and know-how," Bergman adds.

"Our R&D engineering department has invested heavily in this field as we see it is essential for the future of marine traffic."

The equipment is manufactured either at Auramarine's own factory in Shanghai, China, or by trusted manufacturing partners in Finland.

"Asia is our main market area. Our Shanghai factory has been in operation for 22 years already. Currently, China and South Korea are the leading shipbuilders worldwide in terms of volume."

"The system will be delivered ready for assembly to our customers who in turn will install the system on board. Auramarine will then handle the testing at sea," explains Bergman.

TAILORED SYSTEMS AND FINE-TUNING

According to Mr. Bergman, the particularly challenging part in the development work is that the technology is quite innovative and therefore new for everybody involved.

"Acquiring knowledge of the whole system is a full-time learning process. Optimising the ship emission reductions has to be worked on a ship-by-ship and engine-by-engine basis. There's a whole lot of variables to be considered."

Furthermore, the type of methanol fuel being utilised in ship engines can be significant.

"Some types of methanol are being manufactured by using fossil fuels while other types may be synthetically produced from environmentally friendly raw materials. Such differences have an effect on the total environmental impact of methanol."

SAFE SOLUTIONS FOR HAZARDOUS AREAS

The Auramarine supply unit is designed to fit on closed and Ex rated hazardous areas where fire-safety is of paramount importance. The health and safety guidelines have been taken into account.

This level of safety is achieved by using self-draining mechanical design in conjunction with the nitrogen inerting process and specially designed configurations to any serviceable methanol line segments. Also, all components and electric equipment will be selected for demanding use in a hazardous area.

In order to minimize the volumes of electrical equipment in a hazardous area, the electrical cabinets and control panels are designed to be fitted separately to a safe area.

Auramarine's methanol supply system is suitable for all types of ships, regardless of ship size.

"The key requirement is that the ship will need an engine that is compatible with methanol fuel. Quite often, some kind of methanol conversion for the ship engine will be required," Bergman explains.

In his view, the demand for methanol supply systems will skyrocket in the near future.

"Green technology is becoming increasingly important for the maritime industries. A large portion of the world trade is currently being transported by sea. For such goals, clean fuel technology would be just the thing." ■

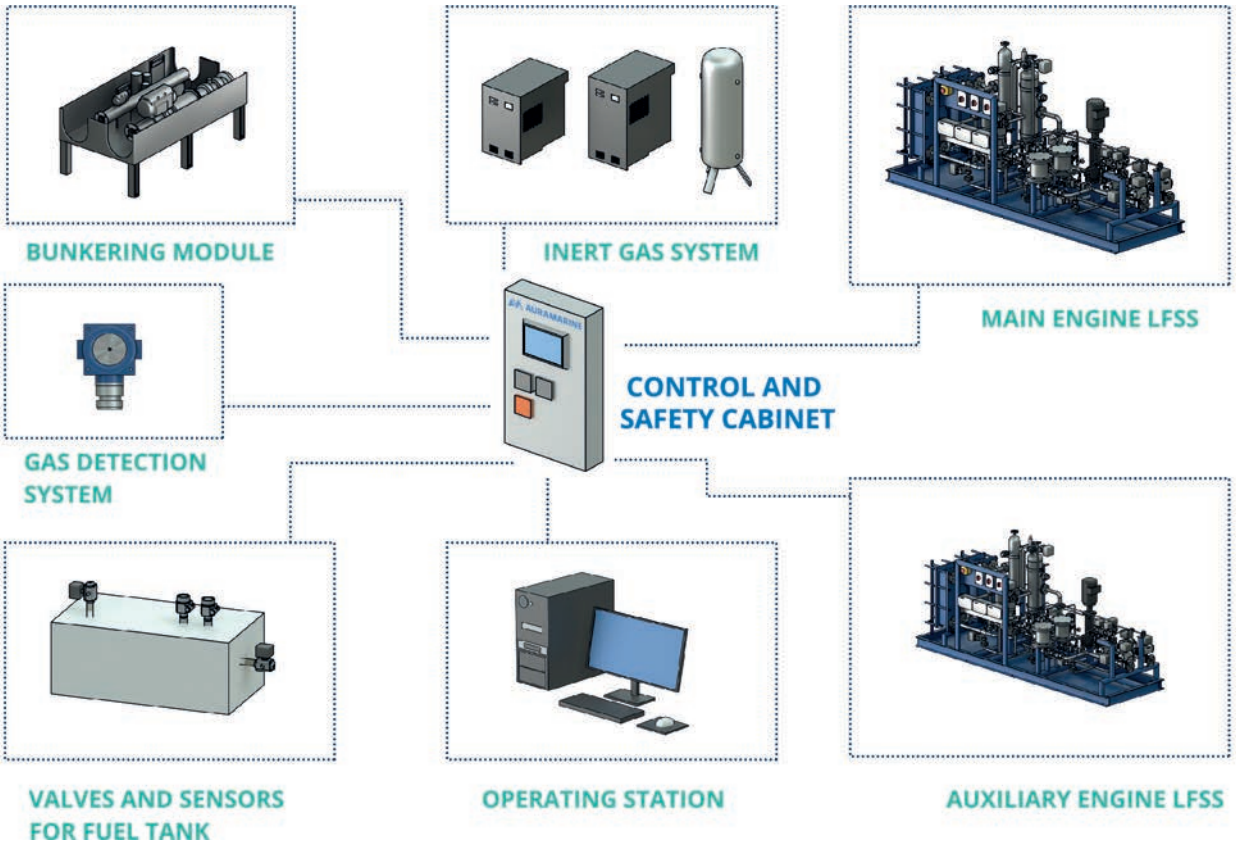


photo: AURAMARINE LTD

Auramarine Methanol Supply System – Full fuel system from design to commissioning and lifecycle services.

"The high-performance vessels are designed to operate in the Baltic Sea all year round.

Finnish Navy's multi-role corvettes under construction at Rauma shipyard

by: ARI MONONEN
photos: RAUMA MARINE CONSTRUCTIONS

This Navy Squadron 2020 project will replace some of Finnish Navy's current ships with new Pohjanmaa-class multi-role vessels, or corvettes. These multi-role vessels will have an essential role in Finland's future naval defence. The Finnish shipyard Rauma Marine Constructions (RMC) and its subsidiary RMC Defence will build the corvettes. Construction of the first vessel was started in late October of 2023.

At RMC's shipyard in Rauma on the southwestern coast of Finland, the steel cutting ceremony of the first Squadron 2020 multi-role corvette to be constructed for the Finnish Navy was celebrated on 30th October 2023.

The first corvette has been scheduled for completion in 2026, with two more vessels to follow in 2027 and the fourth in 2028. This major ship project ensuring the Finnish national maritime defence capabilities has been in preparation for several years.

"The first spark for these multipurpose vessels was lit up as early as 2007 when ideas for successors for the Finnish Navy´s legacy vessels were being preliminarily contemplated within the Navy. Later on, further research on operational, tactical, and technological levels was carried out, to find out how new vessels should actually operate and how their capabilities could be utilised in various types of naval operations," explains Mr. **Timo Ståhlhammar**, retired Navy Captain and currently Project Director for Squadron 2020 at Rauma Marine Constructions (RMC).

> **"These four vessels are rather exceptional.**

"The Finnish Navy does not order warships upon a spur-of-the-moment inspiration. Procurement of vessels is based on operational needs. In ship designs, possible scenarios for battlefield operations encountered on the current and, above all, on the future battlefields – as well as the required wartime capabilities of new vessels – will be taken into account."

RELIABLE OPERATION IN VARIOUS ENVIRONMENTS

Finnish Navy's new Pohjanmaa-class vessels will monitor the Finnish sea area, repel attacks from the sea, protect the vital sea infrastructure of communication and safeguard vital assets at sea and in the archipelago. This will ensure that the Navy will be able to conduct its statutory defence tasks well into the future and control the sea and archipelago areas having significance from the perspective of operations.

The high-performance vessels are designed to operate in the Baltic Sea all year round in various circumstances, ranging from autumn storms to icy and freezing conditions.

"These four vessels are rather exceptional, with their versatile capabilities optimised for this northern operating environment," Mr. Ståhlhammar notes.

"In September 2019, the contract between Finnish Defence Forces Logistics Command and RMC Defence was signed. This started the project for the eventual design and production of four new multipurpose corvettes."

The multi-role corvettes will have a length of 117 metres, a width of 16 metres

and a speed of 26 knots (48 km/h), with accommodation for a crew of 70 persons.

The four new ships will in time replace seven older vessels: the four Rauma-class fast-attack missile craft and two Hämeenmaa-class mine-laying ships, as well as one Pohjanmaa-class minelayer that was already decommissioned in 2013.

FUNCTIONAL, DISCREET, AND ROBUST

According to Mr. Ståhlhammar, the preliminary planning was based on the customer's concept. The ship designs were then further developed in close cooperation between RMC shipyard and the Finnish Defence Forces.

"Consequently, the final blueprints depict a fully functioning ship model, from all points of view."

The new Pohjanmaa-class corvettes will be equipped with top-notch monitoring capacities for air, surface and underwater surveillance. They must also be capable of laying mines, defending themselves against hostile surface vessels as well as submarines and various airborne targets, and command maritime operations. Such vessels can be used in crisis management measures and as part of NATO's Standing Naval Forces.

"The design of the corvettes pays particular attention to shock resistance, noise levels and stealth technology. The multi-role corvettes are the first vessel class in the Finnish Navy designed and constructed under the surveillance of the ship classification society, including the ship's performance in ice," Ståhlhammar points out.

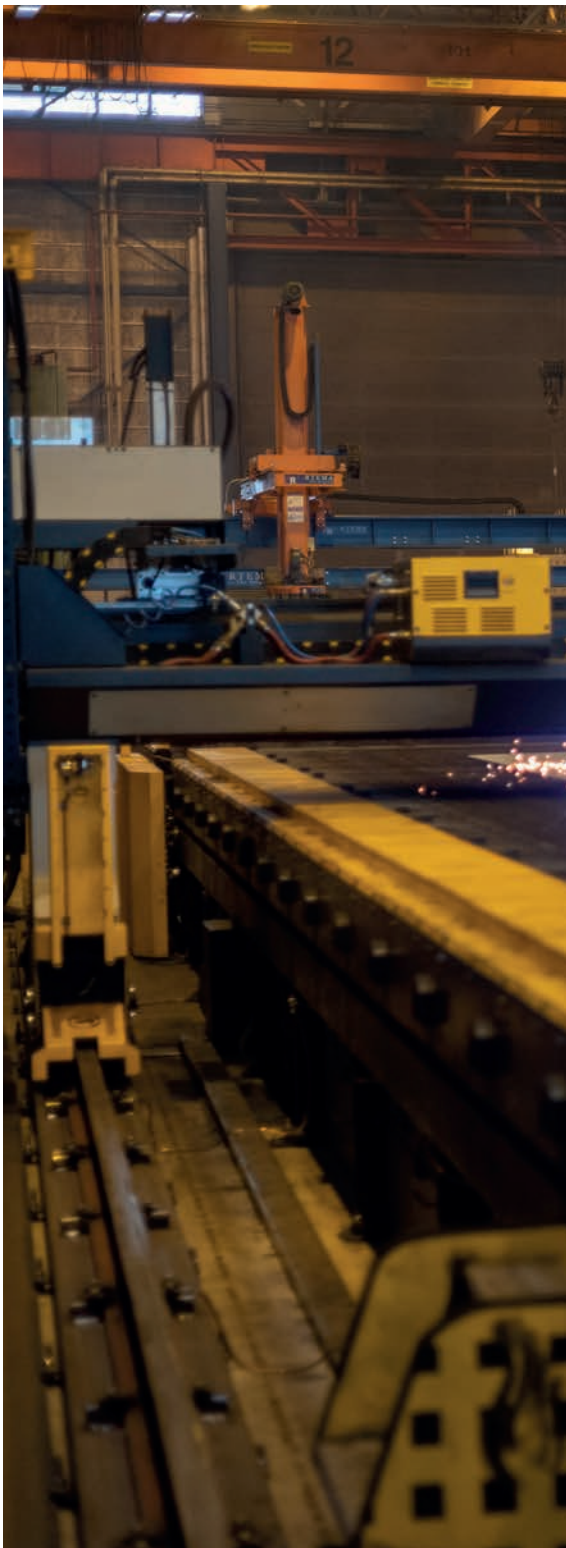
"The corvettes have been designed to navigate unaided even in relatively thick ice. This is practical as it enables the vessels to proceed from the Naval Base to open sea without ice-breaker assistance throughout the winter season."

DESIGNED FOR LONG-TERM DURABILITY

The Finnish maritime defence has for a long time relied on shipbuilding expertise from Rauma, as most vessels that the Finnish Navy has adopted since 1990 have been built at Rauma. Furthermore, a significant number of vessels owned by the Finnish State, including all multipurpose icebreakers and Finnish Boarder Guard patrol boats, have been built, maintained, and repaired at Rauma shipyard.

"The new multipurpose corvettes are being built in Finland mainly for two reasons. One is to ensure that the domestic defence industries retain the capability to construct such vessels even in the foreseeable future. Also, it is crucial that the vessels can be repaired, maintained, and upgraded in Finland," Ståhlhammar emphasises.

The corvettes are being constructed in a new multipurpose workshop that has been built specifically for this project. The workshop will provide suitable conditions for the production and will enhance security and quality. RMC's new steel produc-



tion process will allow for the welding of even thinner plates. Still, the hull has been specified to withstand a reasonable impact of underwater explosive force. Such shock-absorption propensities are not uncommon in warship designs.

Furthermore, RMC has constructed a reference block to ensure the technical production capacity of the project.

"The reference block enabled inter alia testing and functionality of new facility investments, including one-side plasma welding, modernisation of profile-cutting machine, T-beam line, dimensional control process, plus welding with surface treatment and outfitting installations."

> **"The corvettes have been designed to navigate unaided even in relatively thick ice.**

"The product development of the technically challenging corvettes will continue even after the start of production," mentions Ståhlhammar. ■

Finnish Marine Industries

photo: PEXELS

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AQ Trafotek Oy
Auramarine Oy
Beacon Finland Ltd Oy
Bertel O. Steen Power Solutions Finland Oy
Bluetech Finland Oy
Cadmatic Oy
Comatec Industrial and Marine Oy
Deltamarin Oy
EIE Maskin Oy
Elcoline Group Oy
Elomatic Consulting & Engineering Oy
Emmanoa Oy
Enersense Offshore Oy
Etteplan Oyj
E.U. -Adhoc Project Oy
Evac Oy
Foreship Oy
Furuno Finland Oy
Groke Technologies Oy
GTF Finland Oy
Halton Marine Oy
Helkama Bica Oy
Helsinki Shipyard Oy
I.S. Mäkinen Oy
Jalmare Oy
Jukova Corporation Oy
Kaefer Oy
Kavika Oy
Kemppi Oy
Koja Oy
KONE Hissit Oy
Koneteknologiakeskus Turku Oy
Kongsberg Maritime Finland Oy
Laivasähkötyö Oy
Lamor Corporation Oyj
Lautex Oy
LED Tailor Oy
MAN Energy Solutions Sverige AB, Finland Branch
Marioff Corporation Oy
Material Maintenance MaMa Oy
Merima Oy
Mesekon Oy
Metalliasennus Huuhka Oy
Metos Oy Ab
Meyer Turku Oy
Millog Marine & Power Oy
Mobimar Oy
Napa Oy
Nora flooring systems Oy
Norsepower
Oy NIT Naval Interior Team Ltd
Oilon Oy
Onninen Oy
ORSAP Oy
Parmarine Oy
Paroc Oy Ab
Pemamek Oy
Piikkio Works Oy
Pocadel Oy
Promeco Group Oy
Rauma Marine Constructions Oy
Rauman Meriteollisuuskiinteistöt Oy
Reddal Helsinki Oy
R&M Ship Technologies Finland Oy
Roxtec Finland Oy
RR Site Service Oy
Saajos Oy
Saint-Gobain Finland Oy
S.A. Svendsen Oy
SBA Interior Oy
SeaKing Oy
Shipbuilding Completion Oy
SSAB Europe Oy
Steerprop Oy
Oy Stellio Ab
TEVO Lokomo Oy
Turun Korjaustelakka Oy
Uudenkaupungin Työvene Oy
Vallila Marine Oy
Valmet Oyj
Wiima Logistics Oy
Wärtsilä Oyj Abp

company directory

photo: PEXELS

1 4 6 7

AB-MARINEL OY

Konsantie 30
FI-21260 Raisio
Finland
Phone +358 2 444 11
info@ab-marinel.fi
www.ab-marinel.fi

Contact Persons

Tommi Niemi
Henry Lindström

Facts & Figures

Turnover: EUR 5 million
Personnel: 41
Established: 1986

Specialty Areas

- AB-Marinel Oy supplies comprehensive delivery of the electrical materials, - equipment and spare parts for all kind of ships and represents several manufacturers of the electrical control-, alarm and communication systems.
- Specialised in turn-key-deliveries for newbuilding ships, including design, installations, material and equipment.

2 6 7

AT-MARINE OY, AUTROSAFE

Uranuksenkuja 10
FI-01480 Vantaa
Finland
Phone +358 9 5494 2600
sales@atmarine.fi
www.atmarine.fi

Contact Persons

Antti Pihlajamäki, antti.pihlajamaki@atmarine.fi
Jussi Kujanpää, jussi.kujanpaa@atmarine.fi

Specialty Areas

Services:
- Sales, maintenance, manufacturing, commissioning and planning

Equipment:
- Navigation and communication systems
- Machine and fire alarm systems
- Engine room equipment, sound and light alarms, alarm panels and centers
- Temperature and pressure sensors
- Machine automation
- Escape and emergency lighting including special signs for exterior and interior decks
- LED lamps, searchlights and window wipers.
- Liquid Handling Equipment
- Special Electronic Devices

2

JOUKA OY

Somerotie 4
FI-33470 Ylöjärvi
Finland
Phone +358 3 359 7500
info@jouka.fi
www.jouka.fi

Contact Person

Peter Lillqvist
Peter.Lillqvist@jouka.fi

Facts & Figures

Net sales: EUR 6,5 million
Personnel: 34
Established: 1957
Parent Company: Indutrade AB

Specialty Areas

Jouka manufactures ball valves and ball valve manifolds for demanding solutions with years of experience. Our know-how in marine certified solutions is covering several fuel options. We thrive from customer success, and we are specialised in finding best valve solutions for our customers.

1 3 8

JTK POWER OY

Teollisuustie 6
FI-66600 Vöyri
Finland
Phone +358 20 781 2300
Fax +358 6 361 0383
info.fi@jtk-power.com
www.jtk-power-group.com
www.jtk-power-vss.com

Contact Person

Robert Ollus, Managing Director, robert.ollus@jtk-power.com

Facts & Figures

Turnover: EUR 35 million
Personnel: 97 in Finland, 35 in China
Established: 1998

Specialty Areas

Large Internal Combustion Engines' and Gas Turbines' exhaust and charge air silencers. Offshore-, paper- & pulp and other process industries large silencers. Small parts machining of e.g. valve seat inserts for medium speed engines and other high quality machined cylindrical parts. Shelter Solutions Equipment (Väestönsuoja tuotteet) for the building industry and complete Shelter Solutions together with Karanttia Perusturva Oy. Subcontracting of complex welded structures. 3-way and 2-way exhaust flow valves/ dampers. Design, simulation & measurement services, specialty on attenuation.

2 6 7

KOJA MARINE

P.O. Box 351 (Lentokentänkatu 7)
FI-33101 Tampere, Finland
Phone +358 3 282 5111
kojamarine@koja.fi, www.koja.fi

Contact Persons

Sales, Air Conditioning Systems
Teemu Tanninen, Business Director, teemu.tanninen@koja.fi
Life Cycle Services and Spare Parts, EU
Jussi Koskinen, Project Engineer, marine.spareparts@koja.fi
Koja USA Inc.
Pasi Lähteinen, CEO / President, pasi.lahteinen@koja.fi
Life Cycle Services and Spare Parts, USA
Jake Avery, Sales Director, jake.avery@koja.fi

Facts & Figures

Turnover: EUR 100 million
Personnel: 350
Established: 1935
Parent Company: Koja Group

Specialty Areas

Air conditioning systems, air conditioning units. System design and material delivers. Cargo ventilation systems. Air Conditioning turn-key deliveries, HVAC electrical / automation systems. Energy efficiency. Indoor air quality.

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LAUTEX OY

Ojakkalantie 13
FI-03100 Nummela
Finland
Phone +358 9 224 8810
sales@lautex.com
www.lautex.com

Contact Persons

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Antti Holappa, Sales Manager
antti.holappa@lautex.com, +358 50 386 1213

Facts & Figures

Personnel: 53
Established: 1951
Parent Company: Teknoma Oy

Specialty Areas

Ceilings for ship accommodation and public spaces, such as metal panels, profiles, tiles and gratings in aluminium or steel. The product range also includes B-0 and B-15 fire classified ceilings, domes, beams and special ceilings. All ceiling materials are possible to coat on different materials.

1. Consulting
2. Equipment
3. Machinery
4. Materials
5. Safety
6. Systems
7. Turnkey Deliveries
8. Yards
9. Other

4

ONNINEN OY

Työpajankatu 12
FI-00580 Helsinki
Finland
Phone +358 20 485 5111
www.onninen.fi
www.onninen.com

Contact Person
Sampsa Tuomi
Sales Director
sampsa.tuomi@onninen.com

Facts & Figures
Personnel: 1200 (in Finland)
Established: 1913

Specialty Areas
Onninen provides a comprehensive selection of products and service packages to contractors, industry, infrastructure building and retail dealers. In Finland, Onninen is part of K Group's international building and technical trade division.

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S.A. SVENDSEN OY

Rajatorpantie 41 C
FI-01640 Vantaa
Finland
Phone +358 9 681 1170
Fax +358 9 6811 1768
www.sasvendsen.com

Contact Person
Kimmo Räisänen
Managing Director
kimmo.raisanen@sasvendsen.com

Facts & Figures
Turnover: EUR 3 million
Personnel: 3
Established: 1981

Specialty Areas
- Complete turnkey deliveries for cruise ships and ferries
- Interior materials and custom made interior modules
- Refurbishments and refits for cruise ships and ferries

2 4 9

SBA INTERIOR LTD

Hangontie 940, FI-10300 Karjaa, Finland
Phone +358 19 327 71
info@sba.fi
www.sba.fi

Contact Persons
Thomas Pökelmann, Sales Manager, thomas.pokelmann@sba.fi
Johan Fagerlund, Technical Director, johan.fagerlund@sba.fi
Aki Virta, Executive Vice President, aki.virta@sba.fi
Henrik Grönvall, Sales & Project Manager, henrik.gronvall@sba.fi

Facts & Figures
Turnover: EUR 22,7 million
Personnel: 132
Established: 1985

Specialty Areas
SBA Interior is specialised in accommodation panelling and different types of beds for marine applications.
Latest development is an only 16mm B-0 class panel and a 50 mm A-60 class light weight box; wall and ceiling as well as a B-15 class Extension Screen. Digital printed panels available.
Another branch of SBA is subcontracting for metal industry.

9

SEAKING LTD

Valimotie 13b B, FI-00380 Helsinki, Finland
Phone +358 9 350 8840
Fax +358 9 3508 8422
sales@seaking.net

Contact Person
Jan Montonen, VP Sales, jan.montonen@seaking.net

Facts & Figures
Personnel: 400
Established: 1985
Parent Company: SeaKing International AG

Subsidiaries & Representatives
SeaKing France, SeaKing GmbH, SeaKing Italy, SeaKing Poland, SeaKing Inc.

Specialty Areas
Established in 1985, SeaKing is the industry's leading provider of functional catering systems to cruise liners and other high-class passenger vessels. SeaKing supports its customers throughout the ship's life cycle with basic design, consulting, equipment deliveries, training, maintenance and upgrading of the catering systems. SeaKing has a large production facility in Poland specialised in stainless steel (including refrigerators, service counters, ventilation hoods and pre-fabricated pantries) and a second production facility in Ft. Lauderdale, aimed at responding to the industry's growing renovation and repair activities.

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SEASIDE INDUSTRY PARK RAUMA

Suojantie 5
FI-26100 Rauma
Finland
www.seasideindustry.com

Contact Person
Timo Luukkonen
+358 40 550 1942
timo.luukkonen@seasideindustry.com

Specialty Areas
Seaside Industry Park is the hub of the maritime cluster in Rauma. Successful principal companies in shipbuilding and marine production with wide and efficient supplier network operate in the park. The region is utilizing versatile infrastructure and comprehensive common services. Seaside offers an efficient manufacturing environment and cooperation network that also enables smaller companies to participate in major projects and achieve competitive advantages and added value.
Additional information: www.seasideindustry.com

4 7

SPT-PAINTING OY

Rälssitie 6
FI-01510 Vantaa
Finland
www.spt-painting.fi

Contact Person
Tomi Hulmi
+358 40 548 3898
tomi.hulmi@spt-painting.fi

Facts & Figures
Personnel: 30
Established: 1990

Specialty Areas
- Decking systems for the cruise industry
- Indoor- and outdoor-floorings to shipdecks
- Balcony floorings
- Epoxy- and acryl-floorings

1. Consulting
2. Equipment
3. Machinery
4. Materials
5. Safety
6. Systems
7. Turnkey Deliveries
8. Yards
9. Other

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