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International Maritime Review

Aalto University's top-notch Nordic Master program draws students from around the globe

Viking Line's Glory is one of the most climate-smart passenger ships in the world

Breaking ice

Sweden and Finland are joining forces to create the next generation of green icebreakers

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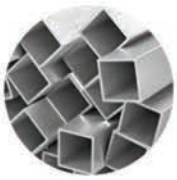
2/2022

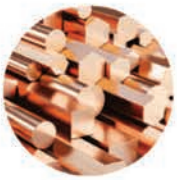
Our offerings to Marine industry

Wide range of metals

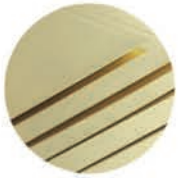
Aluminium



Stainless steel



Copper

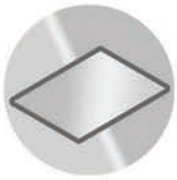


Brass

Bronze

Other metals

Standardized and customized solutions

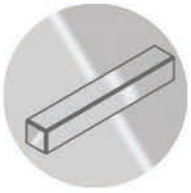


Plates

Coils

Profile systems

Profiles



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TURN THE TIDE

Marine industry is getting greener every year. In December 2021, SEA Europe, representing close to 100% of the European shipbuilding industry in 16 nations, laid down some guidelines how the shipbuilders approach the Green Transition.

SEA Europe supports the goals of the Fit-for-55 legislative package, seeking zero-emission waterborne transport by 2050. SEA Europe believes that this legislative package will offer "stimulating opportunities" for Europe's shipyards and maritime technology sector. However, at the same time, SEA Europe believes that more efforts will be required to turn the EU's ambitions on climate change into true economic opportunities.

SEA Europe calls for specific policy actions to enable Europe's shipyards and maritime equipment industry to reap the promising benefits from the European Green Deal and Fit-for-55.

SEA Europe is of the opinion that there is no "one-size-fits-all" solution for the transformation of waterborne transport towards a zero-emission mode of transport, due to the large variety of ship types and ship trades – and that the optimal pathways towards rapid emission reduction, zero-emission ships and climate neutrality are by no means straightforward.

Therefore, SEA Europe has issued a call to research, develop, financially support, and legally ascertain all options for clean technologies, alternative fuels and their optimal integration onboard vessels.

Finnish Marine Industries has launched ResponSea initiative to create and nurture the sustainable maritime sector of the future. The Finnish marine industry has a rather unique strength: it develops the sustainability of its products and its network together, throughout the industry – and beyond.

ResponSea focuses on reducing the environmental impact of shipping and shipbuilding as well as the monitoring of the sustainability of the delivery chain and enhancing circular economy and lifecycle efficiency in all actions.

Finnish industry innovators are responding to the call. In January 2022, the technology group Wärtsilä received its first order for newbuild methanol-fueled engines. A new Offshore Wind Installation Vessel (WIV), being built for Dutch contracting company Van Oord, will be powered by five Wärtsilä 32 engines capable of operating with methanol.

With delivery scheduled for early 2023, the methanol engine order extends Wärtsilä's position in support of the maritime industry's decarbonisation ambitions, and in the use of the fuel. Wärtsilä already has some experience with methanol, having converted four engines to use the fuel in 2015.

Wärtsilä sees methanol as one of the alternatives to meet the industry's goals to reduce its environmental impact. Such solutions are now needed, perhaps more than ever, as we seek to turn the terminal tide of climate change.

PETRI CHARPENTIER

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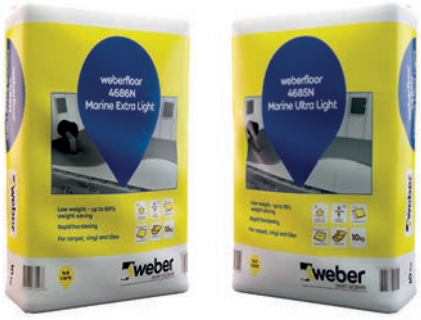

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Maintenance of Multi-Purpose Icebreaker Fennica at RMC's shipyard in Rauma, Finland.

FIVE ICEBREAKERS IN THE PIPELINE?

SWEDEN AND FINLAND ARE JOINING FORCES TO CREATE THE NEXT GENERATION OF GREEN ICEBREAKERS

by: SAMI J. ANTEROINEN

photos: RAUMA MARINE CONSTRUCTIONS

Finland and Sweden have been considering a joint purchase of icebreakers for a couple of years now. In March 2020, the Swedish Maritime Administration and the Finnish Transport Infrastructure Agency began collaborating on the design of a modern ice breaker concept.

Finland is thinking about getting 1–2 icebreakers and Sweden could order as many as three. It is no surprise that Sweden has its eye on more icebreakers than Finland, since the Swedish icebreaker fleet is also smaller. But the fact remains that both Sweden and Finland have outdated icebreaker fleets, and the next generation of icebreakers is required.

Presently, a lot of freight is being moved from road transport to ships, and, of course, a major part of Finnish and Swedish foreign trade is shipped by sea. The ports in the Gulf of Bothnia need to remain open and accessible all year round – so those icebreakers need to be ready to perform.

UPDATE THE OLD FORMULA

Finland and Sweden want to create a different type of icebreaker that is able to

Maintenance of Multi-Purpose Icebreaker Nordica at RMC's shipyard in Rauma, Finland.

"The next generation of icebreakers must respond to great expectations.

Conversion of Icebreaker Otso was carried out at RMC's shipyard in Rauma, Finland. Among other things, the conversion reinforced the ship's structures in order to upgrade its ice class to match Arctic requirements.

serve ever wider ships, as well as cope with new ice characteristics. It appears that a milder climate with more wind and less widespread ice can, actually, make navigation more difficult in ice-covered waters. For example, in the coming years we're likely to see pack ice and ice ridges that are tougher than solid ice.

In addition, the demand for icebreaker assistance has changed in recent years. While ships are getting bigger, environmental standards limit their power somewhat – and thus their ability to navigate ice-covered waters unaided is compromised.

The Nordic icebreaker project is estimated to come with a price tag in excess of billion euros. Both the Swedish Maritime Administration and the Finnish Transport Infrastructure Agency recommend state funding for the undertaking.

14 ICEBREAKERS RIGHT NOW

Presently, there are five active icebreakers in Sweden and nine in Finland, a fleet that was partly developed in collaboration between the countries in the 1970s. That's when the five Urho/Atle class icebreakers were built, together with the sister ships Sisu, Ymer and Frej.

Therefore, this is not the first time that the two countries are working together on icebreaking innovation. In addition, Finland brings into the project its rather recent experience from Polaris, the LNG-powered ice breaker built five years ago.

Mika Laurilehto, interim CEO, Rauma Marine Constructions (RMC), says that the Swedish Maritime Administration has already made preliminary inquiries about whether RMC would be interested in building the vessels. Laurilehto deems the project worthwhile and, in fact, really necessary:

"It is clear that the fairways in the Baltic Sea area must stay open throughout the coldest months of the year. The icebreaker fleet in the Baltic has to be able to perform their invaluable tasks also in the future," he says.

WANTED: MORE SUSTAINABLE ICEBREAKERS

Laurilehto says that the next generation of icebreakers must respond to great expectations when it comes to performance and eco-friendliness.

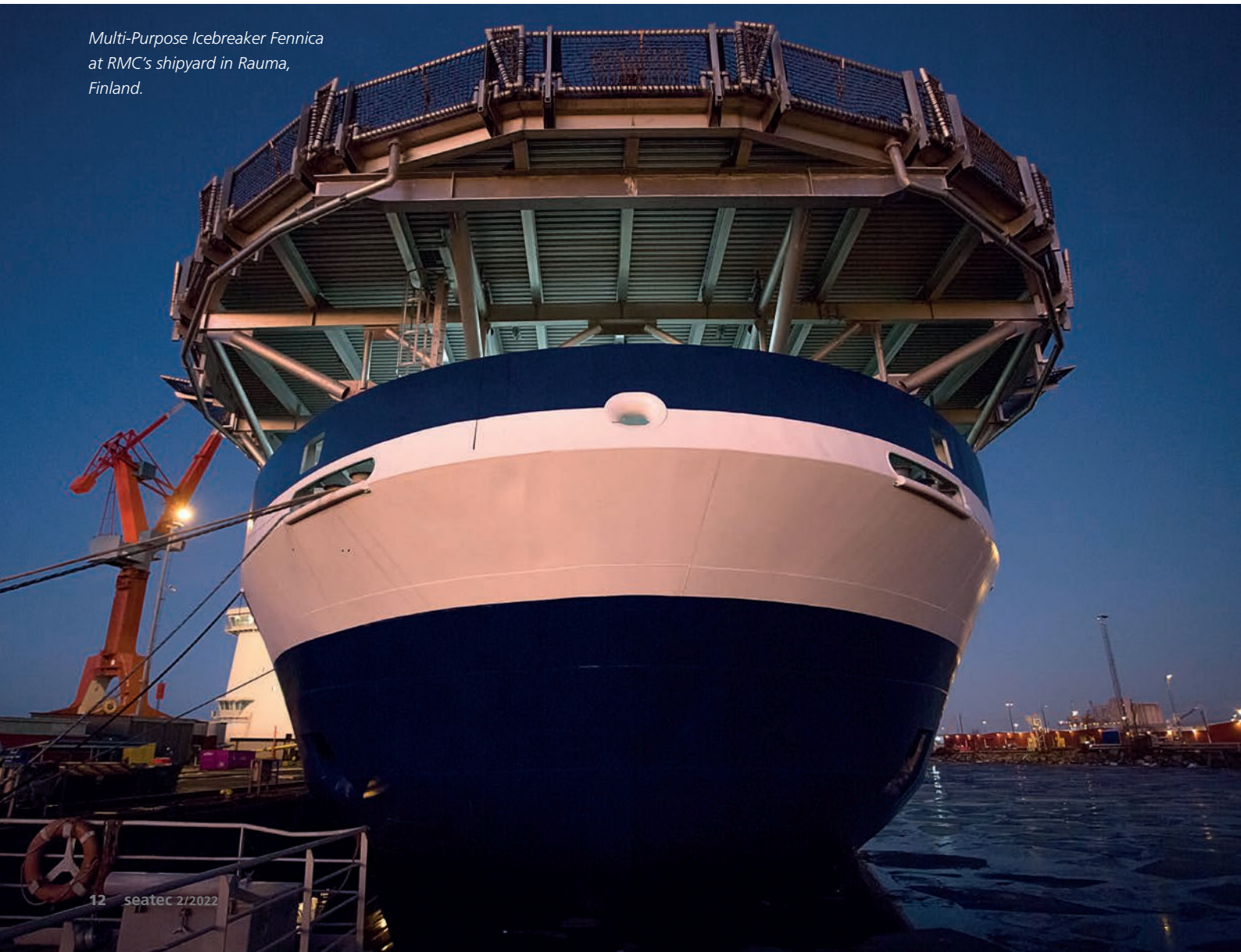
"Their emissions must be significantly lower than those of their predecessors in the Urho and Atle class. Also, they must be able to break a 32-metre-wide channel in the ice, endure tough conditions that are becoming even more severe, and operate for up to 50 years," he runs down the list of requirements.

To be able to build such icebreakers, a shipyard must have know-how in arctic shipbuilding and the ability to implement new technology and innovations in a way that increases the icebreaking capabilities of the vessels while cutting down emissions. Moreover, previous experience from public-sector procurements plays an important role: knowing the process and necessary preparations makes collaboration between the buyer and builder smoother.

RMC KNOWS ICEBREAKERS

"Shipbuilders in Rauma have plenty of experience in building vessels for challenging weather conditions", Laurilehto points out.

"RMC has been operating the Rauma shipyard from 2014, and during this time we have upgraded the operative capabilities of icebreaker Otso, done a general overhaul and modernisation of research vessel Aranda, and built two car and passenger ferries: Hammershus, completed in 2018, and Aurora Botnia, completed in 2021."



Multi-Purpose Icebreaker Fennica at RMC's shipyard in Rauma, Finland.

"All necessary competence and technology can be found in the Nordics.

What is noteworthy, as well, is that RMC's vessels are not produced in series. They are novel and technically advanced, state-of-the-art products tailored to the buyer's needs. "When it comes to technology development projects and future innovations, RMC works in close cooperation with universities, equipment suppliers and other partners."

ICEBREAKERS IN 2070?

"Naturally, the long lifespan of new icebreakers poses a significant challenge to shipbuilding. Requirements related to power generation and emissions will change in fifty years, and they will be difficult to anticipate", says Laurilehto.

"However, decisions must be made now so that the current emission reduction goals can be achieved. The technology for decarbonising marine transport already exists. What we need now is collaboration between companies and the public sector, and across industries and geographic borders." In the industry, bio-based fuels and battery technology are the main solutions considered to have the most potential for the near future.

Laurilehto sees public procurements as "spearheads for industrial development and success" in Finland and Sweden. Likewise, the procurement of new icebreakers offers an opportunity to develop new technologies and the maritime industry cluster.

"A joint project between Finland and Sweden would restore the role of the two countries' maritime clusters as global leaders in arctic expertise. Moreover, it would safeguard national security of supply in terms of export and import by sea. All necessary competence and technology can be found in the Nordics," he believes.

"Nonetheless, before the vessels can be built, the Finnish and Swedish governments must work together and make creative decisions to ensure that the project can be carried out in a cost-effective way – while promoting environmentally sustainable seafaring." ■

GLORIOUS HOMECOMING

VIKING GLORY IS POISED TO START MAKING THE ROUNDS IN THE BALTIC SEA

by: SAMI J. ANTEROINEN

photos: VIKING LINE, photographer TUUKKA ERVASTI

Viking Line's new vessel, Viking Glory, was christened in the Port of Turku on 28th February 2022. The company's new flagship sailed for the first time to Mariehamn and Stockholm the following day.

VIKING GLORY – TIMELINE

3/2016	A letter of intent is signed with the Chinese shipyard XSI
8/2018	Construction on the vessel begins in Xiamen
5/2019	In a public vote, "Viking Glory" is chosen as the name of the new vessel
6/2019	The keel-laying ceremony at the shipyard
1/2021	Viking Glory is launched
6/2021	The vessel passes its first sea trial
11/2021	The vessel passes its second sea trial
12/2021	Viking Glory starts its journey home to Turku
3/2022	The vessel launches service on the Turku–Mariehamn–Stockholm route

Or, actually, Viking Glory already has quite a bit of sailing under her belt. Prior to christening ceremony, Viking Glory completed a five-week journey from China to Finland, reaching Turku on February 6th. The ship had started its journey from Xiamen, China, in December 2021. The journey took Captain Ulf Lindroos and his crew of 40 via e.g. the Suez Canal and the Strait of Gibraltar before ending up in the Baltic Sea, which will be the operative environment for the new vessel.

Viking Glory was built by the shipyard Xiamen Shipbuilding Industry Co, Ltd. Commissioned in April 2017, the ship came with a price tag of approximately EUR 225 million.

The new flagship replaces Amorella, which is now moving to Helsinki, and will increase Viking Line's passenger capacity on the Turku–Mariehamn–Stockholm route by about ten per cent. The vessel

"Most of our sustainability work involves solutions that passengers don't notice.

VIKING GLORY – CLIMATE-FRIENDLY FEATURES

- Wärtsilä 31DF dual fuel engines that run on totally sulphur-free liquefied natural gas
- Azipod rotor propeller system
- Optimal hull design
- Engine waste heat is converted into electricity
- Waste cold is utilized to chill cold stores
- 66% cargo capacity than its predecessor Amorella and 17 per cent more than Viking Grace
- Dynamic control system for air conditioning and lighting
- More efficient recycling
- Combatting food waste in the restaurants

handles about 60 per cent more cargo than its predecessor.

HOME SWEET TURKU

Viking Line's president and CEO Jan Hanses comments that the Turku route is very important for Viking Line as well as for passenger and cargo service between Finland and Sweden.

"We are extremely proud that we once again can take a vessel that represents the very latest in new advances to Turku – one that both improves the level of service on the route and reduces the environmental impact. There is great interest in Glory, and sales have gotten off to a really good start," says Hanses.

Hanses is very satisfied that the company succeeded in bringing home Viking Glory although, as he says, there was also "doubt in the air".

"This fantastic vessel exceeds all my expectations. It represents a brand-new generation of vessels and highlights the company's origins in the archipelago in a fine way," says Hanses.

Viking Glory's innovative solutions make it one of the world's most climate-smart passenger ships. As Viking Glory gets going, the environmental impact of Viking Line's vessels on the Turku–Mariehamn–Stockholm route will be further reduced.

For example, Viking Glory has 66 per cent more cargo capacity than Amorella but is expected to produce more than 25 per cent fewer emissions than its predecessor. Viking Glory and Viking Grace, which began serving the route in 2013, are now the two most climate-smart vessels sailing the Baltic Sea.

ENVIRONMENTAL EDGE

Viking Line's sustainability manager Dani Lindberg points out that efficiency, environmental requirements as well as the future were all taken into consideration in an entirely new way when Viking Glory was being planned.

"Most of our sustainability work involves different solutions that passengers don't notice, like the vessel's technical solutions, which have seen rapid advances. Ten years ago, Grace was the world's most environmentally-friendly passenger ship and now Glory, which is bigger, will use about ten per cent less fuel," Lindberg says.

Viking Glory is one of the first vessels in the world to use Wärtsilä's 31DF dual-fuel engines and run on liquefied natural gas (LNG). They enable optimization of fuel use but produce no sulphur emissions at all. Furthermore, they produce fewer carbon dioxide emissions than do diesel engines.

Project Manager Kari Granberg, who is in charge of the new construction at Viking Line, says that the vessel's six 31DF engines feature the lowest fuel consumption, but at the same time, have the highest cylinder output in their segment (550 kW/cylinder).

RECOVERING WASTE COLD

Viking Glory will also, as the first in the world, recover the waste cold from the use of LNG and recycle it for use in cold counters, cold rooms, and other special rooms.

"Today, recovery of waste heat is already common, but to recycle waste cold for the purposes of refrigeration appliances and cold rooms is an innovative and highly climate-smart solution," Granberg says, adding that Viking Line has carried out development work in collaboration with Wärtsilä, Projektia and Deltamarin.

Captain Ulf Lindroos says that when Viking Grace started running on LNG, sulphur and particulate matter emissions were reduced by 85 per cent while greenhouse gas emissions were reduced by 15 per cent compared to oil.

"Like Grace, Glory will also run on biogas or synthetic fuels produced using renewable energy when these are available in the future," says Lindroos.

MAKING MOVES

As Viking Glory kicks off operations, this marks also the first time when a passenger ship of this kind utilises the Azipod propulsion unit manufactured by ABB as a means of saving time and energy in terms of ship manoeuvring: the system facilitates faster turns in the ports and a hull design with

approximately 8% less water resistance than with a traditional propeller system.

Dani Lindberg confirms that Glory's Azipod propellers and other technical innovations save considerable time in port, giving the ship leeway in terms of keeping to the timetable.

"Every minute saved in port results in fewer emissions during the sea journey. We also do daily route planning, which means we modify our journey based on weather conditions and timetables," adds Lindberg.

CHAMPIONING RESPONSIBLE SAILING

Gustaf Eklund, who is Head of Development at Viking Line and in charge of developing the concept for the new ship, com-

"Every minute saved in port results in fewer emissions during the sea journey.

ments that Viking Line endeavours to be a forerunner of responsible navigation – and this goal is reflected in the design and construction of the ships.

Additionally, Viking Glory is equipped with a Climeon energy recycling system that harnesses and converts waste heat from the engines into electricity. The system can generate up to 40% of the electricity required for the passenger functions.

Moreover, there is a dynamic air conditioning and lighting system onboard, which has a direct effect on energy consumption. This system is controlled by the booking system: if a cabin remains empty at departure, it will be set in a power-saving mode, thereby minimising air-conditioning and heating for that particular cabin.

On board Viking Line's vessels, great focus has traditionally been placed on recycling – and that is also the case for Viking Glory. Dani Lindberg says that the ship recycles glass packaging, scrap metal, paper and cardboard.

"Recycling the metal in cans uses 75 per cent less energy compared to producing new iron ore. On board Glory, food waste is also collected and used in biogas production," he says. ■

VIKING GLORY – FAST FACTS

Length:	222,55 m
Width:	35 m
Cruising	Speed: 22,1 knots
GT:	65,211
Route:	Turku-Mariehamn/Långnäs-Stockholm
Class:	DNV
Flag state:	Finland
Passanger capacity	2,800
Crew:	200
Cabins:	922
Laner meters:	Freight 1500 m, 464 passenger cars on deck 3 and 4, and 120 passenger cars on deck 5

AALTO UNIVERSITY'S MASTER PROGRAM

OPTIMISED FOR PASSENGER AND ARCTIC VESSEL DESIGNERS

by: ARI MONONEN

photos: AALTO UNIVERSITY

Model scale testing in Aalto ice and wave tank.

For engineering students' intent on designing ships either for passenger transport or for arctic environments, a Finnish university degree is the grade to go for. Aalto University's top-notch Nordic Master program has drawn in motivated and capable students even from distant continents.

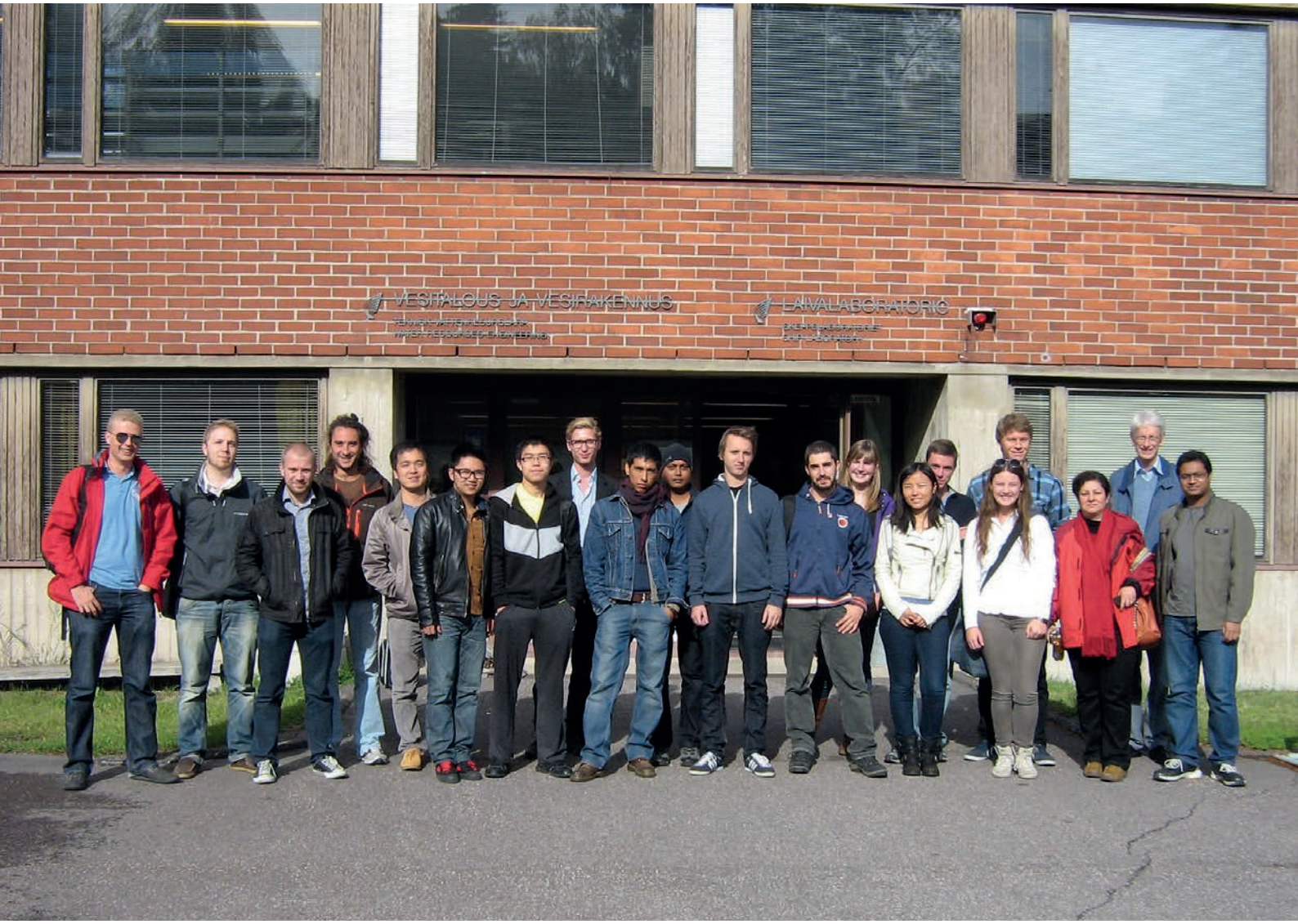
Aalto University's Nordic Master program in Maritime Engineering was started more than a decade ago to market the traditional marine technology master program also to other Nordic Universities.

"In addition to Aalto University from Finland, students will study to complete the degree at either Chalmers University of Technology in Sweden, DTU in Denmark, or NTNU in Norway," says Mr. Pentti Kujala, Professor of Marine technology. He has also been the head of Marine Technology research group at Aalto University and the Vice Dean of the School of Engineering.

"Nordic cooperation between universities is a long-time tradition, dating back to 1948."

INTERNATIONAL COOPERATION

Mr. Kujala has a long experience of working on the safety of ships both in open water and in ice, including full scale meas-



Nordic master students and few teachers in Otaniemi when starting the studies.

Marine Techology research focus areas with 6 full-time and 1 part time professors .

urements of ice induced loads and analysis of the ice load statistics, simulation of ship performance in ice, development of advanced structural solutions for ships and development of system level safety of marine traffic.

Also, he has extensive national and international cooperation heading the Center of Excellence for safe Arctic shipping funded by Lloyd's Register Foundation from London.

"The most significant developmental trend in this study program is that we are now attracting highly motivated students from around the world, even from the U.S. Furthermore, curriculums for the program have been thoroughly thought out between the participating universities," Kujala explains.

From 2022 onwards, Aalto University is in charge of curriculum profiling.

> **"Some kind of hybrid teaching will be continued even after the pandemic.**

COURSES IN FOUR COUNTRIES

Among other things, the Nordic Master program includes principles within the design, construction and operation of ships and offshore structures, including their hydrostatics and stability, hydrodynamics, wave, wind and ice loads, and structural analyses.

Studies include lectures, assignments, workshops and project work. Theory is supported by experimental work and computer simulations are intensively used.

In your first year, students study master's-level topics within maritime engineering, naval architecture and offshore engineering. They include stability, resistance and propulsion, seakeeping, manoeuvring and ship and ocean structures.

In the second year, studies are concentrated on the student's chosen specialisation: ocean structures, passenger ships, arctic ship design, ship operations or small craft.

Mr. Pentti Kujala, Professor of Marine technology says that cooperation between Nordic schools dates as back as 1948 .

For instance, Aalto University in Finland specialises in passenger ships and arctic technology, while Chalmers in Gothenburg will teach ship design.

Before applying, students need to have a suitable B.Sc. degree and a basic knowledge of related technologies.

BIG DATA IN MAJOR ROLE

"Additionally, the subject of Big Data has to be taken into account in maritime engineering studies," Kujala points out.

The term 'Big Data' refers to huge amounts of telemetry and measurement data being acquired, stored, and analysed, in order to gain a more complete picture of hardware reliability, positioning, or other safety-related issues.

"To further develop maritime studies related to information technologies and Big Data, Aalto University has recruited professor Mashrura Musharraf from Canada. She has a lot of experience of maritime research, digitalisation, and Big Data applications."

According to Kujala, Mrs. Musharraf will bring new insight into teaching automation, AI, machine learning and ship safety to maritime engineering students.

Aalto University now has a total of six professors teaching on the Nordic Master program.

Overall, maritime safety issues are high on the list of crucial subjects on the curriculum.

"This is where modern electronics and Big Data applications come in handy," notes Kujala.

"A lot of progress has been made in the fields of collision avoidance, distance measurement and tracking, and automated warning messaging. These are additional tools for the conning bridge."

"Basic navigation and radar technologies are now being complemented by satellite and positioning data. What's more, the collected data can now be utilised more efficiently than before."

On some of these subjects, Aalto University's maritime research personnel is working in close cooperation with the

> **"Nordic cooperation between universities is a long-time tradition.**

electronics & automation lab of the same campus.

BEST KNOWLEDGE FROM FINNISH UNIVERSITIES

Due to the global Covid-19 pandemic, a large portion of Nordic Master studies have been implemented through remote learning over the Internet during the last two years.

"We now usually record the lectures on video. After viewing, some subjects may be perused with the students more thoroughly," says Kujala.

"Some kind of hybrid teaching will be continued even after the pandemic as it has proved practical and useful."

"The Master's thesis has to fulfil the requirements of two different universities."

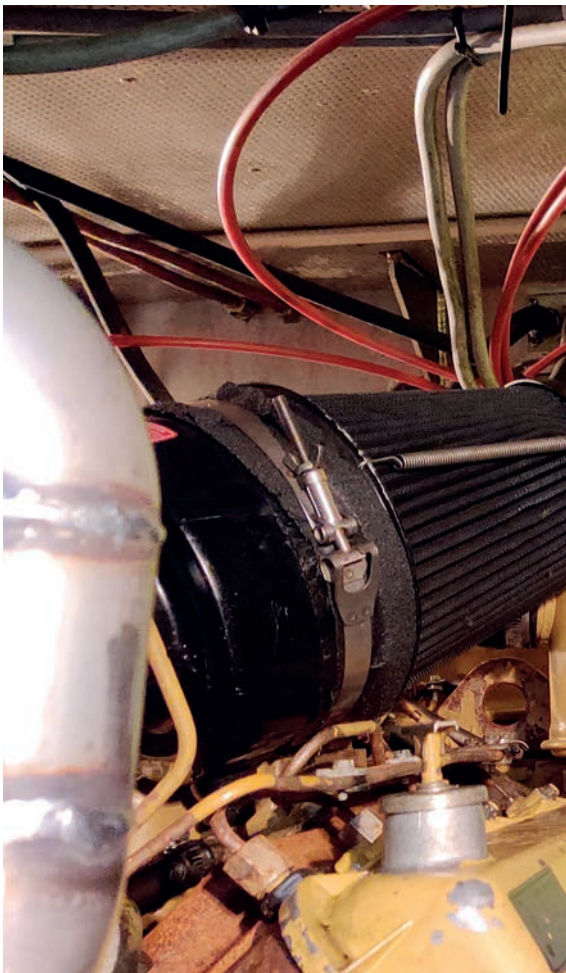
According to Kujala, Finnish universities are the best among those offering studies in maritime engineering.

"The development of ship concepts and prototypes, hull structure optimisation, maritime safety and operating in icy conditions – these are subjects that are particularly well known over here. We have received plenty of good feedback from our international students," Kujala mentions. ■

Chairman of the Board Jyrki Lehtonen from ILS with their project manager, Pyry Haimila.

MAJOR INNOVATIONS IN FINNISH SHIP DESIGN

by: ARI MONONEN
photos: ILS OY



Finland has a long history of high-tech achievements in the domain of naval architecture and ship design, specifically in producing blueprints for arctic ice-breakers or multipurpose vessels. Meet Mr. Jyrki Lehtonen, M.Sc., one of the ship-designing forerunners in this field.

In two cities on the southern coast of Finland, ILS Ship Design & Engineering creates designs for newbuilding, conversion and repair projects. The company specialises mainly in ice-classified vessel design.

"Naval architecture is our profession. It is what we do from dawn to the twilight hours," says ship designer and Chairman of the Board Jyrki Lehtonen from ILS.

"This line of work is in the process of constant and rapid development. Digitalisation has become a part of all industries. In the case of ship design, things are now moving faster and more efficiently than before."

Founded in 1988 by former ship-design specialists from Wärtsilä shipyard – Jyrki Lehtonen among them –, ILS Ship

"This line of work is in the process of constant and rapid development.

Design & Engineering is a privately-owned marine engineering company with offices in Turku and Helsinki. The current CEO is Jyrki Lehtonen's son Kristian.

ILS has decades of experience of carrying out commissions for ship owners, shipyards and other design companies around the world, including high profile design and consulting projects for Finnish and international customers.

"When designing ice-breakers, one should first of all focus on what the ship is eventually expected to accomplish, and in what kinds of operating environments," Jyrki Lehtonen emphasises.

TESTING THE PROTOTYPES

At the present time, ILS designers are taking part in various projects that will eventually result in the building of different kinds of ships.

"They include two passenger ships, one car and passenger ferry, and one sizeable cargo ship," notes Lehtonen.

Quite often, designers utilise floating scale models of prototypes to help in their design work.

"This usually happens in the final phases of design when most things are starting to take shape."

"Model tests will show how the ship actually works on the waves – and whether or not she works as she ought to, in accordance with the design specifications. Such tests are particularly important for the design of ice-breakers."

In southern Finland, model tests can be arranged in Vuosaari and Otaniemi. Abroad, test laboratories can be found in Germany, Russia, and Canada.

"Additionally – and perhaps surprisingly – there is a very good lab for model tests in Austria where different types of vessels are often tested for inland water navigation" Lehtonen points out.

> "Good cooperation can usually solve all problems.

VESSELS FOR ALL PURPOSES

Propulsion systems are also an integral part of ship design.

"All of ILS's ship designers have been trained for propulsion system design. Then again, none of our designers are concentrating solely on propulsion designs on a whole-time basis," recounts Lehtonen.

Many ILS projects over the years have focused on the design on tugs.

"Typically, tugs are vessels that are able to operate even in very difficult conditions."

"We have also designed three multipurpose ice-breakers that can operate as ice-breakers in Finland's winter – but in summer they can double as offshore vessels or supply ships, or perhaps cable-laying ships. Each ship concept must be determined individually, so that the ship can be designed just for its future purpose."

According to Lehtonen, arctic research vessels are often intellectually rewarding projects from the ship designer's point of view. He was one of the original designers of R/V Aranda, the renowned ice-strengthened Finnish research vessel capable of operating both in icy waters and on open seas.

"A few years back, we also designed major alterations for the Aranda design, giving the ship a longer life-span. The midsection of the ship's hull was lengthened by more than 10 metres to provide additional laboratory space and displacement and to expand the operational capabilities of the vessel," he explains.

GLOBAL CHALLENGES

Finding new customers and new projects can sometimes be challenging for ship designers.

"These days, more and more ships are buying built by shipyards abroad, even when the ship has been designed in Finland."

"Recently, ILS was commissioned by a Russian shipping company to design an ice-breaking multipurpose tug. We provided first the ship concept design and later the final blueprints, but the ship was eventually built by a shipyard in China," Lehtonen mentions.

"As it turned out, the resulting ship was good and solid, even if it was the shipyard's first-ever ice-breaker newbuilding project."

Lehtonen feels that it is important to communicate the ship designer's intentions in some detail to the shipyard, to avoid any misunderstandings or construction errors.

"Good cooperation can usually solve all problems. Of course, communication is more simple if the ship is to be built by a local shipyard."

"Even so, today's shipbuilding projects have become more globally oriented than they used to be just a couple of decades ago. Nowadays, is not uncommon that shipowners select foreign shipyards for the task of building their ships." ■

MINERAL WOOL OR ELASTOMERIC INSULATION? – SAINT-GOBAIN HAS BOTH

by: SAMI J. ANTEROINEN

photos: SAINT-GOBAIN FINLAND

Maritime environment demands a lot from insulation materials. For example, during an intercontinental crossing, they have to withstand both icy temperatures in Nordic waters and tropical climates within a very short time – without losing their insulating potency.

In addition, fire protection upon the seas is of great importance due to the sometimes limited possibilities and long delays in rescuing people. Against this background, it's no surprise that when a cruise ship is insulated, this can require up to 500,000 square metres of insulation.

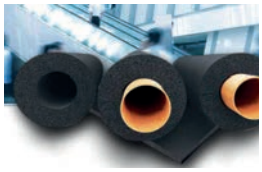
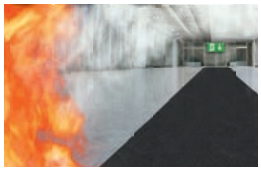
As an industry leader, Saint-Gobain has frequently drawn attention to the significance of effective and sustainable insulation in Marine & Offshore. Saint-Gobain's biggest hit product at the shipyards of late has been ISOVER ULTIMATE mineral wool which is produced through a unique and patented fiberizing process. However, as Saint-Gobain purchased Kaimann, one of Europe's leading manufacturers of elastomeric insulation products in 2018, the company's portfolio added some of the best flexible rubber insulation materials in the world.

ELASTOMERIC EDGE

Key Account Manager Herkko Miettinen from Saint-Gobain remarks that mineral wool and elastomeric are similar in the sense that they offer first class insulation properties and energy savings.

"Elastomeric insulation prevents condensation very well and that's why it's in high demand in cruisers that naturally feature many cooling systems," Miettinen says, adding that another tar-

Black rubber is not the same as black rubber

Base Material	Temperature range	Halogen free	Low Smoke
Kaiflex ST	**Kaiflex EPDMplus**	**Kaiflex HFplus s2**	**Kaiflex KKplus s1/s2**
			
▪ Temperature range -40° C to +110° C ▪ Fire resistance ≥ 90 min. (DIN) ▪ Very flexible ▪ Easy installation ▪ Wide range of dimensions	▪ Temperature range -200° C to +150° C ▪ Solution for changing temperatures ▪ Suitable for low-temperature pipes (LPG or LNG)	▪ Low-smoke halogen free product ▪ Available with aluminium cladding	▪ Premium product ▪ Low-smoke ▪ Ideal for escape and rescue routes
Marine Certification: **IMO Modul B & D**	Marine Certification: **IMO FTP 2010, Part 5**	Marine Certification: **IMO Modul B & D**	Marine Certification: **IMO Modul B & D**

get group for elastomeric is LNG vessels, due to condensation management challenges as well.

According to Miettinen, as designers get to work on big projects such as a cruise ship, there are areas where mineral wool is a better fit – and areas where elastomeric products will do the trick.

"Planners have a very good handle on the application range and we offer support to find the best product in each case."

ENERGY MATTERS

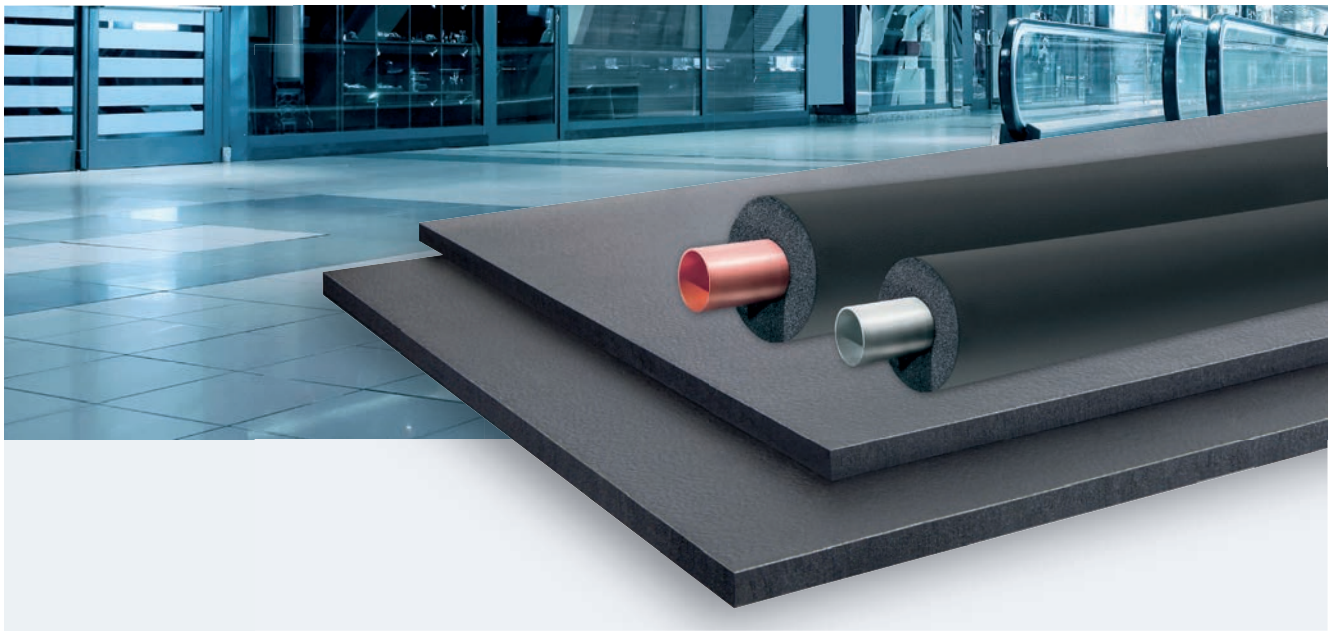
Energy consumption related to HVAC (Heating Ventilation and Air Conditioning) systems constitutes a large part of the total fuel consumption of a ship, up to 35 % on a cruise ship. Having high thermal insulation in the decks, bulkheads and ducts can have a significant impact on operating costs – and this is why major shipyards are eager to engage in close collaboration with Saint-Gobain.

"Our solutions are supplied to the big shipyards across the world, ranging from Meyer Turku to other key European shipyards," Miettinen says.

Collaboration is going strong even amidst the pandemic: Miettinen reports that shipyard challenges – such as lack of components – have been overcome, for the most part.

"Cruise ship industry is in pretty good form and so is the marine sector in general." ■

More information:
www.saint-gobain-marine.com
www.kaimann.com/ship-building
www.kaicalc.zub-systems.de



ENVIRONMENTALLY FRIENDLY BULK CARRIERS WITH WORLD-CLASS QUALITY

From 2017 onwards, ships heading to or from an EU port have been required to report their environmental impact thoroughly from fuel consumption, CO_2 emissions, transported cargo to time and distance of the transportation. While there are a variety of designs in the industry, top of class in effectiveness, annual savings and limiting the environmental impact are the Bluetech Finland bulk carriers.

Designed to provide the best overall cost efficiency in their class, Bluetech Finland guarantees a smooth process from the first discussions to the final delivery of the vessel. Currently available are standard designs that include general cargo carrier BT38 and bulkers Bluetech 42, 45 and 64.

All designs are based on the latest hydrodynamic research, using the top of the line CFD tools combined with extensive model testing and renown expertise. An efficient ship has a hull with a high block coefficient, giving more deadweight and cargo volume. Optimized aft and bow lines provide low resistance across the whole speed range and a high propulsion efficiency. In addition, the application of extensive FE analysis and optimized structural arrangements contribute to low steel weight.

Compared to the other bulkers on the market, Bluetech Finland carriers have outperformed other eco-bulkers in their class.

"According to comparison the average annual daily fuel oil consumption of our 42k and 45k bulkers at 10 knots is 14.4 mt, while the closest competitor comes at 15.8 mt per day at 10 knots. That's a 1.5 mt difference per day. Compared to other same size bulkers in the same owner fleet, Bluetech bulkers outperform them by 4.5 mt per day at 10 knots. The annual savings with our bulkers are between 150 000 and 450 000 USD. Annual emission reduction is to 3.500 mt per vessel", says Tommi Jansson, VP, Project Department at Bluetech Finland.

Several bulk carriers made with Bluetech Finland design are in use, and a handful more have been ordered recently – one of them being a 65k Ultramax, which will be built at Dong bac shipyard for Truong Minh shipping and will be designed together with Bluetech Finland's local partner, Visec. The vessel will also fulfill EEDI III requirements with traditional engine configuration. ■

More information: www.bluetechfinland.com

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KEY THEMES 2022

- Future of knowledge and know-how, including the international Intelligence Hunt student Talent Team Finals
- Digitalization
- Green investments and decarbonization
- Digital transformation
- Maritime supply chains

Finnish Marine Industries

photo: UNPLASH

ABB Oy
Adwatec Oy
Aker Arctic Technology Oy
Alfa Laval Aalborg Oy
Allstars Engineering Oy
ALMACO Group Oy
Antti-Teollisuus Oy
Apex-Marine Oy
AQ Trafotek Oy
Atexor 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
FSP Finnish Steel Painting Oy
Furuno Finland Oy
Groke Technologies Oy
Halton Marine Oy
Helkama Bica Oy
Helsinki Shipyard Oy
I.S. Mäkinen Oy
ISOVER (Saint-Gobain Finland Oy)
Insinööritoimisto Comatec Oy
Jalmare Oy
Jukova Corporation Oy
Kaefer Oy
Kavika Oy
Kemppi Oy
Koja Oy
KONE Hissit Oy
Koneteknologiakeskus Turku Oy
Kongsberg Maritime Finland Oy
Kvaerner Finland Oy
Laivasähkötyö Oy
Lamor Corporation Ab
Oy Lautex Ab
LED Tailor Oy
MAN Energy Solutions Sverige AB, Finland Branch
Marioff Corporation Oy
Merima Oy
Mesekon Oy
Metalliasennus Huuhka Oy
Metos Oy Ab
Meyer Turku 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 Oy
R&M Ship Technologies Finland
RR Site Service Oy
Saajos Oy
S.A. Svendsen Oy
SBA Interior Oy
SeaKing Oy
Shipbuilding Completion Oy
SSAB Europe Oy
Steerprop Oy
Oy Stellio Ab
Suomenlahden Telakka Oy
TEVO Lokomo Oy
The Switch Engineering Oy / YASKAWA
Turun Korjaustelakka Oy
Uudenkaupungin Työvene Oy
Vallila Marine Oy
Valmet Oyj
VTT SenseWay Oy
Wiima Logistics Oy
Wärtsilä Oyj Abp

company directory

photo: UNPLASH

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ABLEMANS OY

Härjänkurkuntie 46
FI-21250 Masku
Finland
Phone +358 2 439 6500
ablemans@ablemans.fi
www.ablemans.fi

Contact Person
Marko Ruostekivi
Managing Director
marko.ruostekivi@ablemans.fi

Facts & Figures
Turnover: EUR 9 million
Personnel: 8
Established: 1987

Specialty Areas
Steel and Aluminium structures.
Shipbuilding – Shiprepairing – Conversions – Outfitting.

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: 50
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.
- Specialized 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 6 7

KOJA MARINE

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

Contact Person
Esko Nousiainen
Director
esko.nousiainen@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.

2 3 6 7

MARINE DIESEL FINLAND OY

Eteläkaari 10
FI-22420 Lieto
Finland
Phone +358 20 510 6900
Fax +358 2 253 9121
marine.diesel@wihuri.fi

Contact Persons
Jukka Uitto
Mika Aaltonen

Facts & Figures
Turnover: EUR 7 million
Personnel: 50
Established: 1992

Specialty Areas
Main- and auxiliary engine repair and service. Total overhaul of all type of engines. Turbocharger service and repair. On-site machining. Fuel injector testing also for solenoid operated devices. Well-equipped workshop in Lieto. John Deere authorized service and repair, Kemel seals and bearings

1 8

MEYER TURKU OY

Telakkakatu 1, FI-20101 Turku, Finland
Phone +358 10 6700
www.meyerturku.fi

Contact Person
Tapani Mylly, Communication Manager
tapani.mylly@meyerturku.fi

Facts & Figures
Net sales 1 035,90 €
Personnel: 2 539

Subsidiaries & Representatives
Piikkio Works Oy, Shipbuilding Completion Oy, ENG´nD Oy

Specialty Areas
Meyer Turku employs over 2,000 persons and specializes in building highly complex, innovative and environmentally friendly cruise ships, car-passenger ferries and special vessels. Together with two other Meyer owned shipyards in Germany, Meyer Werft in Papenburg and Neptun Werft in Rostock, Meyer Turku is one of the world's leading cruise ship builders. The successful shipbuilding tradition in Turku has been continuing since 1737. The company is currently building cruise ships for Carnival Cruise Lines and Royal Caribbean International. The order book includes six large cruise ships and reaches until 2026.

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
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.

4

OY LAUTEX AB

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

Contact Persons
Jukka-Pekka Tuominen, Sales Manager,
jukka-pekka.tuominen@lautex.com Phone +358 44 704 6353
Antti Holappa, Sales Manager,
antti.holappa@lautex.com Phone +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.

4

PAROC OY AB

P.O. Box 240
Energiakuja 3
FI-00181 Helsinki
Finland
Phone +358 46 876 8000
technical.insulation@owenscorning.com
www.paroc.com

Contact person
Milosz Gulinski
milosz.gulinski@owenscorning.com

Subsidiaries & Representatives
In 2018, Paroc joined Owens Corning.

Specialty Areas
Stone wool insulation products for fire, heat and sound insulation to shipbuilding and offshore industries

9

PEDRO OY

Tehdastie 4-6
FI-15560 Nastola
Finland
Phone +358 3 873 900
Fax +358 3 873 9010
info@pedro.fi
www.pedro.fi

Contact Person
Juha Lehtonen
Managing Director
juha.lehtonen@pedro.fi

Facts & Figures
Established: 1988

Specialty Areas
PEDRO has over 30 years expertise of furniture to luxury cruisers, hotels and homes. Theatre seats and sofas to cruisers AIDA, Carnival, Color Line, Costa, Hapac Lloyd, RCCL & TUI Cruises.

2 9

POCADEL OY

Korpelantie 229
FI-21570 Sauvo
Finland
Phone +358 50 435 2638
pocadel@pocadel.fi
www.pocadel.fi

Contact Person
Maria Perrakoski
maria.perrakoski@pocadel.fi

Facts & Figures
Established: 1997

Specialty Areas
Light weight B15 – A60 fire rated glass doors and partitions for marine and offshore use. Product range includes hinged doors, sliding doors, extra wide tandem doors, glass walls and partitions.

2 7

PORKKA FINLAND OY

P.O. Box 127
FI-3310 Tampere
Finland
Phone +358 20 555 512
contact@porkka.com
www.porkka.com

Contact Person
Petri Hiilloste
petri.hiilloste@porkka.com

Facts & Figures
Turnover: EUR 30 million
Personnel: 170
Established: 1962
Parent Company: Festivo Finland Oy

Specialty Areas
Provision stores. Walk-in rooms in galleys/pantries. Insulated doors. Insulated fire doors A60, for cold stores. Marine cold cabinets and counters.

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

9

PORT OF NAANTALI

Satamatie 12
FI-21100 Naantali
Finland
www.portofnaantali.fi

Contact Person
Yrjö Vainiala, Port Director COO
yrjo.vainiala@portofnaantali.fi
+358 50 464 9915

Facts & Figures
Personnel: 19
Vessel calls: 1400

Specialty Areas
Naantali is one of the crucial TEN-T core Ports in Finland, which serves the trade in a wide range of the hinterland as well as the industry close to the port. Port has an excellent logistical location along European Route 18 and well-known Nordic Triangle & ScanMed traffic corridor. Port of Naantali is one of busiest ports in Finland, with annual cargo volume of more than 5 million tons and over 1,400 vessel calls. Port is one of the most important and busiest RoRo/Ropax ports for trucks and trailers in Finland & significant centre for liquid and dry bulk operations.

1 4 5 7

RENOTECH OY

Sampsankatu 4 B
FI-20520 Turku
Finland
Phone +358 10 830 1600
rt@renotech.fi
www.renotech.fi

Contact Person
Bob Talling, +358 50 558 1806
bt@renotech.fi

Facts & Figures
Turnover: EUR 1,5 million
Personnel: 10
Established: 1994

Specialty Areas
MED Certified products, B + D. GRG decorative wall and ceiling elements, mouldings and sculpture work. DGG light-weight gypsum board. Renopur decorative surface finishes, paint effects, marbling, wood graining, gilding, paintings and art work. Stonemix textured mouldings and finishes. Renofix non-combustible glues. Fireshield acoustic and fire proofing. RenoImage silk printing and 3-D release films. Acoustic flooring and floor screeds.

7

S.A. SVENDSEN OY

Valkjärventie 7 B
FI-02130 ESPOO
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

SAAJOS OY

Puistokatu 21
FI-08150 Lohja
Finland
www.saajos.fi

Contact Person
Tomi Lehtonen
Sales Director
+358 400 811 591

Facts & Figures
Turnover: EUR 7 million
Personnel: 30
Established: 1949

Specialty Areas
A-class fire doors, A60 and B15 sliding doors,
Saajos Oy.
B- and C-class fire doors,
Saajos AS.

2 4 9

SBA INTERIOR LTD

Hållsnäsintie 99
FI-10360 Mustio
Finland
Phone +358 19 327 71
sales@sba.fi
www.sba.fi

Contact Persons
Thomas Pökelmann, Sales Manager, thomas.pokelmann@sba.fi
Johan Fagerlund, Technical Director, johan.fagerlund@sba.fi

Facts & Figures
Turnover: EUR 18,4 million
Personnel: 119
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
Pasi Suvanto, VP Sales, pasi.suvanto@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.

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

1 2 7

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

2 4 6 7

TELESILTA OY

Telakkatie 6
FI-23500 Uusikaupunki
Finland
Phone +358 2 848 5500
telesilta@harjuelekter.com
www.telesilta.fi

Contact Persons
Joonas Puustelli, CEO
Jarkko Myllyniemi, Rauma Site Manager

Facts & Figures
Personnel: 35
Established: 1978
Parent Company: Harju Elekter (listed)

Specialty Areas
Marine industry electrification works. Challenging turn-key projects for the electrical, navigation and automation systems including design, system deliveries, project management, installation, commissioning and maintenance. Expertise working in every major shipyards in Finland.

NOTES

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

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Metropolitan Expo, Athens Greece
www.posidonia-events.com