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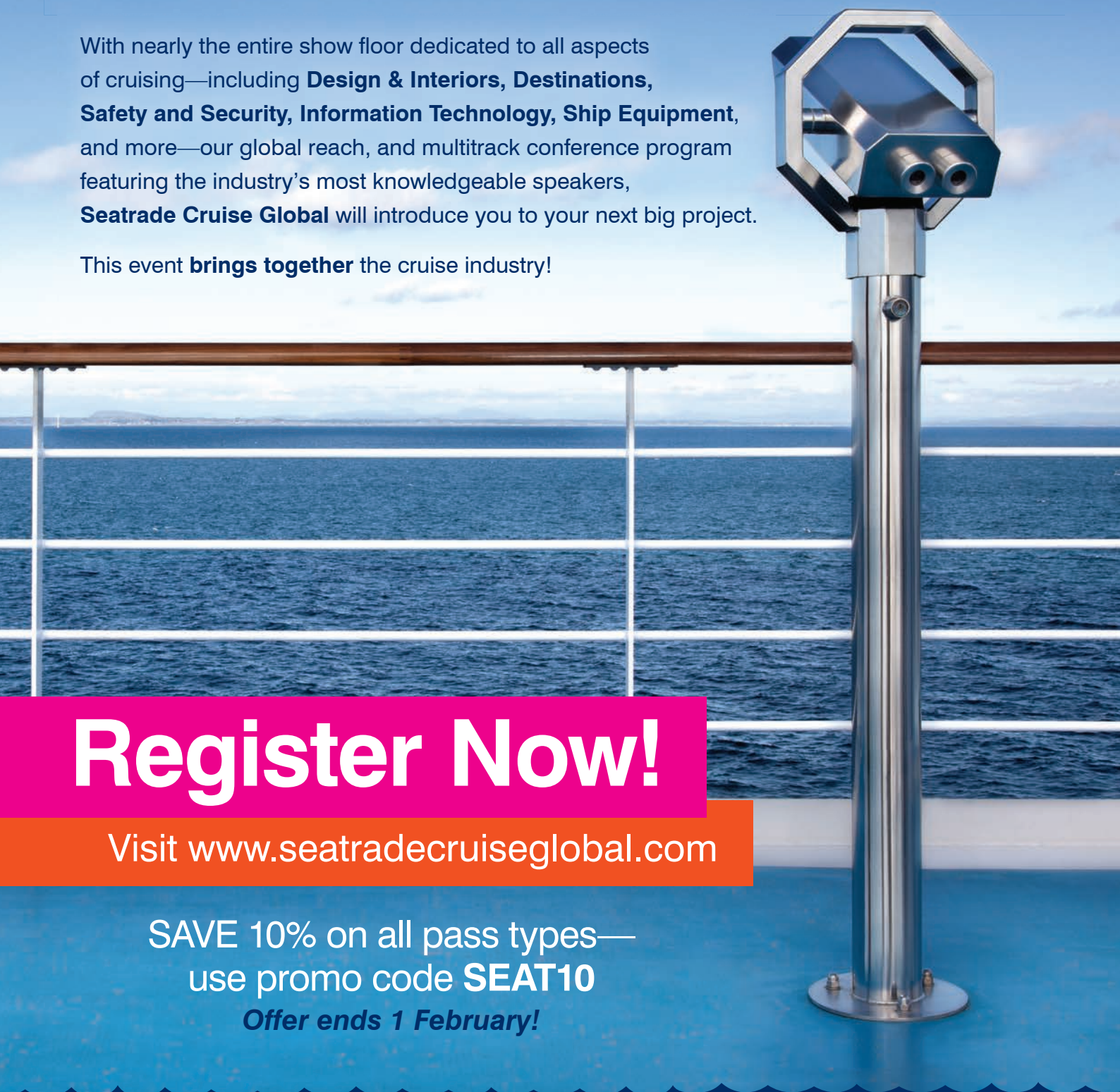

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ICE AGE II

On September 28th, 2016, a powerful newcomer joined the Finnish Icebreaker fleet, as the icebreaker Polaris was delivered to the Finnish Transport Agency. A true masterpiece of Finnish shipbuilding, Polaris is the world's first LNG-powered icebreaker with new, innovative design in the vessel's hull form and propulsion unit arrangement. This prototype vessel, built at Helsinki Shipyard, is designed to serve for at least 50 years in icebreaking, oil recovery and sea rescue operations. Polaris has also been a long time coming – we haven't seen a Finnish icebreaker with similar size range since 1994.

Polaris serves as a great reminder of the long traditions of Finnish arctic seafaring and marine technology. The know-how of winter seafaring has been – and still is – a crucial lifeline for Finland, as about 80 % of the country's foreign trade is transported by sea. Finland is also the only country in the world whose sea around the ports can be frozen during every winter. Add to this, the shallow and fragile Baltic Sea, and you see the catalyst for the Finnish drive to develop innovative Arctic technology and know-how.

Looking at the Finnish economy, it is clear to see that marine industry is one of the most internationalised and global business branches in the land. The Finnish marine industry binds together a strong network of SMEs that keep extending their business reach internationally. The Finnish marine industry involves many global brands, products, and companies which set the course of world markets.

One example of the innovative nature of Finnish marine industry is the autonomous maritime ecosystem programme, which was also launched in September. The aim of the programme is to provide world's first unmanned maritime products, services and vivid ecosystem by 2025 – including testing of autonomous vessels in the harsh weather conditions in Finland.

In line with the Finnish digitalisation strategy, the programme will take Finnish maritime forward and pay tribute to the centennial year of 2017, as the Finns come together to celebrate 100 years of independence. Co-inciding with the milestone year, Finland also takes over the two-year chairmanships of the Arctic Council and Arctic Economic Council. The proposed themes of the programme for Finland's chairmanship of the Arctic Council include e.g. climate change in the Arctic and wellbeing in arctic communities. These chairmanships give a great opportunity for the maritime industry – especially its Arctic branch – to further upgrade its profile and expand its expertise.

PETRI CHARPENTIER

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RAUMA REDEMPTION

RAUMA MARINE CONSTRUCTIONS AND SEASIDE INDUSTRY PARK SHOW THE WAY INTO THE FUTURE FOR THE OLD SHIPYARD TOWN

by: SAMI J. ANTEROINEN

photos: RAUMA MARINE CONSTRUCTIONS OY (RMC)

Rauma has a centuries-spanning tradition of building ships. Located on the west coast of Finland, Rauma shipyard and maritime cluster have become known for their extensive experience in building and servicing car & passenger ferries and specialised vessels such as icebreakers and naval vessels. The newest "incarnation" of the Rauma spirit is Rauma Marine Constructions (RMC), formed in 2014.

Rooted on the positive outlook for small and medium sized vessels, RMC aims to continue the strong shipbuilding legacy in Rauma with a new project-oriented and partner network approach. The idea is that for every commission RMC creates a

"This approach allows RMC to eliminate all non-value adding elements.

In June 2016, the news came in that RMC had been awarded with a contract to build a 158-metre long passenger-car vessel for the Danish ferry operator Mols-Linien.

"The Finnish Defence Forces trust our know-how regarding the construction of new naval combat vessels and this is a big and significant step for RMC," says Heikki Pöntynen, CEO of RMC.

> **"More than 80 suppliers responded to the request.**

uniquely specialised project team from its wide partner network, based on the individual project needs.

According to the company, this approach allows RMC to eliminate all non-value adding elements while retaining excellent flexibility. At the same time, all partners are fully committed to the project's success from the very beginning all the way up to vessel delivery, with RMC acting as the project manager.

DEFENCE DEAL

The latest proof of the effectiveness of the concept was received in September 2016, as it was announced that Rauma Marine Constructions will build four vessels capable of operating in ice conditions for the Finnish Defence Forces.

Under its 'Squadron 2020' agenda, the Logistics Command of the Finnish Defence Forces will ensure – in cooperation with RMC – its shipyard capacity, security of supply and other building prerequisites for combat vessels. Originally, more than 80 domestic and international suppliers responded to the request for information regarding Squadron 2020.

While nothing beyond a letter of intent has materialised yet, it is known that Squadron 2020 vessels are constructed for homeland defense purposes and the detailed composition of the combat system will be clarified as planning goes forward. According to Heikki Pöntynen, CEO of RMC, the impact on jobs should be considerable, too.

"The Finnish Defence Forces trust our know-how regarding the construction of new naval combat vessels and this is a big and significant step for RMC. If the project is realised, the impact on job creation in Rauma will be extensive and long-term," says Pöntynen.

DANISH FERRY IN THE WORKS

Previously, in June 2016, the news came in that RMC had been awarded with a contract to build a 158-metre long passenger-car vessel for the Danish ferry operator Mols-Linien. The order's market value is around 68 million euros, making it the

> **"The order's market value is around 68 million euros.**

most important ship order for RMC since its founding.

The collaboration with Mols-Linien also send a strong signal that international agents in the industry trust Rauma's expertise, too. Heikki Pöntynen comments that the contract guarantees full employment to RMC for two years and gives the company the possibility to improve the shipbuilding industry in Rauma in the long run.

"We are making good progress with planning, and steel-cutting will start in March 2017," says Pöntynen, adding that everything is running according to schedule. The vessel will be delivered in June 2018.

The ferry service between Bornholm island in Denmark and the mainland will commence in September 2018. The entire ship will be built in Rauma and it will provide RMC 1,000 man-years worth of labour.

REINVENTING RAUMA

Hearing the news, even then-Minister of Economic Affairs Olli Rehn took notice, commenting that the order is "proof of the Finnish shipbuilding industry's ability to be renewed" as well as its capacity to adapt to shifting expectations and demands of different markets.

In the City of Rauma, it felt like redemption. For a community that considers themselves to be ship-builders through-and-through, this second chance seemed heaven-sent. Looking at ferries alone – the Rauma shipyard has constructed over 40 ferries over the years – it is clear that making ships is deeply integrated into the local DNA.

Furthermore, the City of Rauma has recognised the need to keep developing the local know-how, pushing it to new directions. As a consequence, an industrial park for heavy industry – by the name of Seaside Industry Park Rauma – was launched in the spring of 2014. Located on a site where the shipyard previously

Heikki Pöntynen comments that the 68-million-euro contract gives the company the possibility to improve the shipbuilding industry in Rauma in the long run.

operated, the industrial area offers companies an effective operating environment in which to carry out their business.

"Right now, we have 33 companies here in the park," says Managing Director Timo Luukkonen from Seaside Industry Park in November.

THE TOTAL PACKAGE

Possessing an excellent location for logistics – situated by the sea and next to the port, with good road and rail connections – Seaside Industry Park Rauma has the infrastructure in place to take it to the next level. The area is particularly suited for heavy industry requiring space, dry dock, cranes and other industrial equipment. Furthermore, by utilising a common infrastructure and services, companies benefit from economies of scale and share costs.

Built largely on the shoulders of industry pioneers – RMC, Rolls-Royce, Steerprop and Logistikas – the Park offers also SMEs opportunities which would be difficult or impossible to implement alone.

"Especially the small and medium size companies see the park as a kind of a business enabler," confirms Luukkonen.

And the big players are in fine form as well – for example, Rolls-Royce announced in June that it is making a € 57 million investment in the production of propulsion devices at Rauma. ■

"This second chance seemed heaven-sent.

Bluetech Finland and RMC shipyard cooperating in innovative projects

by: MERJA KIHL AND ARI MONONEN

Established in 2013, Bluetech Finland Ltd specialises in various kinds of ship design and related customer projects. They include the development of fuel-efficient ships, as well as design and engineering services for fixed and floating structures.

"Bluetech has taken part in many of the Admares Ltd projects built at Rauma Marine Constructions (RMC) shipyard. One example is the Hotel Burj Al-Arab Terrace resting on top of piles in Dubai," says Mr. Antti Metsä, Managing Director of Bluetech Finland Ltd.

"The platform body is made of steel like a ship hull. We designed the structures and the HVAC system and analysed the lifting capacity of the grand blocks."

The terrace is an offshore structure utilised as an outdoor leisure facility annexed to the world renowned hotel. The sail-shaped hotel itself provides seven-star luxury accommodation. Bluetech also delivered a number of thermal, wave-load and earthquake analyses needed to ensure the feasibility of the innovative new concept.

Another project built in Rauma is a large, 6,000 square-metre floating luxury villa for a private owner.

"The villa has no propulsion but otherwise it is an autonomous unit, like a ship. For example, it produces its own drinking water and has an electrical power plant. It also has its own sewage treatment plant. The pontoon, the steel structures, and various systems including piping were designed by Bluetech," explains Metsä.

"To continue the list of our special designs, there are several smaller floating villas – luxurious canal-borne summer cottages – also destined for the Middle East."

Bluetech Finland also participates in the newbuilding of RMC's new 158-metre RoPax ferry for the Danish shipowner Mols-Linie A/S. Bluetech won the contract for both the basic and for the production structural design of the entire ship.

"At present, the basic design and various CFD analyses for the ship are underway. Later on, we prepare for detail and production design and coordination," Metsä notes.

The ship is designed to carry trucks and other vehicles and passengers on the route between the Danish islands Bornholm and Sjaelland on the southern Baltic Sea.

Bluetech has previous experience of the design of cargo ships. The company has delivered several full-scope basic design packages for dry cargo ships and succeeded in making a breakthrough with a licensed 'standard ship' product while the cargo ship market was still booming a few years back.

"We have now expanded our expertise from cargo ship designs to various kinds of ship and marine structure designs. Our strong areas of expertise cover the hull surface design and the propulsion design, e.g. to improve energy-efficiency," recounts Metsä. ■

SIMPLY ICONIC

TURKU SHIPYARD NOW HAS A RECORD-BREAKING ORDER BOOK WITH TEN CRUISE SHIPS

by: SAMI J. ANTEROINEN
photos: ROYAL CARIBBEAN CRUISES LTD

The Turku shipyard has clearly borrowed a page or two from Lazarus' book. While just a couple of years ago, the shipyard was just about pronounced dead – along with the Finnish maritime industry – the shipyard has made a 180° turn under the ownership of the German powerhouse Meyer Werft. Now, under the name Meyer Turku, the Finnish shipyard is hard at work again, doing what it does best: building world-class cruise ships.

"Many of the Icon design elements are in very early stages.

With the new orders, Meyer Turku shipyard pushes past all previous achievements – including the "Golden Age" (2007-2009) which saw the construction of the world's largest cruise ships, Oasis and Allure of the Seas. In the photo: Oasis of the Seas, Allure of the Seas and Harmony of the Seas.

"Our common aim is to develop fuel cells to a level that allows their usage in a significant application to power the ship's hotel functions," outlines Jan Meyer, CEO of Meyer Turku. Photo from Mein Schiff 6 Keel Laying, Jan Meyer on the right.

The Turku shipyard is on a roll that is unprecedented in the history of Finnish ship-building: there are ten ships either under construction or waiting in line. The order book stretches up to 2024 which is also unheard of in the industry.

The latest good news hit in October as Royal Caribbean Cruises Ltd. and Meyer Turku shipyard announced an order for two next-generation cruise ships, to be

"The high-load order book enables the company to modernise Turku shipyard.

photo: MEYER TURKU OY

delivered in 2022 and 2024. The 200,000 GT cruise ships under the project name "Icon" will mark the beginning of a new breed of LNG-powered cruise ships with a number of innovations, such as an application of fuel cells for power generation, on board. Within the industry, fuel cells are viewed as a very energy efficient and clean way to generate electrical energy.

PUSH THE ENVELOPE

Richard Fain, chairman and chief executive officer of Royal Caribbean Cruises (RCCL), comments that with Icon class, RCCL begins the journey to "take the smoke out of our smokestacks".

It is no wonder that RCCL is turning to Turku and Meyer with this important step: after all, the fruitful partnership has created numerous groundbreaking ships such as Oasis, Celebrity Solstice, Quantum and Mein Schiff. Jan Meyer, CEO of Meyer Turku, perceives the new deal as an opportunity to advance the state of maritime technology with a new class of cruise ships.

Richard Fain, chairman and chief executive officer of Royal Caribbean Cruises (RCCL), comments that with Icon class, RCCL begins the journey to "take the smoke out of our smokestacks".

Harri Kulovaara, RCCL's chief of ship design, believes that fuel cells offer very interesting design possibilities.

"Our common aim is to develop fuel cells to a level that allows their usage in a significant application to power the ship's hotel functions," outlines Meyer.

TRENDING TECH

The introduction of fuel cells represents another dramatic step forward for the maritime industry, which has, so far, made only limited experiments using the technology. Harri Kulovaara, RCCL's chief of ship design, believes that fuel cells offer very interesting design possibilities. As the technology becomes smaller and more efficient, fuel cells become more viable in a significant way to power the ship's hotel functions.

"We will begin testing those possibilities as soon as we can, and look to maximise their use when Icon class debuts."

Royal Caribbean has been eyeing fuel cells for nearly a decade, and the company believes the technology is now at a stage of development that justifies investment. Kulovaara points out that there is a long lead time for Icon class, and RCCL will use that time to work with Meyer Turku to adapt fuel cell technology for maritime use. Additional regulatory standards also need to be developed for the technology, somewhere down the road.

But what other goods will the ship with the big bold name entail? RCCL says that many of the Icon design elements are in very early stages, due to the extra-long pipeline. The Icon ships are "likely" to accommodate approximately 5,000 passengers, but details are still being worked out. Icon is the first new ship class announced by RCCL since Celebrity Cruises' new Edge class, which debuts in 2018.

SMOOTH SAILING

With the new orders, Meyer Turku shipyard pushes past all previous achievements – including the "Golden Age" (2007–2009) which saw the construction of the world's largest cruise ships, Oasis and Allure of the Seas. As the order book now spans eight years, the shipyard can enjoy a level of sta-

bility never seen before, and, also secure a smooth production ramp-up. The Turku shipyard believes that the long horizon creates a unique opportunity for the shipyard (and the entire Finnish maritime cluster) to invest and develop their capabilities with a long-term strategy – and achieve critical new leaps in technology, as well.

According to Jan Meyer, the high-load order book enables the company to modernise Turku shipyard into a "data-driven ship factory" and grow it to a new level 50% above the all-time high.

"With our investments of more than 75 million EUR, we are investing more in Finland than any other company in our industry. Both the new ship orders as well as our investments will provide a lot of good work for many other Finnish companies and for our own growing team," Meyer points out.

BANKING ON PEOPLE

In addition to the 75 million EUR already announced, there are upcoming investments on the drawing board. While upgrading machinery and IT systems of the yard, Meyer is also investing heavily in people and is well on its way to increasing the number of employees from around 1,300 in 2014 to 1,800 in the near future. The total employment effect (which includes the numerous specialised subcontractors) is estimated to be larger than 15,000.

> "Meyer is also investing heavily in people.

Jan Meyer observes that this is "a very interesting time" for the shipyard's specialists – the entire way of operating at the shipyard is being recreated and product technology is retooled in the same vein.

It is also noteworthy that Meyer Turku is fast building a reputation as the go-to shipyard when it comes to LNG-powered cruise ships. It was only in September that Meyer Turku struck a deal with Carnival Corporation for two new, 180,000 GT cruise ships that are powered by LNG. In fact, Carnival has its own next-gen "green cruising" concept built around the use of LNG. ■

Maritime advances push the classification societies to renew their operations

by: SAMI J. ANTEROINEN

photos: ROLLS-ROYCE PLC.

Maritime industry is dealing with new, more environmental technologies and fuels – and classification societies need to keep up with the times.

photo: TALLINK SILJA

(The keel laying of Tallink Megastar in Meyer Turku shipyard)
"In Finland, the situation with regards to cruise ships is very good, but offshore is not enjoying favorable winds just yet," Niklas Rönnberg from Lloyd's Register says.

Maritime industry is dealing with new, more environmental technologies and fuels – and classification societies need to keep up with the times. Similarly, the classifiers keep a keen eye on the shipyards' capacity: if there are many vessels under way, this promises work for the classification societies.

Niklas Rönnberg from Lloyd's Register comments that maritime is facing dire straits in many countries, with e.g. China and South Korea having to slow down.

"In Finland, the situation with regards to cruise ships is very good, but offshore is not enjoying favorable winds just yet," Rönnberg comments.

"Globally one can say that shipyards are facing challenges and this is naturally reflected in the classification societies' business." Rönnberg is of the opinion that the current lackluster situation will continue for 3–4 more years.

> **"The classification game is changing.**

CHINA GOES SOLO

Also, the classification game is changing, with, for instance, China Classification Society (CCS) introducing its own standards for cruise ships that will be formally adopted for use in January 2017.

CCS is launching its own standards, hoping to bring more transparency in the design technology of cruise ships and more diversified designs apart from the Western style dominating the market. With China

needing seven to 10 new cruise ships every year, the national classifier considered the time ripe to introduce its own standards.

From the looks of it, no real revolution is expected here: the Chinese standards aim to emphasise passenger safety, define requirements for the cruise experience and ensure public health – much like its Western counterparts.

> **"It is possible that cyber certification will soon become a legal requirement.**

CYBER PIRATES ON HIGH SEAS?

The trying times give the classification societies opportunities to work on their processes and learn new technologies. One new area is cyber-safety on the seas. In recent years, cyber-attacks have become more frequent and more sophisticated, with the threat becoming a board level preoccupation for the marine sector.

Cyber security is becoming an increasingly important element of the risk profile of critical assets that are connected between ship and shore. The Baltic and International Maritime Council (BIMCO), the International Maritime Organization (IMO) and the United States Coast Guard (USCG) are all developing guidance and regulation to address these challenges.

Lloyd's Register announced a collaboration with cyber expert QinetiQ in September 2016 with an aim of increasing the level of security of cyber-enabled ships. A pilot project with GasLog, an international owner, operator and manager of LNG carriers, seeks to tailor methodologies for LNG vessels.

photo: LLOYD'S REGISTER EMEA

"Globally one can say that shipyards are facing challenges and this is naturally reflected in the classification societies' business," says Niklas Rönnberg from Lloyd's Register.

TOTAL SYSTEMS APPROACH

Lloyd's Register is bringing its technical expertise and understanding of system-level risk to the project in order to support maritime customers and other stakeholders in assuring their cyber security. QinetiQ, having been an advisor for Royal Navy for decades, has plenty of maritime consultancy capability with regards to cyber security.

The collaboration aims at developing robust methodologies for readiness against existing and emerging standards, vulnerability and impact assessment and mitigation measures, all tailor-made for the maritime sector and the specific needs of customers.

Nick Brown, Lloyd Register's Marine & Offshore Director, has commented that a "total systems" approach is required in dealing with cyber issues. This means taking into account all systems on board and on shore – how they are designed and installed, how they connect, and how they will be managed.

ROBOSHIPS ON THE HORIZON

Presently, there are number of factors putting pressure on the maritime industry to increase its focus on cyber security. It is possible that cyber certification will soon become a legal requirement for entering some territorial waters.

Furthermore, increased internet connectivity at sea may enlarge the window

In a future where autonomous and remotely controlled craft are commonplace, greater cyber protection will be crucial in ensuring chartered vessels cannot be taken off course by those with malicious intent.

of opportunity for criminal organisations to intercept confidential data such as the ship's position, its cargo, or its passenger list. In a future where autonomous and remotely controlled craft are commonplace, greater cyber protection will be crucial in ensuring chartered vessels cannot be taken off course by those with malicious intent.

The September announcement follows Lloyd's Register's recent launch of its first technical guidance for cyber-enabled ships, which provides the shipping industry with a route map to understanding the implications of digital technology. The company maintains that cyber-security is a core component alongside safety, autonomy, condition based maintenance and operational efficiency.

NETWORK POWER

While the certified cyber fleets are not here yet, there are many other areas where standards are gaining ground. In Finnish maritime, for instance, the end product – say, a cruise ship or an ice breaker – is all about network excellence. The shipyards, functioning as the master coordinators in these projects, have found it worthwhile to do business with subcontractors who have been "standardised".

> **"The shipyards are becoming even more and more networked.**

Olli Kaljala from Bureau Veritas notes that quality and environmental standards are now in demand among the subcontractors. "In some cases, such standards as the information security standard ISO27000 may also be applicable," adds Kaljala.

Kaljala points out that pursuing standards makes sense, since it's an effective way to learn how to do things better:

"This way, the companies are able to lay down the foundation for systematic improvement in their operations."

QUALITY RULES

According to Kaljala, as the shipyards are becoming even more and more networked, quality control continues to be a big issue. In the network model, one needs to get properly organised:

"It is critical to make sure that quality issues are not compromised at any point." ■

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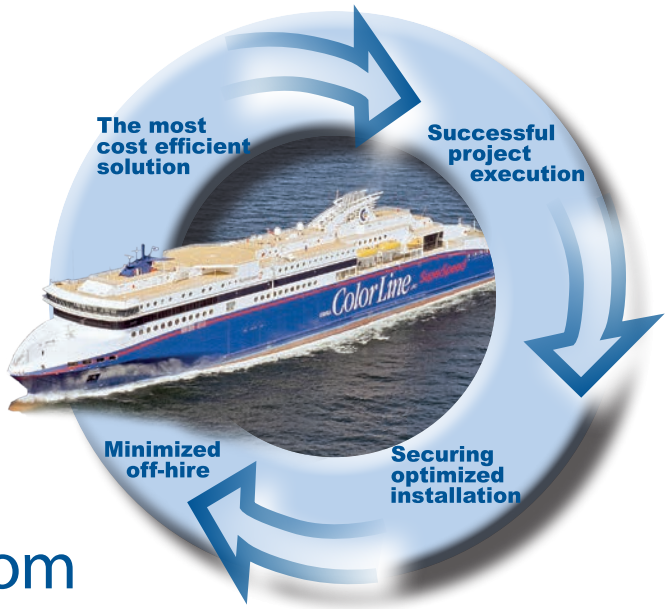

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Brand new Polaris icebreaker ready for action in the Baltic Sea

by: MERJA KIHL AND ARI MONONEN
photos: ARCTECH HELSINKI SHIPYARD OY

Arctech Helsinki shipyard gave the finishing touches to the Polaris icebreaker during the last days of summer, ordered by the Finnish Transport Agency. As a product of the latest high technology, the new vessel utilises LNG fuel (liquefied natural gas) to minimise engine emissions and fuel costs.

Polaris will replace some of the aging and outdated Baltic Sea icebreakers. The vessel, handed over to the customer on the 29th of September, has been designed to stay in operation for a span of at least 50 years.

"This type of propulsion arrangement is rather unique in ships," the CEO for Arctech Helsinki Shipyard Oy, Mr. Esko Mustamäki expects. The Azipod thrusters were manufactured by ABB.

The 110-metre *Polaris* vessel, prepared at the Helsinki shipyard in Hietalahti, is rather different from her predecessors. New and progressive technologies developed in Finland have been applied to her design and shipbuilding processes.

The ship was baptised on 11 December, 2015, in the tradional way with a champagne bottle. The name Polaris refers not only to the Polar Star but also to the ship's polar classification that empowers her to even break thick ice with old ice inclusions.

In the assessment of the shipbuilder Arctech Helsinki Shipyard Oy, Polaris is the most environmentally-friendly icebreaker in the world. The ship has been specifically designed for demanding ice-breaking operations in the Baltic Sea. Polaris has 16 members of running crew and 8 other beds.

"Polaris is rather different from her predecessors.

Polaris is capable of constant seafaring without stopping amidst regular ice of a thickness of 1.6 metres. The vessel can break ice to clear a waterway of a width of 25 metres at a speed of six knots amidst ice of a thickness of 1.2 metres.

The icebreaker can operate independently even in temperatures of –30 °C. In Baltic Sea waters, the vessel can reach an average escort speed of 9 to 11 knots. In open water, the vessel has a travelling speed of 17 knots.

In January 2016, Polaris was floated out from the covered dry dock for the first time. The first sea trials for the ship were arranged on 22 April, 2016.

TOWING DUTIES AND OIL SPILL RESPONSE WORK

The contract to build icebreaker Polaris was signed in February 2014. Shipbuilding work at Arctech Helsinki shipyard in Hietalahti was started in the autumn of 2014.

In January 2016, Polaris was floated out from the covered dry dock for the first time. The first sea trials for the ship were arranged on 22 April, 2016.

In Autumn 2016, Mr. Esko Mustamäki – the CEO for Arctech Helsinki Shipyard Oy – noted that the icebreaker Polaris was already being finalised.

"The concept for the vessel was outlined by the Finnish Transport Agency who ordered the ship. Polaris will operate as an icebreaker in the Baltic Sea region and will also be the most efficient vessel of the Finnish icebreaker fleet," Mustamäki says.

> **"It is a so-called multipurpose vessel.**

More detailed blueprints for the ship were drafted by Aker Arctic Technology Oy together with the Turku-based engineering office ILS Oy.

"Arctech then engaged in further design work and ensured that carrying out the shipbuilding process for such a vessel was possible."

Mustamäki emphasises that while the ship is essentially intended to be used as an icebreaker, it is a so-called multipurpose vessel.

"The ship can also be utilised as a rescue vessel, a tug, and an oil spill response ship in open-sea conditions. When a ship is built for official duty, it is generally fitted for oil spill response operations."

For oil destruction, the ship's equipment includes brush skimmers and a side-

mounted gate for recovering oily water into recovery tanks that have a total capacity of 1,400 cubic metres.

The ship has been designed according to 'zero emissions' principle so that no garbage or pollutants are allowed to spill into the sea. All solid and liquid waste materials are stored on board to be later discharged ecologically while at port. The ship's double sideboard and double bottom plates will protect the storage tanks while the ship is at sea.

The vessel's towing winch is 300 metres in length and has a maximum capacity of 110 tons.

AZIMUTH THRUSTER EVEN IN THE BOW

According to Mr. Mustamäki, the new vessel has been equipped with a combination of classic qualities from several generations of icebreakers.

"For instance, the ship features an unpainted stainless steel ice belt to reduce friction."

"Furthermore, Polaris has a novel propulsion system consisting of three ice-strengthened Azipod propulsion units, one of which is located in the bow of the vessel and the other two at the stern. This ensures good maneuverability in all ice conditions."

The Azipod thrusters were manufactured by ABB. Their power ratings are

2 x 6 500 kW at the stern and 1 x 6 000 kW in the bow.

"This type of propulsion arrangement is rather unique in ships," Mustamäki expects.

"Icebreakers have been equipped with bow-mounted propellers even in the past, but those could not be rotated to any horizontal angle as in the case of Polaris."

> "The vessel has been equipped with a combination of classic qualities.

LNG FUEL FOR BETTER ECOLOGY

The new icebreaker has a length of 110 metres and a width of 24.4 metres. The ship is the ninth icebreaker in the fleet of the state-owned Arctia Oy.

"Overall, it has taken more than 500 man-years to build the ship," says Mustamäki.

The ship is the world's first icebreaker to utilise LNG fuel (liquefied natural gas). Both of the ship's LNG tanks have a capacity of 400 cubic metres. Marine diesel oil can be used as an auxiliary fuel.

Polaris has been equipped with a diesel-electric power plant and propulsion system. The main engines are the 2 x 6 000 kW, 2 x 4 500 kW and 1 x 1 280 kW Dual Fuel engines manufactured by Wärtsilä.

"The Finnish Transporst Agency can fill up the ship's tanks with LNG fuel at various ports by utilising a fuel truck," Mustamäki mentions.

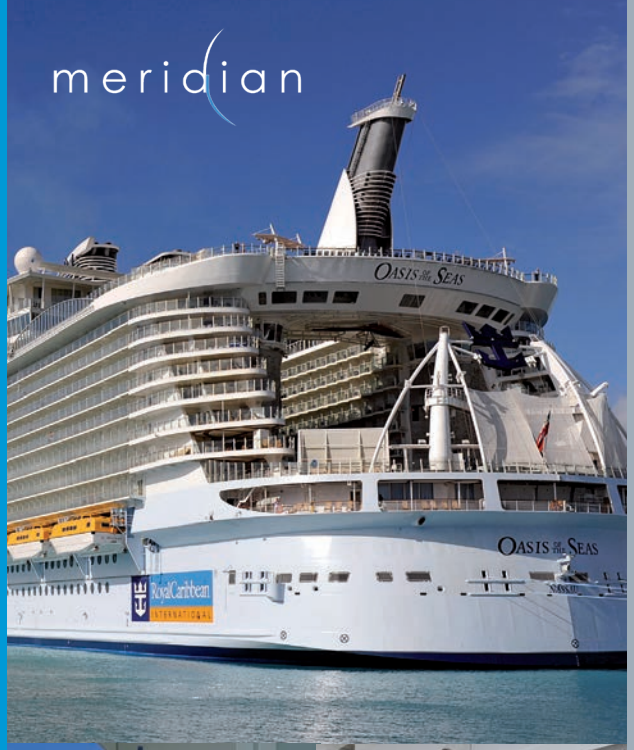
For the first sea trials, the ship was fuelled up at Port of Vuosaari in Helsinki.

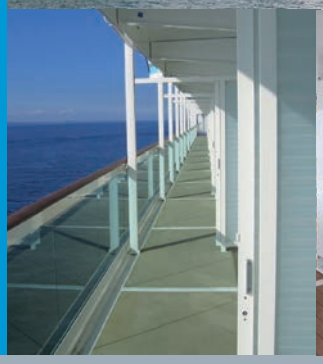
Polaris conforms to the IMO's forthcoming international Tier III emission requirements, as well as the special Baltic Sea regional requirements for limiting sulphur emissions.

Further old icebreakers in the Arctia's fleet are to be replaced by newer ones by the year 2029. The total cost for the fleet renewal has been estimated to be close to 1 billion euros. ■

Both of the ship's LNG tanks have a capacity of 400 cubic metres.

meridian





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Finnish maritime cluster preparing for further advancements in digitalisation

by: MERJA KIHL AND ARI MONONEN

photo: ROLLS-ROYCE PLC.

To highlight new marine innovations and the possibilities of increased use of ICT applications, the Finnish maritime cluster joined forces under the umbrella of the MERIT project.

Owing to the long-term proficiency and know-how of local engineers in the field of information and communication technologies, Finland is particularly well placed to achieve success in high-tech maritime ICT solutions.

The MERIT project was officially inaugurated in November 2014 to promote the national marine cluster's commercial potential – and also the new ICT technologies that are being developed for use within the marine industries.

The MERIT project is funded by the Ministry of Employment and the Economy in Finland and coordinated by the industry and trade office of the City of Helsinki.

In the first two years, the MERIT project has already proved to be a force to be reckoned with. Now that various digital applications are gaining headway in the maritime industries, MERIT has brought together knowledgeable people working both in maritime and ICT fields, thus providing new possiblities for interaction and networking.

MERIT has been scheduled for termination at the end of the year 2016. However, the markets for maritime ICT applications are on the increase. This will create new demand for technical innovations as well as for new cooperative projects. In these domains, the marine cluster has already established itself as a versatile operator.

CONSIDERABLE KNOW-HOW IN ENGINEERING AND ICT

To put ICT technologies and digitalisation to better use to benefit the maritime industries, quite a lot has been done up to now.

One example of the promising innovations is the *'Smart Port'* concept,

> **"Various digital applications are gaining headway in the maritime industries.**

Mr. Juha Ottelin, Logistics Manager at Kotka Mills, hopes that digitalisation will simplify maritime logistics operations and make shipping more flexible.

photo: STOCKSNAP.IO

designed to improve the quality and efficiency of port logistics.

Mr. Juha Ottelin, Logistics Manager at Kotka Mills, hopes that digitalisation will simplify maritime logistics operations and make shipping more flexible.

"These days, break bulk shipping requires EDI messaging *(EDI = Electronic Data Interchange)*. If shipping routes between predetermined ports need modification for some reason, such changes will be time-consuming and costly. Perhaps digitalisation may eventually replace EDI messaging and change things for the better," says Ottelin.

> **"Such changes will be time-consuming and costly.**

Throughout 2016, various existing and planned marine ICT solutions were discussed in numerous conferences and other events, e.g. in connection with the SLUSH exhibition for start-up companies.

Kymenlaakso University of Applied Sciences (KYAMK) published in early 2016 a study on the educational needs for enhancing innovation and know-how within the Finnish maritime cluster. The study was carried out as a part of the MERIT project.

Mr. Tomi Oravasaari, Project Manager at KYAMK, notes that Finland already has quite a lot of know-how in many fields related to the maritime industries.

"In particular, marine engineering and ICT technologies are amongst our strengths," he says.

"M.Sc. degree in marine engineering is available in Aalto University and B.Sc. in marine technology in Turku University

photo: STOCKSNAP.IO

"Digitalisation is on the rise – and this should be taken note of by the educational establishments," Mr. Tomi Oravasaari, Project Manager at KYAMK suggests.

of Applied Sciences. In addition, education for a degree in maritime engineering for seagoing personnel is carried out at four universities of applied sciences: Kotka, Turku, Rauma and Åland Islands. In addition, we have strong expertise on how to navigate ships in ice conditions."

On the other hand, more education would be needed for such fields as maritime economics and maritime law.

"At the moment it does not appear as if there was such a large-scale local need for specialised maritime lawyers, but it is

"Maybe the maritime cluster was not the first one to look for digitalization.

important we have our own expertise in this field so that we do not need to rely on foreign experts who may not know the local Finnish conditions."

"From the business viewpoint, a more comprehensive range of educational courses in maritime economics might also stand the marine cluster in good stead," says Oravasaari who also hopes for more possibilites for supplementary studies.

ENHANCED EDUCATION

Mr. Oravasaari affirms that the Finnish maritime cluster is quite knowledgeable in ICT matters and in fact quite capable to promote the digitalisation of the maritime industries.

"Maybe the maritime cluster was not the first one to look for digitalisation, but now the advantages of combining maritime and ICT knowledge are widely accepted in the maritime industries."

Consequently, there has been a tendency to hire more and more ICT experts to the marine industry companies.

"Digitalisation is on the rise – and this should be taken note of by the educational establishments. Aalto University already has e.g. marine IT minor studies available. It would be a good thing if similar course packages were available in other universities as well," Oravasaari suggests.

"The Finnish maritime industries have become aware of the business possibilities of maritime ICT solution and acted accordingly. As a country, we are already on a good level, but even better results could perhaps be achieved with a wider range of interdisciplinary education." ■

New innovations in propeller technology

by: MERJA KIHL AND ARI MONONEN
photos: ABB

Some of the leading manufacturers and designers of propeller and propulsion devices have come up with new hi-tech solutions for the maritime market.

Azipod propulsion – electric podded azimuth thrusters – has been on the market for 25 years.

“Numerous possible solutions were tested.

Azipod propulsion – electric podded azimuth thrusters designed by ABB Group – has been on the market for 25 years. In this design, the ship's propeller is connected directly to the motor shaft, with no tradional propeller shaft.

"Within the last two years, new and improved products have been added to the product family," says Marketing Manager Antti Lehtelä from ABB.

According to him, the new products have been designed to be utilised in connection with both high and low power Azipod devices.

"In 2015, a compact-sized Azipod thruster was launched. It is called Azipod D and it has proved to yield a better efficiency than its predecessors."

"With this new propulsion model, power levels up to 7 MW (megawatts) can be reached, either with asynchronous or permanent-magnet electric motors. The product is particularly suited to offshore applications."

The trick is in the motor cooling system. Based partially on water cooling and partially on internal air-circulation, the motor frame will yield more power and a better hydrodynamic efficiency than previously.

In time, Azipod D is expected to replace ABB's older "C" version.

NOZZLES TO IMPROVE HYDRODYNAMIC EFFICIENCY

ABB launched another innovation for a more powerful Azipod model in 2016: the XL version of the Azipod XO, utilising a linear flow propeller (LFP) Azipod.

"In this version, the propeller is surrounded by a nozzle module equipped with guiding plates, so that the water flow

photo: STEERPROP LTD.

"The new compact Steerprop CRP ECO LM combines an integrated permanent-magnet (PM) motor with the high efficiency of contra-rotating propellers (CRP) to bring the fuel economy to a whole new level," says hydrodynamist Hannu Jukola from Steerprop Ltd.

"Within the last two years, new and improved products have been added to the product family," says Marketing Manager Antti Lehtelä from ABB.

gets directed through the propeller in the right direction. This will improve hydrodynamic efficiency by 5 to 10 percent, depending on the application," Lehtelä explains.

While Azipod D version has already been sold for use in various ships, the Azipod XL will be officially launched for sales in early 2017 for power ranges up to 17.5 MW, with further models for other power ranges expected to follow.

Mr. Lehtelä notes that the R&D work for the Azipod XL took several years at ABB's marine laboratory in Helsinki, Finland.

"In the development stages, numerous possible solutions were tested. Various scale-model tests were required."

"The new products are more energy-efficient, more reliable and easier to access for service work than the older models. New technology will bring savings in fuel costs. Furthermore, environmental emissions will be reduced."

"Furthermore, a system for continuous measurement will provide telemetry data that can be transmitted via satellite links to ABB's three Integrated Operation Centres worldwide, making it easier to plan overhauls before any serious faults occur," recounts Lehtelä.

> **"Virtually any vessel will benefit.**

NEW-GENERATION DUCTED PROPULSOR

Steerprop Ltd. has launched a new generation of ducted azimuth propulsors with new features and upgraded design specifications. Solutions are available for various vessel types.

"Amongst the novelties is a new propeller nozzle type, HJ4. Steerprop's R&D team combined experience with new design and produced a nozzle profile that will yield better propulsion characteristics than older models," notes hydrodynamist Hannu Jukola from Steerprop Ltd., based in Rauma in Finland.

"Also, the new nozzle is easier and cheaper to manufacture than previous nozzle types, while no compromises have been made with the operational specifications."

The new propeller nozzle has been designed specifically for tugs, anchor handlers, push boats and other support ships that require high bollard pull.

"For these types of ships, the bollard pull characteristics are particularly significant. The HJ4 nozzle guarantees superior bollard pull without compromising the propulsive efficiency," Jukola says.

BETTER FUEL ECONOMY

According to Mr. Jukola, the new propulsor type has been created with modern design technology.

"Seen from the outside the unit may resemble previous versions, but they incorporate the latest hi-tech solutions."

"The shape of the underwater housing has been designed for optimised hydrodynamics. The R&D team utilised 3-D design tools in order to produce a more slender body and a smaller hub ratio than those of older models. Furthermore, the devices now have improved efficiency, endurance, and fuel economy, producing a new degree of high performance."

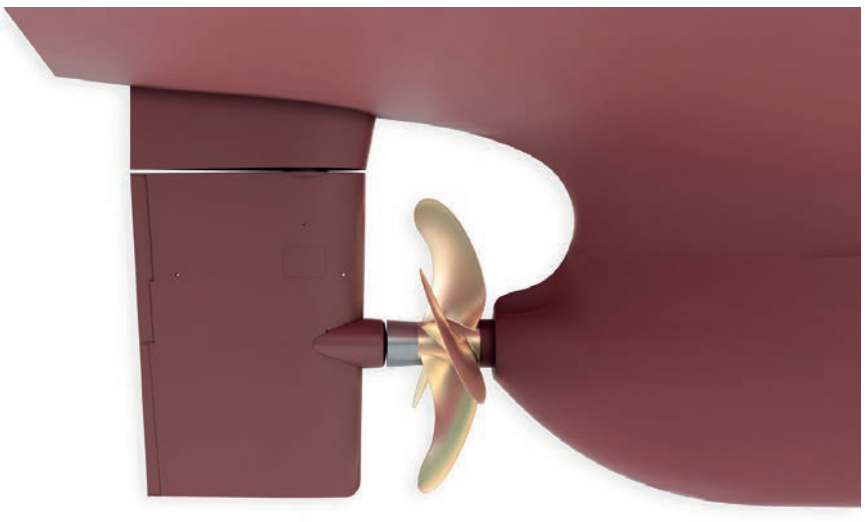
The underwater part of propulsor is now manufactured with steel cast housing for enhanced robustness.

"The cast also makes the device more cost-efficient to produce at the workshop," Jukola mentions.

It took approximately one year of R&D work to design the new propulsion unit. It has just been launched to the market, with first deliveries expected in 2017.

"In addition, we are in the process of developing a new solution for Ferries and RoPax ships as well as ice class vessels: the CRP ECO LM-unit. This innovation, incorporating an integrated perma-

photo: ROLLS-ROYCE PLC.



"By adapting the propeller and rudder into one propulsive unit, Promas offers increased propulsive efficiency and improved manoeuvrability," says Göran Grunditz, Manager of the Rolls-Royce Hydrodynamic Research Centre (HRC).

nent-magnet (PM) motor, enables space savings, eases the installation and maintenance and maximizes comfort onboard. The high efficiency of the PM-motor combined with that of contra-rotating propellers (CRP) will bring the fuel economy to a whole new level," promises Jukola.

IMPROVED MANOEUVRABILITY

Rolls-Royce has developed Promas, an integrated propulsion and manoeuvring system.

"By adapting the propeller and rudder into one propulsive unit, Promas offers increased propulsive efficiency and improved manoeuvrability", says Göran Grunditz, Manager of the Rolls-Royce Hydrodynamic Research Centre (HRC).

In general the efficiency gain is between 3 to 8 percent for single screw vessels and 2 to 6 percent for twin screw vessels.

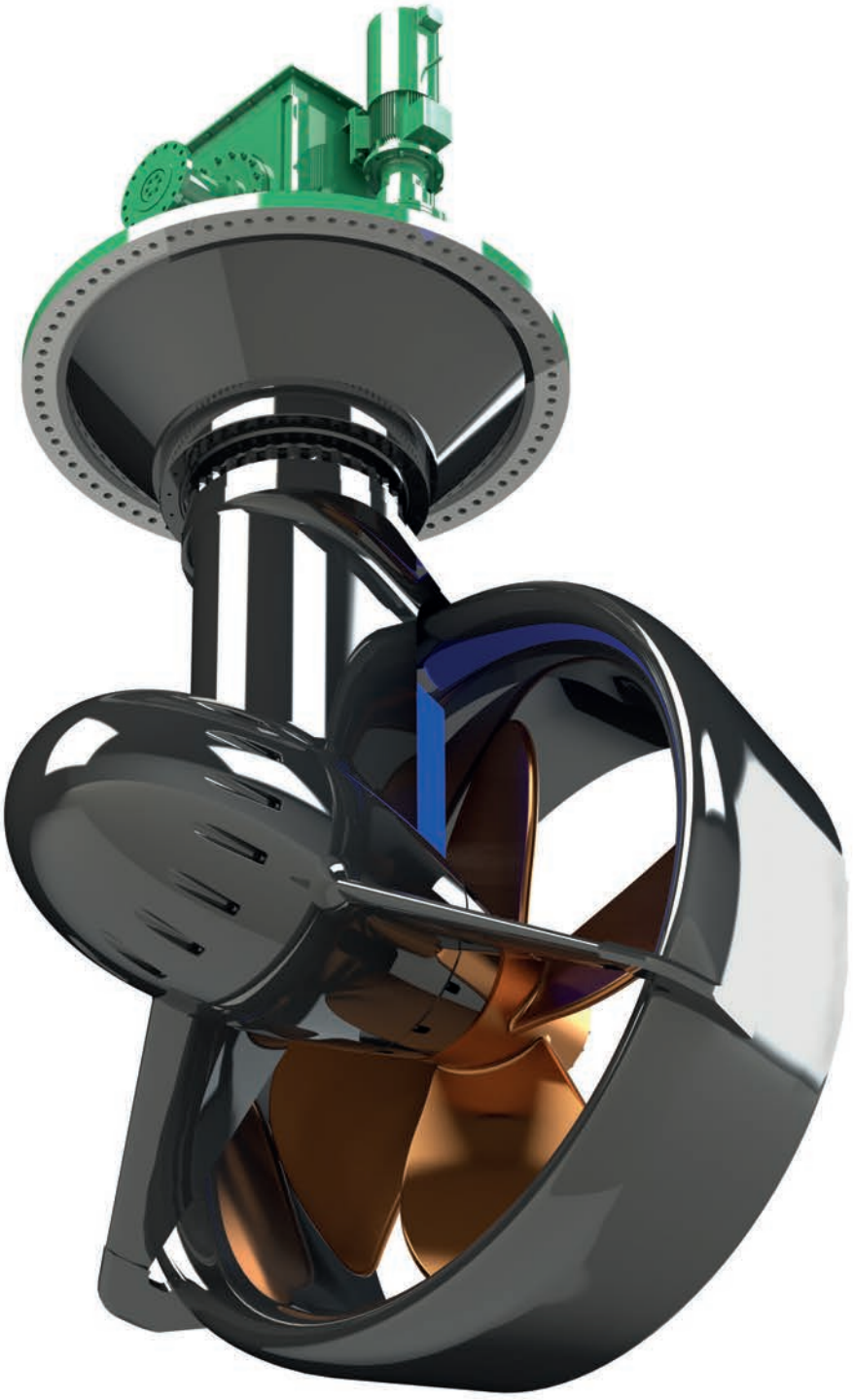
"Virtually any vessel will benefit. The position of the rudder in the slipstream and the skeg design can deliver further improvements," Grunditz points out.

The Rolls-Royce Promas system comes in a number of forms.

For newbuilds, there is the full Promas. One version of it includes a high efficiency propeller in a nozzle, with a hubcap and specially designed rudder.

Promas Lite is specifically designed for retrofitting to vessels with conventional shaftlines. The main difference in comparison to full Promas is that the existing rudder is normally retained, saving costs with only a small sacrifice in propulsive efficiency. ■

photo: STEERPROP LTD.



Steerprop Ltd. has launched a new generation of ducted azimuth propulsors with new features and upgraded design specifications.

ENSTO discloses your true colors

Colour is Nature's own powerful signaling system, the universal, non-verbal language. Colour is energy and the fact that it has a physical effect on us has been proved long time ago, also in experiments. On a wider level, the colours of our environment affect our behaviour and mood and also, it is established that objective colour´s harmony is a scientific reality. Architects and light designers deal with the colours of the light in order to communicate uncompromising standards, leadership, status of state-of-the-art products, cutting-edge design and anything that could be described as glamorous, sophisticated or ultra chic. For those reasons Ensto selected the market highest flux density RGB and RGBW LED emitters to provide a wide range of compact and powerful linear LED flexible strip, bars, edge-lit panels, down/up light and suitable control gear and colour mixing controllers. By adding the full spectrum white led (W) to the typical RGB chip base,

the designer can explore almost infinite gamut nuance by counting on an additional and very efficient light flux source. The W section of all ENSTO's RGBW fixtures can be selected from 2 700K to 5 500K to provide even more design flexibility. Moreover, following on to the tradition of being strongly customer oriented, ENSTO makes its team of expert solid state light engineers and designers available to jointly develop peculiar and astonishing solutions with its client. ENSTO RGB(W) products help you to spill your true colours out. ■

Good news for shipowners: Become Greener, Save Money and Increase Profit

Impending MARPOL Annex IV regulations like 0,5% sulphur, Tier III, PM, MRV, GHG requirements spell millions of dollars and doom for many ship owners facing a challenging economic climate.

The good news: emulsified fuel system developed by Blue Ocean Solutions (BOS) can help. Leading owners of container ships, car carriers, cruise ships, tankers, bulkers have been enjoying the benefits.

BOS Emulsified System System (EFS) offers a solution with compelling ROI of 1–3 years to ship owners seeking for solutions to address the key issues of:

- **Increasing profits:** BOS guarantees fuel saving of 2–5%. Actual fuel saving on reference ships have been more than 5% often. Fuel saving is reduction in carbon footprint and GHG.
- **Meeting low sulphur requirement using either:**
  - MGO solution: BOS EFS is the only solution that has proven record of operating with MGO without using expensive additives. The cost of MGO is about double that of HFO
  - Scrubber solution: BOS EFS compensates for the increased fuel consumption due to back-pressure; reduces soot coagulation caused by wet scrubbing; and reduces PM.
- **Meeting Tier III requirement using SCR/EGR:** BOS EFS reduces NOx by 20–30% at source in the combustion cylinder which means:
  - reduction of CAPEX by 20–30%
  - reduction of OPEX (i.e. reduce cost of urea and extend life of expensive catalyst by 20–30%)
  - reduction of space required for the SCR/EGR

However, adding water to the fuel may sound like a song of a snake oil peddlers to many. There have been too many frauds that have taken the trust away from the true benefits of emulsified fuel technology.

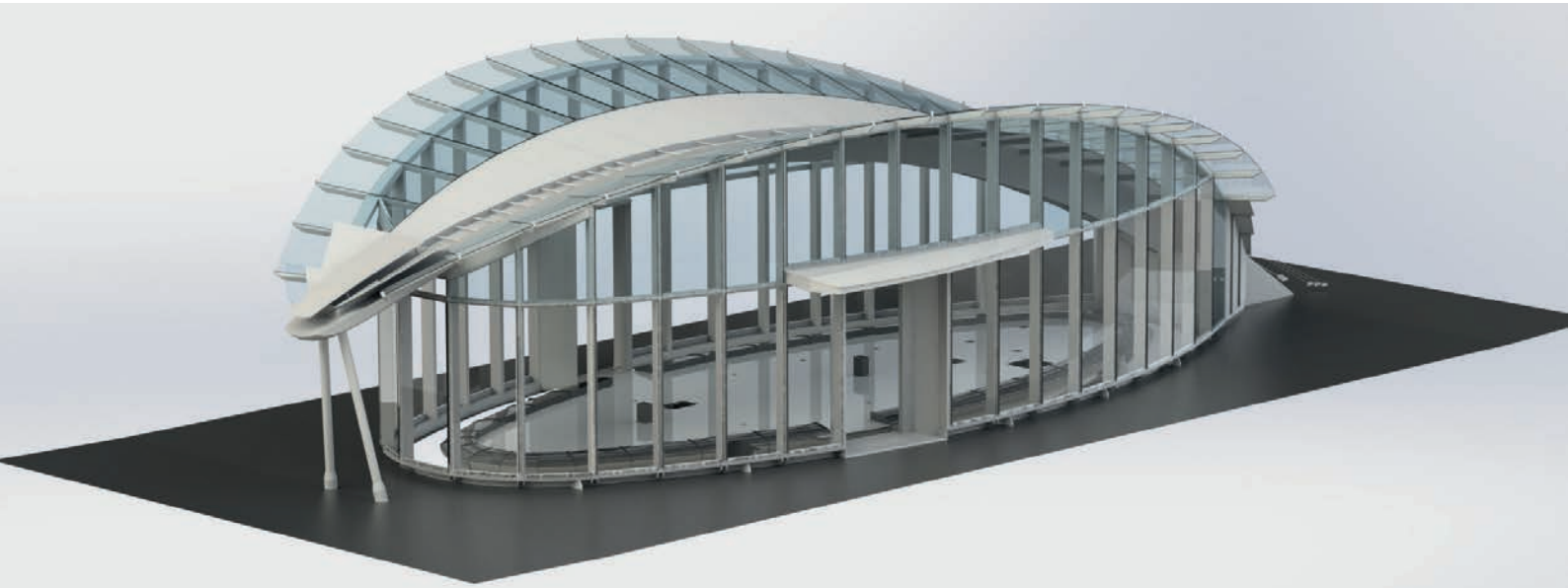
A water controller module of BOS emulsified fuel system.

The concept was initially studied at Newcastle University Upon Tyne in United Kingdom. The first sea trials for the concept started as early as 1980s. An updated version was launched by Blue Ocean Solutions in 2011 and the patented system has been in operation since then on several ships. Importantly, the system has repeat orders. American President Line, for example has the system on 12 ships already and has recently signed a maintenance service agreement with the company.

"Compared to the more complex solutions that have been used to create water-fuel emulsions, including the homogenizer and ultrasonic systems, the Blue Ocean Solutions emulsifier is incredibly simple and most importantly, reliable," Kaisa Honkanen from Blue Ocean Solutions explains. The system has just one moving part: the water pump.

"BOS EFS not only worked with heavy fuel oil (HFO), but also with previously thought impossible Marine Gas Oil (MGO) without additives. BOS is probably the only EFS supplier that has been able to keep pace with the latest marine engine technology by pioneering implementation on the latest marine diesel engines with electronic controls, performance monitoring instrumentations and auto-tuning."

Blue Ocean Solutions Pte Ltd. is dedicated to green marine engineering technology, providing more efficient fuel combustion and cleaner emissions. The company is a subsidiary of Keppel Offshore & Marine and has its head office in Singapore and offices also in Finland. Particularly experienced in emulsified fuel technology, Blue Ocean Solutions has been active in the market since the 2011. ■



Flexible design work useful in challenging maritime projects

by: MERJA KIHL AND ARI MONONEN

The Finnish engineering company Alvars Ltd. was founded in 2007. For a decade already, the company's core areas of expertise have included innovative design and R&D project services for the marine cluster.

"We often carry out challenging design projects for shipbuilders, e.g the shipyards in Turku and St. Nazaire – but we also engage in subcontracting projects ordered by the marine industry," says Mr. Mika Laiho, CEO for Alvars Ltd.

He notes that Alvars is specialised in large-scale glass structures in particular.

"Such demanding glass projects have included all-glass coverings on top decks of ships. For instance, the decorative glass structure installed in an outdoor area on an Oasis class cruiser was designed by us."

Another structure was a sliding glass roof for a different cruise ship.

"The glass elements were designed to slide on steel railings, enabling the roof to be opened for an area of 300 square metres in total. Similar glass structures may be utilised to provide coverings for, say, swimming pools," Mr. Laiho recounts.

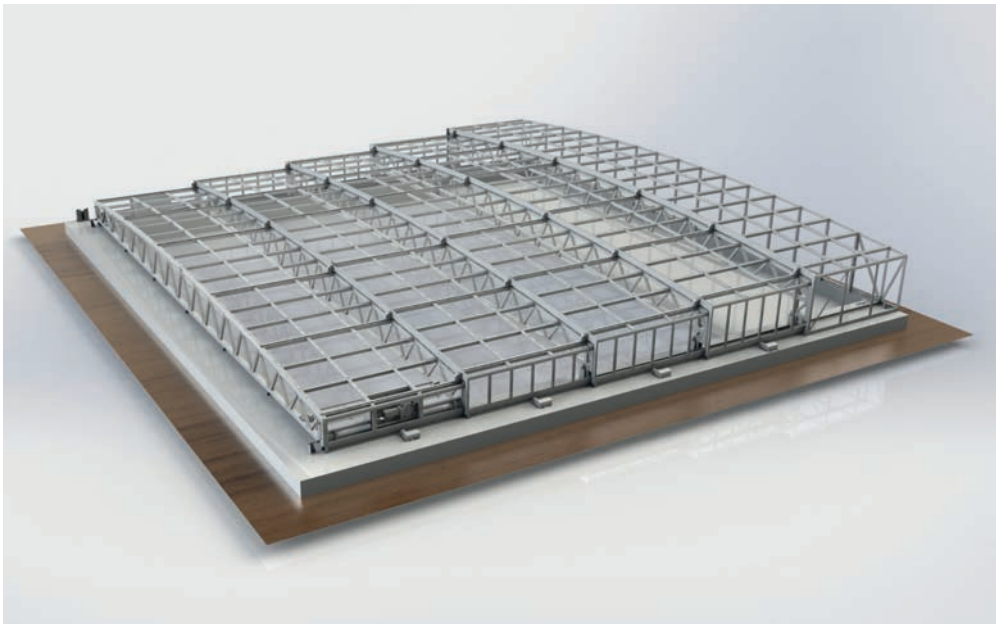
In this project, Alvars was responsible for detail design and structural analysis of the steel structure, as well as the glazing, outfitting, and interior design.

"Our resources provide efficient design services and solutions. We solve the structural concepts and design, do the math for the strength calculations, and carry out the engineering for the mechanics and operational principles – right through to 3D models and blueprints. Our partners in the field of machine workshops then manufacture the parts accordingly," Laiho explains the comprehensive process.

"With flexible configuration, even the main dimensions of the parts can be altered up until the final blueprints are about to be printed."

Furthermore, Alvars Ltd. is experienced in designing solutions for lifting and securing in marine transport.

"It is important that sea cargo is secured properly and that its structures will not get transformed while they are being lifted onboard," Laiho emphasises. ■



Marine safety research draws on benefits of digitalisation and new technologies

A broad range of experts met in Vantaa in November to discuss the Motorways of the Sea concept in the Baltic Sea, new navigation technologies, leveraging of digitalisation and other current research in marine safety.

This international seminar, organised by the Finnish Transport Safety Agency (Trafi) and the Danish Maritime Authority, is connected with the EU's Policy Area of Maritime Safety and Security under the EU Strategy for the Baltic Sea Region, in which Finland and Denmark are joint coordinators. The seminar focused on the results of recent projects of major importance for the Strategy, known as Flagship Projects.

"We can see at this seminar that maritime safety research currently has a keen focus on digitalisation and how it might be leveraged, from a wide variety of perspectives," says Director Sanna Sonninen from Trafi.

The purpose of the seminar is to bring together researchers and maritime operators, to prompt discussion on research needs, and to promote awareness and availability of research findings at Finnish maritime enterprises.

"We are pleased that the goals of the seminar were attained and that we were able to facilitate more widespread awareness of research in the field. We will continue to invest in maritime safety research both under the EU Strategy for the Baltic Sea Region and otherwise," says Sonninen.

The purpose of the EU's Policy Area of Maritime Safety and Security (PA Safe) related to the EU Strategy for the Baltic Sea Region is to make the Baltic Sea a showcase for maritime safety and maritime security measures. ■

Additional information is available from:
www.balticsea-region-strategy.eu

Rolls-Royce To Deliver Propulsion for new Danish Passenger Ferry

Danish ferry operator Mols-Linien has ordered a new passenger ferry from the Rauma Marine Constructions yard in Rauma, Finland. Rolls-Royce will provide the main propellers and propulsion control system to the new ship, which is planned to operate between mainland Denmark and the island of Bornholm, also known as the sunshine island of the Baltic Sea.

Rolls-Royce will deliver two units of a Promas system which integrates the controllable pitch propeller, a propeller hub cap, a rudder with bulb and a twisted leading edge into one hydrodynamically optimized unit. Gearboxes, steering gears, two tunnel thrusters in the bow and a control system are also part of the delivery.

Gary Nutter, Rolls-Royce, Director Products, said: "By adapting the propeller and rudder into one propulsive unit, Promas offers increased propulsive efficiency and improved manoeuvrability. It is chosen by both conventional single and twin screw ships, such as the passenger ferry to be constructed for Mols-Linien."

Included in the order are cavitation tests at the Rolls-Royce Hydrodynamic Research Centre (HRC) in Kristinehamn, Sweden. At this advanced facility, the performance of the combined propeller and rudder system (Promas) will be controlled and tested prior to manufacturing. The HRC includes a large cavitation tunnel where a model of the ship's hull, with the ordered propulsion set up, will perform in different operating conditions. Model testing can lead to important and cost-saving adjustments in a product or ship design.

Göran Grunditz, Rolls-Royce, Manager HRC, said: "Cavitation tests are digitally documented and log efficiency, cavitation performance and risk of cavitation erosion on the equipment. The tests provide us, the yard and the owner with useful data related to estimated future fuel consumption and can also help the owner when planning for future services intervals."

The Rolls-Royce Hydrodynamic Research Centre is one of the world's leading marine research facilities, specialising in the development of marine propulsion systems including the design and testing of propellers and water jets.

The new passenger ferry for Mols-Linien will have a capacity of 600 people and two decks totalling 1,500 lane metres for transportation of cars and trailers. It is planned to enter operation in September 2018. ■

Two Aker Arctic projects reach significant milestones

Aleksandr Sannikov, the first of two icebreakers under construction at Vyborg Shipyard for Gazprom Neft, was launched on Thursday, 24 November 2016, in order to make way for the hull assembly of the second vessel. Both icebreakers are scheduled for delivery in 2017 and will be deployed at the Arctic oil terminal operated by LLC Gazprom Neft Novy Port in the Gulf of Ob.

Aleksandr Sannikov and her yet unnamed sister ship are based on the Aker ARC 130 A concept developed by Aker Arctic. The design is a further development of the Baltic escort icebreaker concept that was originally developed for the Finnish Transport Agency. The new vessels will utilize similar propulsion concept consisting of three azimuth propulsion units: two in the stern and one in the bow of the vessel. The propulsion power has been increased to 21.5 MW and ice class to RMRS Icebreaker8 according to the operational requirements of the Arctic seas. The new icebreakers are designed to break 2 m thick level ice with 30 cm snow cover in both ahead and astern directions, operate in thick consolidated brash ice, and have excellent maneuverability in all ice conditions. The excellent icebreaking capability has been successfully demonstrated with model tests at Aker Arctic's ice laboratory in Helsinki, Finland.

You can read more about the Novy Port icebreaker project on the Aker ARC 130/130 A brochure (English, Russian) and Arctic Passion News 2/2015.

Another Aker Arctic project also reached a significant milestone on Monday, 21 November 2016, when Guangzhou Shipyard International (GSI) held the steel cutting ceremony for the Arc7 ice class Arctic condensate tanker. The vessel is scheduled for delivery in 2018. It will be used in the Yamal LNG project to transport gas condensate, a valuable by-product of the natural gas fields, from the Gulf of Ob to markets in Europe and Asia.

Aker Arctic developed the Aker ARC 212 concept and is currently finalizing the basic design phase. The 214-metre vessel is designed according to the double acting ship (DAS) principle, sailing bow-first in open water and in light ice conditions, and astern in up to 1.8 m thick level ice. The active flushing effect of the two 11 MW azimuth propulsion units allows independent continuous operation without icebreaking assistance even in the most challenging ice conditions such as compressive ridge fields without having to rely on ramming.

You can read more about the Arctic condensate tanker project on Arctic Passion News 1/2016. ■

New Certification Scheme helps 'de-risk' Marine Renewable Energy Technologies

Leading classification society Bureau Veritas certification in projects world-wide is helping reduce and manage risk as ocean engineering requirements develop in growing marine renewable energy sector.

Bureau Veritas, the leading international classification society has published a set of guidelines, NI 631 "Certification Scheme for Marine Renewable Energy Technologies", addressing a broad spectrum of the needs of marine renewable energy (MRE) businesses and projects.

The certification scheme covers:

- Floating offshore wind turbines
- Current and tidal turbines, including sea and river turbines
- Wave energy converters
- Ocean thermal energy converters (OTECs)

'The marine renewables sector is growing in importance and the complexities are increasing as the sector continues to mature', comments Matthieu de Tugny, Senior Vice President, Offshore, Bureau Veritas. 'Bureau Veritas is taking a broad leadership position in the development of cleaner energy projects and technologies in the marine and offshore environments. We are helping de-risk these projects through our familiarity with and our capabilities in offshore engineering and knowledge of environmental realities and regulatory requirements for MRE projects.'

Marine renewable projects are reliant on engineering expertise developed in the offshore oil and gas industry and this expertise is vital as world-wide interest in floating and submerged MRE applications grows.

Matthieu de Tugny: 'As interest in MRE is increasingly expanding to options beyond fixed wind turbines, we are working on projects in harsher conditions and with heavier engineering demands drawing on our technical expertise.'

With projects around the world, as well as in France, this is a growing and important sector for renewable energy.

BV's certification covers entire projects, including farms of multiple units, type approval and components, for concepts, prototypes and for series production. Last year Bureau Veritas issued guidance notes dedicated to specific MRE technologies: Current and Tidal Turbines (BV NI603) and Classification and Certification of Floating Offshore Wind Turbines (BV NI572). ■

More information: www.bureauveritas.com

company directory

photo: TUI Cruises GmbH Hamburg

8

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Facts & Figures
Turnover: EUR 7,1 million
Personnel: 15
Established: 1987

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ACM-TRADING LTD

Ketunleivänkuja 4
FI-21110 Naantali, Finland
Phone +358 20 799 1400
Fax +358 20 799 1409
firstname.lastname@acm-trading.fi
www.acm-trading.fi

Contact Person
Kari U. Laiho

Specialty Areas
Complete PUSHPIN®-ATB-Coupler System for Pusher Tug and Barge combinations. Available models 2 or 3 pin executions, with electro-pneumatic or electro-hydraulic controls with modern PLC controls. New Model! PUSHPIN®-SliderRig – Coupler enabling to be engaged during loading and discharging. Pin forces from 150 Tons up to 3 000 Tons, from River ATBs to Large Offshore ATBs, 15 systems in service. Concept design, Feasibility Studies and total installation engineering and supervision including class approvals with FEM-analysis. Electro-Hydraulic EHS Actuators for valve control and remote sounding systems with total BUSLoop systems for all kind of vessels. Cooling control systems for HT-, LT-, LO-, SW- etc. cooling circuits. Marine Pumps, Marine Butterfly valves in house already over 40 years experience.

2

See page 31.

ANTTI-TEOLLISUUS OY, ANTTI MARINE

Koskentie 89
FI-25340 Kanunki
Finland
Phone +358 2 774 4700
Fax +358 2 774 4777
www.antti-teollisuus.fi

Contact Person
Toni Leino
Sales Manager
toni.leino@antti-teollisuus.fi

Specialty Areas
Antti Marine accommodation & interior doors for ships & offshore
B ja C-class fire doors
Sound reduction doors up to Rw=48dB
Designed features e.g. patterns and digital printing

4

CAVERION, INDUSTRIAL SOLUTIONS

P.O. Box 27 (Lemminkäisenkatu 59)
FI-20521 Turku
Finland
Phone +358 10 4071
firstname.lastname@caverion.com
www.caverion.fi

Contact Person
Marine business unit
Markku Salonen
markku.salonen@caverion.com

Facts & Figures
Turnover: EUR 330 million approx.
Personnel: approx. 3 000
Established: 2013
Parent Company: Caverion Oyj

Specialty Areas
Marine Industry unit:
Electrical and mechanical outfitting projects
Turnkey deliveries for technical areas
Prefabricated pipes, pipe-packages and process modules

2 6 9

DANFOSS DRIVES (VACON LTD)

Runsorintie 7
FI-65380 Vaasa
Finland
Phone +358 20 12121
drives.myynti@danfoss.com
www.danfoss.com/drives

Contact Person
Harri Haikonen
Key Account Manager, Marine
harri.haikonen@danfoss.com

Facts & Figures
Turnover: EUR 1 500 million (Danfoss Drives)
Personnel: 5 000 drives experts
Established: 1933
Parent Company: Danfoss

Specialty Areas
In 2014, Vacon and Danfoss merged, forming one of the largest companies in the industry. Our AC drives can adapt to any motor technology and we supply products in a power range from 0.18 kW to 5.3 MW. Danfoss Drives is a world leader in variable speed control of electric motors. Better tomorrow is driven by drives.

9

See page 44.

ENSTO ITALIA

Saves Your Energy

Via F. De Filippi 3
IT-20129 Milano
Italy
Phone +39 02 2940 3084
Fax +39 02 2952 4554
enstoitalia@ensto.com
www.ensto.com

Contact Person
Guglielmo Rutigliano
Sales Director
guglielmo.rutigliano@ensto.com

Facts & Figures
Turnover: EUR 260 million
Personnel: 1 600
Established: 1958
Parent Company: Ensto Group

Specialty Areas
Ensto's marine lighting products are designed for ship installations and can be customised to Customer's needs.

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

5

EXIT-PAINIKE KY

P.O. Box 78
FI-61801 Kauhajoki
Finland
Phone +358 6 231 4034
Fax +358 6 231 4112
exitpainike@exitpainike.fi
www.exitpainike.fi

Contact Person
Timo Hakala

Specialty Areas
EXIT 6000 series emergency doors. EXIT panic device

9

FORESHIP LTD

Hitsaajankatu 4 A
FI-00810 Helsinki
Finland
Phone +358 20 730 9090
Fax +358 20 730 9091
office@foreship.com
www.foreship.com

Contact Persons
Markus Aarnio
SVP Ship Technology
markus.aarnio@foreship.com
Lauri Haavisto
Managing Director
lauri.haavisto@foreship.com

Specialty Areas
Foreship's Naval Architects and Marine Engineers are specialised in challenging conversion and newbuilding concept designs. Foreship has also extensive CFD capabilities and state-of-the art hull form references.

2 5 6

HALTON MARINE OY

Pulttikatu 2
FI-15700 Lahti
Finland
Phone +358 20 792 200
Fax +358 20 792 2060
haltonmarine@halton.com
www.haltonmarine.com

Contact Person
Tommi Rantanen

Facts & Figures
Turnover: EUR 197 million (Halton)
Personnel: 1 400
Established: 1969
Parent Company: Halton

Specialty Areas
High-quality ventilation systems specifically designed for demanding marine, navy and oil & gas markets.
Main product groups: Cabin Ventilation, Galley Ventilation, Fire dampers, Air intake products, Airflow Management and Air Distribution products.

1 3 8

JTK POWER OY

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

Contact Person
Timo Viitala
Managing Director
timo.viitala@jtk-power.fi

Facts & Figures
Turnover: EUR 22 million
Personnel: 82 in Finland, 11 in China
Established: 1998

Specialty Areas
Large Diesel and Gas engines exhaust and intake silencers. Offshore-, paper- & pulp and other process industries large silencers. Also Valve seat inserts are manufactured for exhaust and intake valves, of both large and small diesel engines.

2 7

See page 31.

JUKOVA CORPORATION OY

Jukovantie 20
FI-21430 Yliskulma
Finland
Phone +358 10 474 444
Fax +358 10 474 4290
jukova@jukova.com
www.jukova.com

Contact Person
Stefan Sundblom
stefan.sundblom@jukova.com

Specialty Areas
Modular balconies
Sliding doors
Balcony divider walls
Glass railings

7

KAEFER OY

Lehtimäentie 17
FI-21290 Rusko, Finland
Phone +358 2 437 9400
Fax +358 2 438 6692
kaefer@kaefer.fi
www.kaefer.fi

Contact Person
Janne Sirviö, janne.sirvio@kaefer.fi

Facts & Figures
Turnover: EUR 26 million
Personnel: 75
Established: 1977
Parent Company: KAEFER GmbH

Subsidiaries & Representatives
KAEFER GmbH

Specialty Areas
Interior outfitting in passenger vessels
Turnkey solutions in galleys, pantries, catering areas
All type of insulation solutions in marine industry

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

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 60 million
Personnel: 232
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.

3 9

LAIVAKONE OY

Uranuksenkuja 1 C
FI-01480 Vantaa
Finland
Posenerstr. 1 a
D-23554 Lübeck
Germany
Phone +358 20 763 1570
Fax +358 20 763 1571
laivakone@laivakone.fi

Contact Person
Harri Elonen

Facts & Figures
Personnel: 20
Established: 1969

Specialty Areas
Ship engine repairs and services
In-Situ machining

1 2 9

OY LINDAB AB

Juvan teollisuuskatu 3
FI-02920 Espoo, Finland
Kankitie 3, FI-40320 Jyväskylä, Finland
Phone +358 20 785 1010
www.lindabmarine.com

Contact Person
Piia Kyrönlahti, +358 20 785 1010

Facts & Figures
Turnover: SEK 7 589 million (2015, Lindab Group)
Personnel: 5 100 (Lindab Group)
Established: 1959

Specialty Areas
Insulated and non-insulated ducts and fittings
Acoustic solutions
Bulkhead penetrations
Dampers and measuring units
Air terminals
Fans
Lindab develops the most innovative and simplified solutions on the market. Our energy effective solutions will change the way of designing ships and brings the best indoor climate onboard.

1

LLOYD'S REGISTER EMEA

Aleksanterinkatu 48 A
FI-00100 Helsinki
Finland
Phone +358 20 791 8300
helsinki@lr.org
www.lr.org

Contact Persons
Päivi Björkestam
Field Operation Manager
Niklas Rönnberg
Business Development Manager

Facts & Figures
Personnel: 25
Established: 1957 (Finland)
Parent Company: Lloyd's Register Group Limited

Specialty Areas
Ship and offshore:
Newbuilding & periodical surveys
Industrial inspections and certification
Consultancy

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
Markus Hjerppe
Mika Aaltonen

Facts & Figures
Personnel: 40
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
Conservation works after engine room fire or flooding
Well equipped workshop in Lieto
CAT authorized service and repair, Kemel seals and bearings

4

ONNINEN OY

P.O. Box 109
FI-01301 Vantaa
Finland
Phone +358 20 485 5111
Fax +358 20 485 5500
www.onninen.fi
www.onninen.com

Contact Person
Martti Lehti
Area Sales Director
martti.lehti@onninen.com

Facts & Figures
Personnel: 3 000
Established: 1913

Specialty Areas
Onninen provides comprehensive materials services to contractors, industry, public organisations and technical product retailers. We are a family-owned company and have operated in the industry since 1913. We have 3 000 employees in our Finnish, Swedish, Norwegian, Polish, Russian and Baltic operations.

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

PARAMET KONEPAJA OY

Saaristotie 1142
FI-21601 Parainen
Finland
Phone +358 207983939
www.paramet.fi

Contact Person
Tommi Lahdensivu
Managing Director
tommi.lahdensivu@paramet.fi

Facts & Figures
Turnover: EUR 15 million
Personnel: 65
Established: 1988

Specialty Areas
Manufacturing of high quality steel structures. 16 000 m² facilities including one of the largest welding robots in Finland, harbor and professional people at your service.

4

PAROC OY AB

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

Contact Person
Tommi Siitonen
tommi.siitonen@paroc.com

Facts & Figures
Turnover: EUR 410 million
Personnel: 1 945
Established: 1952
Parent Company: Paroc Group Oy Ab

Subsidiaries & Representatives
Paroc operates in 14 European countries. Please visite our website www.paroc.com for more information.

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

2 3

PATRIA AVIATION ENGINE BUSINESS UNIT

Linnavuorentie 2
FI-37240 Linnavuori, Finland
Phone +358 40 869 2800
Fax +358 20 469 2801
www.patria.fi

Contact Person
Seppo Tamminen
General Manager, Diesel Engine Business
seppo.tamminen@patria.fi

Facts & Figures
Turnover: EUR 20 million
Personnel: 165
Established: 1947
Parent Company: Patria Oyj

Specialty Areas
Maintenance and overhaul of high speed diesel engines and related equipment up to 6 000 kW
Authorised MTU Service dealer
Maintenance and overhaul of industrial and marine gas turbines
Special repairs of parts for diesel engines and gas turbines

3

PKP-MACHINING

Koukkarintie 3
FI-21870 Riihikoski, Finland
Phone +358 40 7253 656
sales@pkp-machining.fi
www.pkp-machining.fi

Contact Persons
Antti Satila, Managing director
antti.satila@pkp-machining.fi +358 40 7253 656
Ari Pirinen, Production engineer
ari.pirinen@pkp-machining.fi +358 44 7253 657

Facts & Figures
Turnover: EUR 1,6 million
Personnel: 10
Established: 1998

Specialty Areas
Turnkey deliveries of components including welding, machining and surface treatments.
CNC boring of large pieces, milling and deep-hole drilling.
Extensive competence in machining various materials: stainless and acid-proof steel, copper, aluminium and wear-resistant grades of steel.

2 6 7

PMC HYDRAULICS OY

Mestarintie 6
FI-01730 Vantaa
Finland
www.pmchydraulics.com

Contact Person
Kimmo Salo
kimmo.salo@pmchydraulics.com
+358 207 709 486

Specialty Areas
PMC Hydraulics is the Nordic leader in innovative hydraulic solutions and services for marine applications. By providing everything from customized systems to components, special products and a full range of maintenance and lifecycle services we have the ability to offer our customers the best complete solutions.

2 9

POCADEL OY

Korpelantie 229
FI-21570 Sauvo
Finland
Phone +358 2 477 2950
Fax +358 2 477 2971
pocadel@pocadel.fi
www.pocadel.fi

Contact Person
Miikka Ahlfors
miikka.ahlfors@pocadel.fi

Facts & Figures
Personnel: 16
Established: 1997

Specialty Areas
Fire rated B15 – A60 glass doors and partitions for marine and Offshore use:
Renewed product category includes fire rated glass walls, hinged doors, Super wide Tandem Doors and Butt Joint walls.

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

2 7

PORKKA FINLAND OY

P.O. Box 127
FI-33101 Tampere
Finland
Phone +358 20 555 512
Fax +358 20 555 5288
www.porkka.fi

Contact Person
Petri Hiilloste
porkkapanel@huurre.com

Facts & Figures
Turnover: EUR 26 million
Personnel: 170
Established: 1962
Parent Company: Huurre Group Oy

Specialty Areas
Provision stores
Walk-in rooms in galleys/pantries
Insulated doors
Insulated fire doors A60, for cold stores

7

RAUMA INTERIOR OY

Hallitie 8
FI-26510 Rauma
Finland
Phone +358 2 8387 8200
info@raumainterior.fi
www.raumainterior.fi
www.messin.fi

Contact Person
Kari Wendelin
Managing Director
kari.wendelin@raumainterior.fi

Specialty Areas
Designed fixed and free-standing furniture in various materials especially for passenger & crew cabins, but also for restaurants, nightclubs, coffee shops, conference rooms (wardrobes & racks, dressing tables, cabinets, coffee tables, desks, TV-stands, beds in wood and metal, nightstands, sofas, resin coated dining tables, bardesks, decorative columns etc.)

2 4

REXEL FINLAND OY

P.O. Box 360
FI-05801 Hyvinkää, Finland
Phone +358 10 509 311
Fax +358 10 509 3222
marine.sales(at)rexel.fi
www.rexel.fi

Contact Person
Karri Westermark
Area Manager, Marine
Industrial Services
karri.westermark(at)rexel.fi

Facts & Figures
Turnover: EUR 195 million (2014)
Personnel: 300 (2014)
Established: 1913
Parent Company: Rexel Group

Specialty Areas
Electrical wholesaling; Electrical items such as electrical installation materials, cables, cable racks, cable penetrations and seals. Also deliveries of all electrical items for marine business.

2

ROLLS-ROYCE OY AB

P.O. Box 220
FI-26101 Rauma
Finland
Phone +358 2 837 91
rolls-royce.finland@rolls-royce.com
www.rolls-royce.com/marine

Contact Person
Liisa Snellman
Communications
liisa.snellman@rolls-royce.com

Facts & Figures
Turnover: EUR 468 million
Established: 1988
Parent Company: Rolls-Royce plc

Subsidiaries & Representatives
Rolls-Royce worldwide sales and service network

Specialty Areas
Thrusters, propulsion systems, winch systems, stabilizers, steering gears, bearings

7

S.A. SVENDSEN OY

Särkiniementie 3 B
FI-00210 Helsinki
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 15,7 million
Personnel: 5
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

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 14 million
Personnel: 95
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 and a 50 mm A-60 class light weight box; wall and ceiling as well as a B-15 class Extension Screen.
Another branch of SBA is subcontracting for metal industry.

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

1 2 7

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: approx. 350
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.

7

SEASIDE INDUSTRY PARK RAUMA

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

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

Specialty Areas
Seaside is resource-efficient industrial park of heavy metal industry with supreme logistics including a deep-water route, port, railway and road. Successful principal companies with efficient and wide delivery network operate in the Park. The area utilises versatile infrastructure and comprehensive common services. Seaside offers an efficient manufacturing and cooperation environment enabling smaller companies to participate in large projects and achieve competitive advantages and additional value. Additional information: www.seasideindustry.com

9

OY SIKA FINLAND AB

P.O. Box 49
FI-02921 Espoo
Finland
Phone +358 9 511 431
Fax +358 9 5114 3300
sika.finland@fi.sika.com
www.sika.com

Contact Person
Kai Winqvist
Industry Manager
winqvist.kai@fi.sika.com

Facts & Figures
Turnover: EUR 31,5 million (2015)
Personnel: 47
Established: 1985
Parent Company: Sika AG

Specialty Areas
Sealing – Bonding – Acoustic Damping – Reinforcing – Protecting

3

STEERPROP LTD

P.O. Box 217
FI-26101 Rauma
Finland
Phone +358 2 8387 7900
Fax +358 2 8387 7910
steerprop@steerprop.com
www.steerprop.com

Specialty Areas
Azimuth Propulsors for demanding applications. Steerprop Ltd. combines the reliability of proven technologies with the efficiency of modern design to produce azimuth propulsors of exceptional quality and excellent reliability. Steerprop Azimuth Propulsors can be made up to 20 MW in power or even in the most stringent ice-classes.

2

TEBUL OY

Luumäentie 2
FI-21420 Lieto, Finland
Phone +358 50 540 6031
Fax +358 2 489 9299
sales@tebul.fi
www.tebul.fi

Contact Person
Jussi Uusitalo
Managing Director
sales@tebul.fi

Specialty Areas
TEBUL OY has been designing and manufacturing watertight bulkhead sliding doors since 1961. Our self-tightening 24VDC fully electric watertight bulkhead sliding door is a fourth-generation product. The primary self-tightening is based on metal to metal contact with rubber seals for initial tightening. The higher the pressure, the larger the force exerted on the door. Tebul doors are approved to be installed into A-60 bulkheads.
Tebul doors are available also in the Eex-version, for Explosion Hazardous areas.

1

TEKNIKUM OY

FI-38310 Sastamala
Finland
Phone +358 3 513 5311
www.teknikum.com

Contact Person
Mikko Esko
mikko.esko@teknikum.com

Facts & Figures
Turnover: EUR 38 million
Personnel: 250
Established: 1989
Parent Company: Teknikum Group Ltd.

Specialty Areas
Rubber lining for steel pipes against seawater corrosion.
Rubber hoses, bellows and connection hoses for shipbuilding and offshore industry. Moreover we offer customised rubber products for different industry sectors.

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

1 4 7 9

TELATEK SERVICE OY / TELATEK OY

Öljytie 8
FI-37150 Nokia, Finland
Phone +358 20 734 7040
info@telatek.fi
www.telatek.fi

Contact Person
Pasi Hakkarainen
Sales Director

Facts & Figures
Personnel: approx. 100 (Telatek Service Oy) approx. 130 (Telatek Oy)
Established: 1977 (Telatek Service Oy) 2013 (Telatek Oy)
Parent Company: Atlantia Oy

Subsidiaries & Representatives
Agencies in Sweden, Russia, Greek and Spain

Specialty Areas
Manufacturing heavy and demanding welded and machined structures, on-site machining and thermal coating technologies, NDT-inspections.

2 3 9

TEVO OY

Hiientie 17
FI-92160 Raahe
Finland
Phone +358 8 265 8800
Fax +358 8 265 8805
tevo@tevo.fi
www.tevo.fi

Contact Persons
Timo Norvasto, Sales Manager, Lokomo Steel, Tampere
timo.norvasto@tevolokomo.fi
Ari Viinikkala, Deputy MD, Bronze foundry, Turenki
ari.viinikkala@tevo.fi
Pekka Launonen, Dir. Engineering Works, Raahe
pekka.launonen@tevo.fi

Facts & Figures
Turnover: TEVO 21 MEUR, Lokomo 30 MEUR
Personnel: TEVO 120, Lokomo 130
Established: TEVO 1974, Lokomo 1915

Specialty Areas
Manufacturing and Service of Marine Propellers in steel and bronze
Offshore steel constructions and special welding

8

UUDENKAUPUNGIN TYÖVENE OY

Telakkatie 8
FI-23500 Uusikaupunki
Finland
Phone +358 2 846 4600
Fax +358 2 841 4347
tyovene@tyovene.com
www.tyovene.com

Contact Person
Juha Granqvist

Facts & Figures
Turnover: EUR 30 million approx.
Personnel: 80
Established: 1987

Specialty Areas
Building of aluminium workboats, such as Pilot Cutters, Oil Combat Vessels, Service Ships for Channels
Building of small steel vessels, such as Road Ferries, Offshore Patrol Vessels, Passenger Vessels for commuter traffic

4

OY VALLILA CONTRACT AB

Nilsiänkatu 15
FI-00510 Helsinki
Finland
Phone +358 20 776 7700
Fax +358 20 776 7701
projekti@vallilainterior.fi
www.vallilainterior.fi

Contact Person
Miku Berner
miku.berner@vallilainterior.fi

Facts & Figures
Turnover: EUR 37 million
Personnel: 135
Established: 1935

Specialty Areas
Textile design
Textile full turnkey solutions, measuring, sewing, installation.
All system solutions, electrical and manual
Large collections on Imo certified fabrics

1 5

VTT TECHNICAL RESEARCH CENTRE OF FINLAND LTD

P.O. Box 1 000
FI-02044 VTT
Finland
Phone +358 20 722 4294
Fax +358 20 722 4815
www.vtt.fi

Contact Person
Seppo Kivimaa
seppo.kivimaa@vtt.fi

Facts & Figures
Turnover: EUR 184,5 million
Personnel: 2 200
Established: 1942

Specialty Areas
R&D services. In vehicle engineering VTT offers expertise in model and full-scale tests, computational fluid dynamics, structural monitoring, structural integrity and dynamics, maritime simulations and virtual prototyping, maritime safety and environmental engineering, small craft design analysis, hydraulics.

NOTES

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

seatec.fi/magazine

airways wall and ceiling materials shipbuilding yards new
ulsion all about maritime industry systems engines systems
s audio and video systems communication equipment lightnin
vigation ship management systems ship operation and automa
ering educatic software prod
and ventilatic tems environme
ne extinguishi systems wire
s & fittings i urnishing & f
s new all abou fit repairs t
ystems materia narine technol
ghtning systen ology monitor
omation systen tion design an
oducts survey uipment air-co
ntal technolog ystems pumps
e & cable ship rs and window
floor coverir terials shipb
prime movers about maritim
nology electro mmunication e
ring systems r ms ship opera
and engineering education and research interior design so
ditioning and ventilation cleaning systems cooling systems
safety & fire extinguishing systems waste & waste water s
all about maritime industry furnitures & fittings insulat
d ceiling materials shipbuilding yards new building refit

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