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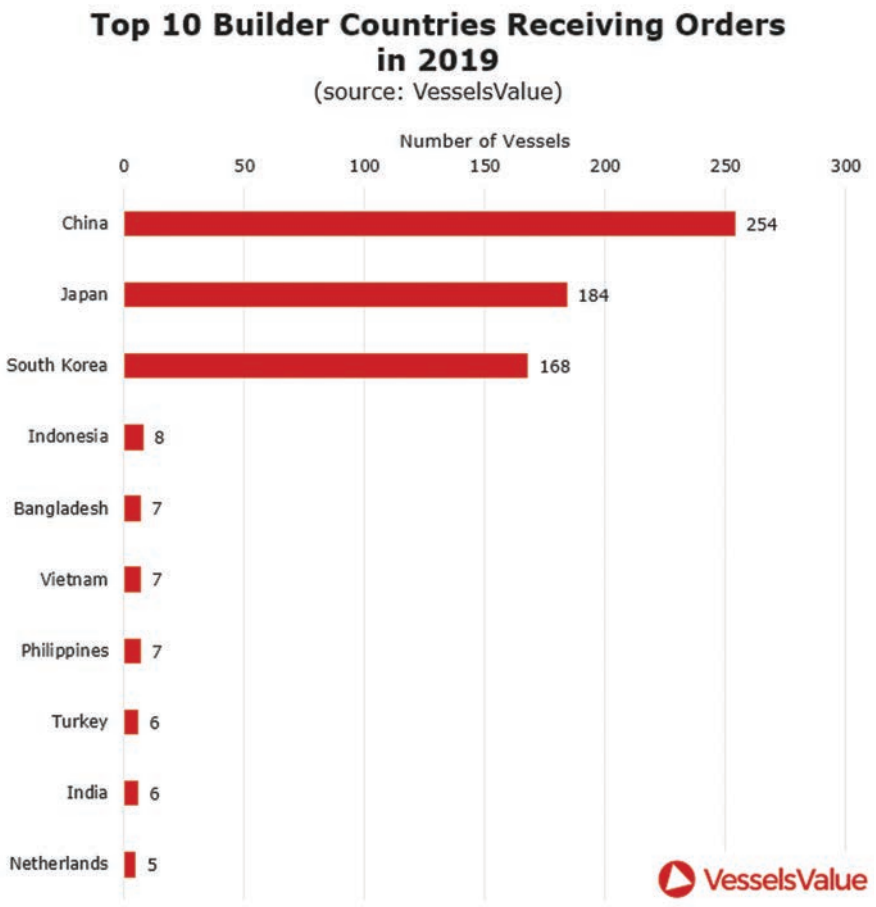
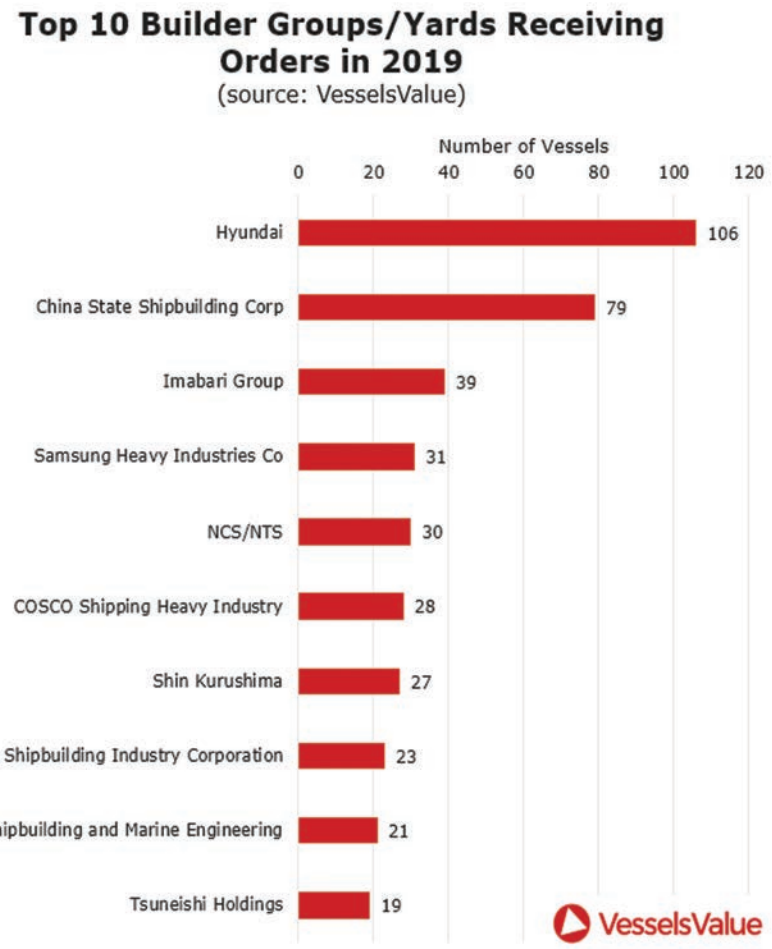
GREAT SHIPS OF 2019

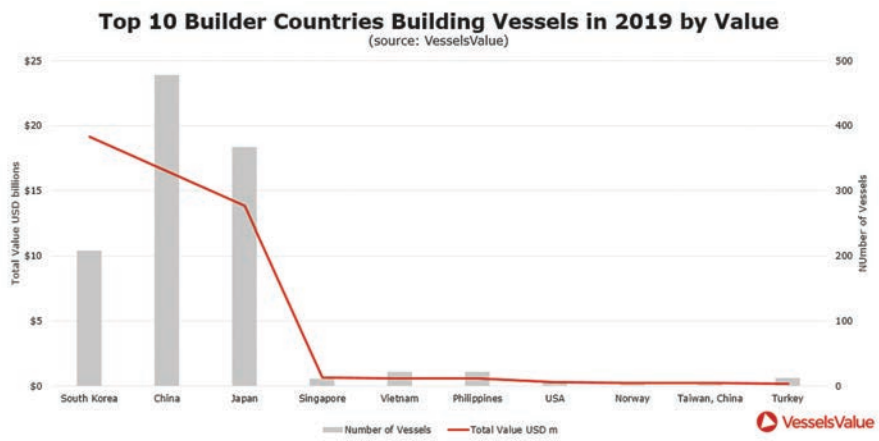
Photo: Stena Line

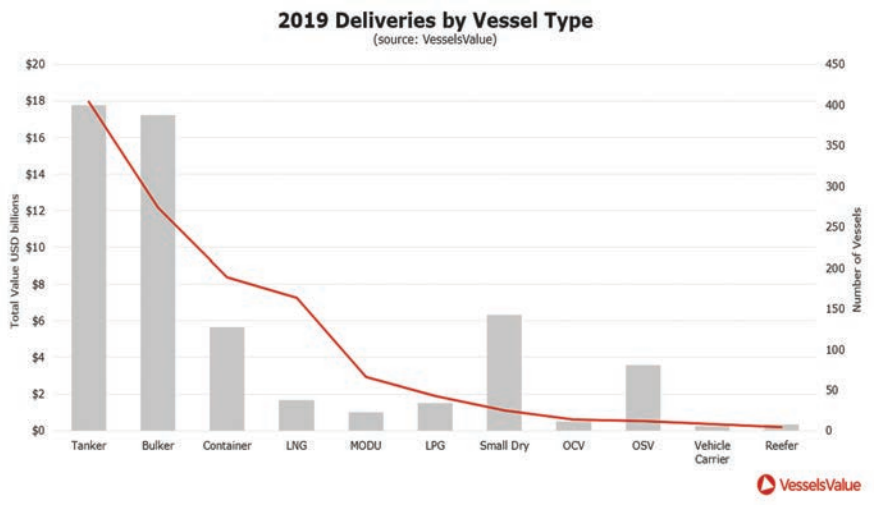
‘Go East Young Man, Go East’

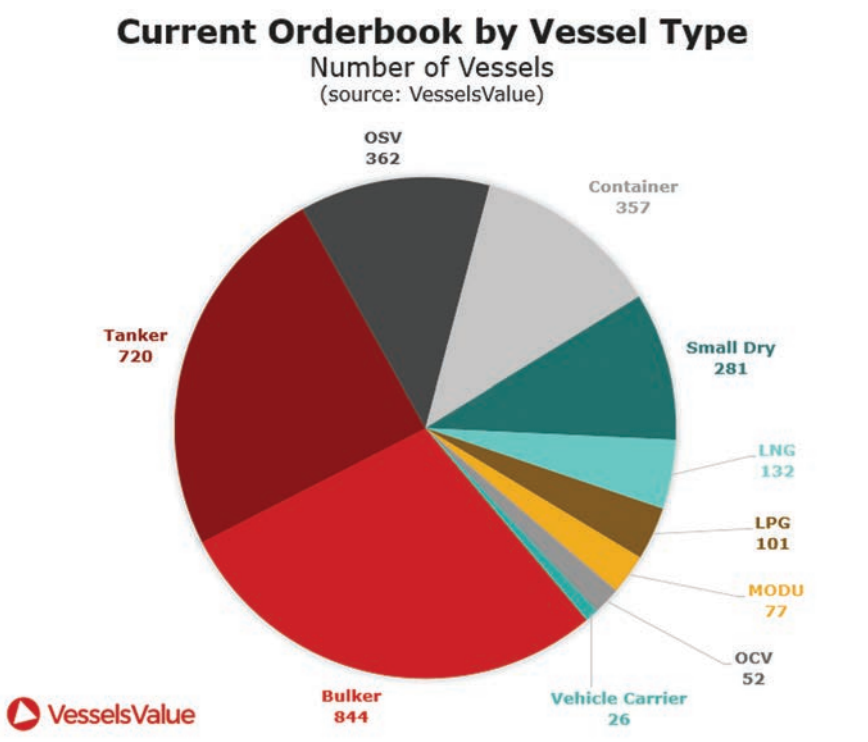
There is nothing like a bar chart from our friends at Vessels Value to illustrate the pronounced movement of large, oceangoing ship constructruction to the East, a ‘trend’ which has been a generation in the making. Perhaps surprising is Japan leapfrogging South Korea to number 2 on the list.











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Editorial

The only constant is ...

When the clock strikes midnight on 12/31/19, it all changes in the maritime world with the introduction of bold new fuel rules that promise to deliver as many questions as answers. While 1/1/2020 has been circled on calendars globally, trust that this is not the end … far from it. Rather it is only the beginning, as the collective maritime market embarks on the long, challenging journey toward ever-stricter emission guidelines far beyond where the eye can see and the mind can imagine.

While I'm sure there are more than a few of you who would beg to differ, I find these days to be some of the more exciting times in maritime history, at least the nearly 30 years that I have been covering this industry. Never in my wildest dreams did I think I would see this much change, this fast. While much of the change is predictably the result of legislative mandate, it's interesting to watch of the jury of public opinion rapidly reshape the policy of, for example, the oil majors, where the words "sustainability" and "renewables" are uttered with frequency and ease. And when the oil and gas companies are under pressure to prove daily the depth and breadth of their environmental commitment, you can be sure that the mandate will trickle down – trickle down like a tsunami that is – to everyone that does business with the companies, including ship and boat owners and operators.

This year's selection of 'Great Ships' is diverse, ranging from Corona Youthful, ironically a coal carrier, but an energy efficient one – courtesy of advance technology – at that; to the John F. Kennedy (CVN 79), the second U.S. Navy aircraft carrier in the Ford Class; to Ishin, Japan's first LNG fueled tugboat.

While the 16 vessels featured in this year's annual 'Great Ships' edition are diverse, a common theme among all, from the small to the large, is a focus on reducing emissions and keeping in check life-cycle costs as vessel owners of every size, shape and locale are pressed more than ever to make tough technical choices regarding their fleets of the future.

While the choice of technical path to take is neither clear nor sure, I think the trek of Waterfront Shipping Company Ltd., a wholly owned subsidiary of Methanex Corporation, and Marinvest/Skagerack best embodies the spirit of innovation in the delivery of the Methanol-fueled M/T Mari Couva and M/T Mari Kokako, hence their selection for feature coverage.

My sincere thanks to both **Paul Hexter**, President, Waterfront Shipping and **Fredrik Stübner**, Director Ship Management, Marinvest, for their time and effort to discuss in great detail their path – and 60,000 hours of experience – running ships fueled by methanol. Sometimes the hardest part of our job is simply getting vessel owners and builders to open up and discuss their ships, their pasts successes and failures, and the reasoning behind technical decisions. But both Hexter and Stübner did just that, and while methanol might not be the fuel of your future, I think you will enjoy their insights starting on page 26.

When the clock strikes 00:00:01 on January 1, 2020, it will also mark one of the biggest changes in the history of Maritime Reporter & Engineering News as we have taken the decision to change the format of the magazine to a standard 8.5 x 11 size. We have steadily built – via organic growth and via acquisition – our portfolio of media products to include the offshore energy, subsea, ports and logistics sectors, and the benefits of standardizing in a common size are undeniable, as anyone in the manufacturing sector can surely agree. While the size changes the mandate to deliver the highest quality editorial product – in print and online – remains the same. I've said it many times in this year-end editorial, starting when I joined the publication in 1992, but the frequency does not diminish sincerity: *Thank you – our subscribers, our advertisers, our trusted consultants and colleagues – for your continued interest and support.*

Gregory R. Trauthwein
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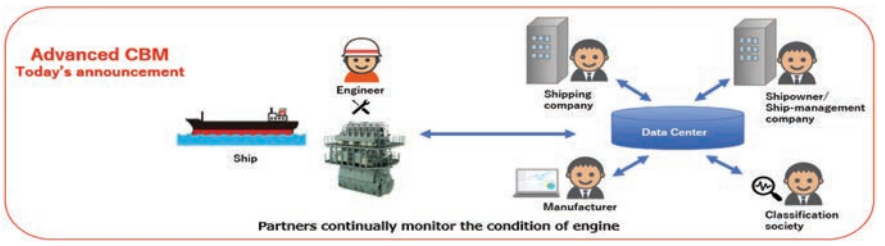
NYK Advances Maritime Autonomy with CBM Trial



As the marine industry evolves toward autonomous operations, one of the sticking points traditionally has been centered on maintenance and answering the question: "what happens when machinery needs fixed?"

Helping to advance the technologies is the NYK Group, which recently finished a joint re-search agreement for developing advanced condition-based maintenance (CBM), a new maintenance and management process for ship machinery which eschews the maritime practice of time-based maintenance (TBM). In fact, the global shipping giant has started verification during actual ship opera-tions.

In accordance with the NYK Group's medium-term management plan "Staying Ahead 2022 with Digitalization and Green," the group is promoting digitalization initiatives, and strives to enhance innovation in the shipping industry with various partners making use of operational big data.

Leveraging the ability to rapidly collect and disseminate large amounts of data from ship to shore, machinery plant data from many sensors will be shared and monitored with the classification society and engine manufacturers in real time, advancing maintenance management. In the future, the NYK Group will use this data and real-time monitoring to develop an advanced CBM to realize manned autonomous vessels.

The Joint Research

In addition to SIMS2, (which is a ship information management system developed by NYK and MTI and allowing data-sharing among workplaces on land and sea in real-time) a new sensor and equipment package are installed in two different types of main engine and main steam turbine, and detailed operational data such as vibration and temperature of bearing are to be collected. The condition of the engine will then be shared and constantly monitored by the classification society and engine manufacturers.

Project: Joint research for realizing CBM for main diesel engines
Partner: NYK, MTI Co. Ltd., Class NK, Japan Engine Corporation

Project: Joint research for realizing CBM for main steam turbines
Partners: NYK, MTI Co. Ltd., Class NK, Mitsubishi Heavy Industries Marine Machinery & Equipment Co. Ltd.

Murray Goldberg is CEO of Marine Learning Systems which provides software and services to optimize knowledge, skills and behavior in maritime operators. In his former life he was a computer science faculty member at the University of BC researching online learning and assessment delivery models and their effectiveness. This led to him develop WebCT, a learning management system that was used by 14 million students in 80 countries. Contact Murray @ Murray@MarineLS.com

Training Tips for Ships
Tip #7 – Stop Lecturing Me!

Does your training still employ traditional "classroom style" lectures where an expert conveys their knowledge to your trainees? If so, your training is an example of a diminishing trend; there is an industry-wide move away from lectures. The 2019 Maritime Training Insights Database (MarTID) report showed that while operators intend to increase their use of almost every type of training surveyed (simulation, videos, eLearning, etc.), classroom-style training stands alone with more operators intending to reduce its use than increase it. There are very good reasons for this move away from classroom-based lectures. For those responsible for maritime training, it is a call to action. It is time to stop lecturing.

What's Wrong with Lectures?

So – what is wrong with classroom lectures? After all, we've been using them effectively for millennia, right? Well, yes, people can indeed be taught knowledge by attending a classroom lecture. But it turns out that it is actually a very inefficient and ineffective way of teaching. Additionally, it tends to leave many students feeling confused, bored, or generally dissatisfied.

The fundamental issue begins with the fact that not all trainees are equal. Some students come to their training with a solid foundation of knowledge and experience. Others come with relatively little. Some come to the lecture as expert "students" who know how to learn, and have good note taking and study habits. Others have hardly ever been in a lecture before. Some students come to their training endowed with a natural academic ability. Others come with very little. These are only some of the many deep differences which make each student's needed training approach … well … different.

© stokkete/AdobeStock

Yet despite the diversity of students in a course, we give them all the exact same lectures. They sit in a class together, hear the same words, see the same diagrams, and have exactly the same amount of time to absorb the material. Even so, despite their vastly different learning needs, we somehow expect them all to equally flourish. That's crazy. They clearly can't all flourish because different students each require different amounts of time to absorb concepts, different levels of presentation to understand the material, different speed of presentation, different level of review of supporting information, different numbers of examples, etc.

Since it is impossible to teach to each student's individual needs in one classroom, the lecturer is instead left to teach to the needs of the mythical "typical" student. Our lecture is therefore constructed so a typical student would understand it, be able to keep up, and derive value from it. But since there is no such thing as a "typical" student, we are instead presenting a lecture that tends to lose half of the class, and to bore the other half of the class.

Said another way, the "invariant" (the aspect that is the same for all) in a lecture-based course is the learning experience and the duration of the lecture. All students have the same presentation. Unfortunately, what varies are the individual outcomes – some do better, some do worse. That's backwards. What we actually *want* is for the invariant to be the learning outcomes (we want them to be uniformly high), and the variant to be the learning experience (so that each student receives the experience that works best for them). Traditional lectures cannot achieve this, and that is why operators, as well as universities and other training institutions, are moving away from traditional lecture-based learning. The next question, then, is "what should we be moving to"? The answer might surprise you. It is a technique called the "Flipped Classroom" where we stop lecturing, and instead utilize our expert trainers in a far more productive, engaging and effective way. We will discuss the flipped classroom in the next edition of Training Tips for Ships. Until then, start saying goodbye to your classroom lectures and safe sailing!

MarTID 2019 Report

The 2nd Annual report from the historic MarTID survey initiative to study global maritime training practices, investment and thought is now available. The surveys draw on insights from shipowners and operators, maritime education and training institutions and seafarers. The insightful report is available free for global distribution @

http://digitalmagazines.marinelink.com/NWM/Others/MarTID2019a/html5forpc.html

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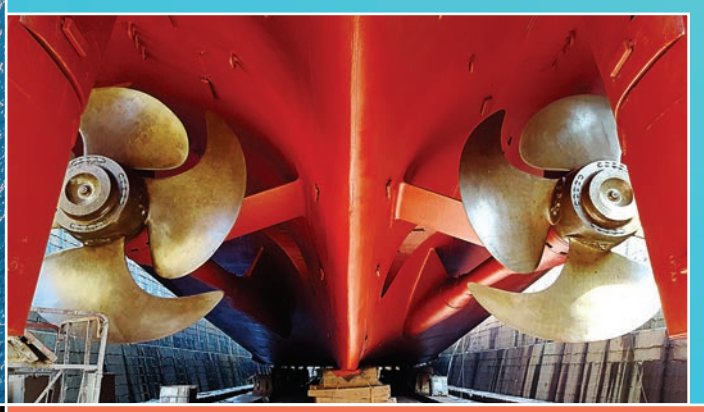

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By Informa Markets

Ted Bailey is Head of Digital Learning, Lloyd's Maritime Academy. Within his current role as Head of Digital Learning at Informa plc, Ted leads a team responsible for creating and delivering high-value professional development learning online – either in collaboration with academic partners or independently through Lloyd's Maritime Academy.@ Murray@MarineLS.com

Lifelong Learning in an Age of Disruption

Photo courtesy Lloyd's Maritime Academy

The global labor market is changing at a rapid pace. One of the major drivers behind it is technology which is shifting the balance between the work performed by humans and jobs undertaken by machine learning, automated workflows and Artificial Intelligence (AI). While it is predicted that automation and AI will generate prosperity if managed properly, estimates show that as many as 375 million people worldwide will need to shift their occupational focus and upgrade their skills during this transition.

With 40% of employers globally finding it difficult to recruit people with the skills they need, an active and ongoing support offered to the workforce to learn and develop new skills is more critical than ever before. But it is equally important that individuals take a proactive approach to their own lifelong learning in order to really take advantage of the new opportunities in the digital workplace.

A professional lifelong learning plan includes a structured approach to personal development throughout one's career. It covers the whole spectrum of formal and informal learning to enhance career progression, employability and competitiveness in the job market. What has really changed is that, in the past, it may have been assumed that an employee would gain training and development through their employer but now the onus to push forward with training requirements lies on the employee.

Maritime 4.0: A changing workforce, Rise of new skills

The maritime industry is no exception to the trends above. The sector is entering what has been dubbed Maritime 4.0, including the emergence of autonomous ships, "connected" ports and harbors, and the growth of alternative fuels and green ship technology. These are developments which have not been around for long and making sure personnel are kept on top of these rapid advancements is a major challenge.

According to the Department for Transport's Maritime 2050 strategy document, the skills profile of the maritime sector will change significantly over the next 30 years. The importance of STEM (Science, Technology, Engineering and Mathematics) subjects will increase as jobs become more skilled and data driven in response to new technology. Roles will be multidisciplinary, potentially requiring the ability to create, operate and maintain autonomous and technological systems. To add to this complexity, we are witnessing profound changes to the structure of the maritime workforce, particularly from a demographic point of view. Crews have become fully internationalized with an explosion in the number of seafarers hailing from Ukraine, Russia and China. Alongside that, a change in generations coupled with poor succession planning has resulted in a lack of senior people, particularly ship superintendents.

The end result of these tectonic movements is a lack of personnel and insufficient skills which are not keeping pace with the transformation of the industry.

Closing the skills and training gaps

At the recent London International Shipping Week conference, Baroness Scotland, the Secretary-General of the Commonwealth of Nations, emphasized that the most effective form of investment is in human capital, as that differentiates the best-performing organiza-

“The sector is entering what has been dubbed Maritime 4.0, including the emergence of autonomous ships, ‘connected’ ports and harbors, and the growth of alternative fuels and green ship technology. These are developments which have not been around for long and making sure personnel are kept on top of these rapid advancements is a major challenge.”

tions across the globe. However, global research conducted by Lloyd’s Maritime Academy (LMA) has revealed that over 41% of professionals from the maritime industry still receive no funding from within their business for training. This statistic highlights the need for companies to demonstrate more commitment to training, to invest time in building professional development and map out a variety of career paths to attract new people and close the existing skills gap.

At the same time, the importance of proactive lifelong learning in maritime has never been more important and, according to LMA data, the share of self-paying learners has been growing markedly. Better internet connectivity at sea and new, agile e-learning delivery models are facilitating lifelong learning of seafarers. This trend is set to continue with the application of technologies such as virtual reality that is changing the way “older” on the job deck training programs are delivered. Regularly reviewed and easily adaptable training packages to match new skills requirements are further driving the uptake of online training programs.

E-learning that supports a maritime professional’s lifelong learning

Online learning is not just important for fostering lifelong learning of current maritime professionals. It is becoming ubiquitous if the industry is to meet the expectations of new generations entering the workforce. Growing up as digital natives, their standards have been shaped by online experiences created by tech giants. A training environment experienced by their parents 20 years ago may not seem like an attractive employment proposition anymore.

There are some key principles to look out for when establishing whether an online training program is relevant to someone’s career progress and provides a high-quality learning experience:

- Learning is delivered via a user-friendly platform that is easy to navigate and follows the latest evidence and best practice in instructional design.
- Course content is regularly updated and reflects the latest values, industry trends, findings, legislative changes…
- Quality control in terms of external quality assurance and accreditation is provided by industry bodies and/or established educational institutions.
- Availability of stimulating course materials in a range of different formats that encourage engagement, such as a combination of short videos, written content and audio content.
- Emphasis on the quality of interaction not just with the tutor but also among learners from around the world. High value training incorporates both high quality of information and also the core fundamentals of good teaching which ensures the information is properly absorbed and used in practice. This is where many online courses, for example MOOCs (Massive Open Online Courses) struggle, with attendance normally dropping off the cliff after the first session.
- Most importantly, the program needs to be part of someone’s lifelong learning journey and be useful to their career progress.

At Lloyd’s Maritime Academy we always challenge learners to really understand their needs, motivations and longer-term goals to be able to facilitate their lifelong learning at any stage, from introductory certifications to a full MBA. Several courses are accredited and awarded by reputable educational institutions or professional associations, such as Middlesex University London, North Kent College and Chartered Management Institute, with several courses contributing towards Royal Institution of Naval Architects (RINA) and IMarEst CPD requirements.

By following the path of lifelong learning and taking responsibility for upgrading our skills we can all play a big role in the next exciting chapter of the maritime industry’s transformation.

Photo courtesy Lloyd’s Maritime Academy

Christine Spencer receives a master's of science in January 2020 from SUNY Maritime College. Her degree is in International Transportation Management with a focus on the business of shipping.

Maritime Risk & lessons learned from MRS 2019 @ SUNY Maritime College

Last month SUNY Maritime hosted the 10th Annual Maritime Risk Symposium, a forum for industry, academia and regulators to gather, exchange notes and experiences, and chart the path forward for maritime. Christine Spencer, SUNY Maritime College, ITM Graduate Student, reports.

There is no doubt that marine and road congestion are increasing, vessels are getting larger, cyber threats are ever growing and technology is rapidly advancing. Not to mention, the level of automation today is unlike anything we have ever seen and climate change is affecting global food security and critical infrastructure. Our geo political networks are in constant flux- leading to trade wars and beyond and as a global world we ourselves, our companies and supply chains are more connected than ever. Not just this, our risk is also more interconnected than ever.

At least, this is the argument of MRS speakers such as Cynthia Hudson (HudsonAnalytix) and Jen Pederson (National Risk Management Center). What does it mean to pass on risk to our shareholders and investors because we act in a negligent manner? What does it mean to be at risk? How do we measure it? How do we stay ahead of the curve in regards to risk in such a demanding and fast paced environment? How does the United States compare to other global powers and maritime nations? Does government policy meet demand? How do we balance legacy and the skillsets needed to operate effectively and train mariners in an already stretched curriculum? How do we meet bottom lines yet combat cyber threats? How should we spend our limited capital?

The 10th Annual MRS 2019: Understanding and Managing Risks to the Marine Transportation System hosted by, SUNY Maritime College brought together federal experts, government officials, industry professionals, researchers, students and educational institutions to address how to better understand and manage risks posed to our current and future Marine Transportation System (MTS) and answer some of these questions. RDML Andy Sugimoto, who currently serves as the Coast Guard's Assistant Commandant for Intelligence, said "we are in a seminal moment in our marine transportation system" and in the midst of doubts about the United State's current standing as a maritime nation, spirits lifted when there was talk about collaboration, innovation, future leadership and the hope for change. The symposium was followed directly by Project Evergreen, a strategic planning tool, used by the USCG for 20 years, that attempts to provide effective future preparation and planning for a variety of the future realities that the US could face regarding the security of our MTS. Creating a think tank like environment the project allowed participants to work together in groups to address theoretical realities as dramatic as a political drama or dark indie film. The Chinese Yen and cryptocurrency have overpowered American currency and HIV is now drug resistant! These are the sort of scenes that the group members had to make sense of and respond to.

However, when comparing these fictional realities to some presented at the MRS it is hard to sometimes tell the difference. The reality of rising risk in todays contested environment is one that has the ability to haunt anyone willing to pay attention. John Wolf (Morgan Stanley) shared an outer industry perspective on risk and the billions of dollars at stake and RADM Tiongson (USCG) shared the ease of weaponizing Unmanned Aerial Systems (UAS) and their ability to be used in homegrown terrorism.

Yet as the risks may haunt us, what can help us rest easier is that forces to be reckoned with like Dr. Martha Grabowski (Le Moyne College/Rennsselaer Polytechnic Institute) are working diligently to keep us safe despite our risk prone environment.

MRS 2020 will be hosted by the University of Illinois at Urbana–Champaign

Photos: SUNY Maritime College & Maritime Reporter

"We have to find a way to **diversify** *our institution and our industry"*

RADM McDonald
MassMaritime

VIEW FROM THE TOP
The President's Panel was the final panel of the 10th Annual Maritime Risk Symposium, held last month at the Maritime College State University of New York. Pictured left are: **Eric Johansson**, Professor, Marine Transportation, SUNY Maritime College; RADM **Michael Alfultis**, President, SUNY Maritime College; RADM **Michael E. Fossum**, Superintendent, Texas A&M Maritime Academy; and RADM **Francis X. McDonald**, President of Massachusetts Maritime Academy, and panel moderator RADM **Fred Rosa** (USCG, Ret.), Johns Hopkins APL.

"The speed of innovation and change is making things speed up and we must embrace this and move forward accordingly. It takes the will to do so."

Rear Admiral Mark H. Buzby,
USN, Ret., U.S. Maritime Administrator,
& MRS '19 keynote speaker

Photo: MarAd

from October 27th-29th and the focus will be on resiliency.

MRS '19: "The Presidents" Panel

"The decrease in state spending on higher education is what keeps me awake at night" is how RADM Michael Alfultis, President, SUNY Maritime College, neatly summarized the biggest challenge he faces as the leader of one of the U.S.' leading maritime universities. "With a small student body (about 1700), the numbers simply don't work," noting that while state funding 15 years ago covered two-thirds of the college's operating expenses, that percentage hovers at or below 30% today. The 10th Annual Maritime Risk Symposium closed yesterday at the Maritime College State University of New York feature a panel of three presidents of leading U.S. Maritime Academies: RADM Michael Alfultis, President, SUNY Maritime College; RADM Michael E. Fossum, Superintendent, Texas A&M Maritime Academy; and RADM Francis X. McDonald, President of Massachusetts Maritime Academy. Moderating the panel was RADM Fred Rosa (USCG, Ret.), Johns Hopkins APL, who discussed with the University leaders and the audience of nearly 200 the challenges facing not only maritime universities, but the maritime sector as a whole.

Echoing Alfultis, RADM Francis X. McDonald, President of Massachusetts Maritime Academy, said his state funding for Mass Maritime is in the low 20%. But beyond funding, he sees the biggest challenge for his institution and the maritime industry as a whole is attracting and educated a broader diversity of students, including more women and under-represented minorities. "We have to find a way to diversify our institution and our industry," and the best means he sees to accomplish this is collaboration; collaboration with other universities, with local communities and organizations, and with local schools starting at the earliest ages. Switching gears was RADM Michael E. Fossum, Superintendent, Texas A&M Maritime Academy, a veteran of three space flights who took up his post after retiring from NASA. He sees a top challenge to the industry as a whole, and in fact the nation, is fortifying the Jones Act. "The Jones Act is about our nation's security, and you have seen a degradation of sealift capacity since Desert Storm," said Fossum. "We need those U.S. flag vessels because we need that capability which is ours."

"The **decrease in state spending** *on higher education is what keeps me awake at night"*
RADM Alfultis
SUNY Maritime

"The **Jones Act** *is about our nation's security"*
RADM Fossum
Texas A&M Maritime Academy

Digitalization: *A key for port operators to survive and thrive*

Gary Anderson, Rajant Senior VP of Business Development

As the demand for goods continues to rise, the need to move a higher number of containers quicker and more efficiently is also increasing with this. As a result, port operators are proactively seeking new ways to boost productivity, all while reducing costs to meet this demand.

The emergence of the Industrial Internet of Things (IIoT) is a significant factor in convincing ports to adopt new technologies to help them overcome the day-to-day complexities they face and not miss a beat in a fast-paced industry. But to exploit the capabilities of IIoT, seaports must have the right network infrastructure in place.

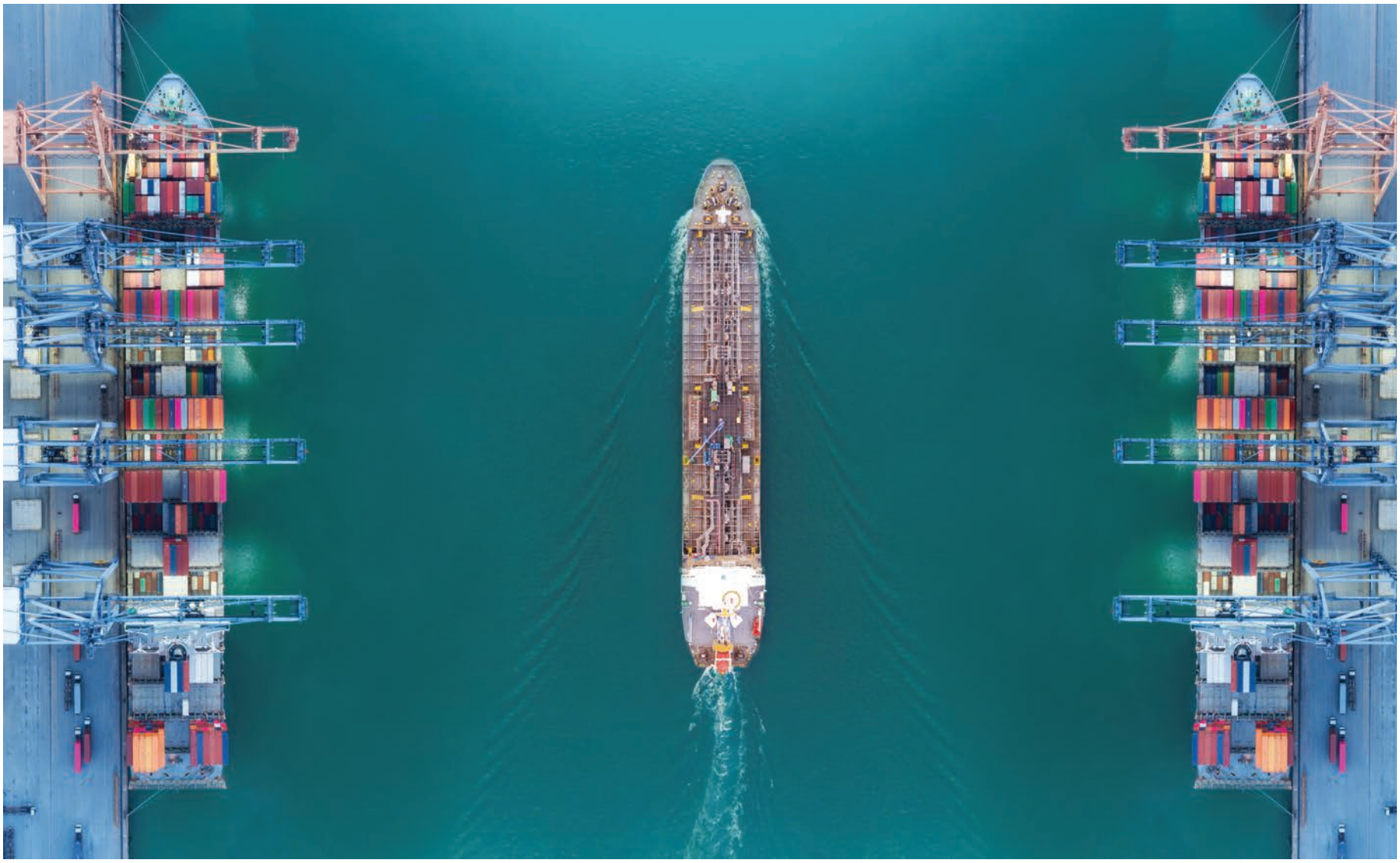
For ports to remain competitive in a continually changing market and revive their chances of an upturn in revenue, investment in the right technological tools and embracing digitalization is the only logical choice to make.

Challenges aplenty if digitalization is not adopted

Seaport operators often have to operate in harsh weather conditions, which can often cause communication problems for teams on the ground. For instance, if there is a dip in signal or a loss of coverage, this can significantly impact the ability of the seaport operator to keep its crew safe and remain profitable.

Conditions and out-of-date equipment aren't the only difficulties which ports have to contend with, as complex environments often have lots of moving parts such as cranes, vehicles, staff, containers, and vessel ships, which are always on the move. This shifting environment can pose significant interference, which in turn, can impair the critical communications imperative for the smooth running of a port's day-to-day operations.

Another notable challenge for port operators is security risks. These risks can come from rival port operators, or it can



be in the form of something far more sinister, such as terrorist groups. For example, seaport competitors may deploy drones to disrupt operations, or even spy and gain intelligence about its business logistics. However, terrorism can potentially target a specific port, which would catastrophically affect the valuable exporting and porting process of the business. Furthermore, this could possibly impair and destabilize a nation's economy. If seaport operators don't embrace digitalization, they are at risk of being left with legacy infrastructure, which will only hinder their growth and prevent them from scaling their operations in the future. However, each port is different, meaning each one has its own vast and varying complex needs, which makes the challenge of delivering and implementing multiple communication networks a problematic task. That's where Rajant's Kinetic Mesh technology can offer a solution.

Liberating operations

Seaports handle millions of containers every day, meaning guaranteed, secure, and reliable connectivity is a necessity. Rajant's Kinetic Mesh delivers the robust connectivity which port operators demand to take full advantage of IIoT. By deploying Rajant's ruggedized multi-radio BreadCrumb nodes equipped with InstaMesh networking software onto autonomous equipment, operators can communicate and control their assets, whether they are stationary or on the move.

With ports operating across a vast area, it can be challenging to monitor all their assets at once. Still, with Rajant's comprehensive tracking ability of containers, vehicles, and staff, it can provide port operators with the unparalleled real-time tracking capabilities to function as effectively as possible. Rajant's technology allows a business to hold multiple connections at any time and the ability to scan the environment to decipher the fastest route from source to destination and maximize efficiency.

The fourth industrial revolution is helping to create seamless, autonomous production processes across a host of sectors and in particular, allowing ports to have increased security measures in place, whether that be via cameras on the ground or UGVs or drones in the sky. Security is fundamental to ensure a seaport can operate effortlessly, without any disruptions. If not, it has the potential to cause a lull in efficiency levels for port operators. Furthermore, Rajant's Kinetic Mesh network offers robust security capabilities, ensuring that port operators can protect their critical data. The network has extreme ruggedness and is proven to support AES-CCMP and TKIP encryption with configurable per-hop, per-packet authentication.

Ports are historically demanding environments, with stacks of containers acting as barriers and interfering with the communication signals. However, Rajant's BreadCrumbs, and their ability to communicate peer-to-peer, via multiple simultaneous connections, means that information can be shared back and forth in a fully mobile, highly resilient web of communications. Furthermore, the BreadCrumbs can maintain these connections, even while in motion, and autonomously make additional connections to other nodes as they come into range.

By adapting to obstacles in the network, Rajant's dynamic technology can deliver robust, mobile-enabled connectivity ports need to capitalize on the opportunities of IIoT fully.

How Rajant helped connect DP World Antwerp

In partnership with BT, Rajant helped deliver a wireless backbone solution for DP World Antwerp in Belgium, for its Antwerp Gateway. As one of the busiest container terminals in Europe, it handles two-and-a-half million containers every year. With 900 staff, 3000 trucks, and 950 ships operating at the port, it required an intelligent, rock-solid IoT infrastructure to support its growing operations.

Ensuring end-to-end reliable and secure wireless connectivity across DP World Antwerp would be no easy feat due to the vast environmental interference across the port. Thanks to its proven track record in serving industrial environments, Rajant's wireless Mesh technology was chosen by BT to help meet DP World Antwerp's complex demands. Rajant's "Make-Make-Make-Never-Break" method of forming connections ensured DP World had a solution to its interference challenges.

Rajant's BreadCrumb nodes were able to create an intricate, and robust set of frequencies which could send and retrieve signals, while continuously shifting to provide the best route for the signal. Therefore, if a certain path became unavailable, or an object is obstructing the path, the nodes can identify an alternative route to redirect the data. This means that the network can dynamically adapt connections to moving vehicles such as containers or large ships, meaning that DP World Antwerp never falls behind.

Additionally, DP World will be able to analyze and optimize processes such as the movement of vehicles across the site – providing operators across the port with an end-to-end view of its operations to enable timely analysis and improved decision making.

Digitalization the key to unlocking the vast potential

It is clear as the port industry continues to move further into the 21st century, that demands will not stutter but only increase exponentially in the future. With the increased pressures that port operators face day-to-day, it becomes not only a case of keeping up with the demand but also of survival.

The proliferation of the IoT has provided ports with a stellar opportunity to thrive and utilize technology to digitally transform their ports and day-to-day operations – providing them with the tools to enhance their performance and monetize on new revenue-generating opportunities.

Tapio Hulkkonen (left) is the Director of Product Management at NAPA Design Solutions. His experience includes 23 years working at shipyards in Finland and now 14 years at NAPA. **Teemu Manderbacka** is a Senior R&D Engineer at NAPA Shipping Solutions. He has a background in experimental hydrodynamics and computational modeling, and holds a Doctor of Science in Naval Architecture.

Digitalization: *How well do you know your ships?*

Collaboratively use existing technologies and data to find valuable information about a ship's actual condition. Eventually, this leads to positive changes in vessel performance and optimization. Is that too much to ask?

What's the basis for the difference between the prices paid for VLCCs at the moment? Is it the variance in size or equipment? Or, perhaps the geopolitical tensions and changing expectations of tonne-mile demand? Maybe it is the reputation of each vessel's shipyard? How about refinery capacity growth in the Middle East and Asia? And, then there's the enforcement of tighter regulations with stricter safety and environmental standards? And, what about that clean energy "transition?"

Each of these factors certainly influences the final price. But to anyone with reasonable knowledge of the sale and purchase market, we've so far overlooked perhaps the most important obvious factor of them all: the ship's current state.

The value of due diligence

The stresses, strains, forces and tensions – otherwise known as cyclic loading – on a ship are responsible for the structural causes of material degradation, and ultimately fatigue. While at sea these factors cause progressive deterioration of a vessel, affect its service lifespan, and the level of service and maintenance it will require. It's possible to get a partial understanding of a ship's working life through its logbooks. Similarly, its classification records will tell you of any mechanical or structural defects which have been remedied, and there are a variety of other specialist sources from

Photo: NAPA Design Solutions

which you can infer aspects of a vessel's condition. However, even with all these sources, you can't get a complete understanding of its seaworthiness. None of shipping's mandatory records will detail the weather it has endured, the loads it has carried, its engines' revolution profiles, or the daily stresses of its superstructure – and these are all factors that affect the condition of a vessel, the safety of its crew and cargo, and the value at which it is bought, sold, or insured.

If we take the example of Jones Act shippers, we can see how important it is that you accurately understand the remaining working life of a vessel you're buying – especially where accurate assessments of lifespan can be worth hundreds of millions of dollars.

In 2017, the United State's federal government's Congressional Research Service estimated that American-built coastal and feeder ships – for example, those most commonly used in cabotage trades – can cost between $190-250m. Whereas the same type of ships built elsewhere in the world can be had for as little as approximately $30m. At the top end, this implies a difference of $220m to a Jones Act operator's P&L. The net effect is that any ship purchased for intra-USA commerce which has a shorter working life than expected could end up costing its owner ruinous amounts to replace it. Jones Act container ships have spent, on average, three decades in service.

The international average is 11.5. For bulkers, the numbers are even further apart: 38 years old in the U.S., and nine internationally.

It's worth emphasizing that these vessels all undergo periodical surveys by their flag state administration or classification society and are therefore legally safe to sail. But with so many miles under their belts, how much longer can they be expected to earn enough to make a profit as well as supporting maintenance and ongoing compliance requirements?

A survey a day keeps off-hire away

Recent technology developments that provide a ship's minute-by-minute position via AIS and make it easy to identify the local weather enable you to build an accurate timeline of a ship's operations and the environmental conditions in which it operated. Combine this data and connect it with structural analysis software and you are provided with a valuable estimate of a ship's current and future service needs.

NAPA Fleet Intelligence acquires hourly AIS data and global weather data, and we collate them for each vessel's specific operational history. This includes position, speed, wind conditions, sea currents, and wave and swell height, direction and period.

As part of this process, NAPA can combine this with advanced structural analysis – as well as the experience it has gained as the provider of the ship design software used for more than 90% of ocean-going newbuilds – to create a digital twin of the vessel that reliably estimates remaining fatigue life, and safety profile. It would be possible to use this information to derive a financial assessment of a ship.

The scientific research which provides the foundation of these structural and wave estimates is not new. They are the outcome of numerous empirical investigations over the past decade, which have proven their underlying effectiveness. However, it has not been possible until recently to combine them in one simple, easy-to-use package.

In comparison to other non-destructive fatigue detection methods, this provides an optimized experience and can substantially reduce inspection costs compared to conventional testing.

Staying Out of Dry Dock

Navin Thakur, director at Drewry Maritime Research, noted last year that ship financiers are now rarely willing to estimate that a ship will have an average economic life of 25-30 years.

In an era in which almost every sector has overcapacity concerns and freight rates which are frequently unable to cover OPEX and debt repayments, it won't take much off-hire to leave a shipowner or operator underwater. With the arrival of this development from NAPA, it is now possible to collaboratively use existing technologies and data to find valuable information about a ship's actual condition which was previously difficult to obtain, and lead to major positive changes to the current state of vessel performance and optimization. Think about it: no surprises, no off-hire. Just the provision of consistent, reliable service. Isn't that what you want to know about your ship?

Corona Youthful

Corona Youthful is a 91,000 dwt-type coal carrier, a special coal carrier built at Oshima Shipbuilding Co., Ltd. It is the same type known as the "Corona-series," "K" Line's specialized fleet for transport of thermal coal. The Corona-series are equipped with wide beam and shallow draft which are the most suitable type for entering ports of Japanese Thermal Power Stations to discharge cargo.

This ship is equipped with a Binary Cycle Power Generation System developed by Kobe Steel Ltd.

Binary Cycle Power Generation System is a waste heat recovery electric power generation system utilizing compression heat by scavenging air from the main engine which, in turn, contributes to reduction in fuel oil consumption of diesel generator engine.

Corona Youthful is equipped with the latest energy-saving and ecological technology such as Advanced Flipper Fins and Rudder Fin which promote her propulsion efficiency.

Advanced Flipper Fins are a stern attachment located in front of the propeller and designed to optimize water current to propeller. Rudder Fin located in the rear of propeller is designed to reduce energy loss caused by propeller slipstream.

Corona Youthful Main Particulars

Ship Name	CORONA YOUTHFUL
Ship Type	Bulk Carrier
Ship Builder	Oshima Shipbuilding Co., Ltd.
Ship Owner	FGL Mast Panama S.A.
Ship Operator	Kawasaki Kisen Kaisha, Ltd.
Ship Designer	Oshima Shipbuilding Co., Ltd.
Delivery Date	February 1, 2019
Classification	ClassNK
Main Particulars	
Length, (o.a.)	234.99m
Length, (b.p.)	230.00m
Depth, (molded)	18.40m
Draft, (scantling)	12.885m
DWT (at scantling draft)	91,861MT
Fuel Type	Fuel gas oil/Diesel oil/Heavy Fuel Oil
Main engines	MAN B&W 6S60ME-C8.5
Total installed power	9120kW

A special coal carrier with Binary Cycle Power Generation System

Photos: K-Line

Lily Promenade *10% gain in energy efficiency*

Ariake Shipyard of Japan Marine United Corporation recently delivered a new VLGC (very large gas carrier) that NYK will charter under a long-term contract to Astomos Energy Corporation, a liquefied petroleum gas (LPG) company. The ship was named Lily Promenade by Kazuhisa Otsuka, senior operating officer of Astomos Energy Corporation, and the ceremonial rope holding the vessel in place was cut by Mariko Kurokawa of Astomos. Akira Kono, NYK managing corporate officer, attended together with others from the company.

The ship is the first new NYK-owned VLGC to include a SOx scrubber that is compliant with the International Maritime Organization's (IMO) more stringent SOx emission regulation, which is scheduled to become effective in January 2020. The ship will be about 10% more energy efficient (reducing CO2 emissions per unit of transport), exceeding the IMO EEDI phase 1 requirements that will become effective in 2020. In addition, an energy saving devices and the low-friction paint make the ship a more fuel efficient tanker.

Corona Youthful Main Particulars

Shipyard	Japan Marine United Corporation
Type	LPG Carrier, IMO Type A_Cargo Tank
Owner	IRIS GAS SHIPPING S.A.
Operator	NYK Line
Delivery	October 30, 2019
Length (OA)	230 m
Length (BP)	222 m
Breadth (molded)	36.6 m
Depth (molded)	22.2 m
Draft (designed, molded)	10.86 m
Speed (at designed draft)	16.75 knot
Main engines	DIESEL UNITED-WIN GD 7RT-flex58T-D
Cargo Tank Capacity	83390.832 cu.m.
Classification	ClassNK

Photos: NYK

CVN-79

John F. Kennedy (CVN 79) is the second aircraft carrier in the Ford Class. It is also the second aircraft carrier built by Newport News Shipbuilding named for JFK. Like its forerunner CVN 78, Kennedy is a truly electric aircraft carrier, with many of the systems powered by steam on Nimitz-class carriers now powered by electricity. The ship is designed to save the Navy $4 billion in total ownership cost over the ship's 50-year lifespan, with fewer overall components, extended drydocking interval, improved ship-wide air conditioning, and more.

Ishin

In May 2017, MOL decided to build an LNG-fueled tugboat that would be operated by Nihon Tug-Boat Co., Ltd. It was built by Kanagawa Dockyard Co., Ltd., has dual-fueled engines from Yanmar Co., Ltd., and runs on LNG supplied by Osaka Gas Co., Ltd. The LNG-fueled tugboat, called Ishin, was delivered in February of 2019. Ishin is Japan's first tugboat built to conform to the International Code of Safety for Ships Using Gases or Other Low-flashpoint Fuels (IGF Code). MOL conducted a demonstration test to supply LNG to the LNG-fueled tugboat Ishin in the port of Kobe and Nagoya. The test confirmed that LNG can be safely supplied to vessels at the port.

Inside Ishin

The tugboat's role is to support large-size vessels in port, as well as escorting large vessels plying Osaka-Bay and the Setonaikai Inland Sea. So the Ishin not only has to deliver optimum performance in port, but also high-speed operation for those escort duties. It has a top speed of 16 knots, a fast tugboat and something of a rarity in its class. Generally, ship maneuverability and high-speed sailing tend to contradict each other, but this ship reconciles both needs. This is one of the Ishin's major characteristics. In addition, many tugboats today are equipped with an azimuth thruster, which allows the propeller to rotate 360° around the vertical axis. The Ishin is equipped with two of these propellers, each of which is driven directly by an engine. The Ishin can be freely moved forward and backward, port and starboard by changing the engine rpm and the direction of the 360° rotating propellers. By making full use of this feature, the Ishin can more effectively assist large-size vessels in berthing and un-berthing.

LNG Bunkering System

The most obvious feature of the Ishin is the arrangement of the LNG fuel tank, which is positioned on the rear deck and is a removable structure. Normally, the tank is not removed, but it can be, for example, when the Ishin is docked for regular maintenance. To achieve this configuration, the LNG fuel-gas supply system is integrated with the tank to make a very compact structure. As a result, the risk of a liquid spill is significantly reduced because the design minimizes the area where onboard leaks might occur during operation. In addition, the piping from intake port to tank is shortened to minimize the effect of heat load on the piping when bunkering the vessel from an external source.

The LNG fuel tank has a vacuum-insulated, double-hull structure, kind of like a large thermos bottle. It can maintain the temperature inside the tank longer than general ocean-going LNG carriers, because the heat load is small and pressure can be contained inside the tank.

Dual-Fuel Engines

The Ishin adopts dual-fueled engines, which can run on both LNG and heavy oil. These engines use heavy oil A as a backup to LNG fuel, and can be operated in both Gas Mode (running on LNG) and Diesel Mode (running on heavy oil A). LNG is gasified using exhaust heat from the engine, and supplied to the engine. The gas is mixed with air and ignited with an extremely small amount of heavy oil A to create the explosion that produces power in the cylinders.

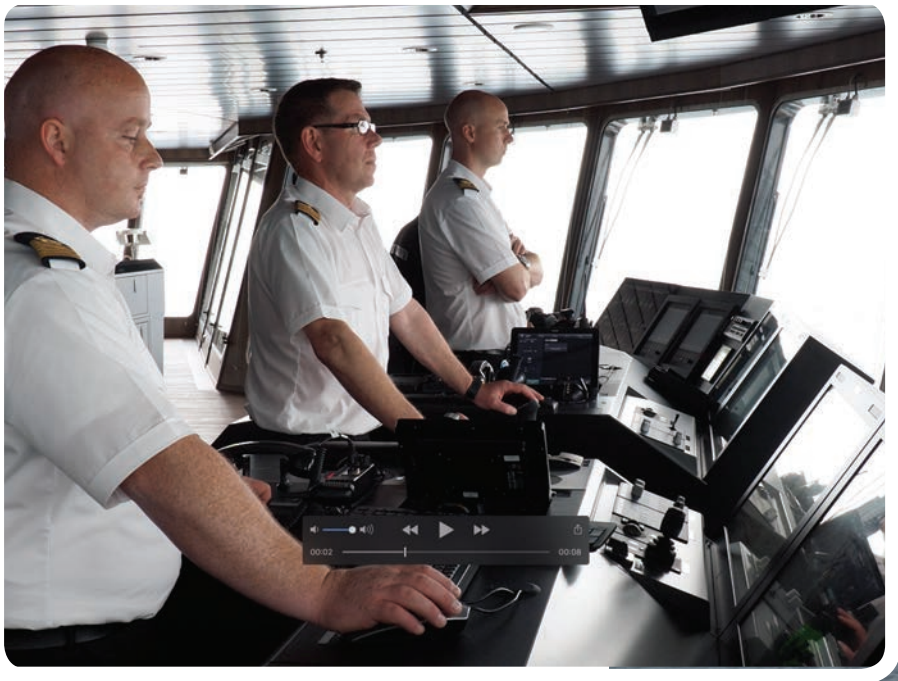
Ishin Youthful Main Particulars

Vessel Type	LNG-fuelled tug
Shipbuilder	KANAGAWA Dockyard Co.,Ltb
Material	steel
Owner	Mitsui O.S.K. Lines
Operator	Mitsui O.S.K. Lines
Ship Designer	Mitsui O.S.K. Lines
Delivery Date	February 2019
Length, (o.a.)	43.6m
Length, (b.p.)	38.75m
Breadth, (molded)	9.2m
Depth, (molded)	3.99m
Draft, (designed)	3.15m
Speed	16.4kt
Fuel Type	LNG / Diesel oil
Main engines	YANMAR 6EY26DF
Total installed power	1618kW×750rpm×2set

Japan's first LNG fueled tugboat applying IGF Code

Photos: Mitsui O.S.K. Lines

Hybrid Cruise ship Roald Amundsen



Photos: Hurtigruten/Inset photo: photo Espen Mills_Hurtigruten

"It is with great pleasure that I can report that we have delivered MS Roald Amundsen to Hurtigruten. This is a fantastic ship built by fantastic talented people," said Olav Nakken, CEO of Kleven Verft AS.

The cruise shipping industry continued its torrid pace in 2019 with a number of significant deliveries, perhaps none more impressive than the MS Roald Amundsen, specially designed for some of the world's most demanding and spectacular waters. The expedition ship is the world's first hybrid-powered cruise ship and accommodates about 500 guests. It can run on battery power, but the main task of the large battery packs is to reduce fuel consumption, and if the system works as planned, Hurtigruten can bank on a 20 percent saving in fuel compared to other ships the same size. In addition, the ship is equipped with an ice-reinforced hull and has several innovations to achieve to be as environmentally friendly as possible.

MS Roald Amundsen adds a number of 'world firsts.'

"I am unbelievably impressed with the job that has been done among the employees," said Nakken. "To deliver such a complicated product in a demanding period, while we during the same period also delivered a series of anchor handlers to Maersk, is something that everyone who has contributed to can be very proud of. With the interior, the technology and the unique design, MS Roald Amundsen is the most amazing ship that has ever been delivered from a Norwegian shipyard."

While the construction process demanded more time than initially planned, Nakken said that building MS Roald Amundsen has been a positive experience for Kleven. "We have acquired a unique expertise here at the yard through this project, which puts us in a completely new position when it comes to building passenger ships. All suppliers, together with employees at the yard and Hurtigruten, has the credit of having built the world's first hybrid-driven expedition ship."

A sister ship, MS Fridtjof Nansen, is also being built at Kleven Verft and will be delivered towards the end of this year. Design of both ships is provided by Kongsberg Maritime AS.

Photo: RMK Marine

T.Elinor

Adnan Nefesoğlu, RMK MARINE's CEO, thought a short moment and replied by reflecting his self-confidence "Yes, we can do", when the local client came and asked RMK MARINE in early 2016 that: "We have two main engines, procured eight years ago and standing in a depot since then. They have Tier I feature. Can you convert them first to Tier II compliant engines, to be followed with Tier III compliant features, make them fully operable and then can you build two ships around 15.000-16.000 dwt, one asphalt/bitumen, the other one chemical tanker and install these two engines having Tier III features?". In giving his positive reply without hesitation, of course he considered being a subsidiary company to Koç Group, Turkey's largest conglomerate and the only Turkish company taking its place in Fortune 500 Global List, the self-confidence in what they achieved as RMK MARINE until then and the trust felt in RMK MARINE's solution partners in this project, led by MAN ES, the manufacturer of the MAN Engines. At the beginning of the project, the two MAN 7S35MC7.1 engines were inspected carefully by MAN Diesel & Turbo (later changed its name to MAN ES) and both engines were detected to be in perfect shape. Then, they were overhauled successfully by MAN ES and RMK MARINE together in the shipyard and in line with the project schedule. Then, they were converted to Tier II compliant features. This phase was followed by converting both main engines to comply with Tier III emission regulation requirement in full collaboration among the client, RMK MARINE, MAN ES and Doosan, the manufacturer of LP SCR system and the subcontractor of MAN ES in this project. While transforming the Main Engines to Tier III compliant, the design and building schedule of both ships were carried out in parallel. During the construction phase of the two ships, RMK MARINE received an additional demand from its client: the installation of a scrubber system to both ships, in addition to LP-SCR systems, to allow both ships to comply with IMO 2020 SOx cap. Upon an evaluation, it was concluded that this modification on both vessels was possible. The designs were modified accordingly and after a market search, Panasia was chosen as the Supplier for scrubber systems.

Following a two year period, RMK MARINE performed all these conversion, designing and construction activities in full cooperation by its solution partners, delivered the first ship T.Adalyn, a 15,000 dwt asphalt/bitumen tanker on May 28, 2019. T.Elinor, the second ship, a 16,000 dwt chemical tanker is to be delivered to its client on December 16, 2019.

As their main engines, diesel generators and thermal oil heaters are connected to the exhaust lines, when T.Elinor or her very likely sister ship T.Adalyn uses low sulfur fuel, they will use their LP SCR system. To the contrary, when they use high-sulfur fuel, they will bypass the SCR system and will start using scrubber system. Consequently, both vessels have been ensured to have unrestricted navigation features in all seas of the world by being in full compliance with both the requirements of Tier III and IMO SOx 2020 cap. T.Elinor was delivered as both SCR and Scrubber systems installed. T.Adalyn was delivered with SCR System and it will also acquire scrubber system shortly after the delivery of T.Elinor.

T. Elinor Main Particulars

Ship Name	T. Elinor
Ship Type	Oil Product & Chemical Tanker
Ship Builder	RMK MARINE Gemi Yapım Sanayii ve Deniz Taşımacılığı İşletmesi A.Ş.
Material	Steel
Ship Owner/Operator	Tuzla Tankercilik A.Ş.
Ship Designer	NAVTEK Deniz Teknolojisi A.Ş.
Delivery Date	December 16, 2019
Classification	DNV-GL
Length, o.a.	153.9 m
Length, b.p.	144 m
Breadth, molded	22 m
Depth, molded	11.5 m (main deck)
DWT (at design draft)	16,000 ton
DWT (scantling)	abt. 16.318 ton
Speed	14 knots
Fuel Type	Heavy Fuel Oil, ISO 8217, HFO 380 cst at 50°C
Main Engines	MAN B&W 7S35MC-Mk7, IMO Tier III
Total Installed Power	5,180 kW at 173 rpm
Bow Thrusters	Veth VT-900
Propeller	MAN Alpha Propeller Equipment
Bearings	Stern Tube Wärtsilä
Gears	Mekanord PTO 900
Generators	3 x Hyundai 6H1728E 1 x Emergency Generator Lindenberg-Anlagen
Shaft Alternator	Leroy-Somer
Engine Controls	Alphatronic 2000
Radars	JRC
Depth Sounders:	JRC JFE-680
Auto Pilot	YOKOGAWA, PT900A-ANA-1S
Radios	JRC JSS-2150, JRC JHS-770S
AIS	JRC JHS-183
GPS	JRC JLR-7800
GMDSS	JRC JUE-87
SatCom	Sailor 100GX Antenna
Gyro Compass	YOKOGAWA CMZ 900D
Speed Log	JRC JLN-550-2
Mooring Equipment	Gürdesan
Fire Detect/Extinguish	Aksis Heat Exchangers
Lifeboat	Harding Noreq-Lbf 580C
Liferafts	2 x Viking Life Saving Equipment
BWMS	1 x Alfa Laval Pure Ballast 3.1

Wind of Change

Wind of Change is a maintenance vessel for offshore wind turbines, built in Turkey at the Cemre shipyard for the Louis Dreyfus Armateurs Group (LDA) and works for the Danish energy group Ørsted.

Wind of Change, developed by Salt Ship, is the first wind farm maintenance ship in the Louis Dreyfus Armateurs fleet. The Offshore Service Vessel (OSV) will be deployed in the wind farms "Borkum Riffgrund 1 und 2" and "Gode Wind 1 und 2" off the German coast as part of a long-term contract with Ørsted. A sister ship, Wind of Hope, has been ordered for the service in "Hornsea Project Two".

Ørsted operates the vessel, which is equipped with a diesel-electric propulsion system and dynamic positioning DP2. It can accommodate 90 people, including 65 wind farm technicians on board for wind turbine maintenance.

Measuring 83 x 19.4m with a 7m draft, the 6,060-gt ship offers two 1,600 kW Schottel rudder propellers at the stern drive the diesel-electric vessel. Two 1,400 kW transverse thrusters and an extendable rudder propeller of 800 kW are located in the bow to enable dynamic positioning in accordance with the DP2 standard. The power required for this is generated by four generators driven by a total of 1,600 kW MAN diesel engines. If more power is needed at short notice, batteries are used. Two battery packs with 720 KW then take over the power peaks.

A 200-kW emergency power generator is also available. The ship has a range of around 5,000 miles at 10 knots in DP mode. The maximum speed is 12.5 knots.

Wind of Change is the first ship in the world to be equipped with a hummingbird crane with 3D motion stabilization. This means that during swell, movements in all directions can be compensated. The crane can lift a maximum weight of 1000 kg and has a reach of 30m.

The wind farm technicians can reach the landing platforms of the wind farm towers directly via a special, hydraulically stabilized gangway. This gangway is located on a telescopic tower on the aft deck on the port side of the ship. The gangway with a double extension extends over 31m and can be operated with waves of up to 2.5m.

In addition, a passive anti-roll system with two tanks was installed to reduce ship movements during work at sea. The deck is intended for stowing four 20-ft. containers.

The helicopter deck is suitable for landing helicopters within the offshore wind farm and can carry a weight of up to seven tons. In addition, Wind of Change has a 12-m daughter boat with room for up to eight people which is housed in a special davit system in a hull recess on the starboard side below the superstructure. The technicians first go on board and are then discharged into the water. When they return, they are lifted back on board. This procedure also increases safety for the technicians.

Wind of Change Main Particulars

Type of vessel	Offshore Service Vessel
Home port	Marseille
Owner	Louis Dreyfus Armateurs Group
Shipyard	CEMRE Shipyard, Turkey
Dimensions (LxWxD)	84 x 20 x 5 m
Commissioning	June 2019
Deadweight	6.060 GT / 1.945 NT
Propulsion	Diesel electric
Gensets	4 x MAN Diesel gensets
Total power	1.600 kW
Max speed	12.5 knots
Emergency genset	200 kW
Bow thruster	2 x Schottel
Output	2 x 1.400 kW
Extendable rudder propeller	1 x 800 kW

Photo: RMK Marine

Photo: Stena Line

Stena Estrid

Stena Estrid, built in China at AVIC Weihai Shipyard, is the first of five new Stena Line next generation RoPax vessels, three of which will be introduced on the company's Irish Sea routes from Dublin to Holyhead and Belfast to Liverpool. Sister ship Stena Edda is due to commence operations from Belfast to Liverpool in spring 2020, with the third vessel Stena Embla expected to be introduced on the same route in early 2021.

"Stena Estrid will bring many benefits to our customers including speedy and efficient loading and unloading operations, plus further development of our Scandinavian-inspired facilities including our restful and bespoke Hygge Lounge," said Paul Grant, CCO, Irish Sea and North Sea at Stena Line.

Measuring 215m long, Stena Estrid and her two sister ships for the Irish Sea will be larger than today's standard RoPax vessels and will provide freight capacity of 3,100 lane meters and the space to carry 120 cars and 1,000 passengers and crew. The name Estrid is connected to Stena Line's Scandinavian heritage. It is an Old Norse eastern-nordic version of the name Astrid. Estrid is commonly found on old runestones and means 'divinely beautiful'.

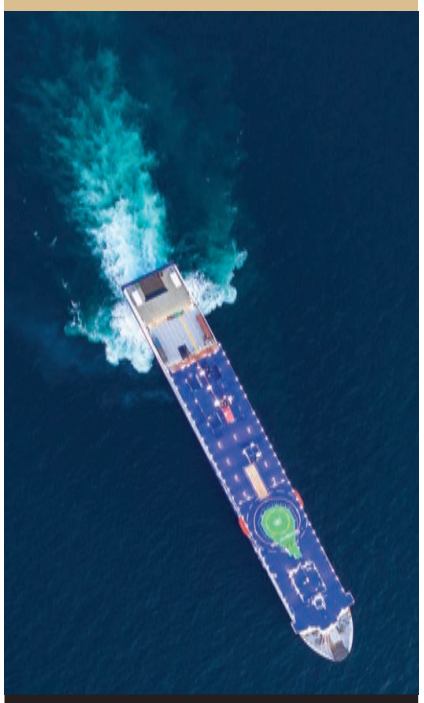


Photo: Stena Line

© HPA

Branddirektor Westphal

Compared to the first fire-fighting boats that were used around 50 years ago in the major trading ports, today's vehicles are true high-tech monsters with enormous capabilities. And the flagship of the Hamburg fleet, the Branddirektor Westphal, is now also part of it. The ship is operated by the Hamburg Fleet, a subsidiary of the Hamburg Port Authority. It is still the largest fire-fighting boat in the port of Hamburg. The ship is named after Johannes Westphal, who was appointed head of the Hamburg professional fire brigade by the British military government in August 1945. The Hamburg fire brigade uses the modern high-performance firefighting boat.

The new boat measures 43.5 x 9.8m with a 2.8m draft.

The ship of the type Löschboot LB 40 ordered in October 2016 was built under construction number 7030 at the Fassmer shipyard in Berne/Motzen. The keel laying took place on April 26, 2017, the stack lift on 24 May 2018. The ship was christened on November 26, 2018 in Hamburg. The godmother was Eva Maria Tschentscher, wife of Peter Tschentscher, First Mayor of the Free and Hanseatic City of Hamburg. The construction costs of the ship amounted to around 16 million euros.

The ship is powered by two Caterpillar C18 diesel engines, each with an output of 500 kW at 1800 rpm. The engines operate on two Schottel type SRP 190 rudder propellers. The ship reaches a speed of around 12 knots. It is also equipped with two electrically driven Schottel STT 170 bow thrusters with 330 kW output. Three diesel generators are available for the on-board power supply. Two of the three gensets are of the Caterpillar-C18 type with an output of 460 ekW/50 Hz. The third genset is a Caterpillar-C4.4-Acert with 99 ekW/50 Hz and is equipped with a sound insulation hood. A dynamic positioning system keeps the Branddirektor Westphal in position during operation.

All engines are equipped with a modern exhaust aftertreatment system with soot particle filter and SCR catalytic converter. The engines are powered by low-emission synthetic GtL fuels (Gas to Liquid).

The ship is equipped with three extinguishing monitors from the Norwegian company Fire Fighting Systems, each capable of spraying up to 180m wide and 110m high, as well as three combined water and foam jet pipes. Three Caterpillar C32 Acert diesel engines, each with an output of 1134 kW at 1800 rpm, are available for fire-fighting operation. The fire pumps can pump a total of up to 120,000 liters of extinguishing water per minute. The ship is equipped for fire-fighting, personal rescue and technical assistance. A medical room modelled on a rescue vehicle is available on board for rescue operations. In the stern area there is a working crane on the starboard side.

In addition, the boat is equipped with a gas protection system (citadel): it offers protection to the crew in the event of a major fire, for example.

Branddirektor Westphal Main Particulars

Vessel type	Firefighting boat
Class	Löschboot LB40
Home port	Hamburg
Owner	Hamburg Port Authority
Shipyard	Fr. Fassmer
Commissioning	Nov. 2018
Dimensions	43 x 9.80 x 2,8 m
Crew	4
Main engine	2 x Cat C18
Output	2 x 500 kW
Max speed	12 kn
Propeller	2 x Schottel rudder propeller
Fire fighting operation	3 x monitors
Drive power	3 x Cat C32 Acert engines
Output	3 x 1.134 kW
Gas protection system	Citadel

©Pospiech

Potsdam: *German Federal Police*

On December 14, 2018, the first of three new police mission ships was christened Potsdam at the Fassmer shipyard in Berne. With the three ships Potsdam, Bamberg and Bad Düben built in Berne, the Federal Police is entering a new dimension. They tower over the current boats by 20m and thus have considerably better seaworthy characteristics. The biggest special feature of the newbuildings is a helipad on deck where even the largest helicopter of the Federal Police, the Super Puma, can take off and land. In addition, the ships have storage facilities for containers with equipment for special missions. The new ships will replace three mission ships that are 28 to 30 years old and partly come from the former Volksmarine of the GDR.

Dr. Dieter Romann, President of the Federal Police Presidium, stressed in his naming speech the technical as well as tactical for the fulfilment of the tasks of the Federal Police Sea. With the new ships, the Federal Police will in future have state-of-the-art, efficient and environmentally friendly resources at its disposal to carry out its tasks in the coastal surveillance network on the North- and Baltic Sea as well as within the framework of the EU. If necessary, they must be able to stop a dangerous vessel with a warning shot in front of the bow or render it inoperable and prevent it from continuing its journey.

The diesel-electric propulsion system and modern exhaust aftertreatment also set new standards. The ships meet the strict exhaust emission limits of TIER III as well as the ECA standard for the North- and Baltic Sea. In addition, the service ships have all the design criteria required for the "Blue Angel" environmental seal of approval.

In addition, the new coastguard ships offer more space, more comfort, improved possibilities to stay on board and a significantly increased sea endurance. After all, at 86.2 x 13.4m and 1900 gross tonnage, a maximum speed of around 21 knots (39 km/h) and a maximum of 48 persons, they resemble the corvettes of the German Navy in terms of size, water displacement and some tactical and technical parameters.

The new police ships, as well as their older sisters, are equipped with seaworthy control boats which can be used up to a wave height of four meters. This is made possible by a sea state stabilizing side launching device. This enables the officers to board the daughter boat during border police checks at sea. This eliminates the not inconsiderable source of danger when manning the boats using pilot ladders. These boats can reach a speed of more than 30 knots and also have extensive nautical and radio equipment, such as a marine radio, a radio for BOS, a chart plotter and an echo sounder.

In addition, the new P 86 ships have, among other things, two fire-fighting monitors with a throwing range of 60 and 90 m (extinguishing and cooling of burning ships). The heart of every ship is its propulsion system, and the new boats are characterized by a large radius of action. This is achieved by a hybrid drive consisting of diesel engines for high speeds and electric motors fed by the Caterpillar gensets. This enables particularly economical diesel-electric operation in the predominantly used speed range up to 12 knots.

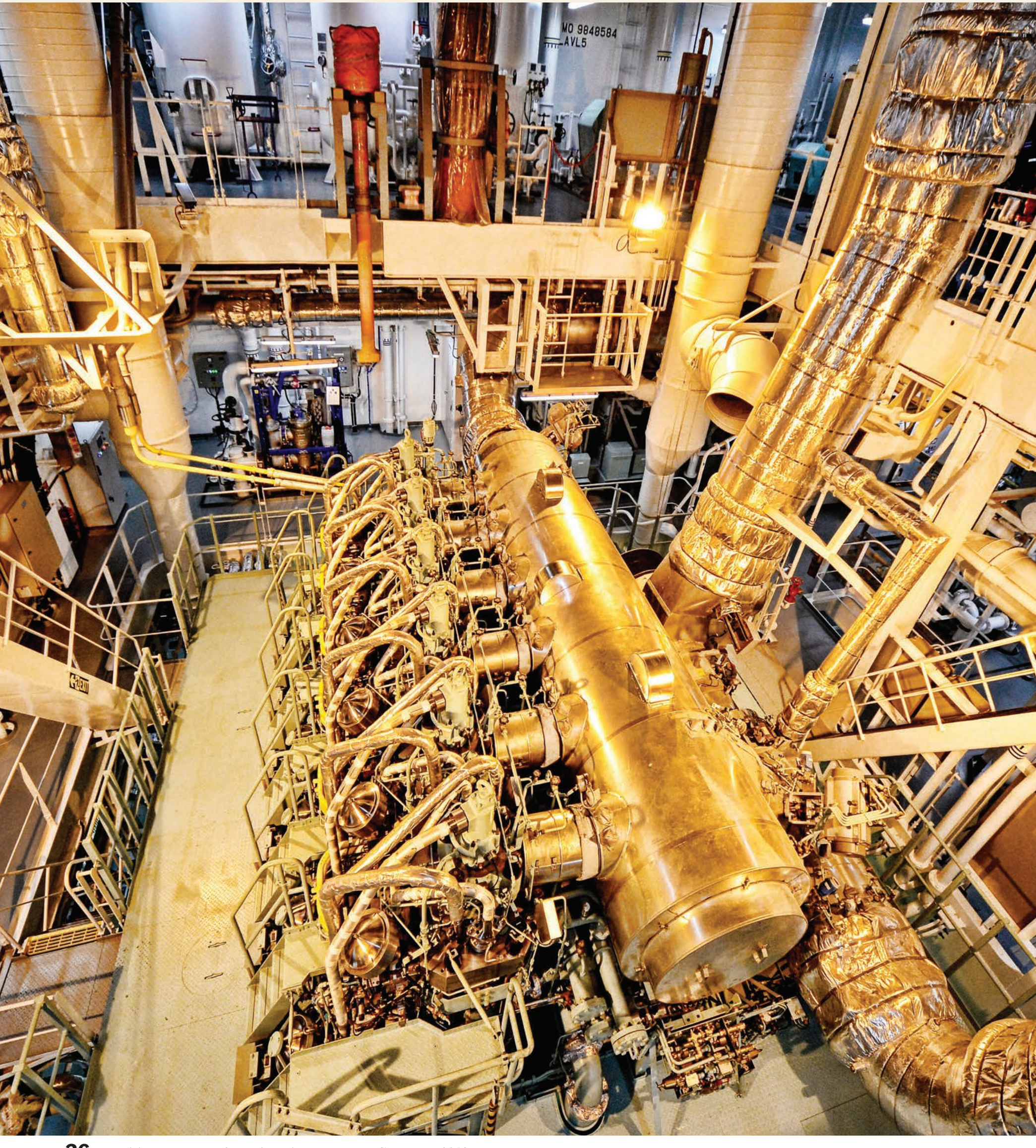
The client has opted for Wärtsilä as the main drive motor. Two Wärtsilä diesel engines type 12V 26F with 4,080 kW each at 1,000 rpm, transmit their torque via a ZF transmission (W430000NR2) each to a Piening variable pitch propeller (diameter: 2.75m).

Two gensets, Caterpillar 3508 SCAC with 820 kW each at 1,500 rpm, increase the drive power via electric traction motors that are flanged to the two transmissions of the main engines and can operate as generators as well as electric motors. In combiner operation, the ships reach a top speed of more than 21 knots. In addition, the ships can be driven solely by one or both gensets. According to the technical development, a 600 kW three-phase motor is used in this specific case, which can be controlled steplessly via a frequency converter. The boats reach a speed of 12 knots. The maneuvering characteristics are ensured by two Jastram transverse thrusters, type BU60F, each with 350 kW.

The main engines as well as the gensets are each equipped with exhaust aftertreatment systems, SCR systems (selective catalytic regeneration with urea injection). The ships do not have a DPF (diesel particulate filter). Operation with the sulfur-free fuel MGO (Marine Gas-Oil = 0.1%S) and with SCR is already an overfulfilment of the existing regulations and a major step towards environmental protection at sea. For special operations, the three new boats are each equipped with two stern hulls to accommodate two fast control boats (comparable to the daughter boats of the DGzRS rescue cruisers).

Potsdam Main Particulars

Vessel type	Patrol Boat
Class	P 86
Shipyard	Fr. Fassmer Shipyard
Christening	Dec 2018
Dimensions	86 x 13,42 x 3,95 m
Tonnage	2.092 BRZ / 627 NRZ
Crew	14
Main engines	2 x Wärtsilä 12V 28F
Power	2 x 4.080 kW
Max speed	21 kn
Propeller	2 x CPP
Armament	1 x Mk 110
Class	DNV GL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Feel the Power of Methanol
These 49,000 dwt vessels are built with the second generation of MAN B&W ME-LGIM two stroke dual-fuel engines that can run on both methanol and conventional marine fuels.

Photos: Methanex Corporation

Methanol Proves Promising

The future [fuel] *is now*

When the clock strikes midnight on December 31, 2019, the maritime world enters a bold new era of emission reduction. With its growing fleet of methanol fueled ship and more than 60,000 hours of operating experience under its belt, Waterfront Shipping Company has a five-year headstart.

By Greg Trauthwein

“Through those first 60,000 hours the engines and technology are proven to work, and the performance and safety aspects have been excellent. We’re achieving better fuel efficiency, and we’ve had no loss-of-power incidents due to the technology.”

Paul Hexter, *President, Waterfront Shipping*

As a general rule, shipowners are remiss to share insights on their operations, lest their competitors catch wind and leverage the same technology and savings. The case of Waterfront Shipping Company Ltd. – which is a world leader in terms of experience in using methanol as marine fuel with more than 60,000 hours under their belt – is different, as Waterfront is a wholly owned subsidiary of Methanex Corporation and Marinvest/Skagerack. Earlier this year Waterfront Shipping welcomed two new ships, M/T Mari Couva and M/T Mari Kokako, of four in total coming into the Waterfront Shipping fleet in 2019.

“It is important that we share our experiences and make the industry aware that methanol is a well-proven, simple-to-adopt solution offering compliance with IMO 2020 regulations and provides a pathway to meeting IMO 2030 and 2050 CO2 emission targets,” said Patrik Mossberg, Chairman, Marinvest.

LOOKING BACK

“Methanol as a marine fuel concept started for us and Marinvest back in 2012, with the initial discussion centering on retrofitting existing vessels,” said Paul Hexter, President, Waterfront Shipping. “After detailed analysis, the decision was taken to focus on new builds, with our first seven methanol-powered vessels ordered the following year and delivered in 2016. Those ships have now run on methanol for over 60,000 hours, and during that time we have gained valuable operational experience, incorporating learnings into the new vessels, and proven that the technology works. We are very pleased with the performance of the first seven vessels, and are excited about the new, second-generation ships, three of which we have already taken delivery of. The second-generation vessels benefit from innovative technological advancements that continue to optimize efficiency.”

“We were aware of other options and evaluated them, but we are confident of the positive benefits of methanol, and believe it is one of the best clean burning fuels for the wider shipping industry,” said Hexter. “Methanol might not be too familiar to the marine industry, but it is one of the top five commodity chemicals traded globally with a long history of safe transportation and safe handling.”

The Business Case for Methanol

The first consideration for any alternative fuel is availability, a ‘chicken and egg’ situation that continues to play out in regards to LNG as a mainstream maritime fuel. “Methanol is a cost-competitive marine fuel, it is readily available and the infrastructure for bunkering will be easy to establish, said Hexter. “The dual-fuel engine technology is flexible, so you have the choice of using the lowest cost fuel, hedging your risk to price volatility in the market.”

“Methanol as a marine fuel has many benefits from the dual fuel capabilities of the engines, the ability to meet Tier III without exhaust after-treatment, the lower infrastructure cost because of its liquid nature, to the fact that methanol is sold on a global specification. When we look ahead, methanol is also future-proof because it can be produced from renewable sources providing a pathway to compliance with future IMO emission regulations,” said Hexter. “Compared to HFO, methanol is more expensive. Compared to MGO on an energy equivalent basis, we’ve seen it as competitive. There is a modest incremental cost in building a methanol-powered vessel, however, compared to other low sulfur options, such as LNG, the cost is significantly lower, both for onshore bunkering and for the vessel. As a liquid fuel, methanol does not require cryogenic storage making it simple to bunker with existing infrastructure and doesn’t require additional exhaust after-treatment to meet Tier III NOx standards. The business case for a methanol engine makes sense and the flexible nature of these engines to burn multiple fuels is enormous.”

LESSONS LEARNED

Tips on designing, building & operating with methanol as fuel.

Generally averse to technological risk, maritime professionals lean on lessons learned, when available, to make future decisions. According to **Fredrik Stübner**, Director Ship Management, Marinvest, his organization's experience running ships on methanol can be instructive for others considering emission reductions technologies, and to this end he suggests:

1. VESSEL DESIGN

"For other shipowners considering methanol as fuel, the differences between a standard vessel design and a methanol dual-fuel design are minimal and revolve around the engine and fuel supply system. One consideration is the calorific value of the methanol itself, which is about half the energy value of diesel, so you need twice as much fuel. Depending on the sailing range, fuel storage capacity is a consideration, however, it is simple to convert ballast tanks to fuel storage"

2. VESSEL CONSTRUCTION

"Go to an established, experienced shipyard and bring on board the right site management team. We have a great cooperation with Hyundai MIPO in Ulsan, Korea. They have experience with the two series that we've already built and are a world-leading shipbuilder."

3. VESSEL MAINTENANCE

"As a low flashpoint liquid fuel, there are additional safety features needed. For instance, all the methanol fuel piping in the engine room is double walled, and the outer wall piping needs to be ventilated. The bottom line is the engine is a standard two-stroke engine, and the methanol fuel system is an add-on. With the flex-fuel engines, changing between the fuels is seamless and automatic." He did note that the second generation ships and engines have evolved to be even more cost effective. Running on methanol requires a small amount of pilot fuel for ignition. On the first generation engines the amount was less than five percent, while the second generation engines require under 3.5 percent.

4. ADDITIONAL TRAINING

"When we started this, we were in new territory. We're still running on the draft IMO guidelines for low-flashpoint liquid fuels, which we are assisting the classification societies and the flag states to implement. The chief engineer and others participate in special electrical engine and liquid fuel methanol training at The MAN PrimeServ Academy in Copenhagen. Since the IGF code came into play and the entire crew undertakes in-depth training for bunkering and fire safety procedures for low flash point liquid fuels."

According to Hexter, the methanol fuel technology "has been reliable and has led to refinement of the improved second-generation of MAN methanol duel-fuel engines – the test results have returned better fuel efficiency when running on methanol compared to HFO/MGO."

"When we launched the first dual-fueled vessels there were minor teething issues but none that prevented the vessels from operating and these learnings evolved into a better solution," said Hexter. "Well-designed failsafe mechanisms, including automatic failover between fuel types, also increases the reliability of the overall system."

"Through those first 60,000 hours the engines and technology are proven to work, and the performance and safety aspects have been excellent. We're achieving better fuel efficiency, and we've had no loss-of-power incidents due to the technology. With our partners at MAN, it's encouraging to see that they continue to work towards improving the efficiency of the system."

“Our experience to date has led to what I think is best termed ‘simplification’. For example, the piping arrangements. In the first-generation engines, there were a lot more pipes than you see on your standard engine. In the second-generation engines, this was modified to place them inside the cylinder head, making it more maintenance friendly.”

Fredrik Stübner, *Director Ship Management, Marinvest*

As anyone in the shipping business can confirm, there are no perfect technical solutions. The team responsible for these innovative ships are not remiss to point out problems along the way, but note that there are no ‘show stoppers’ that would dissuade wider application of methanol as marine fuel.

“Our experience to date has led to what I think is best termed ‘simplification’,” said Fredrik Stübner, Director Ship Management, Marinvest. “For example, the piping arrangements. In the first-generation engines, there were a lot more pipes than you see on your standard engine. In the second-generation engines, this was modified to place them inside the cylinder head, making it more maintenance friendly.”

“Also, in the beginning, the methanol booster injection valves had a cooling and a sealing oil. After our operating experience we realized that we didn’t need the cooling oil, which helped to reduce piping.”

“Because methanol is a dry fuel with no lubricity, you need to lubricate moving objects in the booster valves. Every time you switch off conventional fuel you would have hydraulic oil coming into the methanol system. That pressure of the sealing oil is reduced now, so the consumption has dropped from the first series of engines. Valve changes and software changes have been instrumental in improved performance.”

While Stübner does concede that that “there are more components on the engine, including an additional fuel supply system, there are added maintenance requirements,” he said the extra cost overall Is minimal, particularly when considering there is no “additional investment in scrubbers and SCRs needed.”

For more insight on design, construction and maintenance considerations, see ‘Lessons Learned’ on page 29.

THE NEW SHIPS

These 49,000 dwt vessels are built with the second generation of MAN B&W ME-LGIM two stroke dual-fuel engines that can run on both methanol and conventional marine fuels.

While there are no firm plans to build more ships beyond the four delivered in 2019, Hexter noted that today, with a fleet of 30 ships, 40 percent of the fleet is running on methanol and “we are often reviewing our fleet requirements. There is nothing on the order books today, but there will be a replacement and newbuilding plan in the future.”

The four new vessels are also able to meet IMO Tier III emissions standards without the need for exhaust gas after treatment.

“With partners like Marinvest, and the work done by MAN ES on the technology, methanol made a lot of sense to us,” said Hexter.

“We knew 2020 and more strict environmental regulations were coming, and we expect demand growth for clean burning fuels such as methanol to continue.”

René Sejer Laursen, Promotion Manager at MAN Energy Solutions said “We developed the ME-LGIM engine in response to interest from the shipping world in alternatives to heavy fuel oil. With the growing demand for cleaner marine fuels, methanol is a sulfur-free alternative that meets the industry’s increasingly stringent emission regulations. We are also very happy to collaborate once again with Methanex, whose vessels have showcased the benefits of operating on methanol and that meeting Tier III limits is possible through mixing methanol with water.

Furthermore, a methanol-burning engine can enable the vessels to meet future greenhouse-gas emission standards as methanol can be produced in a carbon-neutral fashion from renewable sources.

As such, the ME-LGI concept is mature technology and MAN Energy Solutions looks forward to exploring its many possibilities in the future.”

Takaroa Sun

funded through NYK's 'green financing'

Nippon Yusen Kaisha (NYK Group) announced the delivery of Takaroa Sun, a methanol carrier equipped with two-stroke dual-fuel engine technology that enables the vessel to be powered by methanol. Built in South Korea at Hyundai MIPO Dockyard, the new ship was funded through NYK's green financing initiative established to support environment-friendly projects.

Takaroa Sun was built with the MAN Energy Solutions second-generation B&W ME-LGIM two-stroke dual-fuel engine that runs on both methanol and conventional marine fuel. The vessel will be chartered to Waterfront Shipping Company Limited (WFS), a wholly-owned subsidiary of Methanex Corporation, the world's largest producer and supplier of methanol, in a long-term time-charter agreement between WFS and NYK Bulkship (Asia) Pte. Ltd., an NYK Group company based in Singapore.

"We are delighted to establish this relationship with WFS, which has expertise in methanol shipping, and we welcome our first methanol-fueled vessel into our fleet. Making use of the NYK Group's attentive, safety-focused vessel management featuring advanced, new technology, we plan to fully meet the expectations of WFS. We will continue to transport cargo for customers around the world by corresponding to individual demands and strengthening our knowledge of new technologies," said Takeshi Kishi, managing director of NYK Bulkship (Asia) Pte. Ltd.

Takaroa Sun Main Particulars

Shipyard	Hyundai Mipo Dockyard Co., Ltd.
Delivery	August 16, 2019
Main Engines	MAN ES ME-LGIM two-stroke dual-fuel engine Ship Type : 1A, Tanker for Oil Products and Chemicals, ESP, CSR, IMO Ship Type2, E0, TMON, ETC, CLEAN, VCS(2), LFL FUELLED, BWM(T)

Ærø-Windmills electrified E-Ferry Ellen

"An electric ferry costs more up front, but is cheaper to operate in the long run, for example because of reduced fuel and maintenance costs," says Cecilie Larsen, project manager, renewable energy, Ærø Municipality. Ærø Municipality aims to be CO2 neutral and self-sufficient with renewable energy by 2025, and completely fossil-free by 2030. Those targets will be reached through a combination of expanding renewable energy production, converting energy consuming activities to use renewable energy, and through a reduction in energy consumption.

The E-Ferry project was a five-year (2015-2020) innovation and development project with the objective to design, build and demonstrate operation of a 100% electric medium-sized ferry for passengers, vehicles and cargo. The goal is to promote energy efficient, CO_2 neutral and pollution free waterborne transportation for island communities, coastal zones and inland waterways in Europe and beyond.

The vessel operates in Denmark on the route between Soby (Ærø) and Fynshav (Jutland). The ferry will only recharge in Soby, which means that the vessel is able to travel up to 22 nautical miles, equivalent to 40 km per return trip. This is a world record in that it is seven times longer than previously possible for fully electric ferries for passengers and vehicles. And in August 2019, the all-electric ferry, named Ellen, made its first trip between Søby on Ærø and Fynshav on Als.

The development of Ellen is funded under the European Commission's Horizon 2020 framework program in cooperation with Ærø Municipality. The European Commission has allocated $16.6 million to the project.

Ellen's special features:

- The world's first type-approved battery pack for maritime use under DNV GL's new guidelines (energy content of 4.3 MWh).
- Capacity to sail seven times longer than previously possible for fully battery-powered car ferries.
- Record-high peak power at charge (up to 4.4 MW).
- Minimal noise, even at high speeds.
- Expected to reduce emissions by 2,000 tons of CO2 and 41,500 kg of NOx annually compared to conventional ferry services on the same route.
- Certified under the shipping sector's standard for accessibility

The Battery System

The battery system is developed especially for Ellen (by Leclanche) and is the first battery system for maritime use that is type-approved under the classification society DNV GL's new guidelines. In terms of the battery pack's energy content, Ellen can boast of having one of the world's largest packs with a capacity of 4.3 MWh.

The batteries are water-cooled to keep the operating temperature stable and designed for easy replacement of single parts – and for possible scaling to other needs. The batteries always have spare capacity for emergency preparedness and will rarely use more than 45% of the energy in normal operation. About 1/3 of the daily energy consumption on the electric ferry is charged overnight. Additional recharging takes place during the day, when Ellen is docked in Søby Harbor.

Ellen Main Particulars

Yard	Soby Shipyard A/S (assembly of the vessel)
Yard	Kedat Sp. zoo (PL) (Hull manufacturer)
Commissioning	August 15, 2019
Length	59.5 m
Width	12.6 m
Depth	2.5 m (fully loaded)
Deadweight	192 tons
Propulsion motors	2 x 750 kW
Batteries	4.3 MWh / 56 tons in 20 individual strings distributed in 2 separate rooms
Battery type	Li-Ion, NMC, water cooled
Power consumption per round trip	1,650 kWh
Speed	up to 14 knots
Passengers	200 (summer) / 150 (winter)
Vehicles	31 cars / 4 trucks + 8 cars
Docking system	Cavotec Vacuum mooring system
Class	DNV GL

Photos: © PPM, P.Pospiech

Bow Orion

Hudong-class Chemical Tanker

Photos: Odfjell

Odfjell celebrated a milestone moment in 2019 with the delivery of the first of four 49,000 dwt chemical tankers, Bow Orion. The Hudong-class are all built at Hudong-Zhongua shipyard in China, a fleet renewal delivering the world's largest stainless steel chemical tankers. Bow Orion, measuring 182.88 x 32.2 m with a 13.2-m summer draft and sporting 33 segregated Stainless Steel cargo tanks, was delivered in July followed by Bow Olympus in early November 2019.

"Our investments are part of our plan to both replace aging vessels and to ensure growth," said Kristian Mørch, CEO, Odfjell, at the time of Bow Orion's launching in late 2018. "We are making sure that we have new and modern tonnage, but at the same time we want to grow from where we are today. Our efforts are focused on making sure that Odfjell is as efficient as we can be, no matter what the markets do."

The four ships – Bow Orion, Bow Olympus, Bow Odyssey and Bow Optima – are designed to deliver to Odfjell an eco-friendly and modern fleet.

With the microfocus on ship emissions, it is worthy to note that the four sister ships are designed to consume no more than 21.5 MT/day at 14 knots at design condition – and is one of the first series with the NOx emission standard Tier III.

Bow Orion Main Particulars

Owner	Odfjell
Builder	Hudong-Zhonghua Shipbuilding
Length, o.a.	182.88 m
Breadth	32.2 m
Summer draft	13.2 m
Main engine	MAN B&W 6550ME-C9.5
Main Propulsion	7,820 kW
Consumption	21.5 MT/day at 14,0 knots at design condition
DWT	49,000, stainless steel
Tanks	33 segregated Stainless Steel cargo tanks of Duplex 2205 material
Cargo capacity	54,600 cu. m.
Total cargo volume	abt. 55 000 cu. m.
Maximum cargo discharge rate	3600 cu. m./hr.
Nitrogen capacity	4500 Nm3/hr.

- Scrubber ready design
- High-efficiency rudder with twisted leading edge and rudder bulb

RV Atair: A (new) Star is Born

The new research vessel received its name on the occasion of its traditional naming ceremony at the end of September: Named after the star Altair in the constellation Adler, the new ship was christened Atair by the godmother Dr. Elke Ferlemann, who succeeded with the first throw of the obligatory bottle of champagne.

Atair, which entered service in 1987, is replaced by a state-of-the-art vessel that meets the highest environmental standards. The new Atair is the world's first seagoing public authority vessel for special tasks with a partially environmentally friendly natural gas propulsion system. It is also built to be particularly quiet. The newbuilding was built at the Fassmer shipyard in Berne/Lower Saxony and will go into service in 2020. The new research vessel measures 75 x 17m, able to carry a crew of 18 plus 15 scientists. The vessel reaches a speed of around 13 knots, all the while remaining stable, calm and maneuverable.

While it is a medium-sized research vessels, it is the largest ship in the BSH fleet (Federal Maritime and Hydrographic Agency). The new surveying, wreck search and research vessel (VWFS) will take over the previous tasks of the current research vessel in wreck search and sea surveying. In addition it will conduct BSH's oceanographic surveys. The ship will sail in the North Sea, the Baltic Sea and the North-East Atlantic. As a research vessel, it is a travelling scientific laboratory and performs tasks in geology, oceanography and in the development and testing of technical ship equipment. Atair will also be used in the future for the development and testing of new technologies such as e-navigation and smart shipping.

The ship is equipped with a diesel-gas-electric propulsion system. Two Wärtsilä six-cylinder dual-fuel engines (type: 6L20 DF), each with an output of 960 kW, are available for power generation. Both engines can run on environmentally friendly natural gas or diesel fuel. In addition, a six-cylinder diesel engine from Wärtsilä (type: 6L20) with an output of 1200 kW is available.

These engines comply with the exhaust emission regulations of Tier III and EPA Tier IV. The engines are elastically mounted to minimize underwater noise in the water (DNV Silent Class Notation - SILENT R). The seven-bladed propeller (also contributes to noise reduction) is driven by a 1600 kW electric motor. The ship reaches a speed of around 13 knots. The newbuilding is equipped with an electrically driven transverse thruster (foredeck) with 330 kW power and a transverse thruster (stern) with 200 kW power, as well as a Schottel pumpjet.

The liquid gas tank has a capacity of 130 cu. m. The ship can stay at sea for up to 10 days if natural gas is used exclusively as fuel. In addition, a diesel fuel tank with a capacity of 200 tons of gas oil with a sulfur content of < 0.1 % was planned. The ship meets the requirements for the "Blue Angel" ecolabel for environmentally friendly ship design (RAL-UZ 141); in addition, exhaust gas aftertreatment with SCR catalytic converters and soot particle filters for diesel operation is installed to meet the demanding exhaust gas regulations in accordance with IMO Tier III and US EPA Tier IV; due to the use of natural gas, no exhaust gas aftertreatment is required for gas operation.

The equipment includes laboratories, an air pollutant measuring station, a working crane and a sliding beam for geological work on the seabed. A 200 sq. m. free working deck offers space for laboratory and transport containers. Extensive diving equipment and a diving pressure chamber are also on board.

The federal government has invested around 114 million Euros in the construction of the ship and DNV GL awarded the class notation: Germanischer Lloyd :[+] 100 A5 E1 SPS NAV-INS + MC E1 AUT DP1 GF, as well "Silent-R".

Atair's Main Particulars:

Owner:	Federal Ministry of Transport and Digital Infratsructure
Operator	Federal Agency for Maritime and Hydrographic Affairs
Home port	Hamburg
Shipyard	Fr. Fassmer-Werft GmbH
Dimensions	75 x 17 x 5 m
Deadweight	806 ton
Main propulsion	Electric Motor 1.600 kW
Propeller	One, seven blades, noise optimized
Gensets	3 x Wärtsilä
LNG-tank	130 cu. m.
Class	DNV GL

© P.Pospiech

Photo: Costa Cruises/Meyer Turku

Costa Smeralda: *180,000 gt, LNG*

The cruise sector maintained its torrid pace of deliveries and innovation with the early December completion of the 180 000 gt Costa Smeralda built by Meyer Turku in Finland for Costa Cruises, part of Carnival Corporation. The mammoth cruise ship continues the cruise industry's push toward emission reduction with the inclusion of LNG as fuel. "Costa Smeralda will be a further boost to the use of LNG in cruise ships, a technology we were the first to believe in, setting a new course in the cruise sector," said Neil Palomba, President of Costa Cruises. Costa Group has invested in the construction of five new LNG ships altogether.

"We have used all our knowledge, skills and imagination to design and build this ship. I would especially like to mention the Colosseo, a three-deck open area in the middle of the ship with state-of-the-art audio-visual technology inside which required a specific design and building capabilities," said Jan Meyer, CEO, Meyer Turku. Costa Smeralda is touted by owner and builder as a traveling "smart city". Apart from the LNG, the ship incorporates a series of tech innovations designed with the environment in mind. For example, the daily water requirement is achieved directly from the sea courtesy of the ship's desalination systems. The inclusion of LED lights helps to further reduce the ship's energy consumption, as does recovering the heat generated by the engines. Finally, the hull shape has been optimized to reduce drag in the water, and new generation elevators recover energy and reintroduce it into the electricity system. Costa Smeralda becomes Carnival Corporation's fourth new ship of 2019 and its second LNG-powered ship.

Stena Line

Stena Line Test Drives AI, Saves Fuel

Stena Lines completed a pilot project using artificial intelligence (AI) technology to predict the most fuel-efficient way to operate a vessel, the Stena Scandinavica on the Gothenburg – Kiel route, a technology test which reportedly helped to reduced fuel consumption 2 to 3 percent. As fuel represents nearly 20 percent of Stena Line's operating costs, even a low single digit fuel savings percentage yields big dividends, and the company plans to deploy the technology on additional vessels. The software is now named Stena Fuel Pilot and will be installed on five more Stena Line vessels during the autumn, with the ambition to do a complete fleet wide roll-out on all 37 vessels in Europe during 2020. Working side by side in this project, Stena Lines Head of AI Lars Carlsson, and Senior Master Jan Sjöström from Stena Scandinavica has been key players in the success of the project.

RINA, VRMedia Team on Remote Ship Inspect Tech

RINA signed an agreement with VRMedia, an augmented and virtual reality company, to boost the de-velopment of remote inspection technologies to carry out ship inspections using VRMedia's Kiber sys-tem. Kiber is a wearable hardware and software fully integrated system for remote assistance, that allows the consultation and sharing of real time information between several participants through augmented reality tech. With the Kiber Helmet, a headset equipped with a video camera, a viewer, a set of headphones and a microphone, the operator can receive real time advice and instructions from one or more remote sources, with additional documents and text displayed directly on the viewer.

Kiber

The power of Data helps

OSV Operator Cuts Consumption

Photo: Kongsberg Maritime/Golden Energy Offshore

Golden Energy Offshore, Kongsberg collaborate to **reduce operational fuel consumption by 20%**

While vessel owners mull a myriad of fuel and emission reduction technologies, Norwegian Offshore Service Vessel (OSV) owner and operator Golden Energy Offshore reports a 20% operational fuel savings courtesy of its work on vessel performance monitoring with Kongsberg Maritime, a collaboration which includes the deployment of the containerized SAVe Energy battery system earlier this year.

"We have a high focus on how our environmental footprint can be reduced, and how our operations can be optimized to contribute to the United Nations sustainability goals," said Per Ivar Fagervoll, CEO, Golden Energy Offshore. "By installing the battery system, shore-power connection and monitoring performance, our energy consumption and environmental impact are significantly reduced."

The test platforms producing the results was Golden Energy Offshore's UT 776 CD design Platform Supply Vessels (PSV), NS Orla and NS Frayja, which have been monitored and analyzed by Golden Energy Offshore and Kongsberg since 2015.

Using the Kongsberg Vessel Performance System (VPS), which includes new vessel data to cloud infrastructure Vessel Insight deployed this year, Golden Energy Offshore was able to parlay information and analytics to transform daily vessel operations.

In addition to data analytics and vessel operation modification, the team this year added the SAVe Energy battery system to both vessels, each sailing with batteries for more than six months. "By utilizing a redundant battery solution connected to the main switchboard in Dynamic Positioning operations, we are able to reduce total engine running hours by 43%," said Joakim Kjølleberg, data scientist, Kongsberg. "The increased load and improved efficiency are very beneficial, helping the vessels to achieve operational fuel savings of 20 percent. This combined with shore connection at port means that the vessels are on their way to achieving annual fuel savings of approximately 360 cu. m., equivalent to around 1000 tons of CO2 and 3 tons of NOx."

Chris-Marine

Cylinder Liner Monitoring

Chris Marine

"The launch of our Cylinder Liner Condition Camera LCC is an important step for us and for our customers," said Alexander Malt, Global Sales & Marketing Director at Chris-Marine. "We know that at least 10% of newbuildings need to have their cylinder liners replaced already before the first dry-docking, a costly consequence of failing to keep the liners in top condition. However, this problem can easily be prevented and that's where our camera comes into play. LCC detects and documents abnormal surface conditions and helps the engine crew determine if measures need to be taken. By monitoring the condition of the liner regularly, severe damage to the engine can be prevented and unnecessary investments avoided."

Images captured by the camera are used to evaluate cylinder condition parameters like presence of cylinder honing marks and wave-cut groove extension, black lacquering and bore polish, size of cylinder wear edge and cleanliness of ring land. In addition, the pictures can be used to inspect exhaust valve, fuel injector valves, lube oil injection area and start air valve. Some key points:

- The LCC unit has 4 built-in cameras to enable photography of the complete liner running surface, cylinder cover, lube oil injection area, exhaust valve, start air valve and injector valves.
- The LCC is capable of in situ cylinder condition documentation of 2-stroke engines with a bore size from 480 to 980 mm.
- LCC is made up of high-temperature resistant electronic components and batteries allowing operation without lowering engine coolant temperature for most engine types.
- The LCC can be combined with Chris-Marine's Liner Diameter Measurement Instrument LDM by using the LDM tablet.

HHI Power System Maximizes Ship Efficiency

Hyundai Heavy Industries (HHI) and Korea Shipbuilding & Offshore Engineering (KSOE) announced that DNV-GL awarded an Approval in Principle (AIP) for HHI's multi-grid design of the power system for 15,000-TEU container ships. The key feature of this latest design is the technology of breaking down the VLCS power system into two separate types of power loads: 'essential loads' required to operate the ship and 'service loads' needed to keep the intermodal reefers at proper temperatures, among others. Thanks to this simplified power supply process that involves no energy transformation, equipment costs go down while cargo carrying capacities go up. For conventional container ships, onboard electrical equipment is typically powered at a low voltage level - 440V or less. As container ships have become larger, however, the total amount of electricity required has grown, calling for 6.6kV or higher-voltage power systems onboard. As a result, installation of up to eight large-capacity transformers to convert high voltages into low voltages has become inevitable.

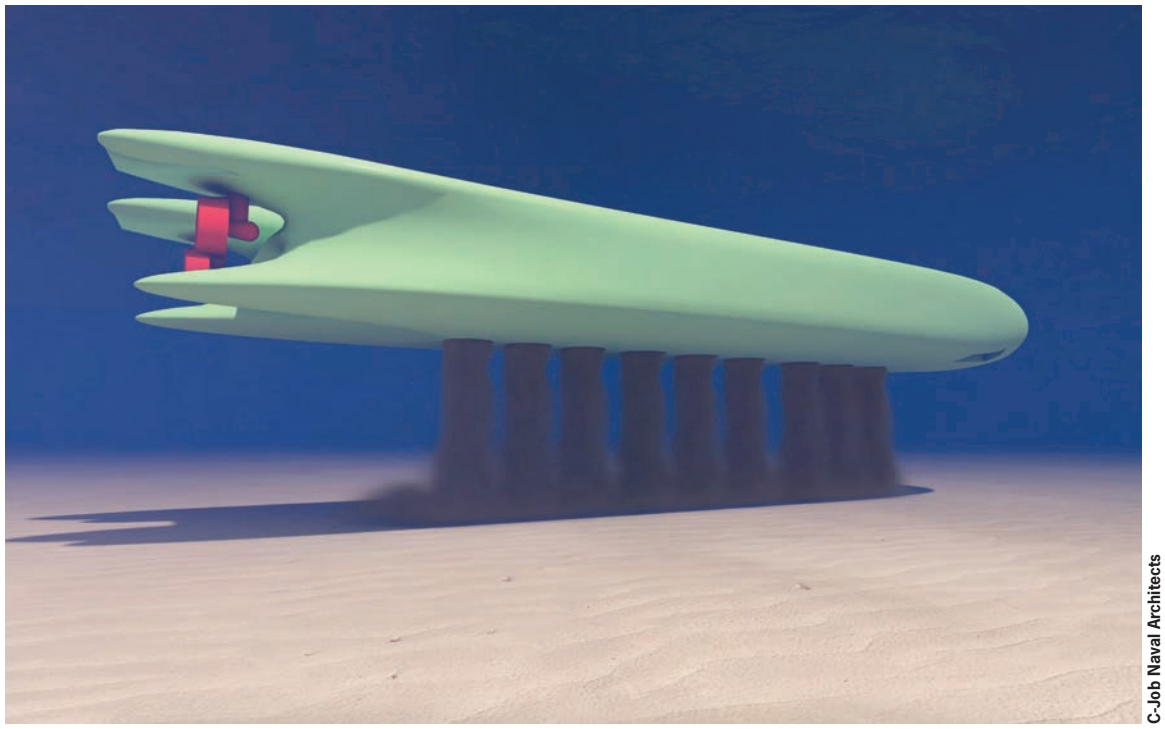
C-Job Naval Architects

It is against this backdrop that HHI Group comes out with its latest technology for multi-grid power systems to lower the capacity of each system, allowing low-voltage power distribution to replace the existing high-voltage power distribution. No voltage conversion means no large transformers weighing up to 64 tons in aggregate that would otherwise be loaded onto the ship, while also allowing for an extra loader capacity of 60 FEU thanks to better space utilization.

MIT to Design Ship for Oldendorff

Oldendorff Carriers signed a research agreement with the Massachusetts Institute of Technology's (MIT) Center for Bits and Atoms (CBA) to make its vessels more green and economical. Oldendorff, together with CBA and its campus collaborators including MIT's Sea Grant Program, will investigate disruptive improvements in ship design and propulsion to achieve the IMO 2030/50 requirements. The initial emphasis will be directed at improving hydrodynamic efficiency, which builds on work CBA has been doing with the aerospace and automotive industries. This looks beyond traditional naval architecture to a deeper integration of form and function. Anticipated research areas include morphing structures, hydrodynamic cloaking, moving boundary layers, and alternative energy sources. Since 2013, Oldendorff has invested $3 billion in 90 new eco vessels, and today more than 95% of the Oldendorff fleet, and most of its chartered vessels, are eco type vessels.

Autonomous Underwater Dredger



C-Job Naval Architects

As autonomy gains a foothold in the maritime world, dredging appears next in line to transition to operations without direct human control. A new design concept unveiled by a C-Job Naval Architects aims to deliver power savings and a larger working window for port maintenance dredging operations, ultimately aiming to increase efficiency and profitability.

The Autonomous Underwater Maintenance Dredger – or AUMD – is a completely submerging a dredging vessel created for maintenance in port environments. The designer says the electric design requires less power than conventional dredgers; equipped with a zero-emissions 16MWh battery pack the dredger is designed to pack enough power for up to 12 hours of maintenance dredging in shallow waters. AUMD features fully redundant propulsion both in power supply as well as azimuthing- and bowthrusters. A power/speed prediction comparison study with a conventional trailing suction hopper dredger showed that the AUMD requires 55% less propulsion power, said Rolph Hijdra, Autonomous Vessels Research Lead at C-Job. "And by submersing the vessel we could reduce the suction head cutting the dredge pump power demand by 80%."

Submersion aids in efficient operations as it remains submerged throughout the dredging cycle, surfacing only for repair, maintenance and battery charging. The hull shape is designed to allow operations near the seabed with the flat bottom cross section, and the depth of the vessel is limited to only 8.5 meters which enables shallow water operations.

The AUMD features the same hopper volume as the traditional dredger even though the overall length of C-Job's design has been reduced by 20%. And due to the fully buoyant hull, a higher payload over main dimension ratio is obtained.

Power efficiency and operability gains ultimately should lead to greater profits. "Autonomous shipping provides enormous potential for ship owners, with both technical design and economic benefits," said Hijdra. According to our research, even with a conservative approach, we found that with the AUMD ship owners can expect nearly twice as much profit after 15 years."

C-Job Naval Architects

Prototype for Hydrog

As the maritime industry steams toward drastic emission reductions, with the holy grail of decarbonization looming far in the future, it is generally agreed that advances solutions will come through collaboration To that end, maritime innovators in Norway are working today toward a solution that will allow large vessels to sail at high speeds for long distances, a solution with Hydrogen at its core.

The Havyard Group, with Havyard Design & Solutions and Norwegian Electric Systems, are working together. The first phase is completed, and it is now entering the approval stage for the hydrogen system together with Linde Engineering as tank supplier and PowerCell Sweden AB as supplier of fuel cells.

"The regulations for these solutions have not yet been developed, and we are pleased to have Linde on-board when entering the approval process, which we expect to be very challenging," said Kristian Osnes, the project manager for the Havyard Group's FreeCO2ast project.

PowerCell was chosen to deliver fuel cells, and Osnes said that fuel cells have similarities with the battery technology that NES has already worked with in a number of ferry projects.The aim now is to develop a solution that

Photo: Havyard

gen: One Step Closer

will be offered to Havila Kystruten for retrofitting. "We will deliver a system that is safe, that takes up little space, that is easy to retrofit and, of course, that does the job," said Osnes. The development of the hydrogen system is part of a PilotE project in which the Havyard companies and the research institutions Sintef and Prototech are working together.

The head of R&D at Havyard Group, Kristian Voksøy Steinsvik, said PilotE is useful when it comes to simplifying the application process in relation to the range of Norwegian research and development funding instruments, and not least in terms of the support, which lessens the risk inherent in spearheading the development.

"With PilotE on the team, you can dare to be a first mover at the same time as having a broad focus on developing tools and methods that will benefit both us and the industry, regardless of the type of technical solution we land on. The system we are developing is designed in modules and can be installed both in newbuilds and retrofitted in existing ships. In this way, we will contribute to development of large-scale vessels that can sail emission free over long distances, or significant emission cuts from vessels that use hybrid propulsion systems."

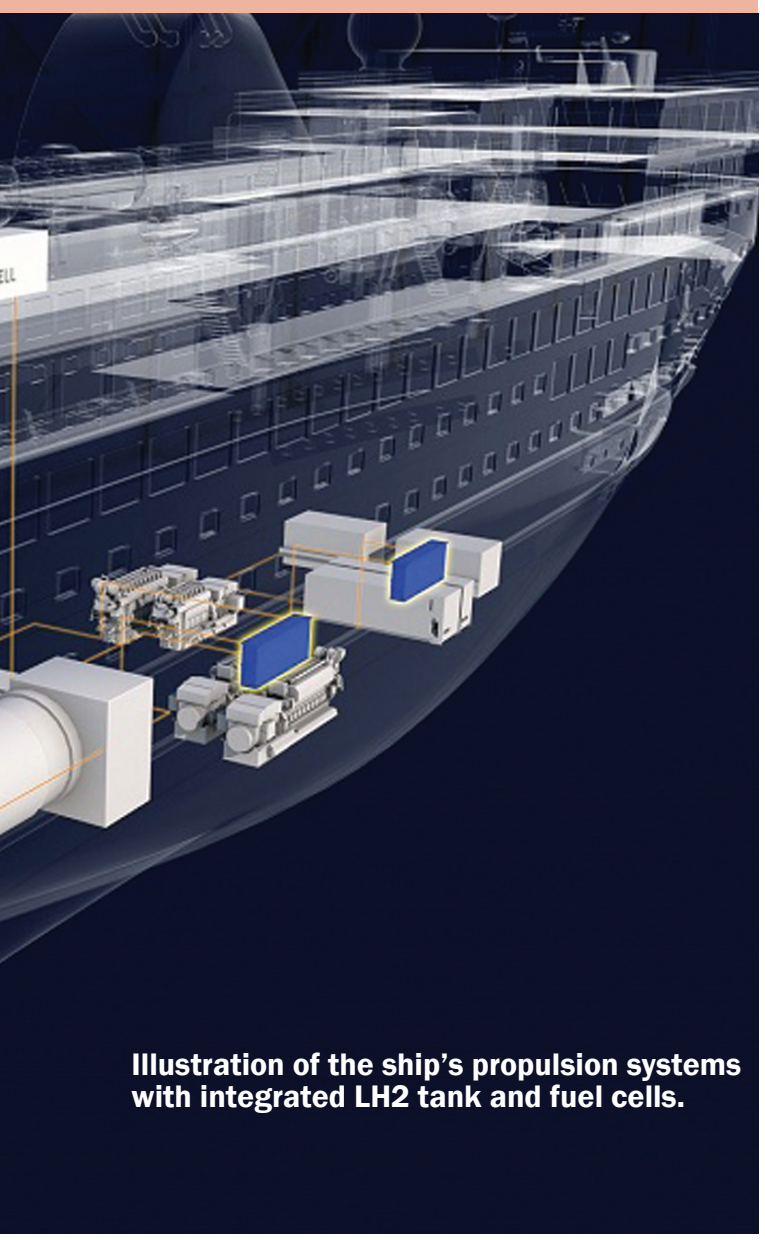


Illustration of the ship's propulsion systems with integrated LH2 tank and fuel cells.

LNG Power for VW Car Carriers

Photo: MAN ES

Each ship is estimated to cut **CO_2** emissions by up to 25%, **NO_x** by up to 30%, **particulate matter** by up to 60%, and **SO_x** almost completely.

Siem Confucius and Siem Aristotle are the names of the new pure car truck carriers (PCTCs), significant in that they are the world's first trans-Atlantic PCTCs to operate full-time on LNG. Built for Siem Car Carriers at Xiamen Shipyard in China, both ships – which will transport cars for the VW Group between Europe and China – are powered by an identical MAN Energy Solutions' propulsion solution. Each ship features individual MAN B&W S60ME-GI (-Gas Injection) dual-fuel, two-stroke engines that deliver 12,600 kW with direct injection and exhaust-gas treatment to further reduce emissions. Each main engine is accompanied by 2 × 9L28/32DF + 1 × 7L28/32DF dual-fuel auxiliary engines. In addition, bothships are driven by a four-blade, 6.95-m diameter MAN Alpha Kappel design fixed pitch propeller. The propellers were produced by MAN's propeller licensee, Dalian Marine Propeller Co., Ltd., in China.

MAN reports that these are the very first L28/32DF units approved for Tier III operation without SCR (Selective Catalytic Reduction), as well as being the first such units to be built by Chinese licensee, CMP. In addition, these are the first 28/32DF engines to be built in a 7-cylinder variant. All gensets are turbocharged by individual MAN TCR 16 (for the 9L28/32DF units) or TCR 18 (for the 7L28/32DF units) turbochargers, with the entire set-up overseen by MAN's proprietary SaCoS engine-control system.

VW stores its vehicles at German port, Emmen, for transport to China. As the shipping of cars from one continent to the other contributes its fair share of emissions, VW – as one of the first OEMs – decided to significantly improve the environmental balance of its marine transport fleet by ordering the new car carriers.

"We are entering a new field here to reduce emissions. Both ships are the first overseas car freighters in the world to be LNG-powered," said Thomas Zernechel, Head of Group Logistics, VW. "In addition to the increasing use of LNG trucks, conversion of our many rail transports to green electricity and the use of biofuel in the short sea segment, the two new LNG ships represent an important building block for our strategic goal of climate-neutral logistics."

Both ships are designed to carry 4,700 vehicles. Both are equipped with a 2 × 1,800 cu. m. LNG tanks installed below deck to fuel the MAN B&W ME-GI main drivers. The vessels are replacing two of nine conventional PCTCs in Siem's fleet. Each ship is estimated to cut CO2 emissions by up to 25%, NOx by up to 30%, particulate matter by up to 60%, and SOx almost completely.

PCTC Main Particulars

Operator	Siem Car Carriers AS
Length	200 m
Width	38 m
Capacity	4,700 vehicles (7,700 CEU)
Number of decks	13
Engines	LNG-powered, MAN B&W S60ME-GI main 2 × 9L28/32DF + 1 × 7L28/32DF dual-fuel auxiliaries
LNG tank volume	3,600 cu. m. total
Average speed, eco mode	16.5 knots
Maximum speed	19 knots

EDITORIAL CALENDAR

JANUARY

Ad Close: Dec 31

Ship Repair & Conversion Annual

- Drydock & Shiplift Equipment
- Hull, Deck and Tank Coatings
- Sanitation / Wastewater Systems
- Welding & Cutting Equipment
- Engine Conversion & Repower

Event Distribution:

- EuroMaritime - Marseille
- FPSO Europe - London

FEBRUARY

Ad Close: Jan 27

Green Ship Technology

- Fuels & Lubricants
- HVAC & Compressors
- Emission Scrubbers
- Autonomous Ship Systems
- Coatings, Corrosion Control

Event Distribution:

- Sea Japan - Tokyo
- Asia Pacific Maritime - Singapore
- Green Ship Tech - Copenhagen
- NACE Corrosion - Houston, TX
- Intermodal Asia - Shanghai

MARCH

Ad Close: Feb 27

Cruise Shipping Annual

- Passenger Vessels / Ferries
- Bridge Electronics: Comms, Navigation & Controls
- Fluid Handling & Filtration
- Desalination & Reverse Osmosis Systems
- Interior Design and Finishes

Event Distribution:

- Seatrade Cruise Global - Miami, FL
- Ferry Safety - New York, NY
- CMA Shipping - Stamford, CT
- Sea-Air-Space- Baltimore, MD

APRIL

Ad Close: Mar 27

Offshore Energy Edition

- Offshore Wind Support Vessels
- Deck Machinery - Winches & Cranes
- Pumps & Valves
- Water Jets & Thrusters
- Surface Preparation - Water Jets & Scrapers

Event Distribution:

- OTC- Houston, TX
- MegaRust - San Diego, CA

MAY

Ad Close: Apr 24

Fleet Management

- Classification Societies
- Crew Training & Maritime Simulation
- Salvage
- Telemedicine
- Vessel Monitoring & Operation Software Solutions

Event Distribution:

- Posidonia - Athens
- Maritime Week Americas - Miami
- Marine Money Week - New York

JUNE

Ad Close: May 27

2020 Yearbook

- LNG & Hybrid Drives
- Luxury & Expedition Cruise Ship Building
- Navigation: Radar, ECDIS & Collision Avoidance
- Ballast Water Technology
- Lighting

Event Distribution:

- Electric & Hybrid Marine World Expo - Amsterdam
- Ballast Water Management - Houston, TX
- Cruise Ship Interiors Expo - Miami

JULY

Ad Close: Jun 16

Maritime Power Edition

- Piping, Valves & Fittings
- Emission Scrubbers
- Engine Room Ventilation
- Bearings, Seals and Couplings
- HVAC & Compressors

AUGUST

Ad Close: Jul 27

The Shipyard Edition

- Heavy Lifting: Cranes, Winches and Hoists
- Welding and Cutting Equipment
- Fuels and Lubricants
- Transmissions, Gears & Thrusters
- SMM 2020 New Technology Showcase

Event Distribution:

- SMM - Hamburg
- BWMTech North America - Ft Lauderdale, FL
- FMMS - VA Beach , VA

SEPTEMBER

Ad Close: Aug 28

Marine Design Annual

- Vessel Conversions
- Naval Architecture
- Design Software: CAD/CAM
- Anti-Vibration & Noise Control Equipment
- Ship Roll & Pitch Control Solutions

Event Distribution:

- SNAME- Houston, TX
- Interferry 2020 - Hobart, TS
- Seatrade Maritime Middle East - Dubai

OCTOBER

Ad Close: Sep 25

Shipping & Port Annual

- Satellite Communications
- Training and Simulation
- Cargo, Container & Material Handling Equipment
- Tank Gauging & Alarm Systems
- Rope, Wire & Cable

Event Distribution:

- Shipping Insight - Stamford, CT
- Commercial Marine Expo - Providence, RI
- Danish Maritime Days
- Breakbulk Americas

NOVEMBER

Ad Close: Oct 27

Workboat Edition

- ATBs
- Workboat Propulsion
- Deck Equipment - Winches & Cranes
- Fire Suppression and Safety Equipment
- Autonomous Workboats

Event Distribution:

- Int'l Workboat Show New Orleans, LA
- INMEX China - Guangzhou
- METS - Amsterdam

DECEMBER

Ad Close: Nov 25

Great Ships of 2020

- Fluid Filtration & Separation
- Gensets
- Surface Navy Shipbuilding
- Electrical Systems & Components
- Windows, Gaskets, Hatches & Doors

Event Distribution:

- Surface Navy Association 2021, Crystal City, MD

Photo: SNAME

L to R: Fred Harris, former president of General Dynamics NASSCO and Bath Iron Works; Mike Petters President and CEO, HII; and Suzanne Beckstoffer, president of SNAME.

Petters Honored by SNAME

The Society of Naval Architect and Marine Engineers (SNAME) awarded HII President and CEO Mike Petters the 2019 Vice Admiral Emory S. "Jerry" Land Medal. Petters received the Land Medal during the Annual SNAME Banquet, held in Tacoma, WA. The Land Medal is named for former SNAME President Emory S. Land who was chief of the Navy's Bureau of Construction and Repair at the time of his retirement in 1937. Each year, the Land Medal is presented to an individual for outstanding accomplishment in the marine field. It was established in 1952 by the SNAME and Emory S. Land was the award's first recipient.

Hägg takes the helm at Steerprop

Steerprop appointed Riku-Pekka Hägg as its new Chief Executive Officer, starting January 2020. Hägg was formerlh Vice President of Ship Design at Wärtsilä.

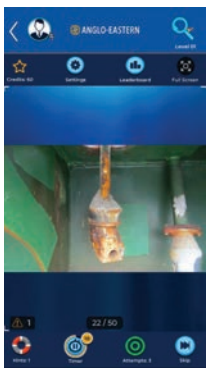
Maersk COO Toft Departs

A.P. Møller - Mærsk A/S COO Søren Toft, recently left the compnay to pursue an opportunity outside the company. Toft joined A.P. Møller - Mærsk in 1994 and became a member of the Executive Board in December 2017.

Holvik joins Thrustmaster

Jon Holvik joins Thrustmaster of Texas as the Executive Vice President for Business Development of Dynamic Positioning Systems. Holvik brings more than 30 years of experience in the DP field having previously worked with Kongsberg Maritime. Thrustmaster acquired the ICON Dynamic Positioning business from Rolls Royce earlier this year.

Inspection Gaming App for Seafarers



The latest offering Anglo-Eastern, from the Hong Kong-based ship manager, is an educational gaming app aimed at reducing shipboard deficiencies. Launched during Hong Kong Maritime Week, "Vessel Inspector" is a gaming app that encourages players to compete against their peers towards achieving zero deficiencies. The objective is to enhance situational awareness skills in a competitive gaming environment to complement learning and amplify learning outcomes. Vessel Inspector is intended for seafarers, as well as vessel managers, marine managers and port state inspectors. It was developed in conjunction with MarinePALS using MarinePALS' GAMES platform, and is available via the Google Play Store.

BUYER'S DIRECTORY

This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers and suppliers of all types of marine machinery, equipment, supplies and services. A listing is provided, at no cost for one year in all issues, only to companies with continuing advertising programs in this publication, whether an advertisement appears in every issue or not. Because it is an editorial service, unpaid and not part of the advertisers contract, MR assumes no responsibility for errors. If you are interested in having your company listed in this Buyer's Directory Section, contact Mark O'Malley at momalley@marinelink.com

AUTOMATIC IDENTIFICATION SYSTEM

Saab AB (publ) TransponderTech, SE-589 41 Linkoping , tel:46 13 180000, fax:46 13 182377, Info.transpondertech@saabgroup.com

BARGE FABRICATION

McDonough Marine Service, 3500 Causeway Blvd., Suite 900, Metairie, LA , USA , tel:(504) 780-8100, fax:(504) 780-8200, pstant@marmac.net

COMMUNICATIONS

David Clark Company (Wireless Headset Communication Systems), 360 Franklin Street, Worcester, MA 77060, USA , tel:(800) 298-6235 , www.davidclarkcompany.com/marine

EXHAUST

Marine Exhaust Systems of Alabama, 757 Nichols Ave. Fairhope, Alabama 36532 , tel:(251) 928-1234, mark@mesamarine.com

HYDRAWRAP

Hydratech Engineered Products, 10448 Chester street, Cincinnati, OH , USA

INERTIAL SENSING SYSTEMS

Silicon Sensing Systems Ltd, Clittaford Road Southway, Plymouth, Devon PL6 6DE United Kingdom , UK , tel:+44 (0) 1752 723330, sales@siliconsensing.com

MEMS MOTION SENSING

Silicon Sensing Systems Ltd, Clittaford Road Southway, Plymouth, Devon PL6 6DE United Kingdom , UK , tel:+44 (0) 1752 723330, sales@siliconsensing.com

NAVAL ARCHITECTS, MARINE ENGINEERS

Bristol Harbor Group, Inc., 99 Poppasquash Road Unit H, Bristol, RI , USA , tel:(401) 253-4318, kribeiro@bristolharborgroup.com

The Shearer Group, Inc, 3118 Harrisburg Blvd., Suite 100, Houston, TX , USA , tel:(281) 532-2080, gbeers@bristolharborgroup.com

PASSENGER AND COMMERCIAL VESSEL REPAIR, MAINTENANCE, DRYDOCKING

Blohm+Voss B.V. & Co. KG, Hermann-Blohm-Strasse 3, 20457 Hamburg, Germany Germany , tel:+49 40 3119 2110, shipservices@blohmvoss.com , www.blohmvoss.com

PUMPS

Aussie Pumps, 7 Gladstone Road, Castle Hill 2154 , Australia , tel:+61 (2) 88653500, marketing3@aussiepumps.com.au contact: Melinda Jansen, www.aussiepumps.com.au

SURFACE PREP TOOLS

Water Cannon, 4300 West Lake Mary Blvd. Units 1010-424 , USA , tel:321-800-5763, sales@watercannon.com , www.watercannon.com

TANK MEASURING SYSTEMS

Hart Systems, 4911-71st ST CT NW, Gig Harbor, WA , USA , tel:(253) 858-8481, fax:(253) 858-8486, hartsystems@centurytel.net

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Chief Radio Electronics Technician

Military Sealift Command
Salary: $ $64,315 , Full Time , Mid Career
Category: Information Technology
Description:
Announcement #: 20-210-01EXOC Title, Series, Grade (Code) Chief Radio Electronics Technician WM-9995-10 (210) Base Salary: $64,315 Per Annum. A $12,863 recruitment incentive is authorized for eligible selectees. Actual amount is calculated as 10% of base pay. Incentive is paid as a lump sum at the beginning of employment with the Command, and requires a 2-year service agreement. CIVMAR (VEOA) candidates and Annuitants selected for employment as Chief Radio Electronics Technician are not eligible for recruitment incentives.
Type of Appointment: Excepted Service Career-Conditional
Opening Date:October 1, 2019
Closing Date: Open continuously with periodic cut-offs
Location:Military Sealift Command (MSC) Vessels Worldwide
Who May Apply: All United States citizens and current Military Sealift Command Civil Service Mariner (CIVMAR) eligible to apply under the Veterans Employment Opportunities Act (VEOA). Active Duty Service Members (ADSMs) must submit a certification (i.e., statement of service) at the time of application which certifies that the service member is expected to be discharged or released from active duty service under honorable conditions not later than 120 days after the date the certification is submitted.
Relocation expenses are not authorized for this position.

Yeoman Storekeeper

Military Sealift Command
Salary: $ $39,301 , Full Time , Mid Career
Category: Shipboard Officer / Personnel / Crew
Description:Announcement #: 20-823-01EXOC Title, Series, Grade (Code) Yeoman Storekeeper, WM-9998-15 Base Salary: $39,301 Per Annum Type of Appointment: Excepted Service Career-Conditional Opening Date: October 1, 2019 Closing Date Open continuously with periodic cutoffs.
Location:Military Sealift Command (MSC) Vessels Worldwide
Who May Apply: All United States citizens and current Military Sealift Command Civil Service Mariner (CIVMAR) eligible to apply under the Veterans Employment Opportunities Act (VEOA). Active Duty Service Members (ADSMs) must submit a certification (i.e., statement of service) at the time of application which certifies that the service member is expected to be discharged or released from active duty service under honorable conditions not later than 120 days after the date the certification is submitted.

Ready Reserve Force Port Engineer

Full Time , Engineer
Category: Vessel Operations
Job Location: Willow Pass Road Concord, California, 94520
Contact
HR Manager
Email: arubin@hroptions.com
Willow Pass Road Concord, California, 94520

Any Entry Level

Military Sealift Command
Salary: $ $26,165 - $$31,315 , Full Time , Entry level
Description:
Announcement #: 20-000-01EXOC Title, Series, Grade (Code) Supply Utilityman (848), WM-9985-09; Wiper Advancement Program (WAP) (363), WM-9965-09; Ordinary Seaman Advancement Program (OSAP) (163), WM-9928-07.
Base Salary: $26,703 Supply Utilityman; $31,960 Wiper; $27,593 Ordinary Seaman
Type of Appointment: Excepted Service Career-Conditional Opening Date: October 1, 2019 Closing Date Open Continuously With Periodic Cutoffs Location: Military Sealift Command (MSC) Vessels Worldwide
Who May Apply: All United States citizens and current Military Sealift Command Civil Service Mariner (CIVMAR) eligible to apply under the Veterans Employment Opportunities Act (VEOA). Active Duty Service Members (ADSMs) must submit a certification (i.e., statement of service) at the time of application which certifies that the service member is expected to be discharged or released from active duty service under honorable conditions not later than 120 days after the date the certification is submitted.
Relocation expenses are not authorized for this position.

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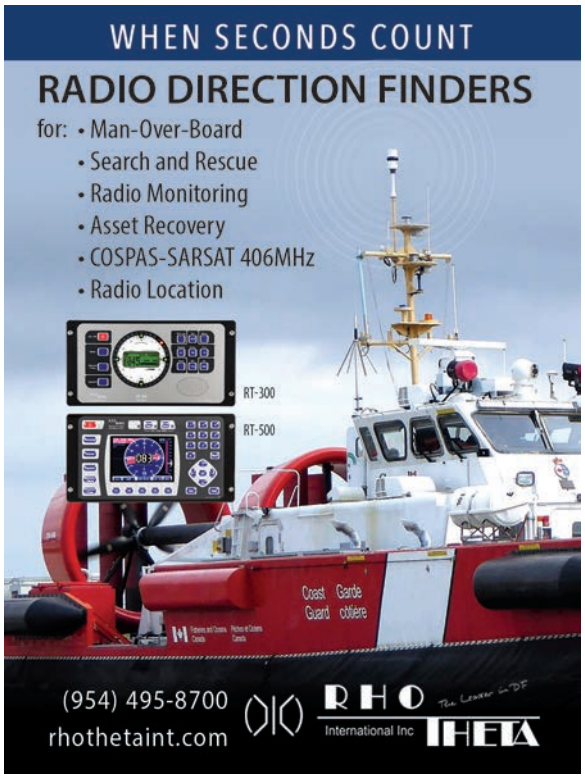

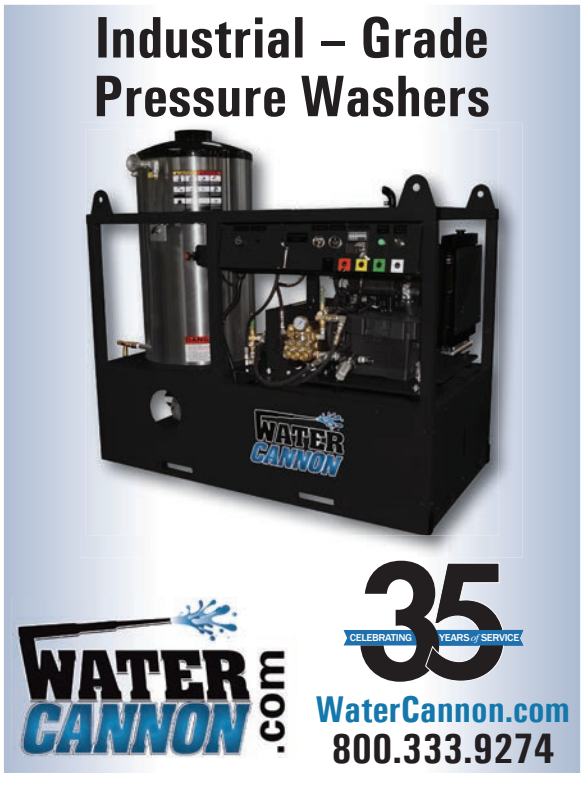

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