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MARITIME REPORTER AND ENGINEERING NEWS

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August 2016

Shipbuilding

German Shipbuilders stay strong in a difficult market

Artificial Stupidity
Take Caution with Autonomy

Ship Breaking
An Economic Case

German Ship Owners
Profile & Value of the German Fleet

Maritime Power
The Real Cost of a Fuel Switch?

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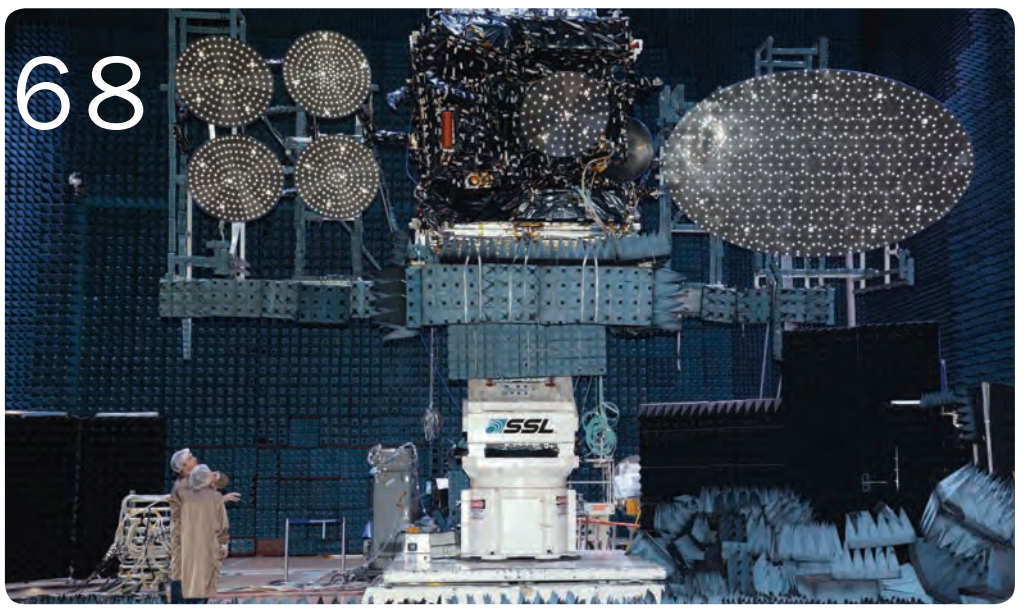

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Contents

THE COVER

Shipbuilding 2016
While shipbuilding markets have been tough, there are pockets of opportunity to be found. Shipbuilding coverage starts on page 50.

(Photo: DNV GL)

Abeking & Rasmussen

German Power

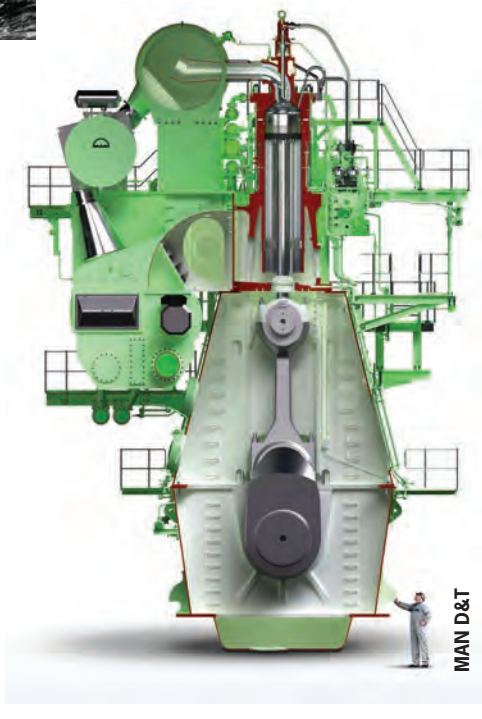
While world shipbuilding markets wilt, the German yards stand strong ... for now.

By Peter Pospiech


Viega


TDI


C. Raymond Hunt Assoc.


MAN D&T

82

CIMAC - Part I

Combustion Engine Afficionados Gather

There was no shortage of maritime propulsion challenges and solutions in Helsinki in June.

By Henrik Segercrantz

86

CIMAC - Part II

Seen & Heard

Snippets of sideline conversations with some of the global titans in maritime power.

By Henrik Segercrantz

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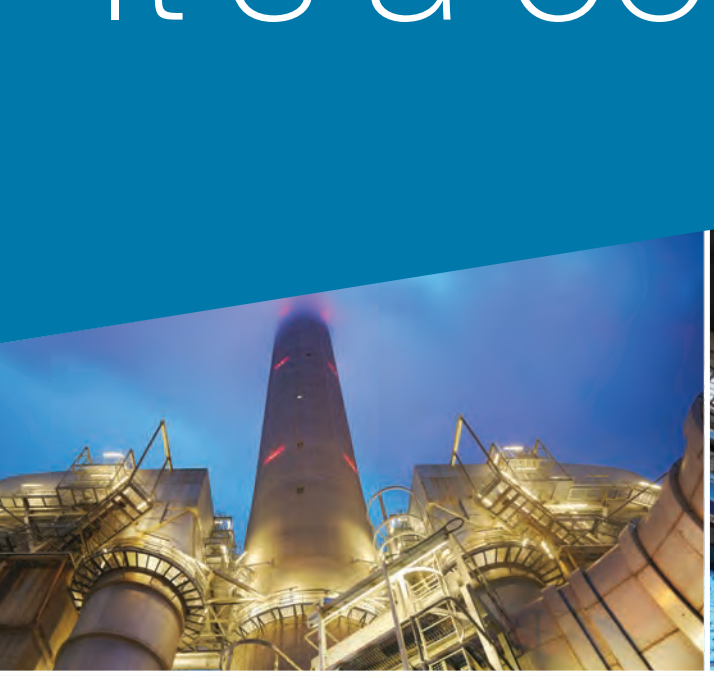




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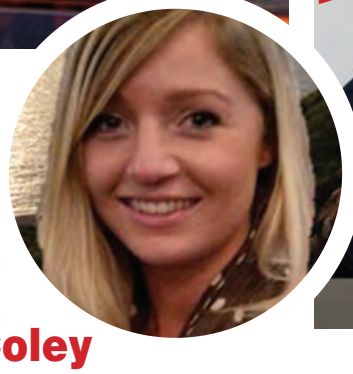

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Vallat
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GREG TRAUTHWEIN, EDITOR & ASSOCIATE PUBLISHER

To say that the shipbuilding market has been tough of late is a bit of an understatement, as shipbuilding globally is in the midst of a historic slump. A number of key market and economic drivers – from the precipitous plunge in the price of energy to the cumulative slowdown in global trade, not to mention more than a fair share of geo-political factors – have collectively dragged the shipbuilding business to a crawl. That, of course, is the theoretical 'glass half empty' view.

I prefer to see the 'glass half full.'

In shipbuilding as in life, balance is key. Many of the industry veterans that I regularly lean on for insight and analysis readily admit that this market, particularly in the offshore sector, is one of the toughest that they have ever seen. (As a point of reference, most of my 'regulars' have between 30 and 50 years of experience). On the shipbuilding side, we certainly haven't reached the depths of the late 1970s and early 1980s when new ships were delivered and promptly driven to the ship breaking yards. Today the market is in perpetual change, as it always has been, as it always will be. Trade routes are changing, particularly on the energy side, as an energy independent United States steams toward becoming a net energy exporter. Trade routes are changing as ships … particularly the containership fleet … keep getting larger, and consolidation of the long oceangoing routes consolidate before our eyes. Communication and connectivity technology – call it "Big Data," call it "The Cloud," call it the "Internet of Things" or call it whatever the next marketing-driven flavor-of-the-month name will be – is arguably the biggest driver for change, as it collectively has the potential to most profoundly impact the efficiency and profitability of a shipping company's operations.

This edition, our traditional "SMM" edition headed to Hamburg in early September to the biggest and best shipbuilding and ship machinery exhibition on the planet, is literally packed with a number of significant articles and sections.

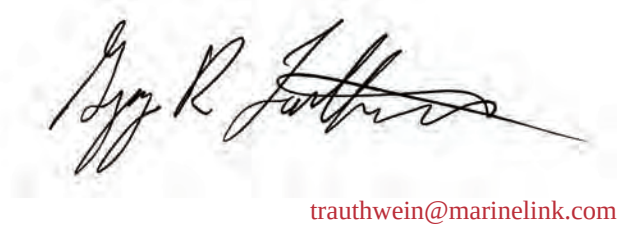
Concerning shipbuilding opportunities I suggest you take a look at the proposed $500 million shipyard project gaining steam in Trinidad and Tobago (page 58), as this project takes real world conditions – in this case the widening of the Panama Canal and the export of LNG from the U.S. – and leverages them for a country's industrial growth, economic gain and stability.

Earlier this year, our U.K.-based contributor Tom Mulligan attended a DNV GL event in London which served as the basis for his article, "How the shipping industry is going to change over the next 10 years" starting on page 68. A heavy dose of the aforementioned communication technology is the basis for much of the change to come.

Looking at the heavy machinery side of the business, our Finland-based contributor Henrik Segercrantz had the opportunity to spend three days with some of the most prominent maritime propulsion influencers in the world, courtesy of his attendance and reporting from the CIMAC 2016 conference in Helsinki. From Rolls-Royce to ABB to MAN to Caterpillar and many more, Segercrantz delivers exclusive insights from some of the brightest minds in marine power.

Finally, I am happy to intoduce a new section to the magazine, "Voices," starting on page 28. This special interview section will become a monthly staple and represent our best efforts to deliver a diversity of insight and opinion from all levels and geographic region. Case in point: it starts with a profile of **Imad Shanta**, a refugee from Syria who is now a trainee at Hapag-Lloyd, and includes market perspective from **Johan Carlsson**, Volvo Penta's CTO; **George Contos**, the second generation CEO of World Wide Metric; **Nick Brown**, the Marine and Offshore Director at Lloyd's Register; and a special tribute to "Mr. Diesel," the ubiquitous **Ole Grøne**, who recently celebrated his 40th year with MAN D&T.

I look forward, as always, to your comments on the copy within, as well as your suggestion for future coverage.



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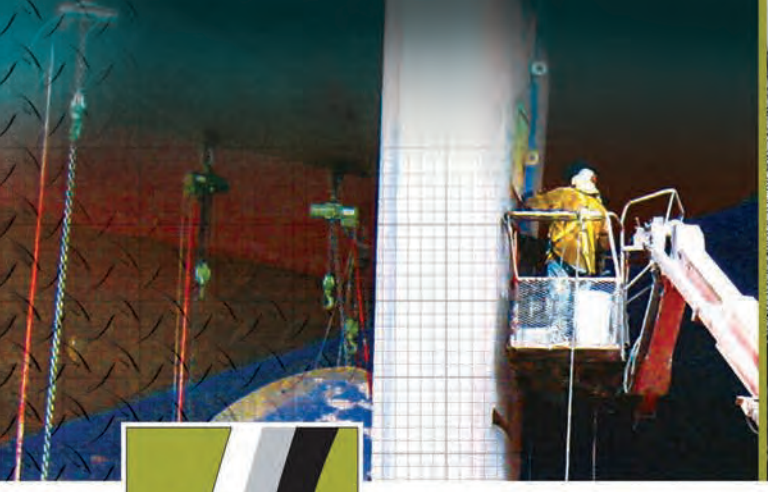

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Fishackathon Coding The Oceans

BY KIRA COLEY

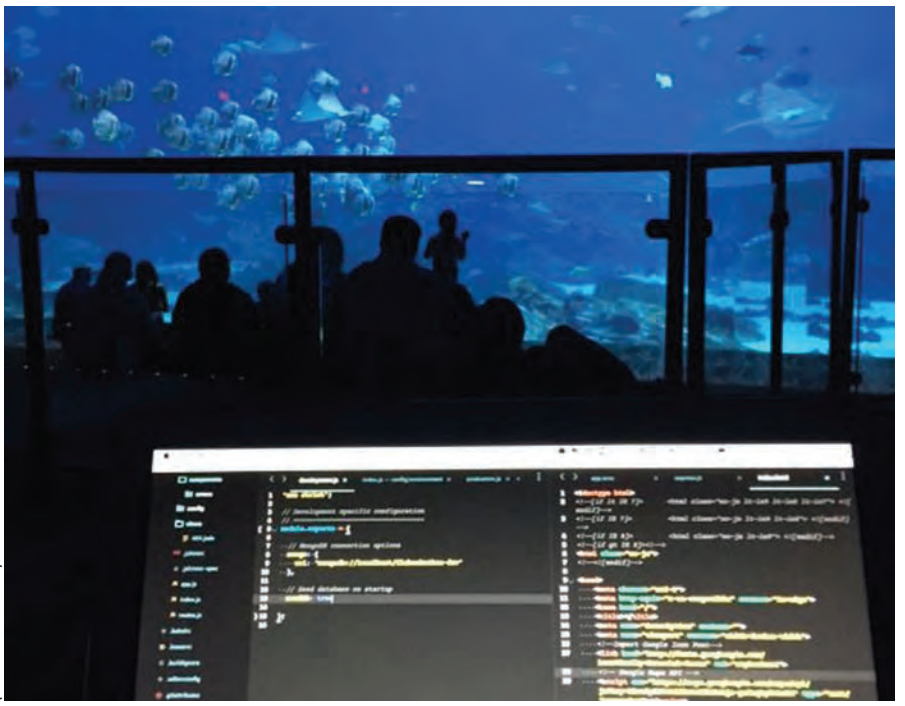
In 2014 the Food and Agriculture Organization (FOA) of the United Nations published a report documenting the state of world fisheries and aquaculture: around 90% of marine fish stocks are either fully or over exploited. Throughout supermarkets worldwide, mislabeled and laundered illegal catches make their way onto shelves and into the homes of consumers. As unsustainable fishing practices sweep through the world's oceans, unlikely collaborations bring modern technology and fresh insights to long-standing global concerns.

Launched by the U.S Department of State, Fishackathon aims to connect coders, programmers and software designers with fisheries experts, data analysts and environmentalists. And, in a space of 48 hours, compete to develop innovative and novel solutions for the collection of key fisheries data to combat ghost gear, fish fraud, seafood traceability and illegal fishing across the world.

Since its launch in 2014, Fishackathon has quickly expanded from five cities to an international event hosted by over 40 locations across six continents. As an output of Secretary John Kerry's 'Our Ocean' conference, the annual event assembles the next generation of coders to create tools which help tackle the overfishing crisis, presented in the form of apps for smart phone devices.

"Secretary Kerry is passionate about climate change and the ocean, and therefore wanted to bring people together to talk about core problems. As part of his office, we wanted to do something innovative for the ocean and to bring in outside ideas and crowd source innovative aspects which hasn't been thought of previously: so we decided to run a hackathon," said Jim Thompson, Director of Innovation at the U.S. Department of State. "Not only is it a great cause but people also find the idea of doing something tangible, where they can actually have an impact, exciting and worthy of their time. We are bringing in younger people, Millennials and the Alpha generation, to think about doing something with their skills in coding that they maybe haven't thought of before."

Each year at the 'Our Ocean' conference, organizers issue a call for problem statements to hundreds of scientists and



(Credit: Fishackathon)

industry professionals. A panel of ocean experts and technologies come together to review the suggestions and select a number of codable options to put forward for the annual hackathon. When choosing what issues to address, the panel looks for original concerns that had the greatest potential of being developed, as well as the data availability that the coders could actually use to create the software. Over the last three years, organizers have seen a trend in concerns focusing around themes such as overfishing, illegal activities and prices in ports.

This April at Fishackathon 2016, the challenges coders were asked to address were around fish identification, lost fish gear, vessel data and compliance with marine applicable fishing laws and regulations covering regions. Problem statements came from organizations such as MarViva Foundation, Fisheries and Oceans Canada, Billfish Foundation and the Global Ghost Gear Initiative.

"Trying to find solutions to ghost gear is fairly new concept for us. If we had the information as to where it was dropped, we could act quickly to minimize the effects," said Thompson. "So this year's coders will be working on questions such as how do we geotag or give the fisherman an opportunity to participate in sustainability by informing us quickly of the situation."

After the weekend-long event, teams of volunteer coders and technologists present their concepts in front of an expert panel of judges. A reward is given to the teams that most effectively develop usable solutions, which then advance to compete against the other winners chosen from each location.

#Codeforfish

The London teams, hosted by the Economist, chose to target cost effective approaches to fisheries data collection to enable fish stock assessment. Examples include the development of a smart phone app that captures data on fishing practices and catch composition with the least amount of manual data entry. The winners of the London 2016 Fishackathon, Fishazam, designed a smart phone app which tackles fish fraud by scanning fish fillets for light signatures, not visible to humans.

According to Oceana, one out of three fish are mislabeled and fish fraud is increasingly being found to be endemic in the seafood supply chain. The Fishazam team based their idea on a recent study that investigated the possibility of using infrared spectroscopy as a tool for the identification of valuable species (e.g. red mullet and plaice) that have been substituted with cheaper ones (e.g. Atlantic mullet and flounder).

The study suggests that different species of fish emit unique levels of infrared light, allowing fish to be distinguished almost instantaneously.

Apps for the Industry

A number of apps for smart phone and tablets are already being developed, in conjunction with and as an outcome of Fishackathon activities, which have enabled fisherman to report illegal practices. "[Because of these new smartphone apps] fisherman are able to tell us when there is a giant trawler out there taking the fish when they shouldn't be. We find fisherman open to these opportunities as it impacts their economy and their ability to make a living," said Thompson. "I think the fishing industry will accept and welcome these sorts of apps. We also found that these days' data is widely shared and people get excited when their data is being used. So, when it comes to the sharing of data we've had no problems. The biggest issues we might encounter are if fishing vessels are turning off the GPS locators so they aren't found where they shouldn't be – this will be a difficult issue to address at future events."

mFish is another initiative launched in partnership from the U.S Department of State using mobile services to provide real-time information that allows communication between fishermen, managers, the seafood industry and families while out at sea. The program also focuses on developing mobile apps for fisherman, enabling them to report illegal fishing and to get notifications of other apps that are being developed through Fishackathon.

An example of one such software developed from Fishackathon last year was KnowFish – know what you're catching. The app lets the user take a picture of the fish using a mobile phone, checks the image against the database and helps to identify the species.

Other examples include software which measures the size of the fish caught and identifies if the individual is undersized.

Fishackathon has an interesting series of partners on board including IBM with a focus on the data aspects and the Economist, London. Virgin is also a partner of Fishackathon 2016 and donated a $10,000 global award to be presented to the winning team.

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JOUNI SALO

One Norsepower Rotor Sail was installed as a trial on Finnish shipowner, Bore's, 9,700 DWT Ro-Ro carrier, M/V Estraden.

Photo: Bore

When it comes to fuel efficiency, innovation continues to challenge the status quo. However, in a risk-averse climate, technology companies cannot rely upon unsubstantiated claims to persuade shipowners, charterers and financiers of the potential ROI. NAPA's Jouni Salo explains why gambling on new technology is a fool's game, especially when it's possible to measure, analyze and verify the data to understand the real savings that a technology can be expected to deliver.

Innovation often stems from adversity and the prevailing financial climate has fathered many new technologies, fuels and tools that are being introduced to the market. However interesting they may seem, shipowners and operators must be presented with a sound business case enabling them to understand exactly how a vessel will benefit. It is crucial that they completely understand the ROI that each solution promises and how that will impact future operating costs. Common sense dictates that the industry will be much more receptive to a proven, measurable technology than one with hypothetical, unverified projections. In today's operating environment, risk aversion is a necessity.

Despite the current downturn in fuel prices, the market remains challenging and many companies have turned to 'clean tech' for existing vessels and newbuilds to improve efficiency, environmental credibility, and to deliver a competitive edge. The multiple technologies available range from air lubrication or harnessing wind power which have the power to deliver dramatic savings, to fuel additives and software solutions that can provide more subtle changes or decision support. Each provides its own specific measurable data, and different conditions present unique variables that need to be filtered out of the results they produce. In addition, ooperational conditions vary significantly in the real world and deep analysis can demonstrate how technologies perform in actual working conditions. The one thing that they all have in common is that proven results verified by an objective third party are crucial to their commercial success.

As the breadth of solutions increases, securing the interest of the market becomes more difficult, which is why independent third-party data capture and analysis to provide easily understandable and tangible evidence for their claims is as critical as ever. Measurement and analysis conducted by credible and well-known industry data specialists provides a solid foundation from which to credibly communicate the potential of a technology to both potential clients and investors.

One such company which has adopted this approach is Nanol. Nanol Technologies, the producer of a patented high-performance lube oil additive, has verified that use of its product delivered a 2% reduction in fuel consumption on M/V Seagard, an operational RoRo Cargo Vessel. Fuel calorific value, operating conditions and typical engine load range

all formed part of the analytical process to ensure the accuracy of the savings. As a result of the verification the vessel's charterer, Transfennica, will continue its use on the M/V Seagard and consider extending deployment to other vessels in its fleet. In addition, Nanol has also secured the opportunity to meet with venture capitalists to support its future growth.

Norsepower's Rotor Sail Solution is another example of a company leveraging verification to its commercial advantage. Norsepower offers a modernized version of the Flettner rotor, a spinning cylinder using the Magnus effect to harness wind power to deliver forward thrust. When the wind conditions are favorable, Norsepower Rotor Sails allow the main engines to be throttled back, saving fuel and reducing emissions while providing the power needed to maintain speed levels and retain voyage time.

One Norsepower Rotor Sail was installed as a trial on Finnish shipowner, Bore's, 9,700 DWT Ro-Ro carrier, M/V Estraden. ClassNK-NAPA Green monitoring and analysis was also installed to verify the efficiency savings delivered by the Rotor Sail. To deliver an accurate result it was essential to take into account factors such as wave and wind resistance, propeller efficiency and the effect of different drafts and tide conditions. By continuously monitoring the ship's performance NAPA identified the baseline efficiency for a vessel without the technology active. With this baseline in place analysis can identify and filter out the effects of waves, tides and draft on fuel consumption. From this analysis NAPA was able to confirm a fuel saving of 2.5% from a single Rotor Sail.

As a result of the proven effectiveness of this technology, Bore installed a second Rotor Sail on the same vessel, the first commercial order of the technology. This installation has also been verified by NAPA with fuel savings of 6.1% recorded on the vessel with the addition of the second Rotor, more than doubling previously recorded savings.

This data analysis and verification has been fundamental to Norsepower's business development by proving the effectiveness and applicability of its technology on operational commercial vessels. A syndicate led by Power Fund III, a clean tech venture fund managed by VNT Management, has now invested €3 million to support Norsepower's growth and market expansion. In addition to the expanded market potential offered by the first commercial purchase, this evidence has also helped Norsepower increase its enterprise value and protect the ongoing commercial activities of the company.

Operational data collection and advanced statistical analysis is not only adding value to the OEMs by independently verifying their claims, it is also reducing risk across the entire industry by ensuring investment certainty. By delivering proven data to confirm that efficiency technologies, hull antifouling, maintenance programmes or operational policy are having the expected impact, big data is providing the business intelligence needed for the industry to make confident and informed progress.

The Author

Jouni Salo is Product Manager, Shipping Solutions at NAPA, holding a Master's degree in Enterprise Communication Systems with minors in Maritime Administration, and working in various positions in the shipping industry, before joining NAPA in 2012.

Artificial Stupidity

DENNIS BRYANT

There is increasing speculation regarding when the first unmanned cargo ship will set sail. *The more important question is when will the first unmanned cargo ship spectacularly fail?*

(Photo: NASA)

The difference between the unmanned space missions and a similar maritime mission is fundamental. A space mission involves a large team of specialists working together for years. Assumptions are challenged and refined. Technology is pushed to the limit and beyond. **Money is spent in truckloads.** Tests are performed and analyzed. Triple and quadruple redundancies are built in. (the list goes on ...)

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On 7 May 2016, a Tesla Model S automobile collided with a tractor trailer on a highway outside Williston, Florida. The driver of the car died. Investigation revealed that the automobile was being operated in its driver-assist mode, meaning that it was guided by the on-board artificial intelligence system. Evidence indicates that the driver may not have been paying attention to the operation of the automobile as his DVD was heard playing a Harry Potter movie when individuals arrived at the scene of the casualty. **It appears that the automobile's guidance camera was unable to distinguish the white body of the tractor-trailer from the bright sky as there is no indication that the brakes were applied before impact.**

We (not me personally, but humans as a group) have utilized artificial intelligence to launch unmanned craft into space on increasingly long and complex voyages. Mostly, these space missions succeed and provide us with wonderful images and reams of important data. Therefore, it is theoretically and practically possible to construct and operate an unmanned cargo ship.

The difference between the unmanned space missions and a similar maritime mission is fundamental.

A space mission involves a large team of specialists working together for years. Assumptions are challenged and refined. Technology is pushed to the limit and beyond. Money is spent in truckloads. Tests are performed and analyzed. Triple and quadruple redundancies are built in. The rocket and payload are assembled with the highest degree of quality control. The rocket is launched. It mostly works now-a-days, but that was not true previously. Even after a successful launch, the space craft is monitored closely by a large team of experts who continually analyze the data and make corrections as needed. They are also available to reprogram the space craft and make course corrections as necessary when something goes wrong – a not infrequent event. Eventually, the space craft performs its mission (be it a fly-by past Pluto or an orbital mission around Jupiter). There are well-deserved congratulations all around and the public increasingly gets the impression that success is routine.

Even with all the checks, double-checks, and triple-checks, space missions do not always succeed.

• In 1999, NASA's Mars Climate Orbiter burned up in the Martian atmosphere because the thrust of the maneuvering rockets on the orbiter had been calculated in metric units (newtons) while the mission team assumed that they had been calculated in English units (pounds).

• When launched in 1990, the Hubble Space Telescope provided only fuzzy images. Analysis revealed that the device used for the final grinding of the 2.4 meter mirror had been incorrectly assembled. The mirror had been ground very precisely, but to the wrong shape. It was only in 1993 after a risky space shuttle mission to install corrective lens that Hubble was fully able to fully explore space. The take-away is that few things go as planned.

• On December 14, 1996, the fully-loaded grain carrier Bright Field was downbound under pilotage on the Mississippi River passing through the Port of New Orleans. The main engine suddenly stopped. Exercising great skill, the pilot was able to guide the freighter into the Riverwalk promenade while sounding the ship's whistle to alert those ashore. The allision into the promenade resulted in 66 injuries, but none was serious. Repair costs for the ship were $2 million and for the promenade and associated property $15 million. Investigation revealed that the engine was designed with an automatic shutdown in the event of low lubricating oil pressure. No one had thought through the ramifications of such an automatic shutdown on the safety of the ship.

• The U.K Royal Navy recently launched and placed into service a squadron of highly sophisticated Type 45 destroyers. The six warships, costing approximately $1.4 billion, have experienced repeated power outages because the gas turbine engines are unable to operate on extended deployments in warm water, such as that found in the Arabian Gulf. Pre-production planning and testing were obviously inadequate.

• On 7 May 2016, a Tesla Model S automobile collided with a tractor trailer on a highway outside Williston, Florida. The driver of the car died. Investigation revealed that the automobile was being operated in its driver-assist mode, meaning that it was guided by the on-board artificial intelligence system. Evidence indicates that the driver may not have been paying attention to the operation of the automobile as his DVD was heard playing a Harry Potter movie when individuals arrived at the scene of the casualty. It appears that the automobile's guidance camera was unable to distinguish the white body of the tractor-trailer from the bright sky as there is no indication that the brakes were applied before impact.

The bottom line is that designers of machines, no matter how sophisticated, can't anticipate and plan for every eventuality. They also can't design and manufacture equipment and structures that will last forever and require no maintenance. Another thing we know is that no matter how many cautions accompany new labor-saving technology, users will invariably operate that technology beyond the published limits.

It is a fool's errand to design and operate an unmanned ship over an extended period unless you are willing to devote the time, effort, manpower, and monies expended by organizations such as NASA. Such devotion will, by definition, make the venture unprofitable.

This is not to say that there is no place for artificial intelligence in the maritime industry. Humans cause the majority of marine casualties. Judicious use of artificial intelligence has proven the possibility of reducing the number and severity of those casualties. It must be recognized, though, that artificial intelligence, because it contains its own unique set of flaws, will also cause its own unique set of casualties.

There are numerous tasks that can be improved through the studied use of computers and related technology. Increased use of artificial intelligence, though, must be accompanied by increased training of crew members, whose tasks will be changed. For example, we quickly learned that Electronic Chart Display and Information Systems (ECDIS) cannot be installed in ships without providing detailed training to the crew members expected to utilize that computerized system. At the same time, basic maritime training for those crew members must not be jettisoned. Unless the mariner understands, for example, what information a maritime chart is expected to provide, ECDIS will be of no more value that a video game.

There are boundaries to human knowledge. These boundaries may expand over time, but they continue to exist. Artificial intelligence still relies on the skills of human programmers, engineers, and operators. We don't know what we don't know. While artificial intelligence is pushing the existing boundaries, stupidity and hubris are limitless!

The Author

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MARLINK

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Picture taken on Stolt Groenland, 2015

Smart sailing with SEALINK

"Now that we have the Sealink VSAT solution in place, we have 24/7 coverage on a global scale on our ships. This really provides highly reliable and transparent communication towards our ship as if it were a remote office...it gives us tremendous possibilities for efficient and safe operation and a real-time link between our ship and shore-side systems."
Peter Koenders, CIO, Stolt-Nielsen Ltd.

Watch the full video of Stolt's experiences on our YouTube channel "MarlinkMedia"

Visit us at SMM, booth B6.415

www.marlink.com

Ship Breaking & Scrapping

ANDREAS BARGFRIED

Sometimes being an industry supplier offers interesting insights – your business is touched by the ups and downs of the charter market, but you are never so involved in it that you lose sight of the big picture. Some of our clients have been hit hard by the market's general downturn; one client I visited last month began 2008 with 41 maritime software licenses for their vessels – just seven remain today.

"We just sold another ship yesterday," he said, and then after a pause: "Please spare me the update costs for this one, it won't receive any." Of course, I nodded. It might be unpleasant to see another

Photo Credit iStock rajami2

Rolls-Royce

Powered by natural gas

Rolls-Royce is widely recognised for its system solutions for a broad range of vessels. Systems comprising propellers and thrusters, engines, stabilisers, deck machinery, rudders, steering gear, automation and control systems. Rolls-Royce supply gas-powered propulsion solutions that reduce emissions significantly. Compared to diesel engines that meet IMO Tier 2 emission levels, Bergen gas engines give E2 weighted emission reductions of 92% NOx, close to 22% in CO_2 and virtually eliminate SOx and particulates, already meeting enforced IMO and EPA Tier 3 requirements and are subject to EPA Tier 4 certification. Clean efficiency by Rolls-Royce.

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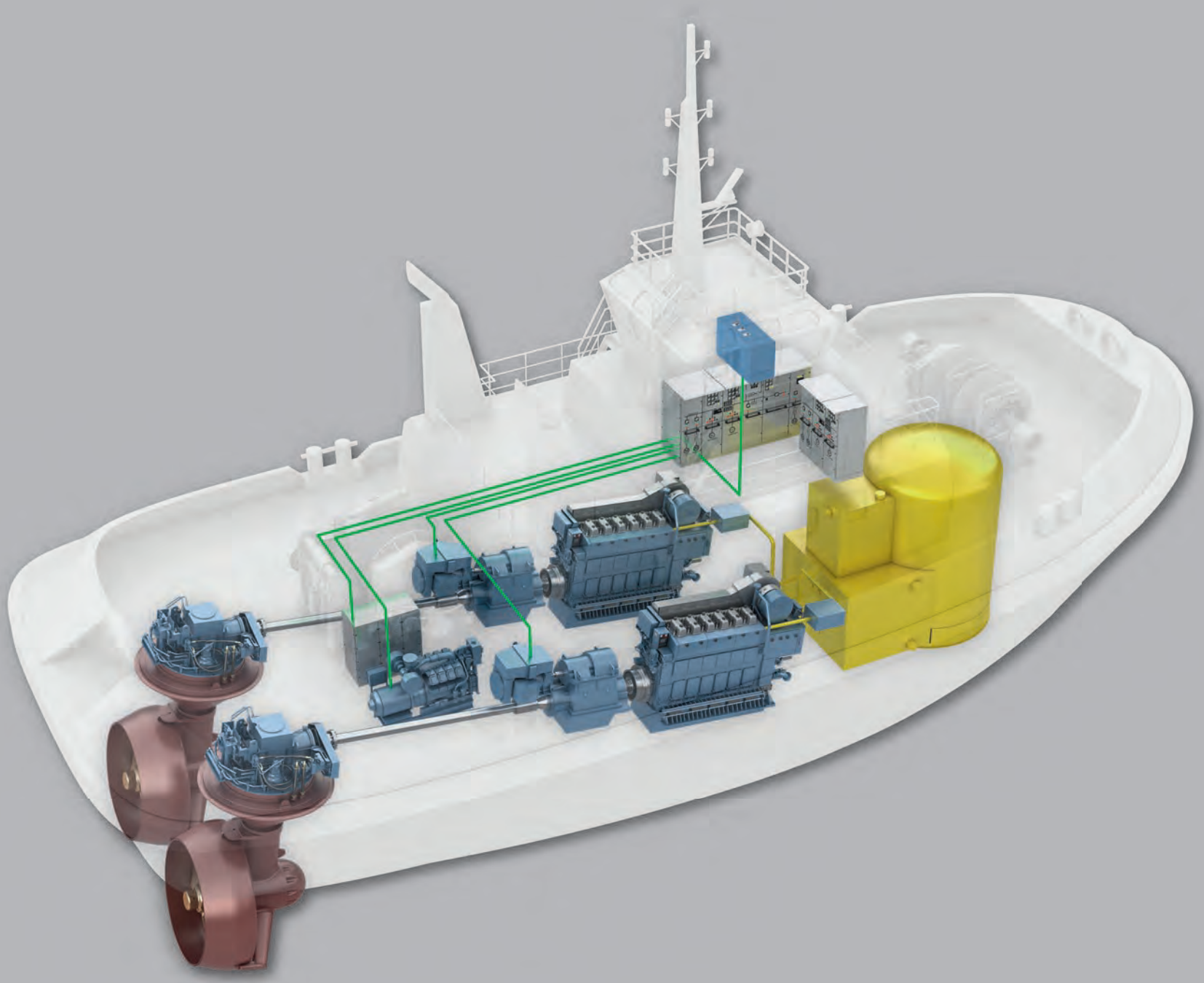

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piece of your development finance blow off, but it might be even more unpleasant to see your ship management company being dismantled piece by piece. "So what will they do with the vessel?" I asked, he shrugged and said: "I would put my two cents on a beaching."

Beaching is an ugly word in the maritime industry. As we know, it holds the silent threat of working men's death and environmental pollution. Greenpeace will chase you and widows will curse you, but what choice did he have? After all, the countries involved could simply forbid the practice or release new regulations. Well, they could - but they won't, and here is why:

The Economy of the Ship Breaking and Recycling Industry (SBRI)

What started in 1965 with the stranded vessel M D Alpine in Chittagong became the most important part of Bangladesh's national steel production, satisfying up to 35% of the current demand of five million tons (2015). The scrap metal industry feeds over 350 steel re-rolling mills and 22,000 workers in approximately 40 yards – dragging with it a long tail of 200,000 indirectly employed workers (e.g. supply chain and downstream market). If extended families are taken into account, the numbers double.

The picture in India and Pakistan is very similar. India hosts the world biggest beaching facility in Alang, accommodating 66,000 yard workers.

These statistics support the fact that this industry involves thousands of companies and influences the shape of the local area, government and society for a considerable distance inland. The SBRI plays a vital role in the national budget and development plans of Bangladesh. For example, 40% of the national steel demand is driven by public construction projects and so 35% of steel demand is covered by recycled re-rollable scrap and melting scrap, which is used especially in construction.

The operators involved (e.g. steel mills, suppliers and local authorities) resist changes that could endanger their business; environmental protection laws and wage rises are major threats. This is the main reason why neither India nor Pakistan nor Bangladesh would ratify the "Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships" of 2009 – a currently inactive IMO attempt to regulate ship breaking.

History shows that it is a volatile business, taking place only in Europe and the USA up to the end of the second world war. Due to rising demands for steel in Asia and the availability of a cheap workforce the industry began to relocate there. By 1977 more than 50% of all recycled ships had been beached in Taiwan (3,391 vessels). A decade later in 1990 it was only two ships!

How much do they make?

The yards have a good standing in Bangladesh. In mid 2009 Maria Sarraf's team estimated in their report "Ship Breaking and Recycling Industry in Bangladesh and Pakistan" (Report No 58275-SAS) that the average profit from a Panamax oil tanker with 80,000 DWT is approx. $920,000.

(See Chart 1)

The vessel is often bought via middle men who establish contact between the international owner and a local yard. Such agents are usually brokers based in London, Hamburg, Dubai or Singapore specializing in buying scrap ships from shipping companies in order to resell them. They also might change to a favorable flag and/or class.

The yard will receive a loan from a local bank with the obligation to pay it back within six months – the time required in order for the vessel to be stripped. Owners should be aware that the price might be re-negotiated when the vessel arrives at Chittagong if scrap prices have decreased.

Multiple administrative processes are set in motion as soon as the ship arrives in the international waters off Chittagong. The industry is supervised by the Ministry of Port and Shipping and the Ministry of Industry, whereas the Explosive Department is responsible for checking the vessel and declaring it gas-free (merely nominal). Import tax must be paid and valuable items such as the radar system will be distributed to the navy. Further checks and certificates must be effected before the Chittagong Port Authority allows beaching.

The beached vessels are then handled by yard workers. The yards attract mainly people from poor districts – in Chittagong 95% are migrant laborers. Of course, they enroll because it is their only option if they want to feed their families; the daily wage is approximately $3 - $7 with a working time of eight hours per day and an expected extra four paid hours. In comparison, a rickshaw puller would have to work more than a week to earn this, but he does not risk his life doing it.

Hidden Costs

However, the almost one million dollar profit per beached ship comes at a high price. Bangladesh and other beaching facilities in Asia have been polluted for decades with hazardous chemicals. PCB, asbestos, TBT and lube oils are often just dumped inland, burned during the recycling process or sold to local markets, they also contaminate the yards themselves. This might raise concern soon to a number of countries due to rising sea levels.

The sea level at Chittagong beach might not rise more than 0.4 meters in

Chart 1

Revenues		**$5,613,600***	
Total costs		**$4,692,200**	
-	Purchase of ship		$3,848,000**
-	Labor costs		$92,700
-	Consumables (e.g. oxygen)		$302,200
-	Financial costs		$147,900
-	Taxes, tariffs, and duties		$263,000
-	Other costs (including rents, investment costs, etc.)		$38,400
Profit		**$921,400**	

*The profit is heavily influenced by the market price for recycled metals.
** Oil tankers command higher prices as they are easier to disassemble than container vessels. $260/LTD has been used.

Chart 2

Time	Measurements	Total investment ($ million)	Cost per LDT in $*
1-2 years	• Worker registration and protective equipment • On-site pollution and safety control equipment • Preparation of various plans (EHS management, ship recycling action plans)	3.5	2-3
3-5 years	• On-site equipment • Training/ capacity • Health care system • Laboratory monitoring	20 - 25	3-4
6-10 years	• Hazardous waste disposal • Thermal treatment facility	25	4
Total		**$53.5**	**$11**

*Includes cost of operation and interest payments (10% pa) at 1.4 million LDT/year

the future, but it would still influence high tides which regularly surge 3 to 10 meters above sea level and would cause an additional 11,000 to 25,000 sq. m. of polluted sand to be washed into the ocean. Mrs. Sarraf suggests in her study that this could submerge up to 12,000 kg of lead, 60 kg of cadmium, 6,000 kg of chromium and 7 kg of mercury at Chittagong beach alone. Effects on the health of local residents and workers can be observed easily. Rising cancer rates and intoxications from chemicals like lead and asbestos, and injured workers (88% of all workers) are a big social problem. Furthermore, Greenpeace claims in its report "End of Life Ships" that between 60 and 100 people per year die at Chittagong, based on local media news.

Improvements

Although the business has existed for 50 years in Bangladesh, improvements have only recently been made. Public awareness raised by investigative reports such as "Working Man's Death" by Michael Glawogger has ramped up international pressure. This might be part of the reason for the improvements, which include more workers wearing protective equipment like welding goggles and gloves, enhanced worker training and more local authorities fighting for better working conditions and healthcare.

In Alang, India the first workers union has been formed, stepping in when compensation for widows or injured workers is not paid. Despite this, little has been achieved. It is possible to do a lot for the local yard workers, residents and the supply chain. Receiving a couple of hundred thousand dollars in tax and duties per ship, Bangladesh's authorities have the means to improve yard supervision and streets, or to invest in waste recycling. All the reports cited in this article make numerous suggestions about what could be done – ranging from MARPOL reception facilities for operational waste (e.g. paint) to road maps for improving local conditions.

Necessary measures to achieve HKC compliance in Bangladesh:, Maria Sarraf, 2008 (See Chart 2)

If the assumptions of Mrs. Sarraf are correct, Bangladesh earns at least $24 million annually from tax and duties related to ship scrapping. Hence a long-time investment of $53 million over 10 years seems feasible as it will avoid high costs in the future. Additionally, even small steps like avoiding the manual handling of asbestos without protective gear can bring great improvements.

However, the sad truth is that nothing is likely to happen – and for the usual reasons: the problems are remote, and who cares about the poor, when so many people are making a profit?

The Author

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High Noon

The past, present & future of the 'noon report'

MELVIN MATHEWS

Virtually every shipping company today uses noon reports to understand and monitor what is happening on their ships. These reports are traditionally sent by the Captain every day, based on data gathered manually by the crew. The content and format of the report is usually pre-agreed by the company and sent at noon. The noon report has grown over the years to give a snapshot of what has happened on board the ship since the previous noon i.e., in the last 24 hours.

Since the time between noons is based on the time kept by the ship, this is not always 24 hours. The time kept by the ship is changed by the crew depending on which time zone she is operating in. Therefore a ship sailing westward gains time, which means when the clocks are adjusted on board, the time to the next noon is now 25 hours. Likewise, for a ship sailing eastward the time between the two noons ends up being only 23 hours.

For a ship on a voyage of several days, the data received from noon reports is not easily comparable as the data sample every day along the voyage is different based on whether the ship's time was changed by the crew or not. In addition, the managers that monitor these reports ashore, receive them at different times of the day and night as the ships change time zones. This means that the companies do not know in real time what every ship is up to.

One would wonder why the entire shipping industry would lay the foundation of ship monitoring and reporting based on a moving target, i.e. ship's noon time which varies based on the ship's location. The reason GMT has not been picked as the accepted standard for timekeeping is perhaps because the industry is steeped in tradition or may be even linked to the origins of the noon report.

Historically, the only time the ship accurately knew its position in the open ocean was at noon every day. At all other times the position of the ship was based on an estimated calculation (also known as Dead Reckoning) from the previously determined position. To determine the accurate position of the ship, the officer on watch, used the sextant and the chronometer to calculate the longitude in the morning and the latitude at noon. It was important to determine the position of the ship to know what course to steer. Gradually with better communication and an advantage in knowing the best ETA, reporting the latest position of ship became a practice and hence the story of the noon report began. The initially noon position reports were sent over telex and radio. Today some noon reports have become so elaborate that it takes the designated crew several hours (from morning to noon) to collate all the data required from different areas of the ship, i.e. cargo control rooms, engine rooms, bridge, etc. However, what started and evolved as an innocent position report has slowly but steadily become a monster – with various formats of noon reports being provided to not just ship owners and managers, but also charterers, sub-charterers, weather providers, ports and ter-

However, what started and evolved as an innocent position report has slowly but steadily become a monster, with various formats of noon reports being provided to not just ship owners and managers, but also charterers, sub-charterers, weather providers, ports and terminals, oil majors, commodity traders and agents, to name a few.

minals, oil majors, commodity traders, agents, etc. to name a few.

Adopting GMT as the standard time for all reporting, would in today's global era, certainly make life a lot less complicated. Unlike in the past where accurate position was known only at ship's noon, today the GPS position is available throughout the day. With modern communication systems and real-time data collection platforms, it no longer makes sense to continue noon reporting. Real time access to on-board data will not only provide companies the status of vessels at any given time and more importantly at the time of need, but also free the crew to deal with the actual task of operating the vessel efficiently in today's minimum manning environment.

To ensure the efficiency of the larger global supply chain (in which shipping plays a significant part), it is likely that a single unified time will eventually evolve to be the norm. There is no question that early movers will have substantial edge over their rivals when they can show greater efficiency and control of operations. It remains to be seen as to who is courageous enough to break with perhaps a 100 year tradition and bin the noon report in its current form. This in itself will be a giant leap for an industry that is known for being reactive instead of proactive in embracing change.

The Author

Melvin Mathews is an MBA graduate and Ex-Master Mariner with over 20 years of experience in the maritime industry, previously serving as a Captain on vessels ranging from coastal ships to VLCC's. He is an Associate Fellow of the Nautical Institute and fellow of IMarEST. Melvin's extensive travel and working in several countries has broadened his expertise and understanding of operating in multicultural and multilingual environments. He has extensive business and consultancy experience and shouldered Risk-assessment and Risk-management initiatives at a senior level. He is a certified nautical lecturer and has been involved in Maritime & Competency training.

ENMC

The European Network of National Maritime Clusters

FRANCIS VALLAT

One may have all kinds of maritime clusters, depending on the criteria which have been originally selected to create such or such cluster. Some gather maritime professionals who belong to the same geographical areas, some other are based on the type of activity (for instance a cluster of maritime entities active in maritime research & innovation; or in shipbuilding/ship repairs/equipment; or in any other field where maritime professionals want to coordinate and harmonize some of their actions, work, lobbying etc…). But a National maritime cluster – in our view at least – should gather most of the maritime activities of its country, and act at the service of the national maritime economy, especially through pushing initiatives which are transversal (ie gathering various different maritime activities) and are meant to reinforce the strength of the corresponding maritime community at large.

(Image Courtesy ASTICAN)

Astican is a ship repairing and conversion yard plus a heavy offshore project management company who belongs to a billion dollar shipping Group. See more on Astican starting on page.

What is the ENMC?

Today the ENMC gathers the national maritime clusters of Belgian, Bulgaria, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Spain, Sweden, UK, whereas Malta (headed by former Commmissioner Joe Borg) will officially join in October. Knowing that a few of them have a different name, like for instance the Federazione del Mare in Italy or the Forum Oceano in Portugal…

It will take a few years (maybe five or more) to really unify the national maritime clusters of the ENMC into a unique harmonized and homogeneous organization. Indeed the existing national clusters – from Eastern Europe to Northern and/or Southern Europe are sometimes very different the ones from the others: differences in history, culture, or even nature (some are totally private, others are indirectly State-controlled, or half private-public). Differences also in maturity: some are very young, just emerging, while some others are quite experienced. This being said the ENMC already acts sufficiently efficiently to have identified very important common fights which it is leading with the support of all its members. For instance, after a few years of struggle we obtained together, from the Commission, the human and financial means necessary to identify and study what really represents the maritime European economy, what are its strengths, its weaknesses(this in order to boost the blue economy ie have the basis for any powerful concrete combined transnational policies).

What is ENMC Currently Doing?

It is also in that spirit that the ENMC recently discussed, with Commissioner Karmenu Vella about the place of the maritime economy in the Juncker Plan*, or about the priorities which should be retained on a mid-term basis in the working-plan of DGMare, and also about the main specs of the European data-base that we need. We also insisted on the necessity, for maritime EU, to act at world level, to push towards universal rules, and as a consequence to reinforce the influence, role, weight and means of the International Maritime Organization. In our view Europe should “act regional” only in extreme cases (ie when IMO is too slow, or urgent needs appear), and should always bear in mind EU’s duty to secure together sustainable maritime development and fair competition averywhere (ie not jeopardize European maritime economy).

It is important to understand that if the ENMC lobbies, it is not a professional lobbyist! This is more than just a “nuance,” and is not contradictory at all. Because the ENMC lobbies at the service of the European maritime general interest, not for itself. And it is not paid (neither directly nor indirectly) or its lobbying action. An action which we prefer qualify as a permanent, firm, open and constructive dialogue with concerned authorities. And it is worth mentioning that in most of “our” countries the bulk of national cluster funding is coming only or mainly from the annual contributions of the members (although some may accept non-binding subsidies), but not from the sale of their services.

*What is the Juncker Plan?

The European Commission's Investment Plan for Europe (EC IPE) known as the ***"Juncker Plan"*** or the ***"EU Infrastructure Investment Plan"*** is an infrastructure investment program which originally was announced by European Commission President Jean-Claude Juncker in November 2014. The Juncker plan, first and foremost, aims at unlocking public and private investments in the "real economy" of a reported $348 billion over a three years fiscal period (Jan. 2015 – Dec. 2017).

(Source: Wikipedia & MR Staff)

Which Priorities?

As for the political and financial priorities let's say that ENMC's job is to be as opportunistic as possible, ie. they may either vary depending on the issues and challenges which the European maritime world is facing, and/or on the financial tools which may be available at European Union level (for instance the Juncker plan). This being said we are very alert on two aspects: one is that long term challenges and chances of maritime Europe, supposing active co-operations and heavy investments, are tackled as seriously as possible (such as H2020 program); the other one is that the existing rules and funding programs of the Commission are adapted to the various maritime challenges. But this is very complicated and in any case it has first to be handled by the various professional federations at Brussels level (which are more legitimate since they gather the maritime professionals of the maritime activities themselves, and which ENMC can support if and when they want).

And, again and again, the ENMC is maintaining its pressure on a few more general fights (on top of the neutral identification of what represents the European maritime sector as a whole: facts and figures, per country, per activity and which complementarities). These are the allocation of sufficient available resources to the most promising activities on a long term basis (biotechnologies, deep-sea mining, new energies etc…); and last but certainly not least the clarification and improvement of the too long and complicated decision making process at EU level (ie in Brussels, where the various directorates involved in the maritime fields are more often competing than co-operating, thereby not helping to reach the most efficient decisions; whilst many rules are far too stringent, not adapted and lead too often to inappropriate or negative conclusions, and knowing that the weight and controlling capacity of the European Parliament often reveals to be insufficient).

The Author

A reputable shipowner for 32 years, F.Vallat chaired the" Institut Français de la Mer "for 10 years. He created both the "Cluster Maritime Français," and the "European Network of Maritime Clusters" which he chairs to-day. He also chairs "Euromaritime" (the European maritime business show). He has represented France at the "European Maritime Safety Agency" (and has been vice-chairman from 2002 to 2008)

Understanding EALs

A primer for small vessel operators

LISA CLARK

The use of environmentally acceptable lubricants (EALs) in all oil-to-sea interfaces of vessels greater than 79 feet in length has been mandated by the United States Environmental Protection Agency since December 2013. While operators of larger vessels have become familiar with what is required from them, there is still a great deal of uncertainty around why these fluids have been mandated, how they perform and what benefits they deliver. The pending Small Vessel General Permit (sVGP) has created even more market confusion, especially among smaller vessel operators, who may be less familiar with these fluids and their use.

About sVGP

The sVGP will apply to non-military, commercial vessels that are less than 79 feet in length. Compliance with the sVGP allows vessels to meet the Clean Water Act (CWA) requirement to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for discharges incidental to normal operations. The discharges covered in the sVGP are categorized into several broad categories, which are listed in the permit, and include: common-sense requirements for general discharges, fuel management, engine and oil control, solid and liquid waste management, deck wash down and runoff and above water line hull cleaning, vessel hull maintenance, graywater, fish hold effluent, ballast water and overboard cooling water discharges.

While the Federal moratorium on sVGP requirements was recently extended from December 2014 to December 2017, the marine industry is clearly moving in the direction of enhanced sustainability, and all operators, regardless of the size of their vessels, must be educated on these regulations and whether the products they use are as environmentally-friendly as possible.

What is an EAL?

Environmentally Acceptable Lubricants are defined by the EPA as offering these three characteristics.

– **First, they must be "biodegradable"** - biodegrading into carbon dioxide and water by ≥ 60% or more within 28 days (according to OECD 301B or ASTM D7373 methods).

– **Second, they must be "minimally toxic,"** causing only a light impact on the aquatic environment (LC50> 100mg/L for lubricants and LC50>1000mg/L).

– **Third, they are "not bioaccumulative,"** and must have a low propensity to bioaccumulate in organisms.

Additionally, the Clean Water Act of 1972 mentions discharges of oils should not exhibit any visible 'sheen' on the water's surface otherwise it is considered a pollutant (according to CFR 40 Part 435 A).

Where to Use EALs

EALs should be used in place of traditional petroleum lubricants in all marine applications where there is any oil-to-water interface. These applications include stern tubes, controllable pitch propellers, stabilizers, rudders, thrusters, Azipods, towing, notch interfaces, wire rope and mechanical equipment subject to immersion such as dredges and grabs.

EAL Confusion in the Marketplace

There's conflicting information in the marketing place about EALs. A lack of agreed upon definition is one contributing factor, as is lack of awareness of the four different types of EALs that are available. Inconsistent performance claims from manufacturers have also led to the confusion. Let's clarify a few myths right from the start:

EALs Do

- Perform equal to or better than petroleum lubricants
- Mitigate the discharge's environmental impact
- Improve productivity, which leads to profitability

EALs Don't

- Eliminate spill occurrence
- Eliminate the need to report a spill or discharge
- Eliminate the need to clean up a spill or discharge

The Benefits of EALs

Another common misconception is that EALs, while being good for the environment, are not the best choice for operators. However, EALs also deliver a wide range of benefits, making them a strong choice even for those who not are not currently required to use them.

– Sustainability Benefits

While EALs are generally more expensive than conventional oil counterparts in upfront costs, an increasing

Features	Petroleum	HETG	HEPG	HEES	HEPR
Durability / Life Expectancy	●	●	●	●	●
Viscosity Index	●	●	●	●	●
Oxidative Stability	●	●	●	●	●
Hydrolytic Stability	●	●	●	●	●
Seal Compatibility	●	●	●	●	●
Frictional Characteristics	●	●	●	●	●
Mineral Oil Compatibility	●	●	●	●	●
Biodegradability	●	●	●	●	●
Ecotoxicity	●	●	●	●	●
Bioaccumulation Potential	●	●	●	●	●

number of companies have chosen to convert to EALs based on their broad range of environmental and performance benefits. In various marine applications and equipment, there are periodic fluid leaks and discharges. It is critical to minimize any environmental damage or detrimental contact to humans, aquatic life or animals that can be caused by these unavoidable leaks and discharges. Using biodegradable EALs allows companies to be confident that their leaks and discharges will not cause harm to water, land or living beings while potentially reducing remediation costs or fines.

– Performance Benefits

In addition to risk mitigation, sustainability and compliance benefits, EALs, which are high viscosity (high VI) lubricants, can offer several performance advantages including:

- Durability and extended wear protection
- Extended fluid life
- Broad temperature range performance
- Excellent thermal and hydrolytic stability
- Excellent seal compatibility
- Excellent water separation characteristics
- Good corrosion protection and oxidation stability

All of these factors combine to reduce total cost of ownership, which make select EALs a more attractive option for many organizations.

Choosing the Right EAL for Your Needs: The Four EAL Types

EPA recognizes four types of EALs:

- Vegetable Oils (HETG)
- Synthetic Esters (HEES)
- Polyalkylene Glycols (HEPG)
- Polyalphaolefins (PAOs) and related hydrocarbon products

Choosing the most suitable EAL depends on the end-user application. The chart below provides a quick side-by-side glance comparing features for all four EAL types and standard petroleum based lubricants. Reference corresponding color key. (See chart on the previous page.)

EAL compliance with VGP must be demonstrated through independent laboratory testing of the biodegradability, toxicity and bioaccumulation of fluid – often referred to as self-certification.

VGP regulations were not designed to interfere with your operations, but to help protect the marine environment on which your operations depend. Environmentally Acceptable Lubricants are not only mandated by the EPA, they perform equivalent to or better than petroleum lubricants while offering a safer alternative for employees to handle and have less impact on the environment.

While many factors should be considered when evaluating which EAL best fits your needs – including operating temperature and pressure, seals/elastomers, water ingress, fluid life, preventative maintenance cycles and spill/discharge potential – the U.S Environmental Protection Agency and many fluid manufacturers offer resources to help with conversion. By availing yourself of these resources, following expert advice and equipping crew members with the right information, operators can focus on what's most important: running a profitable business with compliant vessels that help protect and sustain our waterways.

The Author

Lisa Clark is vice president of marketing and business development at RSC Bio Solutions where she directs marketing activities including marketing communications, lead generation and brand and product management.

(Photo: Hapag-Lloyd)

Imad Shanta

from **Refugee** to Hapag-Lloyd **Trainee**

Imad Shanta and his family fled the war in Syria and headed to Germany. Since then, they have been living in a refugee center in Hamburg.

Imad Shanta followed a rather unusual path to Hapag-Lloyd: He and his family fled the war in Syria and headed to Germany. Thanks to the "Hapag-Lloyd Helps" project, Imad had an opportunity to complete a traineeship in the company. The "Hapag-Lloyd Helps" project was launched in early 2015. Since then, company employees have been using a wide range of activities to assist some 7,000 refugees who have come to Germany from Syria, Iraq, Eritrea and Somalia. Among these activities have been German language instruction, the World Café, donation drives, sports and evenings spent preparing shared meals.

"After Imad told me that he is a cook, I had the idea to having Hapag-Lloyd employees cook together with refugees" said Sakib Mehanovic, who takes care of the refugee-project of Hapag-Lloyd.

Since then, people have been preparing various dishes from their home regions together every other Wednesday under Iman's guidance. And that's how the idea emerged of having Imad do an apprenticeship at Hapag-Lloyd. "This traineeship has been my big chance to work on my future in Germany," Imad says. "It was tough for me at the beginning: a new country, a new culture, a new language. But I push myself to learn something new every day."

Imad was born in Aleppo. After training at a school of hotel management, he worked as a cook for more than 10 years at restaurants and hotels in Dubai. With the money he saved, he moved back to Aleppo and opened a restaurant with his wife. "Our entire life revolved around that little restaurant," Imad says. But then civil war broke out in Syria.

Coming to Germany was no coincidence. The crucial factor in Imad's decision to come here was his belief that Germany plays the role of "mother of Europe" and is therefore associated with being charitable and welcoming to outsiders. "We were taken in and accepted here rather than immediately turned away," Imad says.

His first encounters with Germans confirmed his positive impressions. When he and his family traveled to Germany and took a train from Munich to Hamburg, they were supported by a German family, which gave them provisions and help with planning the next stage of their journey. "At that point, I knew that now I had arrived and was in good hands," Imad recalls.

The 35-year-old cook has high expectations and hopes for his apprenticeship at Hapag-Lloyd – and many of them have been already fulfilled. As a member of the kitchen staff, he learns a lot about German food and proves his ability to work as part of the team. He says that the highlight of the experience is working together with fellow members of the kitchen staff. And he says Martin Pollex, the head of the company canteen, has turned out to be a good career role model for him. During his day-to-day work, Imad is able to contribute his own ideas. For example, recentlyhe has prepared specialties from his home, including tabbouleh and baba ghanoush, an appetizer made of roasted eggplants, and eggplant soup.

And one day he even slips in the role of the head cook and serves exclusively Middle Eastern dishes in the company canteen.

(Excerpted in part from and with thanks to Hapag-Lloyd Insight)

Volvo Penta's CTO

Johan Carlsson

extolling the virtues of

"Over-investing in customer dialogue"

BY GREG TRAUTHWEIN

Q&A

Maritime Reporter was recently afforded the opportunity to test drive Volvo Penta powered boats off the coast of Sweden & interview Johan Carlsson, CTO, Volvo Penta.

IN YOUR ROLE AS CTO YOU HAVE TO MELD AND RATIONALIZE REGULATION, CUSTOMER DEMANDS AND MANUFACTURING ISSUES: WHICH DO YOU FIND THE MOST CHALLENGING?

You get a lot of opportunities coming from technology and a lot of pressure coming from legislation, and a variety of customer demands (realizing that each customer and their situation is unique). In understanding our own manufacturing capabilities (and challenges), in understanding the specifics of regulation, and in understanding what are the actual customer requirements, it is the third one that is always the trickiest. So I tend to over-invest on the customer dialogue side to understand what they

actually need. Technology we can figure out; Legislation is written; but really understanding the customer's need is important.

CAN YOU GIVE AN EXAMPLE?

I can. The Offshore Wind Farm vessel (Njord Offshore) catamaran is a good example. (When we looked at the project) We had to ask what is really needed to run this vessel effectively (and safely) in a wind farm; you want a good TCO, you want good fuel consumption, but you also want a nice bollard push when you get up there to deploy people in a safe manner. You want to ensure that you have the appropriate technical solution, which you can only get if you really dig into the owner/operator's needs.

SO HOW DO YOU ENSURE THIS IS ACCOMPLISHED WITHIN YOUR ORGANIZATION?

I really like the way that we are organized in Volvo Penta. Within my responsibility as CTO I have the R&D department, I have purchasing and supply, but I also have product management, which is the glue that connects the customer into the specifications.

I WOULD ASSUME THAT BELONGING TO THE LARGER VOLVO GROUP WOULD OFFER SOME ADVANTAGES. CAN YOU DISCUSS HOW VOLVO PENTA BENEFITS FROM THIS ASSOCIATION..

There is one simple example. I am going this afternoon to a board meeting at a company called CPAC Systems, a company that we founded from Volvo Penta. It is a technology business that developed the EVC systems that stitches together all of the different systems, and they are very innovative in the on-road/truck side. CPAC Systems develops components which go into making customer solutions in all of the different sectors. It is run as a small entrepreneurial company, meaning it can easily touch the end customer, understand their demands, and pull this back to (develop) innovative technology. We get the volume by leveraging this in all of the different sectors across the Volvo Group, and we get additional ideas by cross-fertilizing those components.

BIG DATA: WHAT DOES IT MEAN TO YOU? PUT IN PERSPECTIVE THE USE OF DATA AND ANALYTICS THROUGHOUT THE LIFE-CYCLE OF YOUR PRODUCTS.

In one sense it is a defining trend. It is a platform that will help us meet customer demands even better. To better manage the cost; manage the up-time; manage the way the vessel is operated. That's one aspect. The other aspect is, in general as a society, there is a danger of throwing a new technology out there just because we can. For me, the maturity of (a given) technology may already be there, but the key is how to translate it into useful actions. That's where we are focusing.

(See related story on page 90)

Growing Up Metric

The story of World Wide Metric's steady growth and promising future.

Original Mission

what can be done today will be done today

World Wide Metric

***Words are powerful**, and "Growing up Metric," the title of the recently released book by George Contos, the energetic CEO and second-generation 'Contos' leader of World Wide Metric, is a fitting title. Contos recently sat with Maritime Reporter & Engineering News in his Branchburg, N.J. headquarters to discuss how his company has grown from roughly $3 million per year when he took over in 2000, to over $20 million per year today, with its course set for $50 million by 2026.*

By Greg Trauthwein


10E6

Voices

"Worldwide Metric is a worldwide distributor of pipes, valves and fittings, specializing in metric components," said George Contos, CEO. "We have bridged the gap between the East and the West when my dad brought metric here."

The company was founded by Constantinos Contos, a man who saw a need for metric-standard products and wanted to create a business he could pass along to his family. The WWM story is one of innovation and re-birth, of family ties and family values that extends far and beyond the Contos clan.

A Brief WWM History

Founded in 1970 as World Wide Ship Repair in Brooklyn, NY, today World Wide Metric (WWM) is a leader in the international distribution of valves, fittings, tubing and flanges serving the maritime, energy, industrial flow control and fluid power markets. As George Contos likes to repeat "WWM links the East and West" by consolidating the supply of products and technologies of the European, Far Eastern and American marine and industrial markets.

The creation of today's World Wide Metric is not unlike the creation of other businesses in other industries, the child of an entrepreneurial and innovative spirit. In this case, in 1970, former ship captain Constantinos Contos, who immigrated to the U.S. from Greece in 1969, founded the company. Soon after, he began receiving an abundance of requests for metric valves and flanges from foreign vessels, but despite the demand, metric replacement parts weren't easy to find in the U.S. World Wide Metric was born, as Constantinos Contos improvized and started to fulfill the need. At first he took an American valve, cut off its flanges, welded on a piece of plate, then drilled holes to match the existing pipeline, and put the valve back in service. Realizing this was not an optimal solution, he saw an opportunity to address the shortage of metric parts in the U.S.

Eventually Contos gave up the ship repair segment and moved the company from Brooklyn to New Jersey, focused solely on delivering an increasingly diverse array of metric products to the U.S. market. Today, the company that a father started has grown considerably under the tutelage of his three children, George, Theo and Anthee. To further expand the company's presence in the U.S. coastal regions, the company opened a fourth distribution center in Ft. Lauderdale, Florida in 2004, and by 2008, World Wide Metric was stocking more than 50,000 products and relocated their corporate headquarters to a larger office and warehouse in Branchburg, New Jersey. In October 2015, World Wide Metric opened its fifth distribution center in Livonia, Michigan to serve the Midwest and central Canadian markets. With operations now in five U.S. locations, the company plans to open additional distribution centers both nationally and internationally. When the second generation took command in 2000, it started a new era that would effectively grow annual sales from $3 million to more than $20 million, its number of employees from the low 20s to 58, with its number of individual products sold approaching 60,000.

A New Era

George Contos is CEO of World Wide Metric (WWM) since 2000, but just two years prior it appeared that his time with the company was done, as he left in 1998. "Dad and I didn't necessarily see eye-to-eye in terms of the business and how we felt things should be done. I was coming into my own, and my dad was in his prime of running the company … so we were butting heads more often than not and the family dynamic was difficult." After a two-year stint at Dale Carnegie, George was approached by his father and brother to return to WWM, and rejoined the company as its CEO at the age of 32.

The rest, as they say, is history. George Contos has a clear vision of WWM's future, and under his tutelage it has enjoyed steady growth over the past 16 years, in times good and bad. While there are many descriptors of the Contos business style, but perhaps 'slow and steady ahead' is most apt. Always ahead, carefully eyeing cash flow and eschewing debt along the way.

"Could we have grown faster" by accumulating debt?, Contos asks rhetorically. "No doubt. It was hard enough to keep up with the demands of growth, let alone make it happen faster than it naturally could or should. Too many mistakes happen when you try to go too fast."

Contos is first and foremost a people person, and from the start his company beefed up on outside sales and customer support in its effort to build revenue. "Yes, we are a distribution company selling metric products, but it is our people that do the selling. It is our people that are our culture. It is people who are our customers, our vendors, our families. People are everything in business," he said.

To Contos people and pace are important, as is focus. He has seen first-hand the perils of growing too fast in too many directions. "My dad always said, if a fox is hunting one rabbit, it will come home with one rabbit. If it is hunting two rabbits, it will come home with none."

"Choosing where to focus is the most important, and sometimes it's not about what you need to add, but what you need

The Product Line

Worldwide Metric can provide everything from a single product to a complete system.

"Worldwide Metric is a worldwide distributor of pipes, valves and fittings, specializing in metric components," said George Contos, CEO. "We have bridged the gap between the East and the West when my dad brought metric here." With more than 60,000 products and growing daily, WWM is situated to meet the need of its diverse client base, whether that's a single piece or a full array of components for a complete system solution. According to Contos, the key to his company's success is not simply pushing product, but working with clients to understand their true needs, and to supply the solution that best suits their need. For the full range of the WWM products, visit: www.worldwidemetric.com

Constantinos Contos children – Theo, Anthee and George – have effectively grown the business from $3 million in 2000 to more than $20 million today.

to subtract," said Contos. "Sometimes letting go of a certain marketplace is going to give you an opportunity to grow in another marketplace. So if one's not doing well … such as the offshore market over the past year … we can re-channel our attention to a part of the marketplace that is doing well."

While Contos and his father may have differed on business vision and method, the fingerprints of Constantinos are still strong on the company. "This was always a family business and family values," said Contos, in explaining the ways in which the company is different yet the same across its four and a half decades of operation. "It was a business created for people. It was a small, intimate company with 20 people. We are still very family orientated. From the very beginning, we have upheld the ideals that my father set forth when he started the company. He believed that 'serving the customer was the only thing that truly mattered, and that what can be done today, will be done today.' That is the philosophy that still drives us today."

New Markets to Conquer

While increasing headcount and sales department firepower were critical steps to expansion, Contos believed that expanding WWM's business beyond the confines of maritime were similarly important in helping to grow bottom line

Constantinos Contos

revenue and profitability. Today the WWM business is still predominantly marine and offshore industry based (70%), or as Contos defines the maritime sector 'anything that floats,' yet there is a critical and growing Fluid Process market and Industrial market that brings in the additional 30%, serving as a spring board to new opportunities. Ultimately Contos has broad visions for the company, a U.S. based company providing a global reach. In summarizing his vision of the company in 10 years time, he is focused: $50 million in revenues, 80 to 100 employees, six to eight distribution center in North America and another overseas, likely in Asia; and a broader range of product and global customer support. All the while, remaining focused on the company's primary mission and equally important, keeping the customer interaction simple and intuitive. "I think the biggest challenge to running an efficient and profitable business is running an efficient and profitable business! Our biggest challenge is as we continue to grow is to maintain that DNA core and family values principle," said Contos. "When you call our company, a human answers the phone. Fighting complacency and maintaining focus; eliminate waste to streamline and simplify the process. The idea of simplicity is not easy. Making things simple and easy for the customer, making it a 'user friendly' good experience is probably the hardest thing to do."

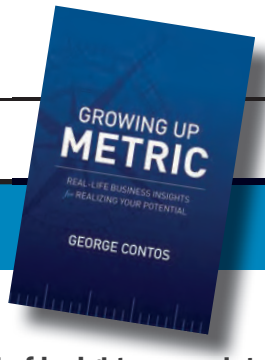
With the diversity of WWM, Contos is remiss to identify one market as more critical than the next. But when pressed he notes that the cruise shipping market is in the midst of a major boom that could have strong legs for decades, courtesy of a large population of Baby Boomers approaching retirement age with higher amounts of disposable income. Yet the cruise industry is unique from, say, a tanker owner, in its supply chain management. Traditional ship owners are accustomed to fleets of ships dispersed globally, but the concept of global fleet management is still somewhat new in the cruise sector as it has grown and diversified. This is a good opportunity for WWM to grow its international roots in tandem, as Contos simply summarizes: "Our job is to help facilitate our customer's growth."

George Contos, CEO, World Wide Metric, Inc.

George Contos is CEO of World Wide Metric (WWM), a dynamic leader with an infectious optimism in business and in life. He is an owner of the company along with his brother Theo and his sister Anthee, a second generation that took over the business in 2000 from his father, Contantinos, who is no longer involved in the company. George has been in the WWM business nearly his whole life, going on board ships with his dad and meeting captains as a kid, fondly remembering them as always asking him if he wanted a "Coca Cola."

In high school and college he worked part time, as a warehouse and sales assistant. In 1991 he moved to California to open WWM's new branch full time. George was Assistant Branch Manager for both the NJ and Texas offices and Branch Manager of the California office. He left the company briefly in 1998, and after a two-year stint at Dale Carnegie, George returned to WWM and has been CEO since the age of 32. Since taking over the business in 2000, George and his brother Theo have grown the business nearly 7x in terms of revenue and 58 employees today. WWM is entering a new phase of it's development – looking to drive significant growth and get to the next level. Their 10-year goal is $50m. In April of 2015, George began the project of writing his first book. This year long endeavor found its way to print and "Growing Up Metric" was released in June 2016.

The Book



Growing Up Metric by George Contos is a business guide chock full of insights, anecdotes and practical advice from a man who took over the family business at the age of 32, and in the span of 16 years grew it from $3 million per year to more than $20 million, with sites set on $50 million in the coming decade. I think anyone who works in a small to medium sized company – particularly a company with a family dynamic – will find that many of the examples given and points made ring true. Contos is somewhat of a visionary, and while he had the notion to write the book back in 2000, he realized that he simply didn't have the experience ... "I didn't have the stories" ... to provide the intended impact. Sixteen years later he delivers a solid guide to business and life, an effort that is focused on the birth and growth of World Wide Metrics and his lessons learned from the top. At the same time, it is far from self-centered, as Contos is quick to ladle out references – personally, professionally and published works – that have helped guide him along the way. – G. Trauthwein

Growing Up Metric by George Contos is available on Amazon for $14.99

Q&A

Nick Brown

Marine & Offshore Director, Lloyd's Register

Nick Brown, Lloyd's Register's director of marine and offshore operations, shares with Maritime Reporter & Engineering News insights on the speed and direction of technology change in the sector.

INTERVIEW BY GREG TRAUTHWEIN

(Photo: Lloyd's Register)

This is Nick Brown

Nick Brown joined Lloyd's Register in 1996. He worked as a ship surveyor in Bahrain, Dubai, Finland and Germany and has extensive experience of ship repair and conversion projects. In 2004 he returned to London to work on the development of LR's award winning "Hull Integrity" service - launched at Posidonia in 2006.

During 2005 Nick led LR's global tanker business at a time when IACS' Common Structural Rules (CSR) for Tankers were being finalized. Following the adoption of the CSRs in 2006, he moved to China, initially in a business development role as the shipbuilding market took off and new ship owners entered the industry. Subsequently, he was promoted to Area General Manager and Marine Manager for Greater China.

In October 2013, after seven years leading LR's activities in China, Nick was appointed Director for Business Development and Innovation - based at LR's Global Technology Center (GTC) in Southampton. In July 2014, with LR's Marine business continuing to grow, he was appointed Marine Chief Operating Officer. In January 2016 he was appointed Marine Director, responsible for LR's entire marine and energy compliance businesses.

Nick's focus is on leading LR to meet the technical and commercial challenges facing the marine industry, providing the support, services and innovation needed to meet ever increasing safety, environmental and efficiency goals.

He is a graduate of Nottingham University, a Chartered Mechanical Engineer and a Member of the Institute of Mechanical Engineers and the Institute of Marine Engineering, Science and Technology.

MANY SECTORS IN THE GLOBAL MARITIME MARKET ARE CHALLENGED TODAY, TO PUT IT MILDLY. HOW, SPECIFICALLY, DO THESE MARKET CYCLES IMPACT LR?

The collapse in dry cargo freight rates, the collapse in the price of oil and in demand for offshore assets, weakness in the containership markets and other sectors has, as we well know, reduced demand for new ships and floating assets. The forward orderbook in the large Asian yards has declined dramatically – especially in Korea. These related market factors affect us considerably but cyclicality is in the nature of the shipping business and we are adjusting accordingly – moving to help our clients deal with their current cost and production challenges and managing our cost base. This down-cycle is proving particularly deep – and broad – and many are struggling to see the light at the end of the tunnel. As well, I think, the evolution of information technology and technical capabilities may change society and economic life in a manner that could profoundly change shipping. This cyclical downturn is an important opportunity for us to be as ready as we can for what's coming next.

OIL … THE INESCAPABLE CONVERSATION! HOW HAS THE LINGERING LOW PRICE FOR OIL TANGIBLY IMPACTED LR?

It has affected our energy business quite considerably and the impact on some of our shipbuilding clients who moved heavily into offshore has been dramatic. Projects have been stopped and put on hold – and we are all suffering in this respect. I don't want to try and predict the future for oil prices but I do feel that the emphasis is now on gas for

future fossil fuel production and marketing and we are well placed to support all across the gas value chain in developing this cleaner fuel source. And at the same time we have been diversifying our markets and our capabilities, so the opportunities that we see for clean energy beyond fossil fuels are creating work for us. We expect this to grow. And, for example, in the U.S. we expect to see the shale gas story to keep evolving and supporting expanded gas shipments out of U.S. ports – as the class leader in gas ship classification we are playing a large role in supporting clean energy exports from North America, in addition to our business areas supporting the upstream energy sectors.

WHILE MUCH TALK REVOLVES AROUND MARKET GLOOM, IN SCANNING THE WORLD MARKET TODAY, BY VESSEL NICHE OR GEOGRAPHIC REGION, WHERE DO YOU SEE POCKETS OF OPPORTUNITY AND GROWTH?

Well, I don't want to give too much away! But we are trying to play to our strengths. Growth in demand for high tech ships like cruise ships, survey vessels and also demand from navies for classification services, as well as large yachts, are all areas of growth for us. We are the class market leaders in LNG ships and passenger ships and, in general, are strong in areas where risk is greatest – due to the nature of cargoes like gas and people, and the greater value and technology development of gas ships and cruise ships requires higher levels of technical capability and assurance.

We also see the United States as a big opportunity – a market where we can continue to provide support for all ship

owners, operators and facilities, like ports expanding into LNG related activities. But, of course, we will be looking to build on our gas ship and passenger ship leadership. Traditionally, Canada has been a very important area for us. That will continue but we hope to continue expanding in the United States as well as in Central and South America. We have reorganized our management to support the Americas and we are now even better placed to provide the support that the market needs.

THE ROLE OF CLASS CONTINUES TO EVOLVE. AS SHIPOWNERS FACE MYRIAD CHALLENGES, FROM VESSEL EMISSIONS TO CYBER SECURITY. FROM YOUR SEAT, WHAT ARE THE TOP TWO OR THREE 'BURNING ISSUES,' AND HOW IS CLASS EVOLVING TO MEET NEW DEMANDS?

The 'burning platforms' are efficiency and the environment – helping harness technology for a more efficient and cleaner industry. We have had to respond to regulation but now we need to try and get out in front of the regulators and be proactive in shaping the future of shipping. Our role is to help clients and stakeholders make the best commercial decisions based on the best technical insight – and then support them through the newbuilding and operational lifecycle. It's all about how we use technology to maintain or enhance safety levels while driving down cost and increasing performance. Safer operations are a long term cost saving. That technology is rapidly changing our lives is a truism – it's obvious but that doesn't make decision making any easier. We can't predict the future – no one can – but we can help clients make the best decisions and help them sleep more soundly at night, because we have their backs. And a major evolution for class is that where, once, we were focused on protecting ships from the environment we now have to, and want to, help do more to support environmental protection. Safety of shipping is still critical but we need to find ways to reduce shipping's environmental impact. The use of gas for ship propulsion, new fuels, hybrid technology and energy efficiency measures are all important areas of work and we are very active and in these areas, leading the way for a cleaner, higher performing industry.

Projects like our gas turbine initiatives with GE Marine and shipyards to provide new pathways for proven technology are good examples of how we can work with technology providers to create safe, efficient solutions.

WE FIND OURSELVES TALKING MORE ABOUT "THE FUTURE OF CLASS." FROM YOUR PERSPECTIVE, WHAT ARE THE TWO OR THREE TECHNOLOGIES OR CAPABILITIES THAT WILL HAVE THE MOST DRAMATIC IMPACT ON THE WAY IN WHICH CLASS CONDUCTS ITS BUSINESS IN THE COMING DECADE. PLEASE BE SPECIFIC.

We have been doing a lot of work on the future for shipping. For example our Global Marine Trends 2030 series of reports detailing our strategic research has provided our stakeholders with insight into the future for maritime trade, future fuel trends. Most recently, Global Marine Technology Trends 2030 looked at a broad range of technologies that will drive change in shipping. But if I have to pick three then it is cyber, or, digital, sensors and automation. They are all connected. But the world will get safer and operations will be more efficient and costs managed more effectively, only if there is a capable, independent organization to provide the necessary levels of risk assurance. That's our role – we are here to help the world move from where we are to where we all want to be. We can see how drones can change how we work and that's an area where we are heavily involved having issued guidance and conducting trials.

BIG DATA & AUTONOMOUS SHIPS: FOR OUR READERS CAN YOU PLEASE PROVIDE SHAPE AND SCOPE TO THE LR POSITION ON UNMANNED SHIPS. TO PUT IT FRANKLY, IN YOUR OPINION WILL WE SEE, IN THE COMING GENERATION, UNMANNED SHIPS SAILING THE HIGH SEAS?

We think we will see various levels of automation – dependent on type of asset, type of operation and operating environment. Again, our job is to provide the confidence and assurance that automation can be safe and effective.

OVERALL, HOW IS LR INVESTING FOR ITS FUTURE?

We are investing everything in our future while making sure we can handle the challenges of today, supporting clients with their daily survey requirements, for example. Concrete examples of the investments we have made include our Global Technology Centres (GTCs) in Southampton and Singapore as well as our Applied Technology Group in Halifax, Canada. This approach has redefined the role and scope of class and we see that our competitors are now following us. Our approach provides the right environment and access to academic and research capability that is needed. We have found ourselves the class market leaders in hybrid technology and we achieved that position through a combination of clear direction, our experienced technology leaders, investment in new talent and – importantly – working with the chemistry expertise at the University of Southampton across the campus from our new GTC.

This investment in technology and capability will carry on as we continue to make sense of the future for the marine and offshore sectors, and the requirement to cyber enable assets and operations, etc.

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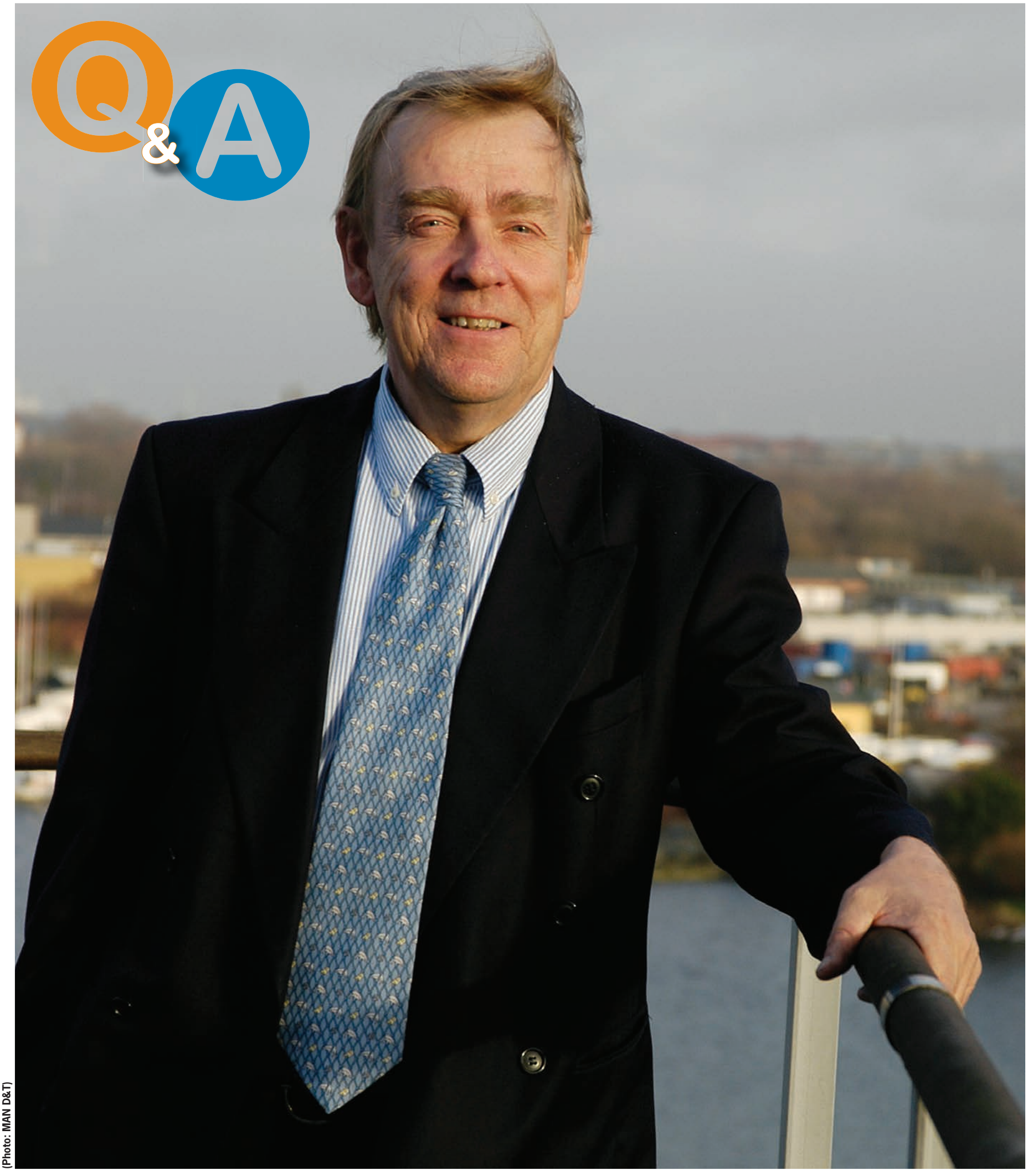


(Photo: MAN D&T)

Congratulations

"Mr. Diesel"

Ole Grøne, a ubiquitous figure at MAN D&T, turned 70 years old on the April 26 and celebrated his 40th year jubilee with MAN D&T on May 1, 2016.

Ole Grøne, studied Chemical Engineering at the Technical University of Denmark and joined the Burmeister & Wain Company in 1976. From being a Manager of the Marine Installation Department he made his way through different stations at MAN D&T up to his today's position of being the Senior Vice President of Two Stroke Engine Sales and Promotion.
The name "Mr. Diesel" first began to be used in connection with Ole Grøne a number of years ago by journalists and shipowners and has since become a common nickname for him. Thus, it is not a name MAN Diesel&Turbo has given him but, rather, one earned from industry. Peter Pospiech had the chance to catch up with Mr. Diesel after the celebrations.

WHERE DO YOU FIND THE MOTIVATION FOR YOUR WORK?

Customer relations are important for me. Communicating our technology while at the same time listening to the customer requirements in support of their business is motivating in a creative house as ours.

WHICH LIFE EXPERIENCE HAS HAD THE GREATEST INFLUENCE FOR THE WORK WHAT YOU ARE DOING NOW?

I cannot point to any single experience, but as long as I can remember, I have always felt a drive to see and work worldwide. What I do now and have done for years is a perfect match to that.

WHAT DO YOU CONSIDER AS YOUR GREATEST ACHIEVEMENT?

Two things stand out: One was the start of understanding environmental affairs in the form of the need for control of NOx, SOx and CO2 in our house and these technologies for such would be the main development drivers. The early development of marine SCR systems on two stroke engines was the start.

The other one, and on the same token, was the energy saving coming from the shift from steam engines to diesel engines, latest in LNG carriers and even as dual fuel ME-GI engines in ocean shipping.

WHICH PERSONALITY WOULD YOU LIKE TO MEET ONE DAY?

There are so many interesting personalities in the world with whom I feel to share interests, so I will refrain from pointing to a single individual.

WHICH OCCURRENCE/INCIDENT HAD PARTICULARLY IMPRESSED YOU MOST?

It has been the growing size of ships and the development of flying, including the space programs. On the political side it was the events leading to the unification of Germany.

WHICH BUSINESS IDEA/CONCEPT WOULD YOU LIKE TO REALIZE (IF YOU WOULD HAVE ACCESS TO AN UNLIMITED BUDGET)?

Within our field of business it will be a developing a combustion process that maintain or even increase the high diesel efficiency with much reduced NOx emission.

WHERE DO YOU SEE THE GREATEST CHALLENGES FOR YOUR INDUSTRY?

Now, as already for some time the greatest challenges – and opportunities – are in developing emission control systems that both are affordable, economical to use and as reliable as the engines.

Q&A

i-Tech's Philip Chaabane

Keeping Ship Hulls Clean One Barnacle at a Time

(Photo: i-Tech)

Voices

PLEASE PROVIDE A BRIEF PERSONAL/PROFESSIONAL BACKGROUND, WITH INSIGHT ON HOW YOU'VE COME TO OCCUPY THE CEO SEAT AT I-TECH.

I have a Swedish and French MSc in Engineering and have spent some six years in the aerospace industry working for Volvo Aero (today GKN) with jet engine components within product development as well as production and supply chain in general. Robust long term business plans and rigid big corporate structures were in 2009 shifted to a start-up company in the fuel cell industry (Powercell AB) with very few bits and pieces in place for the thrill of exploring new territory. Among a lot of other duties, I practiced the customer development process which really caught my interest. This was the basis also for joining I-Tech who was searching for this kind of skills to take the next steps in commercializing the project. In addition, I had had no exposure to the shipping or coating industry before and was exited to, besides the aviation and trucking industry, get a chance to learn this truly global industry. When the owners decided to refocus from regulatory research focus to market and industrial focus I got the chance to assume the position as CEO in late 2013. Since then we have been fortunate to develop the heritage into strong commercial growth and we now spend most of our time around sales and supply chain matters.

FOR OUR READERS NOT FAMILIAR WITH I-TECH, PLEASE PROVIDE THE "50,000 FT." OVERVIEW OF YOUR COMPANY AND ITS OFFERING TO THE MARITIME MARKET.

I-Tech is a bio-tech company relying on unique discoveries within the combined domains of pharmacology, marine-biology and chemistry. The result is a patent solution to a problem mankind has tried to solve in all kind of ways since seaborne trade started, namely a robust and sustainable prevention of barnacle settlement on marine structures and vessel hulls. Although sharp improvements have been made within the industry, the way I-Tech addresses the problem generates ways to rethink the traditional concepts of antifoulings using high enough loadings to create a lethal level (towards marine organisms) of concentration at the surface.

I-Techs product Selektope does it differently. It uses not more material than what is absolutely necessary to create a repellant mode of action and it is highly specific minimizing potential effects on other organisms.

SELEKTOPE: SELF-DESCRIBED AS A 'BREAKTHROUGH' IN MARINE ANTI-FOULING TECHNOLOGY. PLEASE BRIEFLY DESCRIBE WHAT EXACTLY SELEKTOPE IS.

Selektope is an organic compound designed for use as an antifouling agent against barnacles. It is compatible with the major antifouling coating systems and has earned regulatory approvals on all key markets for ship repairs and new building. Incorporated in paints, Selektope delivers unrivalled performance towards animal fouling including enhanced static performance. It is flexible enough to allow for many different combinations with alternative substances and it is powerful enough to fully replace cuprous oxide. Both types of formulations are on the market already. Taking full use of Selektope, it significantly reduces the biocidal loadings in paints reducing the emissions to sea. To find suitable compounds to combat marine biofouling is a huge challenge, even more so to find a compound with a suitable efficacy spectra as well as a regulatory and technical compatibility. This is why only three compounds are available to the global industry and why Selektope is a breakthrough technology as it is the first ever relying on a repellant mode of action.

INTERESTING INDEED. HOW, SPECIFICALLY, DOES IT WORK?

Selektope is designed to stimulate the octopamine receptor of barnacles triggering a swimming behavior forcing them to leave the surface. By having Selektope available at the surface of a coating any barnacle larvae will be unable to settle at that surface due to the kicking behavior. The effect is reversible and the larvae regains its normal properties. This pharmacological mode of action is effective at nano-molar concentrations (meaning around 300 times lower than traditional technology).

AS IT IS AN INGREDIENT IN MARINE COATINGS, WE'RE ASSUMING THAT YOU ARE WORKING DIRECT WITH COATINGS MANUFACTURERS TO HAVE THIS ELEMENT ADDED. SPECIFICALLY UPDATE OUR READERS ON WHERE THEY CAN FIND SELEKTOPE TODAY?

Selektope is offered to all coating manufacturers and several are well progressed in their development and final verification work. In the forefront is Chugoku Marine Paints (CMP) who has three products on market (two regionally in Japan (Sea Premier Plus-series), one aiming for the Korean newbuilding market (Sea-FloNeo S Premium). There is also a beta-version of a very promising antifouling product (Premium AF-S) from CMP for the global ocean going (dry docking and newbuilding) market being tested on full scale. We are facing very interesting years ahead of us although we hoped things would move a lot quicker in this industry.

HAVE YOU RUN INTO RESISTANCE? IF SO, CAN YOU CLASSIFY THE REASONS A COMPANY MAY NOT WANT TO ADD SELEKTOPE TO THEIR PRODUCT ...AND DISCUSS HOW YOUR TEAM HAS WORKED TO OVERCOME THESE OBJECTIONS?

A high priority for us is to work as close as possible with the various development teams to quickly understand the eventual issues and support the efforts in overcoming these matters. They are different for each customer but one example is the handling procedures in

the factory environment where we have several solutions available to assure all HSE aspects are met and exceeded. Like some other compounds in the industry, the handling has to be carefully controlled and thanks to the very small quantities (a few kg per 1,000 liter of paint) the handling matter can be addressed in unique ways.

ULTIMATELY, WHAT ARE THE BENEFITS OF HAVING SELEKTOPE FOR THE COATINGS MANUFACTURERS?

- It gives more power to meet the increasing fouling pressure (more trade in high risk fouling waters, more unpredictable trade with longer idling periods as a result and regulatory demands on limiting risks for transporting aquatic invasive species).
- It leaves room for differentiation as various types of formulation combinations are available.
- It reduces foot print to the marine environment as it reduces the biocidal loadings considerably.

AND WHAT ARE THE ADVANTAGES TO THE SHIPOWNER?

- It can improve the static performance making coatings more flexible and better adapted to the operational pre-requisites and consequently saves a great deal of fuel and reduced need for scrubbing.
- It allows for overall high performing coating systems with sharply reduced levels of active ingredients
- It contributes to reduce the risk of transporting aquatic species which is under great pressure among leading countries and IMO.

WHEN WE HAVE THIS INTERVIEW AGAIN IN FIVE YEARS, WHAT DO YOU BELIEVE YOUR COMPANY WILL LOOK LIKE?

I am fully convinced that Selektope in five years is part of a number of very well appreciated antifouling products frequently used by also the most demanding owners. As a company, I hope we have been able to manage a large industrial ramp up with our partners yet remaining very close to our customers and to the industries various stake holders. For the bottom line, I do hope we achieve a strong financial position enabling a well-deserved return on investment to all those who have supported us financially.

Ship & Boatbuilding 2016

Worlwide, 2016 has been a difficult year for shipbuilding, to say the least. Continued stagnation in the energy sector for the past 24 months has effectively moth-balled what was once a vibrant driver for growth and expansion. But in business as in life the axiom "What doesn't kill you makes you stronger" is apt, as the maritime sector is no stranger to severe and prolonged cycles. Cost cutting and efficient asset management are the drivers today, and when the world economy inevitably kicks into high gear again, those that were most astute during the tough times will stand to prosper. Here we look at some of the more interesting shipbuilders and shipbuilding projects of the year to date.

MR Staff

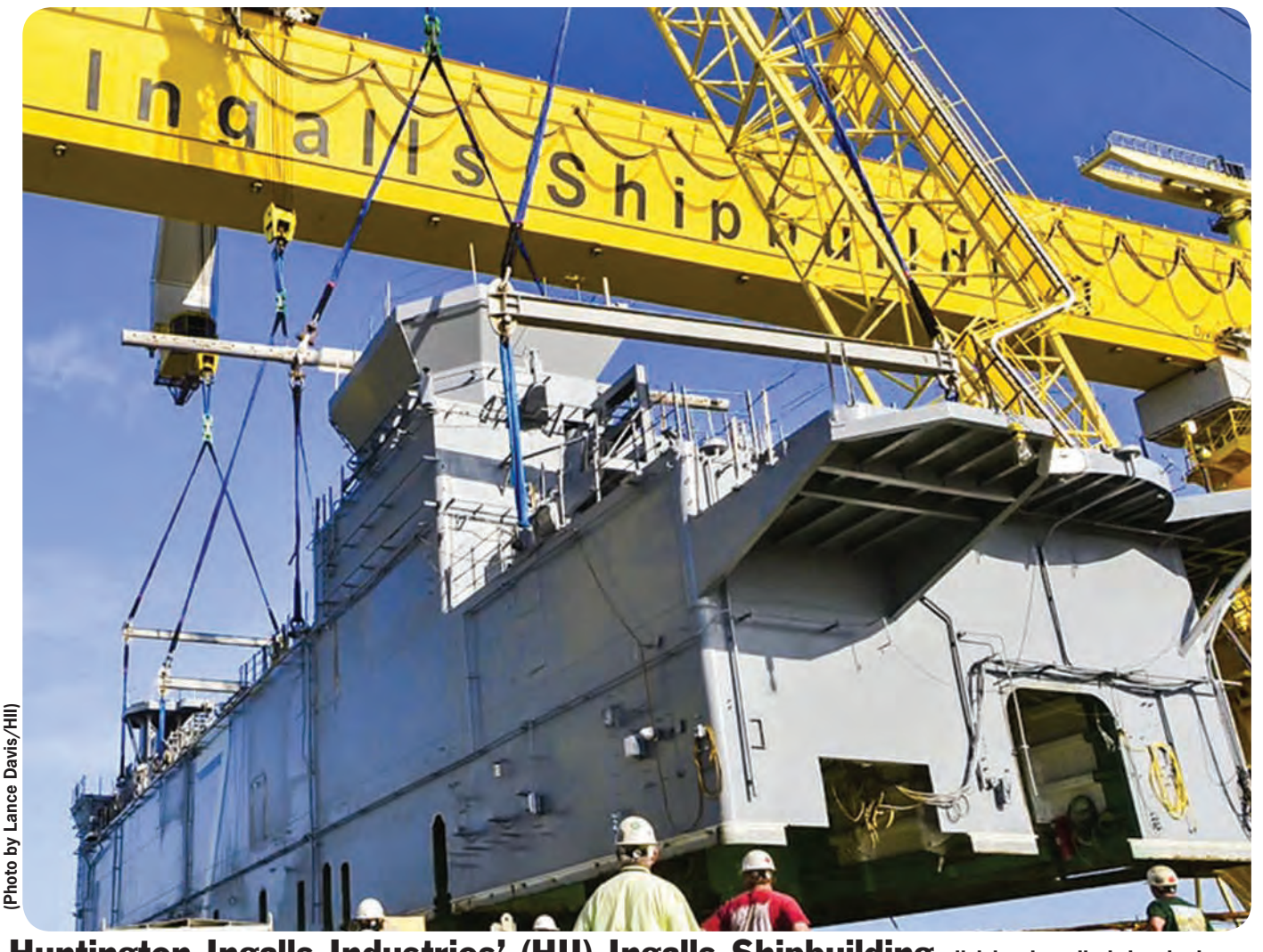
San Diego-based **General Dynamics NASSCO** is a relative rarity in U.S. shipbuilding, as it is a shipyard that has historically been adept at building commercial and navy ships simultaneously and efficiently. A visit to NASSCO in its Southern California home and the first thing realized is space is a premium, and there is not an inch of the yard that can go to waste. To that end, the NASSCO team has invested regularly in both the physical facilities and logistics management of modern shipbuilding to maximize its asset. Those investment are clearly evident by events such as the recent delivery of the newly built ECO Class tanker Garden State for American Petroleum Tankers, the seventh ship delivery in the span of just over a year.

"In the past year, NASSCO shipbuilders have delivered seven ships – or the equivalent to 100,000 tons worth of steel," said Kevin Graney, vice president and general manager for General Dynamics NASSCO. "Among the seven vessels delivered, three have been lead ships: the world's first containership powered by liquefied natural gas, the U.S. Navy's first Expeditionary Sea Base and the nation's most fuel efficient product tanker. We are proud of the diverse design and build portfolio we have delivered during the course of this year."

Within the year, NASSCO has delivered the world's first two containerships to be powered by liquefied natural gas. The 764-foot-long ships—the Isla Bella and the Perla del Caribe—currently service the Puerto Rican-Jacksonville trade route and are considered to be the cleanest cargo-carrying ships anywhere in the world.

NASSCO also delivered four ECO Class product tankers within the same time period—three for American Petroleum Tankers and one for a partnership between SEA-Vista LLC and SEACOR Holdings, Inc. The new "ECO" design allows for 33 percent increased fuel efficiency with a 330,000 barrel cargo capacity. NASSCO currently has under construction four remaining tankers under contract between the two companies.

In June of last year, NASSCO delivered the U.S. Navy's first Expeditionary Sea Base (ESB) as part of the original Mobile Landing Platform program. The USNS Lewis B. Puller was built with a 52,000 square-foot flight deck, stowage and accommodations spaces for up to 250 personnel. The ship was also designed to support MH-53 and MH-60 helicopters. NASSCO is currently constructing the second ESB and is under contract to build a third. NASSCO also maintains a bicoastal ship maintenance and repair operation with locations serving San Diego; Mayport, Fla.; Norfolk,



(Photo by Lance Davis/HII)

Huntington Ingalls Industries' (HII) Ingalls Shipbuilding division installed the deckhouse on the amphibious assault ship Tripoli (LHA 7), a major event in the ship's construction schedule which begins the integration of the three largest sections of the ship. "The deckhouse is comprised of five deck levels and includes radio and radar spaces, the primary flight control station, and the pilot house," said Premo Sabbatini, LHA 7 program director. "The estimated lift weight for the deckhouse is 701 short tons and required three cranes to complete this task."

DAMEN

FACING THE FUTURE TOGETHER

SUCCESS IS BUILT ON CONTINUOUS CONSULTATION AND INNOVATION. WE APPLY THESE PRINCIPLES TO DELIVER THE VESSELS AND SOLUTIONS THAT OUR CLIENTS NEED.

Va.; and Bremerton, Wash.

Canadian naval architects Robert Allan Ltd. is a ubiquitous name in vessel design, and a unique boat has recently been built at Tuzla, Turkey-based **Sanmar.** More so, the boat symbolizes the increasing importance of closer linking custom design to production, as the VectRA 3000 design was developed exclusively for Sanmar, and it contains many innovative ideas from both the builder and designer aimed at developing a cost-effective VSP tug for the world market. Sanmar's first VSP (Voith Schneider Propeller) tug, of the new VectRA 3000 series, named Arie A has been built for Italian operator Tripmare Spa of Trieste. The vessel has been delivered by a Redwise crew to Ashdod Port, located some 40 km south of Tel Aviv where it will operate.

Sanmar's brief to RAL was to create a VSP tug which was under 500 GRT and which would incorporate high-speed engines, a clutch between thruster and engine, electronic controls and be fully MLC 2006 compliant for all crew accommodation. The challenges therefore focused on the machinery design and the overall layout.

In particular, the 30.25m tug boasts a unique propulsion arrangement. Driving the forward located Voith type 32-R5 250 cycloid propellers are a pair of Caterpillar 3516C high speed diesels, each developing 2525kW at 1,800rpm. Instead of the traditional Voith Turbo coupling, the engines are connected to the Voith propulsion through a pair of Reintjes model WAF 843 clutch and reduction gearboxes. This reduces transmission losses, increasing overall propulsion efficiency, and enabling the drives to be de-clutched at idle, significantly reducing fuel burn. Using high-speed engines also significantly reduces the space occupied by drive machinery and of course results in much lower weight, allowing a finer more efficient hull form for the same deadweight.

In addition, Arie A has Crew Habitability on Workboats (HAB(WB)) notation from ABS, all noise, sound, vibration and lighting are appropriate for classification requirements, such as less than 60 db(A) sound level and 5 mm/s vibration level in all cabins at 12 knot cruise speed, with using special high-tech insulation materials on deck and bulkheads and special resilient mounts and elastic couplings for propulsor and paneling installation.

Morgan City, La.-based **Conrad Industries** is another U.S. yard with an innovative spirit, pioneering initiatives in the LNG sector, for one. Most recently however it delievered the ferry M/V Woods Hole to serve Woods Hole, Martha's Vineyard and Nantucket. The Elliott Bay Design Group (EBDG) designed ferry is the naval architects' second design for The Steamship Authority. M/V Woods Hole is a 235-ft. single-ended ferry with a bow thruster and a service speed of 14.5 knots. The vessel is designed to be primarily a "super freight boat" that, when not carrying a full freight load, also serves as a passenger and car ferry carrying up to 384 passengers and 55 cars. The boat is capable of carrying 1 million pounds of tractor trailer freight within hard constraints of maximum draft, length and beam.

Operating environment requirements drove many of the design features. Shallow water turbulence and bottom scouring is a factor for several of the ports, so this vessel incorporates controllable pitch propellers to minimize propeller wake wash when accelerating. High lift rudders and a directionally vectorable bow thruster enable tight maneuvering, and the vessel can turn in its own length. Noise mitigation was also given high priority, and it is noticeably quieter both on board and on shore.

Veecraft Marine in Cape Town, South Africa recently built and delivered a pair of 35-m offshore security patrol vessels – M/V Hezekiah and M/V Lady Dora – two 35-meter offshore security patrol vessels, for an undisclosed client in Lagos, Nigeria. The vessels are slated to provide surveillance, intervention and protection to offshore assets of the Nigerian AGIP Exploration (NAE) located in the Gulf of Guinea, and are also suited to provide replenishment of crews, fuel, and potable water to the NAE offshore facilities.

Propulsive power for the vessels is supplied by three Caterpillar C32 ACERT engines, each producing 1,450 hp at 2,300 rpm, driving Teinbridge fixed pitch propellers through ZF 3050 gearboxes. The vessels have a service speed of 25 knots. Electrical power is provided by two Caterpillar C4.4 generators and maneuverability is enhanced by a Hydro Armor Type 800 bow thruster.

Nakilat - Keppel Offshore & Marine Ltd. (N-KOM) in Qatar has invested in the upgraded of its facilities in 2015 with a brand new VLCC-size floating dock with a capacity of 120,000 tons and measuring 405 m x 66 m, which is a strong addition to the existing two VLCC-size graving docks. With the floating dock coming into one year in operation, N-KOM is now capable to carry out three dockings simultaneously in the shipyard, offering greater flexibility in scheduling dockings.

In February 2016, N-KOM delivered its first liftboat unit Al Safliya, to Qatari rig operator Gulf Drilling International (GDI). Al Safliya is the first liftboat to be wholly constructed in Qatar at the Erhama Bin Jaber Al Jalahma shipyard. The self-propelled and elevating unit has been customized for operations in the Middle East and North Africa (MENA) region in water depths of up to 65m. The liftboat is equipped with four tubular legs, a unique 200 ton leg encircling crane and a 50 ton pedestal crane, a large open deck space of around 800 sq. m., a helideck, and accommodation capacity for 130 persons. It can undertake a wide range of services such as well servicing, commissioning, maintenance and decommissioning of offshore platforms. The liftboat is also equipped with a specially designed gangway bridge to be used for emergency and other safety purposes.

N-KOM was recently awarded the repairs of two chemical tankers from Odfjell Management. Both Odfjell chemical tankers, Bow Flora and Bow Lind, underwent drydocking repairs such as propeller blade renewal, steel renewal in the cargo and ballast tanks, hydroblasting of water ballast tanks, rudder bulb installation, modification of the vessel's 9 ton chain locker. Additional jobs were carried out on Bow Lind that includes Grit blasting and application of

NASSCO: The Garden State on Sea Trials

(Photo: General Dynamics NASSCO)

three coats of phenolic epoxy in four-cargo tanks with area of approximately 5,000 sq. m.

N-KOM has recently fabricated and delivered offshore modular structures such as jackets and piles for a major construction project – Forward Mount Base (FMB) – for clients Qatargas and Technip. The jackets will be installed to support the drilling operations off Qatar waters.

While many shipyards have struggled, N-KOM has experienced a marked increase in the tanker repair business. Several crude oil tankers recently repaired at N-KOM. One of our major clients Dynacom Tankers had awarded the shipyard 10 vessel repairs in 2015 and has sent another three vessels this year. Recently drydocked in the yard is the 97,743 dwt crude oil tanker Morning Glory and the 296,812 dwt crude oil tanker Polymnia I. Other notable work included the second BWMS installation in 2015, for a Nakilat Q-Max LNG carrier. And tw0 noteworthy business development included:

- an MoU signed between N-KOM and Goltens early this year. These ser-

N-KOM: **Al Safliya is the first liftboat to be constructed in Qatar at the Erhama Bin Jaber Al Jalahma shipyard.**

(Photo: N-KOM

Damen in the USA

Fast Start in Houston

Damen Shipbuilding Group established a permanent presence in Houston, as of August 1, headed by Jan van Hogerwou and Ruud Haneveer. This is part of Damen's policy of expanding its local footprint globally. The first order to be handled by the new entity is for four new Damen 3711 Stan Tugs by Young Brothers, Limited, of Hawaii. The 37-m, 6,000 hp tugs will be built at Conrad Shipyard, Louisiana, under a license and materials agreement with Damen. The first vessel will be delivered in Q1 2018 and the last 12 months later. "Opening a permanent Damen presence in North America is a significant milestone for the group," said van Hogerwou.

"With over 200 Damen design vessels built and delivered in the U.S., this has been an important market for our vessels for many years via our flexible licensing agreements, and we have enjoyed excellent cooperation with shipyards across the country. This latest initiative will enable us to strengthen our relationships further with both builders and operators."

(Photo: Damen)

(L to R): Jan van Hogerwou, Sales Manager, Damen Shipyards Gorinchem; with Gary B. Lipely, Director of Marketing & Sales, Conrad Shipyards, USA

vices include overhauls and repairs of main engines, turbochargers, fuel equipment, engine controls as well as the supply of associated spare parts. Goltens has now joined N-KOM's growing list of subcontractors along with Wartsila, MAN Diesel & Turbo, Wilhelmsen, Turbo Technik and Cargotec, just to name a few.

• N-KOM entered in fleet agreement with the Angelicoussis Shipping Group of companies for the repairs and drydocking of all vessels managed by Maran Gas Maritime, Maran Tankers Management and Anangel Maritime Services.

Chinese shipyard **GSI (Guangzhou Shipbuilding International)** delivered the newly built MR tanker Stena Imagination to 50-50 joint owners Stena Bulk and Indonesian Golden Agri Resources (GAR). The 50,000-ton, 183 x 32 m ship will be operated by Stena Weco and sail in the company's global logistics system, which currently employs about 60 vessels. Stena Imagination is the seventh of 13 IMOIIMAX tankers ordered by Stena Bulk. Previous deliveries include the Stena Impression, Stena Image, Stena Imperial and Stena Important in 2015, as well as the Stena Imperative and Stenaweco Impulse earlier this year.

The IMOIIMAX design is a development of an already established concept, developed by Stena Teknik together with the shipyard GSI. It offers extra large cargo flexibility, a high level of safety and low fuel consumption – 10-20 percent lower than that of equivalent vessels when sailing at service speed.

Another Chinese Shipyard, **Houshan IMC-Yougyue Shipyard & Engineering Co., Ltd.,** has risen ranks quickly and is finding success where other shipyards in its home country are not.

Houshan IMC-Yougyue Shipyard & Engineering's success starts with its physical facilities, which includes two graving docks (300,000 dwt, 350 x 65 x 13.6 m; and 100,000 dwt, 251 x 39 x 11.8m) and two sizable wharfs, one measuring 524.5m long with a 12-m depth, the second 250m long with a 12-m depth.

IMC-YY started drydocking repairs on January 18, 2006, and it is located at the Mazhi island Zhoushan Zhejiang, meaning it is situated in a very convenient marine convenient traffic region. The regional location and the favorable port condition are ideal for drydocking and shiprepair works, and in the last decade the shipyard has achieved considerable experiences for all kinds of merchant ships repairs including tankers, RoRos/PCTC/PCC, containerships and bulk carriers, with the shipyard eying the lucrative and expanding cruise ship repair market in the near future.

Equipped with a full range of equipment and facilities, highly skilled staff, and the completed repair quality control system, IMC-YY is one of the leading shipyards in China.

As with other yards in the ship repair sector, IMC-YY counts its people as its number one asset, and the shipyard has set up its own management system based on the international standard, with efficient staff, technicians and workers. But IMC-YY is also keen to promote technology oriented methods to ensure that sets the standard as a green shipyard. As an example, with increasing awareness of environment protection as well as more strict legislation against environment pollution, IMC-YY and Hubert Palfinger Technologies, has reached an agreement to establish a joint venture company in Zhoushan to develop and provide advanced equipment for ship repair and offshore industry. Other cooperative efforts, for example with top makers of UHP water jetting blasting equipment and technology companies in the world, shows how IMC-YY is exploring and adopting various hi-tech, environmental friendly solutions for the ship owners.

BREDO - the Bremerhavener Dock GmbH, is a shipyard for repair and conversion located on the German North Sea coast. Around the clock, more than 100 BREDO experts and up to 400 employees of BREDO's partners work at the four floating docks and at the repair berths. The company also employs and deploys a specialist teams which is designed tocarry out repair work around the world. The tightly organized project management, the compact yard layout and the network of specialists and partner companies help to make BREDO one of the fastest repair shipyards in Northern Europe, that coupled with the fact that it has its own steel and engine work shops, a 150-t floating crane and own oil-tank cleaning facility.

BREDO's facilities and assets include: 100 employees (10-15 apprentices); a floating crane "SK 1" with 150 t lifting capacity, and four docks to the following capacity: Dock 4 – 12,000 t lifting capacity; Dock 3– 7,500 t lifting capacity; Dock 1 – 4,000 t lifting capacity; and Dock 2 – 1,000 t lifting capacity.

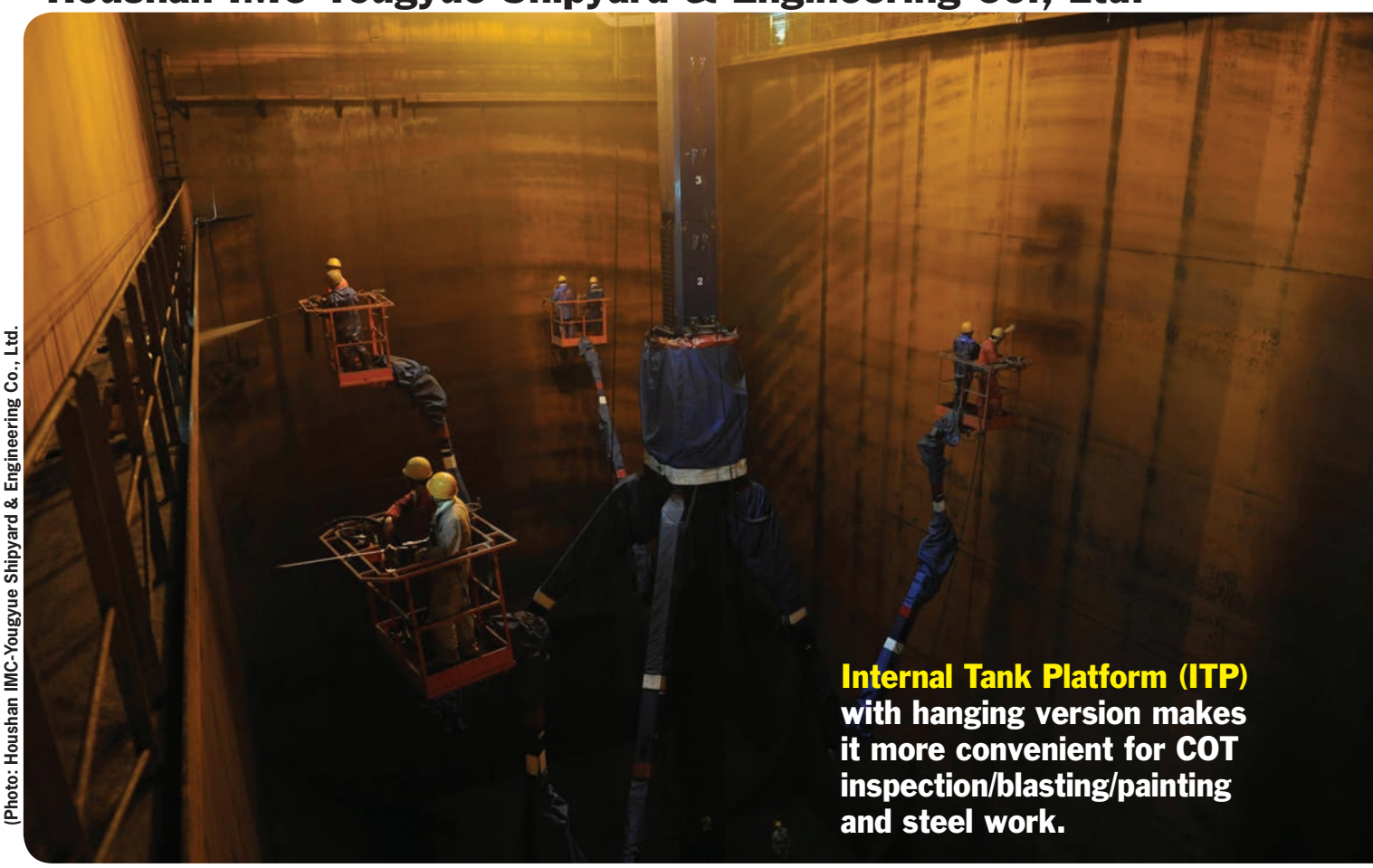
Kooiman Marine Group views investment in its facilities and people central to maintaining its customer base, and with that, despite the current market situation, the Kooiman Marine Group recently obtained a 40 x 23.5 x 7.95m drydock which will be operating at Ship-

yard Kooiman Hoebee. This in addition its newly built slipway which was completed in 2012.

In May 2016, Kooiman handed over the multi purpose DP-2 support vessel "Zwerver II" to HvS Dredging Support BV. According to Kooiman a number of important creative solutions have been developed and implemented, enabling the Zwerver II to serve the top of the market sector. For example, the ship is equipped with DP II, 4-point mooring, a 510 Tm crane with an Active Heave Compensated winch and a conventional crane of 370 Tm. Further, a passive heave compensated gangway will be installed.

In the repairs and conversion business, Kooiman Marine Group is active too. Eiltank Schiffart GmbH & Co KG recently placed the order for the repair of inland waterway tanker Julius Rütgers with Shipyard Gebr. Kooiman B.V. Zwijndrecht. This tanker was seriously damaged after an explosion of some cargo tanks. The midship area is heavily deformed (pictured above) with the ship's deck in the area of these tanks

Houshan IMC-Yougyue Shipyard & Engineering Co., Ltd.



(Photo: Houshan IMC-Yougyue Shipyard & Engineering Co., Ltd.

Internal Tank Platform (ITP) with hanging version makes it more convenient for COT inspection/blasting/painting and steel work.

Kooiman Marine Group

(Photo: Kooiman Marine Group)

Conrad Industries

(Photo: Brian King)

completely ruptured and the deck of adjacent tanks distorted. On the slipway of Shipyard Gebr. Kooiman B.V., the vessel will be cut into pieces and the damaged midship area will be replaced by a new midship section of ca. 24m designed by the in-house design office and built at Kooiman's. Also the cargo pipe systems on the main deck and the electrical installation will be renewed by Kooiman as required.Looking at new construction, Kooiman said it is successfully widening its portfolio of types of vessels and related products.

As such Kooiman developed a range of dedicated deck equipment and other items for the marine market. Currently for inland water way vessels, Kooiman supplies coupling and anchor winches, deck equipment, bow rudders, pile guides and spud poles. For the offshore industry, Kooiman Delta pins, Omega pins and Delta pins were developed suitable for various bollard pulls. In addition Kooiman is working on other orders, both in the field of new building and conversion, of which it is not yet allowed to reveal related details.

According to Jos Blom - Director Business Development, the past 12 months the market has been low, with heavy competition and only few new building tenders, and realistically he does not expected that this situation soon will pick up again soon. To that end, in parallel with the ongoing search for newbuilding projects, marketing of dedicated Kooiman equipment and major conversions like the installation of LNG systems and ballast water treatment installations as well as other works on existing ships, will be a major focus.

While the **Fincantieri** name is perhaps most closely associated with construction of some of the most luxurious cruise ships in the world, a keel laying ceremony was recently held at **Fincantieri's shipyard in Riva Trigoso (Sestri**

Metal Shark & Horizon

NYC Ferries to Be Built in the South

The contract to build a fleet of ferries for New York City has been awarded to a pair of shipyards in the Gulf of Mexico area, Metal Shark and Horizon.

Metal Shark was selected by HNY Ferry Fleet, LLC (a Hornblower company), operator of New York City's Citywide Ferry Service, to build 26-m149-passenger aluminum high-speed ferries. Metal Shark will produce a series of ferries at its Franklin, Louisiana shipyard, a 25-acre waterfront facility which recently received a Small Shipyard Grant from the United States Department of Transportation's Maritime Administration (MARAD) to expand its facilities and shipbuilding capabilities.

Horizon Shipbuilding, Inc., Bayou La Batre, Ala., was also awarded a series production contract with Hornblower to build new 149-passenger ferries for New York City's new citywide ferry service set to begin in Summer 2017.

Horizon, which has expanded its facilities and production capabilities in recent years, will build the ferries using an assembly-line type roll-out with the first boat ready for delivery in the first quarter of 2017. The use of Horizon's GORDHEAD management software allows the shipyard and its clients to remain closely connected throughout the vessel building process and was a key reason why Hornblower selected Horizon. "When we were looking for shipyards, we wanted to work with builders that had the same can-do attitude and innovative approach to business that we have," said Cameron Clark, Vice President and General Manager for Hornblower. "Being able to stay connected with the project 24/7 to resolve issues quickly was critical for us. We were impressed with the transparency of Horizon and their software, and we are confident in their ability to delivery a world class ferry product for our future NYC customers." The ferries produced by Metal Shark & Horizon will use an Incat Crowther USCG Subchapter T design that delivers a 25-knot operating speed while reducing environmental impact by incorporating low emission engines and low wake technology. The first new vessel is expected to be delivered in the first quarter of 2017.

www.citywideferry.nyc

BREDO

(Photo: BREDO)

Sanmar

(Photo: Sanmar)

Levante, Genoa) for a Logistic Support Ship (LSS), significant as construction work continues on the first unit of the Italian Navy's fleet renewal plan, which has been commissioned to Fincantieri. The vessel will be delivered in 2019.

The LSS is a vessel that provides logistics support to the fleet, endowed with hospital and healthcare capabilities thanks to the presence of a fully equipped hospital, complete with operating rooms, radiology and analysis rooms, a dentist's office and hospital rooms capable of hosting up to 12 seriously injured patients.

The ship is capable of combining capacity to transport and transfer to other transport vessels used for liquids (diesel fuel, jet fuel, fresh water) and solids (emergency spare parts, food and ammunitions) and to perform at sea repairs. At this time defense systems are limited to the capacity of command and control in tactical scenarios, communications and dissuasive, non-lethal defense systems.

The vessel is also geared toward embarking more complex defense systems and becoming an intelligence and electronic war platform. It will measure 165m long and be capable of speeds of 20 knots.

Two hundred berths are available for crew and specialists (including inpatients), four replenishment station abeam and one astern. It can supply drinking water and electricity to land.

A Shipyard Grows in Trinidad & Tobago

Spurred by Panama Canal Expansion and U.S. LNG Export, $500 Million Shipyard Projects Starts

As Trinidad and Tobago seeks to diversify its economy, it is banking on a massive shipyard construction project as the centerpiece of a maritime industry and economic revival. A Trinidad and Tobago Parliamentary debate earlier this year centered on the Motion, 'Increase of Loan Ceiling under The Development Loans Act.' One diversification strategy involves the country's thrust into the development and expansion of the maritime sectors, particularly Shipbuilding and Repair.

By Wilfred de Gannes, edited by MR/EN

The Trinidad and Tobago Shipbuilding and Repair Cluster has long held the view that government financial investment is central to a country's successful economic diversification, as was clearly stated in its 'Vision' Booklet, first published by Cluster Stakeholders, when the now Prime Minister was heading the Ministry of Trade & Industry in 2008.

The Trinidad and Tobago Shipbuilding and Repair Cluster Stakeholders were pleased to hear the Minister of Finance that the motion tabled will assist the current government administration to honor contractual agreements already entered, as one of these agreements was the Design, Build and Finance of a $500 million shipyard development project at La Brea, South Western Trinidad which had been proposed by the Shipbuilding and Repair Development Company of Trinidad and Tobago Limited (SRDC), the commercial entity of the Cluster, since September 2010.

This large-scale industrial project, which has already been endorsed by both community residents and environmental activists alike, will permit the country additional opportunities to dry dock large Panamax oceangoing ships, in a graving dock. This included the creation of a number of alongside repair berths to handle up to Aframax sized tanker ships (80,000-120,000 DWT) a tanker class which frequents the southernmost regions, including the Caribbean Sea and are mainly utilized in the ocean transportation of crude oil between refineries, located in both The Bolivarian Republic of Venezuela and the U.S.

The Bolivarian Republic of Venezuela cannot be ignored, as it not only has one of the larger, more established maritime Universities in the region, La Universidad Nacional Experimental Marítima del Caribe (UMC), it also has a large fleet of Aframax tankers for crude oil exports. In 2014 The Bolivarian Republic of Venezuela was also the fourth largest supplier of imported crude oil to the United States, behind Canada, Saudi Arabia and Mexico, according to the United States Energy Information Administration (EIA). In December 2015, the SRDC with the assistance of its Stakeholders facilitated an inward visit by a Maritime Graduate from the UMC. This was the first visitor from The Bolivarian Republic of Venezuela and has also followed similarly inward sponsored visits by maritime related personnel from the United Kingdom in 2009 and the People's Republic of China in 2012.

With the construction and commencement of Shipyard operations at the new La Brea Shipyard site, expected to be completed in 2018 by China Harbor Engineering Company Limited (CHEC) and project financing arranged by the Trinidad and Tobago government and the Export-Import Bank of China, this also represents a tremendous opportunity for Trinidad and Tobago to earn large amounts of foreign exchange. In fact, the SRDC has envisaged that this Shipyard may have to operate 24 hours-a-day, seven days a week, similar to the Republic of Singapore, undertaking both scheduled and emergency repairs of oceangoing ships, much in the same manner in which it has become a global maritime leader from its smaller island mass. The Republic of Singapore is calculated to be one-fifth the size of Trinidad and Tobago and where a ship movement (arrivals and departures) occurs at a rate of one ship every three minutes, approximately.

This industrial-scale shipyard operation at La Brea (not to be confused with the smaller-sized marinas in Chaguaramas, North-West Trinidad) will also demand a huge labor force, both unskilled labor and skilled technicians, from various nationalities.

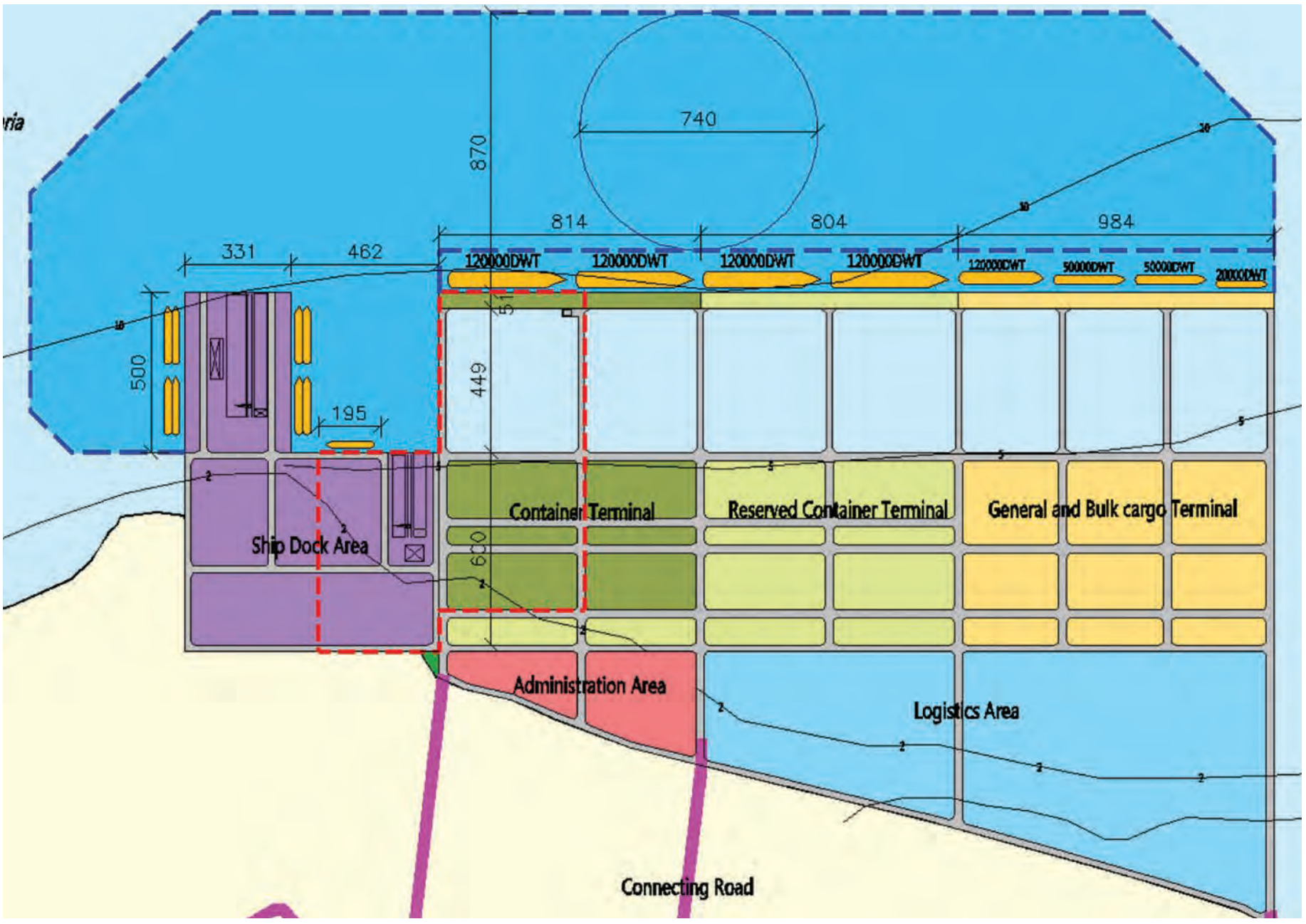
Shipbuilding and repair is a globally competitive business undertaking, which requires astute management and a dedicated labor force. With this in mind, the La Brea Shipyard intends to operate using similar labor practices found in many established Shipyards in North America, Europe and in the Middle East, where job opportunities are first advertised locally. Unfilled positions will then be advertised internationally. The Bolivarian Republic of Venezuela can possibly be one closely managed source for qualified employees, many of whom have gained decades of experience from their petroleum industry, bearing in mind, the close geographical position to Trinidad and their large population of 33 million inhabitants.

The announcement of the shipyard and the economic diversification of Trinidad is considered timely given the recent lifting of the 40-year crude oil ban by the U.S. Congress, together with the commissioning of the Cheniere Energy Sabine Pass Liquefied Natural Gas (LNG) Terminal, strategically located on the Gulf Coast of the U.S.

A recent study undertaken by the United States Government Accountability Office (GAO) and the prediction made by the Department of Energy (DOE) points to the fact that in the next few years, the U.S. is expected to change from a net importer of natural gas to a net exporter, with the completion of five large-scale United States liquefaction facilities – necessary for the conversion of natural gas to LNG. This change will require at least 100 new LNG carrier ships, once the five LNG liquefaction facilities are fully operational by their projected start-up date of 2020.

The La Brea Shipyard project can directly benefit from an increase in ship repairs required by these additional LNG carriers, moving their cargoes from the Gulf Coast, including Sabine Pass and Corpus Christi, Texas through the expanded Panama Canal en-route to Asian markets, such as Japan, Taiwan and the People's Republic of China. It is anticipated that the commissioning of the third lock in Panama in May 2016, will make LNG ship voyages to Asia, some 8,600 km shorter and will be able to accommodate 92% of the world's LNG fleet or some 538 LNG carriers.

Like the well-established Grand Bahama Shipyard counterpart, specialized shipyard investments will also have to be made in the establishment of clean room workshops and suitably trained staff, to adequately overhaul the many specialized cargo pumps and cargo valves found on these LNG carriers. The La



Brea Shipyard, set to be completed in 2018 is also in close proximity to the well-established Atlantic LNG four-train liquefaction plant, which recently celebrated its 3,000th cargo shipment from its Port Fortin Terminal, since its very first shipment to Boston in 1999, by the 125,000 cu. m. LNG carrier Matthew. The Atlantic LNG processing facilities are also set to process additional natural gas from the giant 10.25 trillion cu. ft. Loran-Manatee field, which lies along the Venezuelan and Trinidad and Tobago maritime borders.

With the expansion of the Panama Canal now a reality, and the anticipated hemispheric increase of LNG exports from the U.S. and Point Fortin, Trinidad, both requiring additional LNG shipping capacity, the shipbuilding and repair sector looks promising, and is poised to be the premier diversification strategy for Trinidad and Tobago, away from the energy sector.

1st Meeting on Maritime Sector Development

Ready to set strategic targets to ensure the development and growth of the Maritime Sector, the first meeting of the Standing Committee for the development of the Maritime Sector was held on Wednesday June 22, 2016 at the Ministry of Trade and Industry. The Committee, which will report to Cabinet every three months, has been established to direct the development and implementation of initiatives for the expansion of the maritime sector under the chairmanship of the Honourable Franklin Khan, Minister of Rural Development and Local Government.

Addressing the members of the committee at the first meeting, Minister Khan said. “If Maritime is one of the key sectors to manage the country’s budget deficit then we must start bringing projects on stream to have the impact that we want. We must begin to think about a post energy Trinidad and Tobago. The revenue stream from the energy sector can no longer support our country’s current trend of $50 and $60 billion budgetary expenditure plans. Our debt to GDP ratio still allows latitude for borrowing. However there is need for industries that can pick up the slack.”

The Author

Wilfred de Gannes is Chairman & CEO, Shipbuilding & Repair Development Company of Trinidad and Tobago Limited (SRDC).

Astican & Astander

Pair of privately owned Spanish yards continue to invest in facilities and equipment

Astander and Astican are the two busiest privately owned shipyards in Spain carrying out heavy repairs and special conversion projects with a boutique style attitude towards customers. As part of Lavinia Group, which runs a fleet of more than 70 vessels, the shipyard understand the owner´s needs.

Astander, in the port of Santander, has more than 140 years' presence in the international market and has continually modernized and updatd its facilities.

The latest investment program at Astander includes civil construction works to widen the largest dry dock at the yard in order to dry dock panamax vessels, widening as well the target market of the yard. However, this will not be complete until the middle of 2017, as the yard balances a busy workload.

There have been many recent significant projects completed at Astander, according to Germán C. Suárez, CEO Astander & Astican Shipyards, including:

- French Passenger/RoRo ferries were serviced during 2015 and 2016, with the main scope of working being the installation of scrubbers to reduce SOx emissions to European standards. In total it was five projects on five different vessels and included two different scrubber types, a project which involved complex engineering tailor-made for each vessel to make everything fit in the tight available spaces. Pipes had to be rerouted and additional pipe lines layed, as well as the creation of new pump rooms, installing the scrubbers (up to seven in each of the first three vessels), structural modifications, new insulation, new electrical and control systems and new funnel casings.

Together with the scrubber's fitting, extensive maintenance jobs were carried out simultaneously, including accommodation upgrades, overhauling of all main and auxiliary engines and other 'usual' work.

- Another 'special' project for this current year was the renewal of one propulsion electric motor and two economizers on a 36,876 dwt chemical tanker. The solution minimized the completion time and reduced significantly the idle time of the vessel compared with other shipyards.

The Astican Shipyard in Las Palmas carries out the most specialized and specific repairs projects in West Africa thanks to our the company's high end project management in-house, which allow it to manage a team more than 1,000 skilled workers. To increase the services at its Canary Islands location, it invested efforts in Las Palmas in an additional deep water repair berth (21m draft) including logistics and technical services assistance building in a new exclusively leased land extension accounting for 10,000 sq. m. Moreover, it also has a 6,000 sq. m. Free Trade Zone land extension for assistance in terms of logistics and customs arrangements to key OEMs for ship owners. The company has in Port of Las Palmas more than 180,000 sq. m. of shipyard facilities besides a joint office with Rolls Royce Marine in Port of Tenerife, which is already opened. Dredgers, tankers, supply ships, ferries, cruises, fishing vessels, LNG, rigs or cable layers are part of our portfolio of vessels that the yard typically assist from ship owners, The yard combines excellent location; well-equipped facilities and an exceptional lifting platform dry-docking system; as well as more than 900 linear meters of deep water repair berth.

(Photo: Astander & Astican Shipyards)

Astican is not just a steel, blasting and painting yard, but a yard capable and used to handling the most complex and challenging projects. Prime examples of these include several heavy offshore projects carried out in recent years, as well as ship owners looking to improve environment protective measures on their ships. It recently finished a project covering manufacturing and installations of a spill recovery system equipment on a tanker which consisted of two new cranes, a complete hydraulic system including an electric power pack, FO heating system renewal and HFO recovery equipment: two boom reels, a skimmer, two barriers, a dispersant tank and two dispersant arms with sprinklers and pumps on a Spanish owner´s ship.

Last (but certainly not least), the passenger and cruise vessels market remains top priority to Astander and Astican, as it has a list of repeat customers. This year, companies like Cruise Management International, Silversea Cruises, Fred Olsen Express, Naviera Armas or Britanny Ferries have brought part of their fleet in for service.

French Passenger/RoRo ferries were serviced during 2015 and 2016, with the main scope of working being the installation of scrubbers to reduce SOx emissions to European standards.

(Photo: Astander & Astican Shipyards)

The German Fleet

Courtesy Hapag Lloyd

Background to the German Fleet

Germany shipping is probably best-known for the Kommanditgesellschaft (KG) scheme of financing ships. The KG scheme was originally passed into German finance law as a method of raising equity for the replacement of capital equipment for "mom & pop" business, but this scheme was soon adapted as a way of raising equity for containerships. These vessels were chartered-out by German owners to international liner operators, and for decades the KG scheme provided steady yields for investors, and relatively cheap finance for German ship owners. However, since the start of the financial crisis of 2007 / 2008 onwards, demand for containerships has fallen sharply, just as a new wave of tonnage entered the fleet. As a result, German shipping is undergoing a significant restructuring of its fleet and business.

Container charter rates have fallen below the 10-year median (**see figure 1**), and without a steady stream of income the KG schemes have failed. The German banks that financed the vessels are under pressure from domestic regulators, to carry out a program of distress assets sales. This is having a severe impact on the fleet of German-owned containership fleet (**see Figure 4, Scrapping**).

Current Fleet

The current German fleet of all types of vessels stands at 3,116 vessels with a total carrying capacity of 121m dwt. The value of the current fleet is just over $40 billion. Not surprisingly, given the historical emphasis on ordering and operating containerships, this sector dominates German-owned shipping in terms of numbers (**see Figure 2**). However, the poor state of the shipping markets, especially in the containerships sectors, is putting a brake on newbuilding orders, and now the age profile of the German-owned fleet is adjusting. As **Figure 3** shows, the bulk of the fleet sits within the five to nine-years old age range. As might be expected, the poor state of the shipping market has reduced demand for newbuildings. If this situation continues for next few years, the German fleet will age, and may start to balance fleet supply with actual demand.

Scrapping

The aforementioned distress sales are also thinning out the German-owned fleet from the older age ranges, as many of these have been sold for scrapping. At a time that the average scrap price for German-owned containerships has dropped from $285/ldt (light deadweight ton – the price paid for the estimated recoverable steel in a ship) in 2014, to $210/ldt in 2016, the number of containerships being scrapped is actually increasing. As **Figure 4** shows, the number of German-owned containerships sold for scrap reached 46 vessels so far in 2016. Furthermore, the average age of the containerships being sold for scrap has dropped to just 18 years old, whereas, before the financial crisis, the generally recognized working life of a containership was 25 years (a figure determined from the VesselsValue database).

But German owners are being radical, and younger containerships are being sold for scrap. So far in 2016, 18 Post-Panamax containerships have been sold for scrap. In some cases, the vessels were only 14-years old. The latest sale for scrapping is the 2001-built, 5,576-TEU Chicago Bridge, which was sold to ship breakers in China in June 2016 for $283/ldt. As with other Post-Panamax containerships, this vessel has out-lived its usefulness since the expanded locks on the Panama Canal were opened in June 2016. The new Panamax containerships have a capacity of around 14,400-TEU (VV range for new Panamax containerships is 10,000-TEU to 13,399-TEU), and these are displacing the older Post Panamax vessels, that no longer have the economies of scale to compete. There are still 46 German-owned Post-Panamax containerships in the fleet, that were built between 2000 and 2004, that could be regarded as candidates for scrapping.

The Impact on German Shipping Companies

The fall in demand for containerships is having a rolling impact throughout the liner industry. From the German point-of-view, this is most visible through the merger of iconic German company, Hapag-Lloyd, with United Arab Shipping Company (UASC). This merger has now received approval from both boards of directors. The companies will operate as separate entities until March 2017, at which point the merger will take be consummated. Hapag-Lloyd is to hold 72% of the new entity, with UASC holding the remainder. This is the second merger for Hapag-Lloyd in two years, and is seen as part of the general consolidation that is taking place in the liner industry. As a combined fleet, the new group will have a fleet of 114 containerships with a capacity of just under one million TEU. The combined group has a further seven vessels on order. The total combined Hapag-Lloyd/UASC group current value, according to VesselsValue, is $6.6 billin.

Figure 1

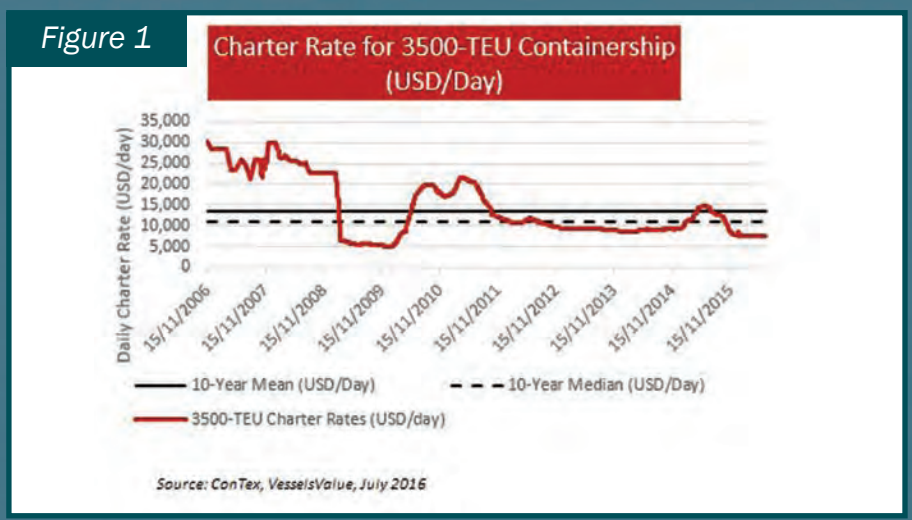


Figure 2

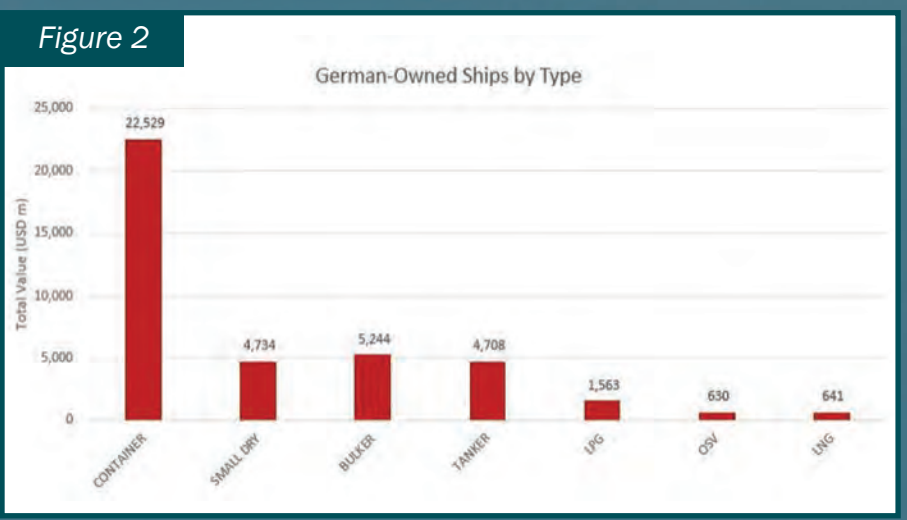


Figure 3

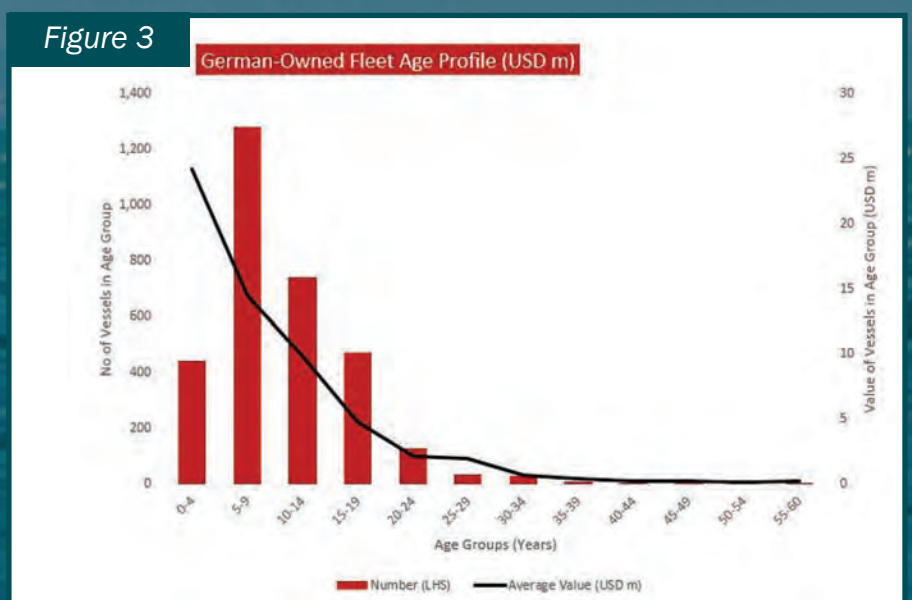


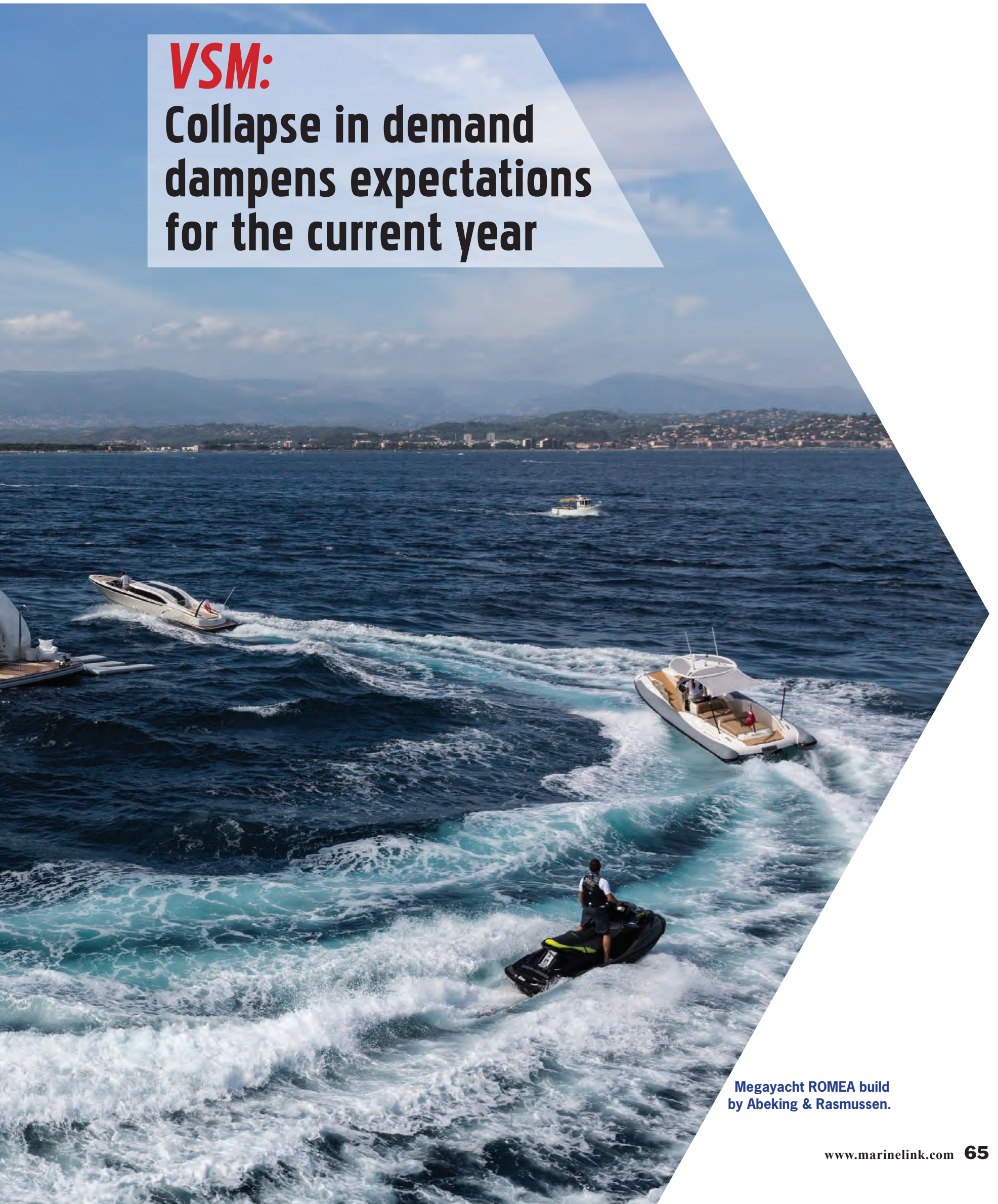
Figure 4

German Shipbuilders:

Strong in a Weak World Market

BY PETER POSPIECH

VSM:
Collapse in demand dampens expectations for the current year



Megayacht ROMEA build by Abeking & Rasmussen.

The global shipbuilding industry continued its downturn in 2015 with the number of new orders halved compared to 2013 level. The year 2016 is shaping up to be even worse.

The "Big Three" shipbuilding nations China, Korea and Japan are major customers to the world leading maritime equipment and system producers from Germany. The fact that the domestic supply chain has been generating more than half of its sales within Europe will come in as an important stabilizing factor to weather the current storm: according to Clarksons Research, more than $7 billion worth of orders for newbuilding projects went to Europe this year, a world market share of 63 percent. Furthermore, the current low ordering activity in Asian comprises mainly shipowners with fixed employment for their newbuilding projects. These customers tend to pay more attention to quality equipment, which is why the success rate of German equipment makers has significantly increased for the few remaining projects.

Nevertheless, the total demand in numbers remains low and causes major challenges also in the German maritime community.

German shipyards bucked the global trend by nearly doubling their order intake reaching nearly €5 billion in 2015 compared to 2013. A similar order of magnitude was recorded also for 2016 to date.

"This great success of the maritime sector of the German industry has its origins in our customers' exceptionally high expectations. The high degree of complexity of the products manufactured here requires large numbers of highly specialised experts. Hundreds of companies, all of them extremely reliable, must be coordinated perfectly to work towards a common goal and jointly ensure the success of the given project. These kinds of structures have grown in Germany over decades and cannot easily be replicated in other countries," said VSM President Harald Fassmer, CEO of the shipyard Fassmer Werft GmbH, describing the situation during the press conference held on occasion of the annual VSM General assembly meeting.

"But there is no time to be complacent. We must relentlessly continue in our efforts to further improve products and processes. We have to seize every opportunity to jointly safeguard Germany as a stronghold of the maritime industry. It is therefore essential that we all come together as one industry and one community," said Fassmer in a compelling appeal.

Even if the German shipyards, based on their specialization, are not afraid of the competition – a concerned look went to Asia: "China will build vessels for their own required cruise market within the next five years", stated VSM-Chief Fassmer, "Until then they will not be better than German shipyards."

Inspired by the same vision, VSM has launched and is driving new initiatives, including, in particular the German Maritime Export Initiative (GeMaX) as well as efforts to fos-ter innovation by establishing a new Maritime Research Coordination Center (Deutsches Maritimes Zentrum, DMZ).

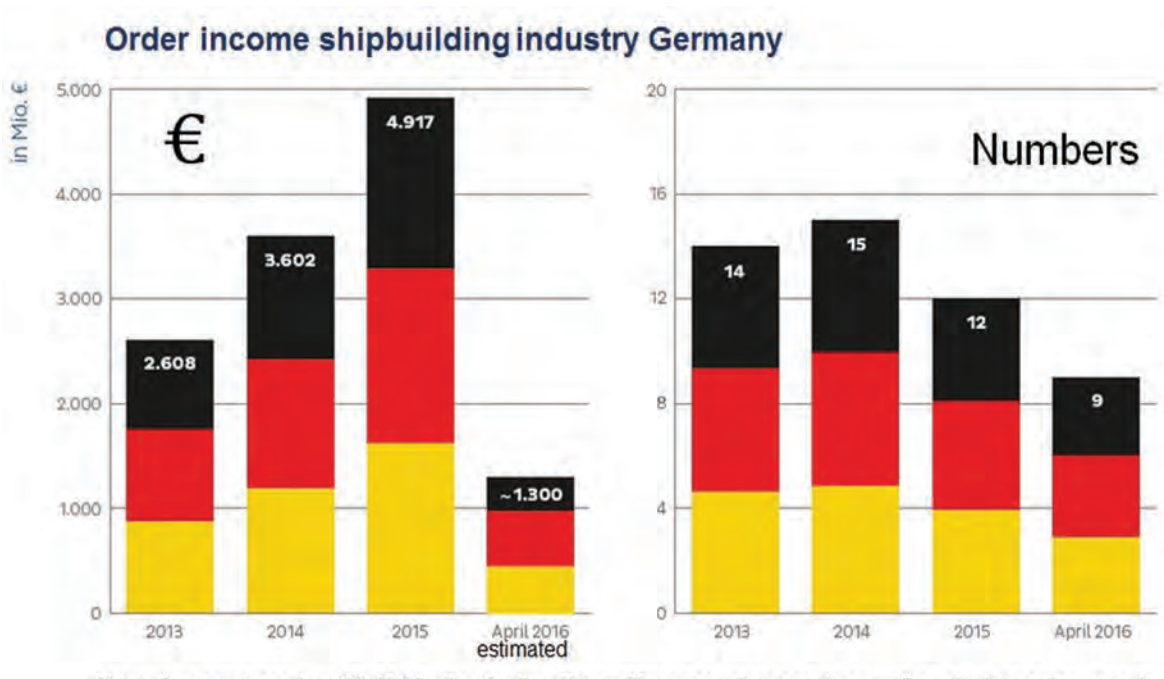
"These activities demonstrate that the industry is doing its homework," adds VSM General Manager Reinhard Lüken, "but we also need back up by policy makers. The idea of launching a maritime agenda for Germany is therefore a great opportunity."

Policy initiatives include efforts to foster LNG as maritime fuel, an active trade policy to improve market access and fight against market distortions as well as support for the naval defense industry base.

The German Shipbuilding Industry

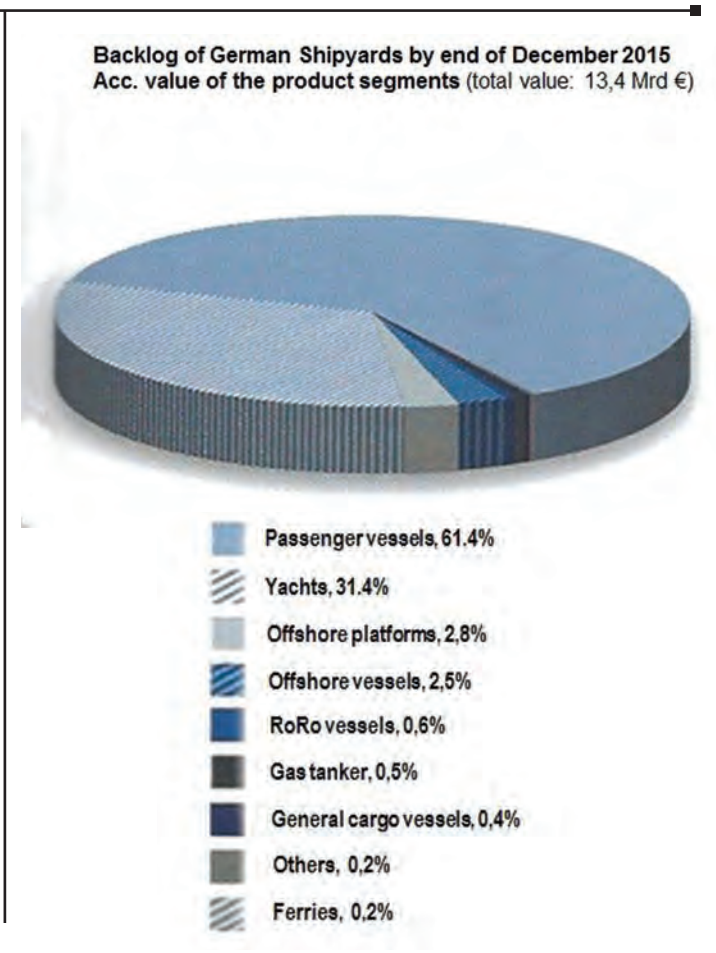
Based upon the concentration of the German shipyards in innovative and promising markets – such as the passenger vessel and yacht shipbuilding – the order situation in 2015 was relatively good. Around 100 percent of the order income, deliveries and backlog with seagoing vessels have been dedicated to export, and many shipyards have built a comfortable order cushion for the coming years. But between the different companies are significant differences.

Twelve newbuilds were ordered in German shipyards in 2015 – with half



The orders announced on 10. Mai by the Genting Goup of four seagoing vessels as well as six river cruise vessels with a total volume of around 3,5 Mrd EURO are not included in these figures

Source: Clarkson / Research
VSM



High-tech rescue vessel BERINGOV PROLIV built by Nordic Yards intended for use in the arctic.

"The great success of the maritime sector of the German industry has its origins in our customers' exceptionally high expectations."

Harald Fassmer, VSM President

"The German activities demonstrate that the industry is doing its homework,but we also need back-up by policy makers. The idea of launching a maritime agenda for Germany is therefore a great opportunity."

Dr. Reinhard Lüken, General Manager VSM

of it generated in the last quarter alone – valued at approximately $5.4 billion. Incoming orders with regard to tonnage increased 25% compared to 2014 to 750,000 CGT (Compensated Gross Tonnage), but the number of deliveries (16 vessels) was lower than in 2014. The tonnage (435,000 CGT) was also lower than one year before, but higher than the total tonnage in 2013. The value of the deliveries in 2015 was in total around $2.5 billion – also somewhat lower than in 2014. In addition, three platforms for the offshore wind industry, valued at $330 million, have been delivered.

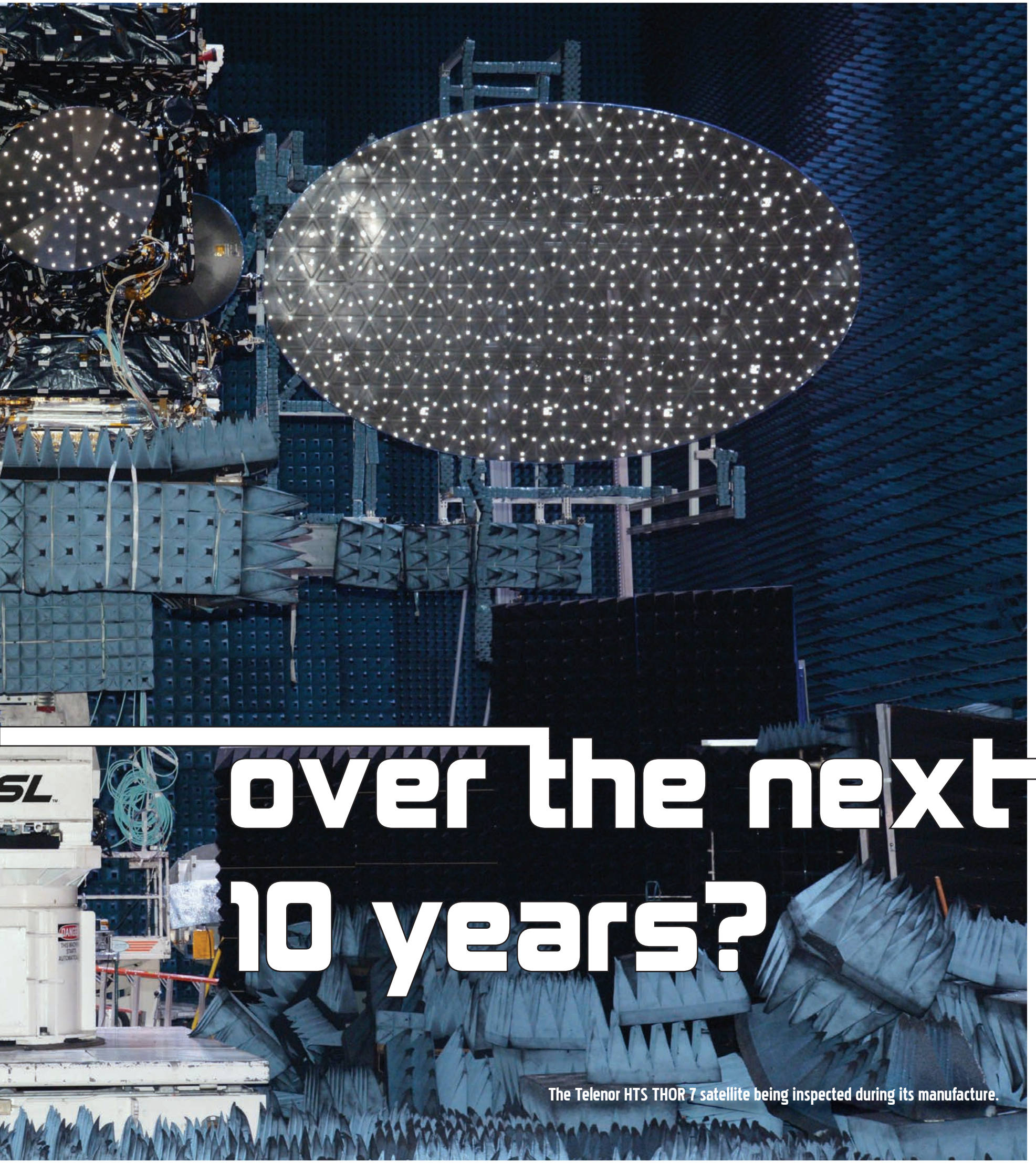
By the end of December 2015 43 vessels, valued at about $14.4 billion, (the highest contract value since 2009) were on the order books of German shipyards. The tonnage with 2 million CGT is higher than in 2014. Two additional orders for new buildings of plants and platforms for the offshore wind industry increased the total order backlog of the shipyards to $14.8 billion.

According to the German Federal Statistical Office, sales at the German shipyards (taking into account shipyards with a minimum of 50 employees from all market segments, including naval ship building, repair/modification, as well as boats, yacht and inland waterway shipbuilding) were down 20% to $5.6 billion (compared to $7.1 billion in 2014). At the same time, the number of employees increased 3% to 18,042.

During the first four month of 2016 orders received the national yards totaled nine vessels valued at $1.4 billion. This does not include the orders about 10 vessels from the Malaysian Genting Group, because this order, valued $3.8 billion, was placed in May 2016.

How is the shipping industry going to change

Telenor Satellite Broadcasting



over the next 10 years?

The Telenor HTS THOR 7 satellite being inspected during its manufacture.

Imagine a maritime world where vessels can be controlled remotely through the Internet; where new energy systems match energy demand and production for optimum performance; where real-time monitoring of a ship's operations are used to ensure safety at sea and in ports; and where new manufacturing techniques enable faster and more efficient production of ships and components, as well as the design and manufacture of new types of vessels. Pure fantasy? Not according to DNV GL's Technology Outlook 2025 Report, which presents maritime technology trends for the next decade, and shows that these ideals are set to become reality.

BY TOM MULLIGAN

Digitalization & Maritime Connectivity

The next decade will see a whole new range of communications technologies being used within the maritime sector, from cellular networks in coastal areas, to new data services on the VHF band as well as Wi-Fi in ports, and, importantly, satellite communications to improve coverage and bandwidth. This trend is already underway as more and more shipowners are installing VSAT (Very Small Aperture Terminals) equipment on board ships, the VSAT network's capacity itself increasing with the introduction of new high throughput satellite (HTS) systems providing up to 10 times higher throughput than classical satellites. Throughputs up to around 215 Gbps may be possible by 2025, implying a massive increase in data transfer rates and decreased cost per bit for the connected vessels.

This improved maritime connectivity will have a dramatic effect on how the industry manages information. Almost all ships, systems, and components will be linked to the Internet, providing access from almost any location. And at the same time, the combination of data streams from a range of sources will enable faster decision-making and more efficient operations, resulting in performance and asset management based on remote condition monitoring and the introduction of increased levels of automation. Autonomous ship operations will also have a positive impact on safety at sea and new digital solutions will provide support in the definition of corrective actions and the reduction of operational risk.

Better connectivity will also enable supply chains to be more efficiently organized based on operations that leverage timely information on cargoes, routes and the operation and condition of assets, improving efficiency in a number of ways, reducing lead times and fuel consumption by optimizing arrival times, and allowing better organization of operations and workforces for handling cargo and carrying out maintenance and inspection activities.

And finally, ship connectivity will enable maritime authorities to monitor compliance with regulations, resulting in improved safety and the achievement of environmental targets, as well as boosting competition in the industry.

Marine-Cyber Physical Systems

Modern ships are becoming more and more dependent on cyber-physical systems made up of physical components that are monitored, controlled and optimized through the use of smart sensors, advanced software and actuators. Examples include operational functions, critical safety-related functions and emergency control. Ships' machinery systems are also increasingly being controlled by software and sensors that monitor condition and performance parameters, while navigation systems will increasingly depend on advanced software and sensors to detect possible hazards ahead, and point out appropriate ways to maintain a safe route.

Digital Twin

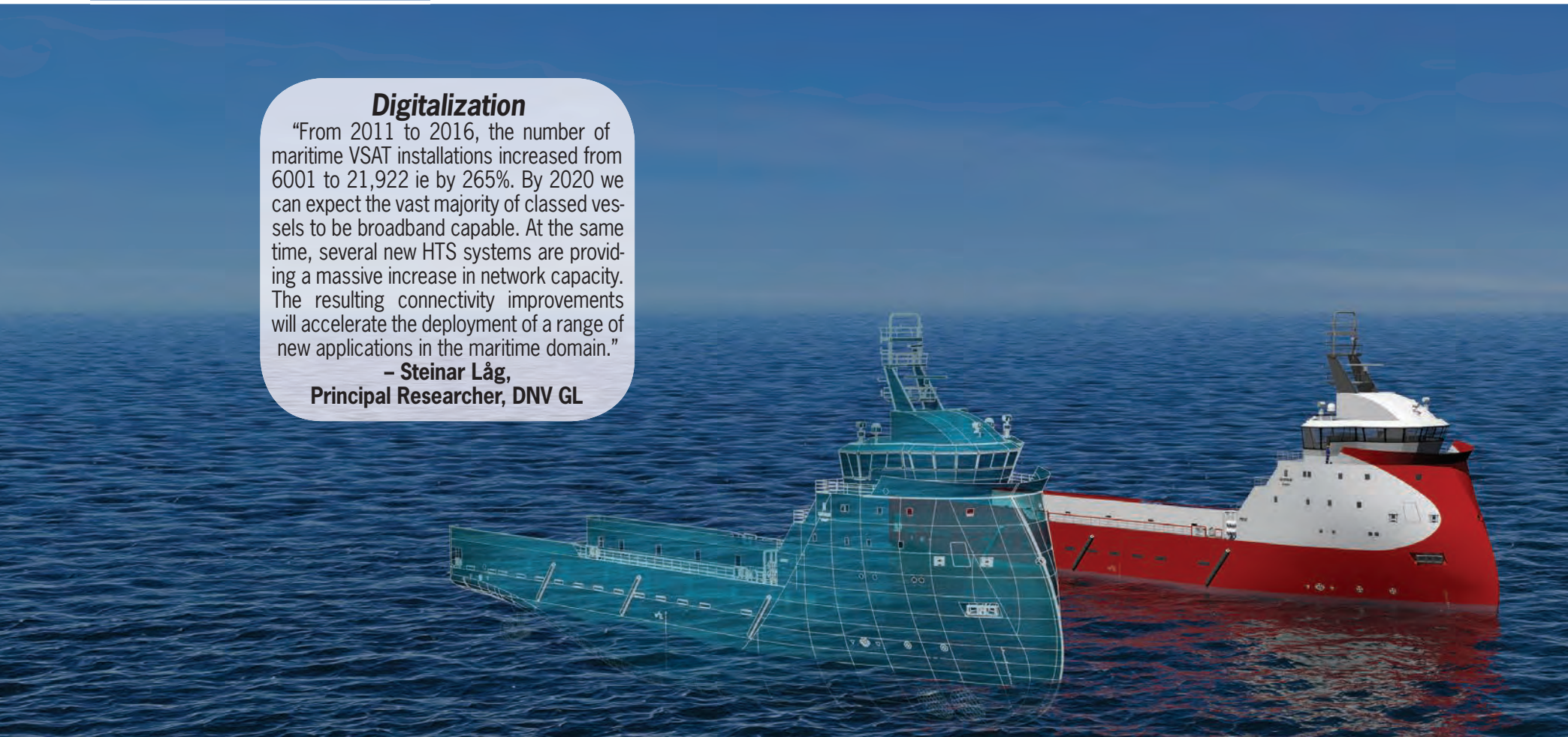
A digital twin is a digital or virtual version of a ship and its systems, synthesizing the information available about the ship in the digital world. Such twins have many applications during their life cycle, as they allow any aspect of an asset to be explored digitally.

For example, to optimize vessel design, a digital twin can be used as a vir-

Digitalization

"From 2011 to 2016, the number of maritime VSAT installations increased from 6001 to 21,922 ie by 265%. By 2020 we can expect the vast majority of classed vessels to be broadband capable. At the same time, several new HTS systems are providing a massive increase in network capacity. The resulting connectivity improvements will accelerate the deployment of a range of new applications in the maritime domain."

– Steinar Låg,
Principal Researcher, DNV GL



A digital twin is a digital copy of a real ship and its systems, synthesizing the information available about the ship in the digital world.

DNV GL / Toftenes multivisjon. 3D model of vessel by courtesy of Ulstein Group ASA

tual test bench so that improvements in system performance can be made and also acts as an information management system that supports the workflow, reducing development costs and time. It also helps with third-party verification, giving a more automatic approach to safety assurance. And as digital technologies develop over the next decade, ship systems and their related digital twins will be designed using cloud-based information management and multi-model simulation platforms. Over time, more detailed and improved virtual models will be continuously updated with information collected on board ship, thereby enabling faster development of industrial big data and smart analytics platforms.

Energy Efficiency

Designing a ship involves deciding upon its size, the type and shape of its hull, what materials it is made of and how it performs when fully loaded or operating under ballast conditions. All these factors will affect how much fuel is used on a voyage and therefore how much carbon dioxide is emitted during the journey. In the next 10 years, ships will operate with less ballast, and lighter materials will replace steel in a vessel's non-structural elements. The result will be large increases in energy efficiency, as a smaller area of hull will be under water, reducing frictional resistance. Other ways of reducing resistance being adopted include air lubrication, which introduces a thin layer of air between the hull and the water; and the use of specialized hull coatings that provide both lower frictional resistance and reduce fouling.

One of the advantages of the use of these new control systems will be improved management of energy flow, matching demand to production based on voyage plans, energy storage in batteries and the use of higher-efficiency power generation technologies such as solar panels and efficient propulsion systems, for example electronically controlled fuel injection systems. Battery-powered propulsion systems are already

Tools with full-range analytics and visualization capabilities will be seamlessly linked to on-board sensor and actuation devices via the Internet.

Autonomy/Safety Enhancement

"As sensor and software technologies and connectivity become more robust, remotely operated vessels, or even unmanned vessels, could become a reality. We are also likely to see many of the traditional activities performed on board shifted to shore-based centers, which will be responsible for vessel condition monitoring, control and logistics. By removing the human element, owners can eliminate on-board safety risk and significantly reduce potential damage to the vessel, cargo and the environment. This will also lower construction and operational costs."

– Garbriele Manno, Innovation Manager, Digital Solutions, DNV GL

Photo: DNV GL / Octaga

being designed for smaller ships, while hybrid electric ships are expected to be in operation after 2020: these will include vessels such as tugs, offshore service vessels and ferries.

Another major development will be the use of alternative fuels that comply with environmental regulations, although how quickly these are adopted will depend on their price, availability, ease of production and safety factors. Liquefied natural gas (LNG), liquefied petroleum gas (LPG), methanol, ethanol, biodiesel, dimethyl ether, biogas, synthetic fuels, grid electricity, nuclear propulsion and hydrogen are all fuels of the future – in fact, LNG was first utilized in the 1960s when LNG carrier vessels used some of the fuel on board; the first fully LNG-powered vessel was built in 2000; there are now 75 LNG-powered ships in operation, with a further 80 under construction; and a total of 40 ships have been designed ready for an LNG retrofit. This growth in the number of LNG-powered ships is set to accelerate over the next 10 years.

Remote Sensors & Autonomy

Robotics and automated systems are commonly used in many industries, particularly in manufacturing. In the maritime sector, remotely operated vehicles (ROVs) have been in use for about 10 years, especially for servicing subsea installations, and autonomous surface vehicles (ASVs) have been used in marine research applications, for example in charting ocean currents or even for tracking the flight paths of migrating birds. The industry will further benefit from advances in automation that have occurred in the offshore, aviation, aerospace and automotive industries, at first by applying these technologies to the operation of instrumented machinery and, over time, increasingly in vessel navigation. Automation will also be extended to ports for cargo handling.

On-board sensors will enable systems, and eventually ships, to be managed remotely; crew numbers will be reduced; and onshore control centers will manage vessel flow in congested sea lanes and in emergency situations. Prototypes of fully autonomous ships have been made and many types of ship with remote or autonomous capabilities are expected to be operational by 2025.

Real-time Analytics and Operations Management

There is a whole range of methods used in engineering to ensure optimal system performance and that safety standards are met, collectively known as RAMS (reliability, availability, maintainability, safety) techniques. Although well established in the area of industrial design, RAMS techniques are just beginning to be exploited in the operational area, and new techniques that leverage near or fully real-time monitoring of operations will become commonplace in the marine sector.

At first, the main benefits of real-time analytics and asset and operations management will be a reduction in how many inspections and repairs will need to be carried out, which in turn means less downtime being required for maintenance. Similarly, safety risk levels can be monitored. Combined with operational data, these will give maintenance and operational personnel more accurate information on a ship's status, enabling any

Hybrid Power Gen

"Significant growth in hybrid electric ships should be expected after 2020 in ship segments like harbor tugs, offshore service vessels, and ferries. By 2025, a large share of new commercial ships will probably include some degree of hybridization. In addition to fuel consumption benefits, hybridization offers power redundancy, reduction in noise and vibrations, and a decrease in pollutant emissions such as NOx, SOx and particulate matter."

– Christos Chryssakis, Principal Researcher and Group Leader for Energy Efficiency & Fuels at DNV GL

DNV GL: A Vision of the Future

Knut Ørbeck-Nilssen, CEO, Maritime, DNV GL, outlines his vision of how the shipping industry will change over the next 10 years:

"In my vision of the future for shipping I see an industry that is still at the heart of global trade, bringing people together, and keeping the world's economy vital and growing. But the industry itself, the vessels, the infrastructure, and the systems that connect them could change substantially. The biggest change will be the way ships are powered. The world's modern fleet will rely on a broader range of fuels and propulsion solutions. On the long-haul trades, we could see a move toward dual-fuel engines, or pure gas fuelled, as well as other gases like ethane, and newly developed renewable biofuels becoming a part of the mix.

"The use of batteries to complement main engines will also grow, to smooth power delivery, drive auxiliary systems, and maximize engine efficiency. In some sectors, such as ferries and coastal vessels, the trend could even be toward vessels powered completely or largely by electricity. Connectivity between ship and shore will have vastly improved and will be much more common. The fleet of the future will be continually communicating with its managers and perhaps even with a 'traffic control' system that is continually monitoring vessel positions, maneuvers and speeds.

"Fleet managers will be able to analyze these data, enabling them to advise the captain and crew on navigation, weather patterns, fuel consumption, and port arrival. This will help to reduce the risks of human error leading to accidents, increase cost efficiency, and help to improve environmental performance. Some of these data will also be shared. Ports will use the data to help them plan and optimize loading and unloading. Classification societies will analyze the data to check on the status of machinery and hull, letting the owners and operators know when a survey is required based on the condition of the systems, helping them to reduce downtime and avoid unnecessary maintenance.

"At DNV GL we are excited to be a part of this coming transformation. We will continue to work with stakeholders across the maritime world to realize the potential of our industry and make sure that the outlook for shipping tomorrow is brighter than today."

adjustment of parameters to ensure the highest reliability, safety and efficiency levels to be maintained. New technology developments will be required to realize this potential. Smart sensor networks will play a critical role, as will ship-to-shore connectivity via the Internet.

Novel Design & Manufacturing

The automotive and aircraft manufacturing industries have started to adopt 'additive manufacturing', also known as 3D printing, into their existing manufacturing infrastructures and the shipping industry is set to do the same. This new manufacturing method lays down successive thin layers of material to build up an object's structure and can reduce manufacturing times by as much as one third. The flexibility of 3D printing is particularly useful when product customization is important. The technology can also enable manufacturers to respond more quickly to market changes, and has the advantage of using only the material necessary to produce a component, thereby reducing waste and overall material usage.

It is expected that the use of 3D printing in the maritime sector will increase rapidly. The U.S. Navy is already evaluating its potential for producing spare parts and other equipment, but the most promising approach is to use the technology in the production of lightweight components or of complex parts that are difficult to manufacture using conventional methods.

Additive manufacturing does have its risks, however. Qualification and certification of products may be difficult because their quality may vary from one manufacturing location to another, and there is also the threat that localized production of parts and products could reduce overall demand for the shipping of goods.

New Ship Types

Shipping is a highly diversified industry that continues to evolve as it serves a growing number of customer types and caters to new demands. Obviously, many designs of ship are needed to comply with the different demands of each sector, and these designs will themselves change in response to new technological and economic developments.

As an example, it is highly likely that the recent trend toward larger container vessels will continue over the next decade. A larger ship provides much higher transportation efficiency than a smaller one does, and, in addition, consolidation in the container sector can only drive the trend toward bigger ships. The Trans-Pacific Partnership (TPP) trade agreement and the widening of the Panama and Suez Canals are testimony that even larger ships will be in operation in the years ahead.

The DNV GL Technology Outlook Report 2025 can be viewed online at or

Novel Design & Manufacturing

"Advances in additive manufacturing, also known as 3D printing, offer possibilities for novel designs, as well as more-lightweight products, with shorter production times and reduced costs. The oil & gas and maritime industries market is projected to grow substantially in the next decade, and the share of shipping is also expected to increase. Thus, it is anticipated that in the next decade 3D printing will play an increasingly more important role in manufacturing components and parts used in the maritime industry."

– Christos Chryssakis, Principal Researcher and Group Leader for Energy Efficiency & Fuels at DNV GL

DPS & Closing the Door on Unnecessary Risk

BY STEVE CARGILL

The design of many DP vessels dates back to a time when there was limited understanding of how to make closed bus power plants fully fault tolerant. This resulted in a number of potentially costly incidents. This poor incident record eventually led to many operators preferring to operate with open bus-ties, especially for critical DP operations. In addition to cost and fuel efficiency burdens, open bus-ties can impose other restrictions on a vessel's ability to carry out its industrial mission, often resulting in otherwise avoidable downtimes. In particular, many older DP vessels were not designed to work effectively with their bus-ties open.

As industry requirements to reduce emission levels have increased significantly in recent years, there has been an added disadvantage to the use of open bus systems, particularly in important territories such as the Gulf of Mexico and the Arctic. Operating with open bus-ties in such regions risks expending an operator's emission budget before work can be completed. Clearly, a solution needs to be found.

High integrity DP Class 3 closed bus power systems may be able to provide an acceptable solution for many types of DP operation. Work undertaken by DNV GL to develop new rules for Dynpos AUTRO (closed bus-ties), and pioneering work by the company's customers to develop new safeguards and techniques for testing and analyzing power systems, mean that such solutions are now more readily available.

Live Testing

Classification societies, DP industry bodies, equipment vendors and customers have cooperated to create guidance on methods for testing and analyzing closed bus power systems. This also includes live fault ride-through testing on power-plant switchboards – a technique once resisted by the industry for its perceived risks. Failure modes and effects analysis (FMEA), proven by testing and supplemented by a range of supporting studies, including validated mathematical models, allows classification societies to achieve the required level of confidence that the power plant is single-fault tolerant and to approve this configuration for DP Class 3.

Although the new procedures are intended to prove the robustness of closed bus power systems, DP vessels that are designed, analyzed and tested to meet requirements for Dynpos AUTRO are more robust, whether operating with open or closed bus-ties. For closed systems in particular, fault ride-through testing – supplemented by validated computer simulation – will play a crucial role as the industry begins to increase its use of closed bus configuration in light of requirements for lower emissions and fuel consumption.

One of the more interesting developments in power system testing is the application of Real-Time Digital Simulation (RTDS). Work carried out by key DNV GL clients has revealed interesting information about the performance of digital controllers and protection relays used in marine power plant. In industrial utilities, protection relays are used to limit the unacceptable effects of power system failures to reduce the extent of equipment damage and ensure the safety of personnel. As part of that role, they are expected to limit disruption of the power supply to the sub circuit containing the fault, but that is seen as less important than their safety function. When such protective functions are used in redundant propulsion systems for DP vessels, the effects of a power outage leading to loss of position presents a much greater threat to life, property and the environment. Thus, the role of a protection system in ensuring continuity of power supplies in a common power system assumes comparable importance.

RTDS allows engineers to study and prove the effectiveness of the real protection system hardware that will be fitted to the vessel and test it, cost-effectively, in a wider range of conditions than would be practicable to achieve using live testing alone. In RTDS, the validated mathematical models are used to drive high speed arbitrary current and voltage waveform generators which simulate the transient power system conditions that would be experienced during fault conditions. These waveforms are injected into the protection hardware to confirm it responds correctly. This technology has been available for some time but improvements in the performance of commercially available IT hardware

(Photo: DNV GL)

means that it is now more cost-effective than ever. Experience from testing has confirmed that the main reasons why power systems fail live fault ride through testing are construction and parametrization errors. Thus, any test process that can be carried out on the real hardware with the actual settings not only increases confidence but also reduces the risk of repeating higher stress tests. Much of the RTDS testing can be done at FAT, reducing the need for additional sea trials time. RTDS can also be cost-effectively used to increase confidence in the robustness of DP Class 2 power plants.

Robust Designs

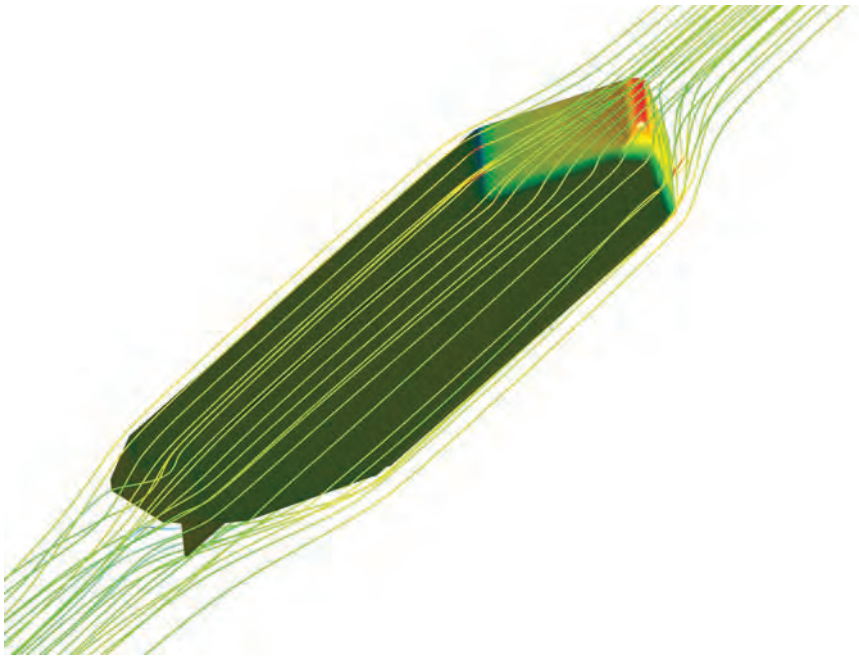
Verification schemes are considerably more onerous for DP Class 3 closed bus power systems. Typically, they will include the need to analyze, test and mathematically model all possible failure modes that can propagate by way of the bus-ties, as well as to verify that power plant systems are able to withstand the severe disturbance associated with clearing a fault. This requires additional studies and analysis into possible failures, existing and potential protection functions, and back-up protection. Such designs are 'built to be tested', adding significantly to confidence levels.

Maintaining integrity in these closed bus systems throughout the vessels' lifecycle will be the next big focus, and techniques for establishing this is something that the company is currently working on with industry partners. RTDS will almost certainly play an important role in this process. DNV GL is able to provide the mathematical modelling services required to undertake this and similar work. Testing does subject a power plant to a reasonable, although measured, amount of stress and it's therefore impractical to test every conceivable power level and configuration. Classification societies have agreed a level of testing to be accepted as a starting point, and the company's mathematical models are validated using that data in order to demonstrate fault tolerance in a full range of approved operating conditions. RTDS is low stress and further enhances the confidence level without adding significantly to the cost and time burden as so much of the work can be done off the critical path. DNV GL's mathematical power system models are able to drive arbitrary waveform generators and can also be interfaced with other models such as DP and power management system simulators to create a very high degree of realism and confidence in vessel performance.

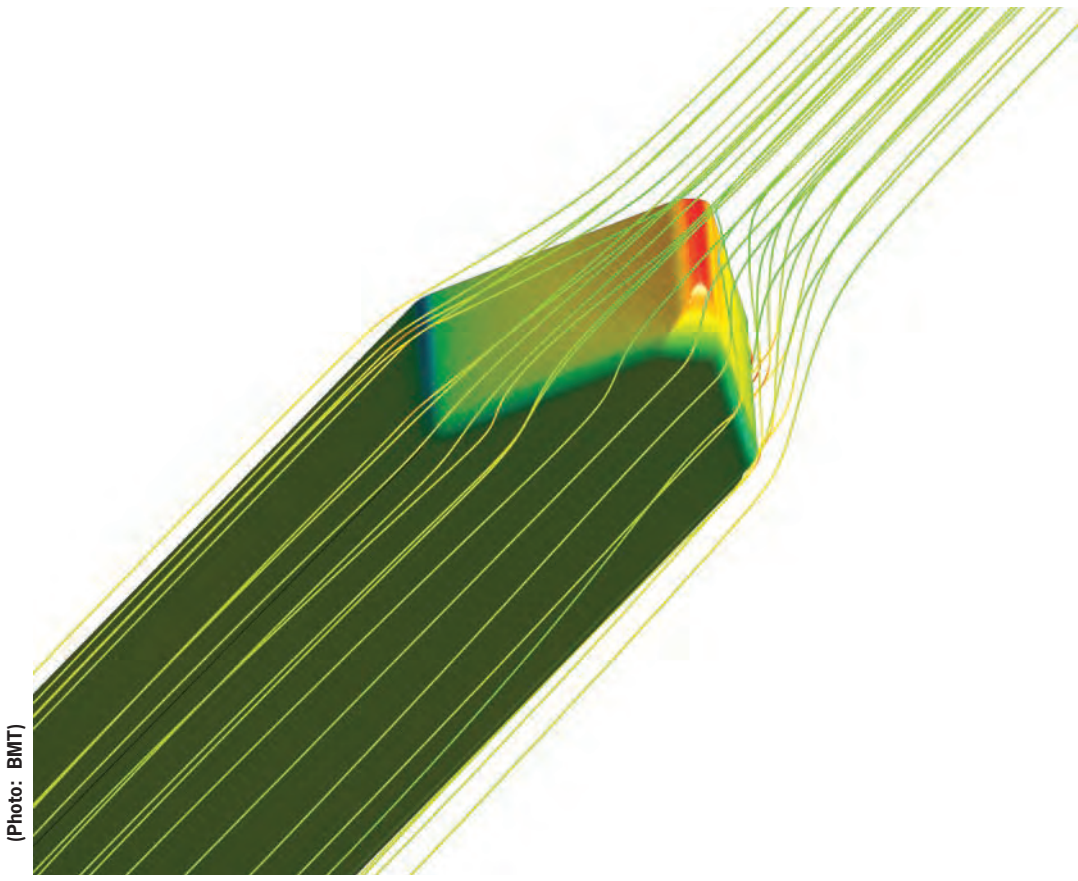
This type of verification process results in a very robust design which is crucial to industry confidence and is proven to be more effective that any previous verification process. Though it's a more holistic approach which requires additional effort, the prize is absolutely worth having.

The Author

Steve Cargill is a PhD qualified electrical engineer with almost 30 years' experience in the electrical engineering, marine and offshore industries including consultancy, academic work and practical applications. He is involved in new building and conversion of all types of dynamically positioned vessels leading to the development of company and industry guidance and standards for the assessment of station keeping integrity.



(Photo: BMT)



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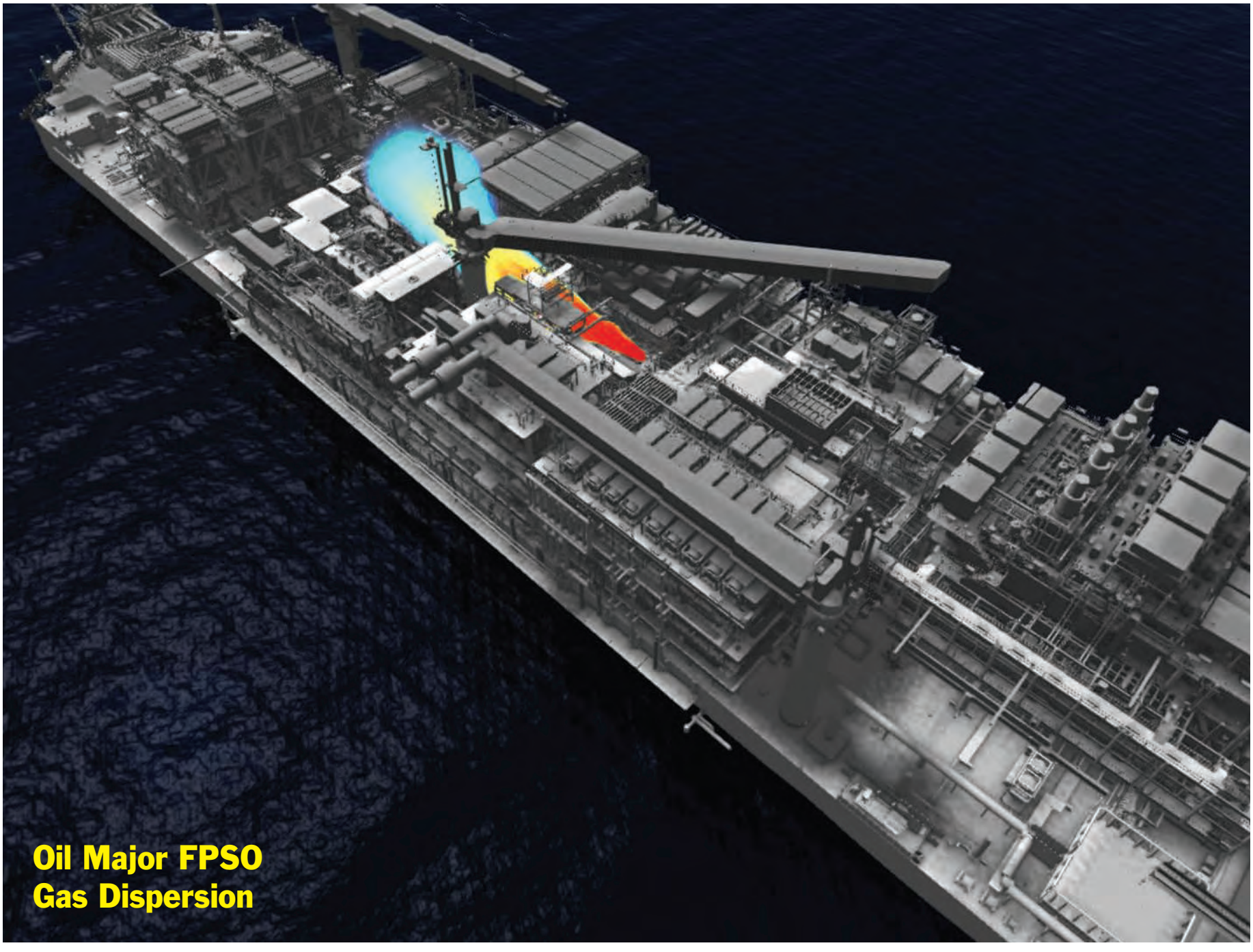

Oil Major FPSO Gas Dispersion

(Photo: BMT)

CFD Study Calculates FPSO Current Coefficients

BMT Fluid Mechanics (BMT), a subsidiary of the international design, engineering and risk management consultancy BMT Group Ltd, has recently completed a Computational Fluid Dynamics (CFD) study for an oil major operating offshore Nigeria. BMT's scope of work included an assessment of the current loading to which the FPSO hull is subjected to, which has enabled the oil major to ensure its mooring systems are fit for purpose. Johnathan Green, Manager for BMT Fluid Mechanics' Numerical Modeling Group explained, "CFD is becoming more commonplace in the oil and gas sector with many customers recognizing it to be an effective tool for solving challenges the industry faces in a less conservative and more efficient manner. In this project, we were able to use CFD to more accurately analyze the hydrodynamic forces caused by current and waves and asses the subsequent effect these forces have on the bilge keels of the vessel which are designed to stop the vessel from rolling."

Through the creation of a 3D CAD model and representation of the FPSO below the water line, the team of specialists at BMT were able to run a comprehensive experimental and numerical study of the maneuvering characteristics. This looked at different parameters of current conditions to help build up a picture of how the forces and motions impact the vessel and how it performs.

Green said, "BMT's extensive experience with shallow water hydrodynamics, maneuvering simulation, hydrodynamic model testing and Computational Fluid Dynamics (CFD) allowed us to deliver against the customer requirements. The benefit of using CFD in this study is that the customer can use the less conservative loads estimated to help design the mooring systems." "CFD has a number of applications within the oil and gas market," Green continued. "BMT regularly uses CFD for consequence modeling (e.g. hydrocarbon fire and explosion and gas dispersion), flow assurance and helicopter operations. Whilst the aim of all of our work is to ensure that risks to personnel, asset and environment are reduced to as low as reasonably practicable (ALARP) and although there may be a focus in today's current economic climate on reducing capital expenditure, BMT strongly believes that optimizing design early on in a project can considerably reduce costs by avoiding conservatism."

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Lifetime Assessment for Deepwater Moorings

(Photo: MARIN)

GE Powers Mammoth Crane Vessels

GE and Sembcorp Marine are working together to realize one of the most challenging offshore projects in recent times—Heerema's new Semi-Submersible Crane Vessel.

GE will provide technology that will be at the heart of the operations of Heerema's new SSCV Sleipnir, a mammoth vessel measuring 220 x 102m, the world's largest crane vessel.

(Photo: GE)

It will be equipped with two cranes, each with a 10,000-ton lifting capacity, to be used for offshore construction and heavy lifting.

GE was contracted to provide the electrical part of the power and propulsion system including 12 sets of 8-MW generators, eight units of 5.5-MW propulsion motors, medium-voltage switchboards, transformers and MV7000 drives. The power generated from the system will position and propel the vessel and provide electricity to the vessel's onboard systems. The power system is designed for fault tolerance in accordance with Lloyds Register's Rules (DP AAA).

"To power our newest SSCV, we wanted to collaborate with some of the best in business. In GE, we have found a partner that brings considerable experience and know-how into the project," said Martijn Wijdeveld, senior project manager, Heerema Offshore Services.

The delivery plan of GE's scope of supply is spread between September 2016 and May 2017, with the vessel scheduled to be commissioned by December 2018.

Mooring integrity is an important concern in the offshore industry [1]. Mooring leg failures can have significant consequences, such as temporary shutdowns and require unplanned, thus expensive, repairs. On the other hand, an over dimensioned design leads to higher loads acting on the floating facilities and a large investment.

Meanwhile, the development of deepwater projects has led to the discovery of the new fatigue mechanism of 'Out of Plane Bending' [2]. This means that the design of moorings requires more detailed analysis to ensure the integrity of the mooring system.

Mooring lines very much behave in a non-linear way. This is the result of, for example, the lifting of the mooring line from the seabed and the loads from the flow around the mooring line. A spectral fatigue assessment is not capable of fully incorporating these effects. A time-domain approach is a more accurate methodology to assess fatigue lifetime.

At MARIN the in-house developed tool aNySIM XMF is used for the time-domain fatigue assessment of deepwater floaters. aNySIM defines mooring lines as a combination of chains, wire ropes and/or synthetic ropes The mooring lines are described using a lumped-mass model, which includes the inertia of the mooring lines, as well as local forces, such as drag acting on the moorings. The result is a mooring fatigue assessment that takes the local dynamics of the mooring lines and the interaction with the production unit fully into account. Time-domain simulation with a fully coupled model with dynamic mooring lines is relatively time consuming. A calculation cluster is used to obtain quick and accurate results for a variety of operating conditions.

The challenges raised by mooring failures are significant and demand improved methodsfor the design of deepwater moorings. Through its time-domain simulation programs, MARIN is seeking to improve the necessary calculation procedures. By simulating the full range of expected environmental conditions, an accurate lifetime assessment can be performed.

[1] K.T. Ma et al. "A Historical Review on Integrity Issues of Permanent Mooring Systems", OTC-24025, 2013

[2] L. Rampi et al. "Chain Out of Plane Bending JIP Summary and Main Results", OTC-25779, 2014

The Author

Remco Hageman is Project Engineer Hydro-Structural Services at MARIN, the Maritime Research Institute Netherlands. MARIN offers simulation, model testing, full-scale measurements and training programmes, to the shipbuilding and offshore industry and governments.

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Green Ships & Compliance

Environmental regulations for ships are getting more stringent, but automated sensor technology could help ship operators remain in compliance.

By Claus Beiersdorfer

The recent agreement signed in Paris, at the UN Climate Change Conference, will require all industries to keep reducing their greenhouse gas (GHG) emissions. Although there was no specific mention of shipping, the aim of keeping global temperature rises below 2ºC this century will require the industry to play its part – as it is responsible for about 2% of global CO2 emissions.

Environmental rules for the industry are enshrined in the MARPOL (standing for 'Marine Pollution') regulations as well as several local regulations, such as VGP (Vessel general permit) 2013, which set strict emission limits. Emission targets in open water are less stringent, allowing high-sulphur fuel to be used there, for example. However, closer to shore – or in special areas such as the Baltic Sea – these targets are far stricter, so ships must switch over to a 'cleaner' fuel. These rules are only going to get tougher: as a special area under Annexe IV of MARPOL, the Baltic Sea will fall under tough new regulations for waste water discharge, for example. The rules will be introduced in 2016 for new passenger vessels and 2018 for existing vessels.

The punishment for breaking MARPOL rules can be severe, particularly in the U.S. For example, recent cases include a German management company fined $800,000 for breaking the Clean Water Act, and an Italian ship owner fined $2.75 million for infringing the Act to Prevent Pollution from Ships. In each case, both the operating company and individual members of the crew were held to be at fault and received fines or community service orders.

At the same time, the U.S. Coast Guard recently issued a Safety Alert, regarding the use of ultra-low sulphur (ULS) fuel. It recommends that switching to ULS fuel – which can result in loss of propulsion – is accomplished "outside of busy traffic lanes" (generally 200 nautical miles off the main U.S. coast). As part of the guidance, it says: "Ensure all sensors, controls and alarms are operational and function as designed."

Condition Monitoring (CM) uses sensors to assess the health of components such as bearings and is commonplace in the manufacturing industry. CM has taken a few tentative steps into shipping, but it is early days: many ship owners, while recognising the benefits, are reticent to invest in such systems.

This type of automated, sensor-based system can also be used for so-called 'functional monitoring': instead of spotting bearing failure, it could automatically monitor critical environmental attributes such as fuel consumption and GHG emissions. This is the basis behind SKF's BlueMon. Often the necessary sensors are already on board, and are monitored by the crew. What BlueMon does is automate the whole process and add an extra level of security by helping the crew avoid mistakes. Most importantly, it overlays all this information with positional data. Marrying environmental and GPS data is a vital resource that helps ship owners and operators to stay within the MARPOL regulations. For example, BlueMon will sound a warning when the ship is approaching the shore – meaning that it must shift to a cleaner fuel, for example, or must not discharge bilge water overboard.

Bilge water must be fed through a separator until it is clean enough to be discharged. Out at sea, it can contain 15 parts per million of oil and be safely discharged. Closer to shore, the levels can drop to 5ppm – or even to zero bilge water discharge. By knowing the exact position of the ship – and correlating it with sensor readings – the system will take charge, and shut off the bilge water discharge valve if necessary.

With BlueMon, data is logged automatically by the system and kept for 24 months. In the case of a dispute, a log of all activities – from fuel-switching to bilge discharge – is available, with a precise location.

It is worth noting that offences under the various pollution and discharge acts can be punished even the offence takes place outside territorial waters. For example, a recent prosecution in the U.S. went ahead on the basis that fraudulent log book claims were presented to U.S. officials. It goes to show how important it is stay within the rules – and to keep accurate records.

BlueMon could comfortably handle tightening emission levels – and the changing boundaries of special areas such as the Baltic Sea – with simple software updates: the warning alarm of a special area could be triggered earlier, to account for a boundary change, for example.

BlueMon has been adopted by operators of tankers and liquid natural gas (LNG) carriers, due mainly to their presence in sensitive areas. The sensitivity factor could also see it deployed on ships that ply their trade in the Arctic – especially as these routes are more often open, due to melting ice.

For now, the system is restricted to the ship itself. There is no ship-to-shore transmission of data – although this is likely to be introduced in future. Such an arrangement is already in place for on-board CM: rather than having multiple maintenance experts on every ship, a fleet owner can transmit CM data back to shore, where remote experts can analyse all the data and act accordingly. This type of remote monitoring is already being used for route optimization. Data is transmitted to onshore experts, who may determine that the most cost-effective route is a longer journey using heavier fuel, for example.

A ship is sometimes considered a floating factory, as it has so much machinery to maintain. Consider, though, that a traditional land-based factory only needs to abide by local environmental regulations. A ship is a moving target – with multiple regulations to obey – so anything that can ease this burden is to be welcomed.

The Author

Claus Beiersdorfer studied process engineering at the University in Cologne and obtained the degree as Mechanical engineer (FH) in 1995. Since then he has gained a worldwide expereince as sales engineer for marine products which require integration in different ship machineries. Today Claus Beiersdorfer heads the sales teams for newbuilding equipment at SKF Marine GmbH in Hamburg.

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CIMAC 2016

Where the World of Combustion Engine Aficionados Gather

REPORTING BY HENRIK SEGERCRANTZ

CIMAC, which meets every third year, called Helsinki, Finland home for a few days earlier this summer, an event that drew 850 visitors, 220 papers and 53 exhibitors. For those not familiar, CIMAC is a high-level technical conference covering all matters propulsion, the preeminent event of its kind in the world. Robert Ollus, Director, Global Testing & Validation at Wärtsilä Corporation, and this year's Congress President, reminded the audience of his promise from CIMAC Shanghai in 2013 that "we in 2016 will have a Tier III diesel engine with 50 percent shaft efficiency and with self control. All this has been reached," he said, reminiscing of a former professor saying shaft efficiency would never go above 50% and that gas would never be better than diesel fuel. In assessing the many challenges faced today, from low oil prices, low charter rates and new environmental regulation, he said "challenges keep us motivated, and they also keep us employed."

Tier III is set to enter into force in the North Sea and the Baltic Sea Emission control Areas between 2018 and 2021. It entered into force, as EPA Tier 4 from this year in the North American ECA. According to Ollus this could be difficult to implement, if the big nations would like to extend the date of implementation further. He mentioned the gas engines which fulfill Tier III NOx emissions as such with more than 80% reduced emissions, "which can be reduced further."

"To reduce NOx, there is, for HF-engines, after-treatment with Selective Catalytic Reduction (SCR). The third method is EGR, Exhaust Gas Recirculation, and for sulfur oxides, there are scrubbers." Wärtsilä provides all three types, the hybrid, closed and open scrubbers. SCRs are in common use on, for example, the cruise ships, operating within the ECAs areas of Northern Europe North America, and the Caribbean.

Wärtsilä is currently developing its EGR technologies, where some exhaust gases are recirculated through the cylinder, reducing oxygen and lowering the combustion temperature. "The downside of EGR is that it heavily reduces efficiency," he noted. "But with two-stage turbocharging there is no downside, NOx is reduced and the efficiency is improved. This technology has been under development for some 15 years. We have sold some 25 engines with two-stage turbocharging." Reference vessels include tugs and the icebreaker being built at Arctech Helsinki Shipyard and Vyborg Shipyard, the first such vessel fitted with Wärtsilä 31 engines. "Two-stage turbocharging requires a much stronger engine structure and a completely new fully-flexible valve timing and electronic control." This development, as applied on the 31 engine, is taking place over the entire engine portfolio at Wärtsilä.

Ollus said another "revolutionary" technology development is engine simulation, which allows manufacturers to extensively test engine in early development. "When looking at external advancements, the engines, their cylinders, turbochargers and the other engines of the vessel are communicating with each other today. And also the different vessels in the fleet communicate," he said. This connectivity promotes lower fuel consumption and the possibility for condition-based maintenance, with online remote centers based at the clients' offices and at Wärtsilä, an optional service with more than 520 engines signed on to date. While many maritime markets are down, Ollus said some markets are doing well, such as the cruise market "with all yards full today and fighting for slots for year 2024. Also the fishing vessel market is very good today. Offshore has been very low, but the fuel prices are going up although markets are tough still. Our flexible power plant solutions are well placed technologically for the market."

Regardless of market fluctuation, Ollus summarized, "Our responsibility is to develop an engine which can operate on all types of hydrocarbons. Different fuels are coming, including hydrogen. The first dredger with biofuel was launched last year. (But) fossil fuels are today still preferred by the clients."

MTU & Pure Gas

Stefan Müller, Sales Manager, Director Application Center Marine & Offshore, MTU Friedrichshafen, a core brand of Rolls-Royce Power System AG, said, "Our core products are diesel engines, and now also pure gas engines. On top of that we are developing and producing complete automation systems for the commercial marine business, the yachting business and also for the navy business. We want to provide complete propulsion solutions. We are cooperat-

(Photo: Henrik Segercrantz)

"Challenges keep us motivated, and they also keep us employed!"

Robert Ollus, Director, Global Testing & Validation, Wärtsilä Corporation

ing with the gearbox suppliers and the marine industry component supplies for propulsion and on-board power generation systems. We offer complete generating sets based on diesel and also on gas. He described how MTU is also working on the electrification of propulsion systems, developing hybrid propulsion systems for both the marine and rail industries. "What we want to achieve is a complete predeveloped system which is configurable according to the customers wishes. The customers are clearly now demanding solutions with low lifecycle costs, higher comfort and higher performance, like in the

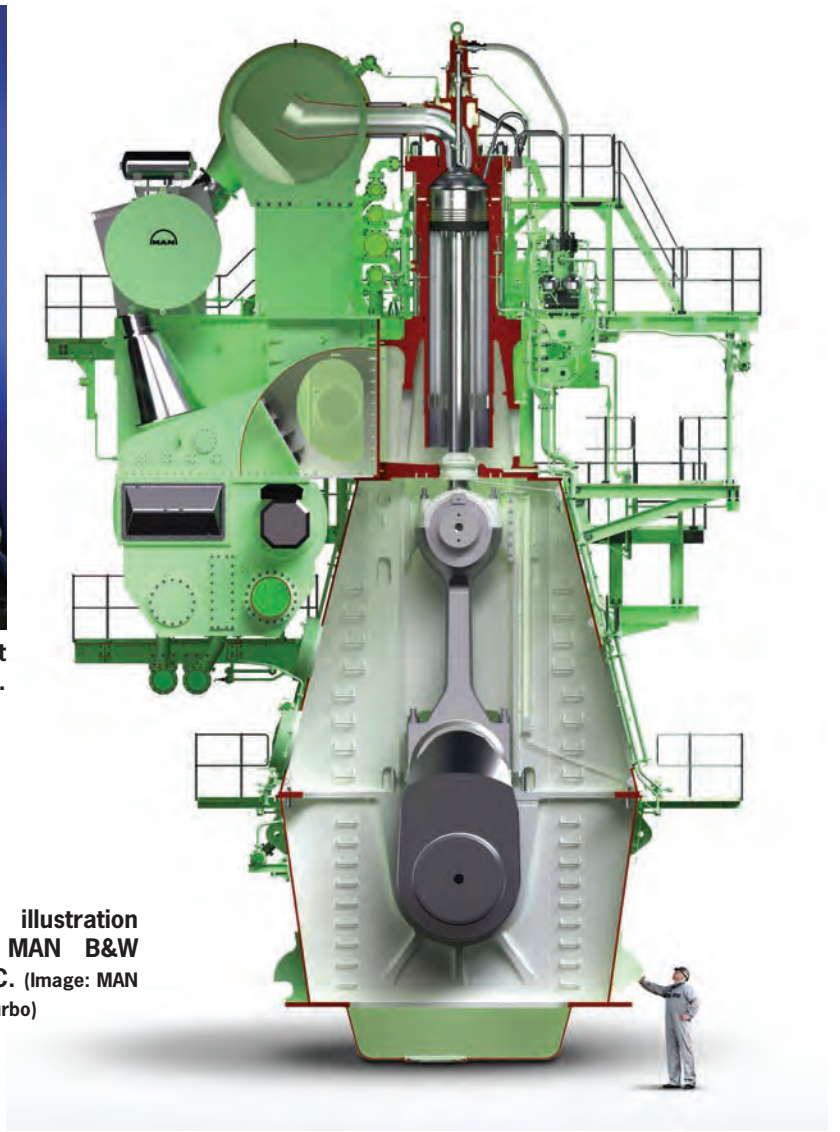
MAN Diesel&Turbo

Running on LNG, methanol, ethanol and LVOC

At CIMAC MAN Diesel & Turbo covered a wide range of current topics in its presentations. Susanne Kindt, Senior Manager, Design, Large Bore, at MAN Diesel&Turbo presented the latest design developments, for Tier II and multiple fuels. Today more than 140 MAN B&W gas engines have been ordered, for LNG and also for methanol, ethanol, and liquid volatile organic compound (LVOC). New fuel injection systems have been introduced, such as for the methane GI engine running on 300 bar gas and the ethane version running on 400 bar. EGR and SCR, both downsized for the engines, are now standard solutions offered. New engine types have been introduced, for large containerships the G90ME-C10.5 has been launched in addition to the already very competitive engine types S90ME-C9/10 and G95ME-C9 (with common rail being developed) and the S50ME-C9.5 has been introduced for the small bore engines program. "It could be an advantage to have an EGR solution on bigger bore engines (as opposed to SCR). It is integrated and does not make the engine outline so much bigger," Kindt said.

But quickly noted, "The owners have certainly their own opinion about this and we are trying to develop both technologies to be the best possible." The latest technology MAN 12V4x/60CR four-stroke diesel engine, now being developed and targeting also cruise ships, has a shaft efficiency exceeding 50%. It is fitted with two-stage turbocharging, Sebastian Kunkel said.

Sebastian Kunkel, Head of Development Projects Engineering Four-Stroke, MAN. (Photo: Henrik Segercrantz)



Graphic illustration of the MAN B&W S90ME-C. (Image: MAN Diesel & Turbo)

car industry, but of course they are not willing to pay too much. To reduce investment costs for hybrid systems we need to predevelop those systems, to reduce risks and the cost of components. Then we can come up with a better portfolio of a pre-tested system," he said. The yachting industry, he noted, is very eager to have these hybrid systems provided, as is also the commercial marine side, "as you can reduce life-cycle costs with a hybrid system, for example in tug boats and patrol boats."

On the marine side, gas engines are new for MTU.

Land-based stationary power plants operating on gas have been supplied for more than 10 years. On display at the CIMAC booth was the first MTU gas engine to run on Compressed Natural Gas based on the company's ECOtug development project. The 2,000kW engine is based on the 16 cylinder Series 4000M63 diesel engine. It is to be delivered in the beginning of next year for a Svitzer-owned tug boat currently being developed by Damen Shipyards. Two 16V engines in a gas electric system has been ordered for two catamaran ferries for Rederij Doeksen as well as two 8V engines for a ferry for Lake Constance.

"We did a study to decide if dual-fuel or a pure gas engine is the right for us. One has to remember that we do not deliver solutions for big oceangoing vessels. We deliver solutions for inland waterways, harbors and coastal applications. In these areas, we believe in some years gas will be there. Secondly, if the infrastructure is there, a pure-gas engine does not have to compromise regarding efficiency. Also the dynamic behavior is very close to that of a diesel engine and the efficiency is good."

Caterpillar

Going Dual Fuel

Maritime Reporter & Engineering News talked with Andeas Banck, the Engineering Manager in charge of Engineering, New Technology Introduction and Performance & Simulation at Caterpillar Motoren in Kiel. When Stena's technical director Harry Robertsson turned talk to biofuel, Banck said he did not think that there would be enough biofuels in 2030 to drive all shipping worldwide. "But there will be many new fuels also available, such as methanol."

Caterpillar is in the process of converting its entire range of medium speed MaK engines to dual fuel. "In the marine business we think that dual fuel engines will be the solution for IMO Tier III. With gas you can fulfill the emission limits and gas is a sulfur-free fuel." At CIMAC MaK displayed its dual fuel marine engines M 34 DF, M 46 DF and VM 46 DF providing a power ranging from 3,060kW up to 15,440kW. The most recent addition, the M 34 DF, will be in service in late summer, as auxiliary engines for a ferry being built in Flensburg. The diesel engines in the portfolio range from the M 20 C engine up to the VM 43 C engine, in all eight types with an engine output from 1,020kW up to 16,800kW. "There will be another dual fuel engine, the M 27 DF, available in two years," Banck said. The current references also include a number of tankers and the cruise ship AIDAprima, fitted also with one MaK VM 46 DF engine.

"For the Tier III emission regulations we have two solutions, the dual fuel engines running on gas, and the SCR after treatment which can be applied to all our engines." He said there are customers asking for both systems. "The customers are not sure if they will get LNG all over the world." The Cat SCR System is being developed initially in the U.S. for the C 280 medium speed engine for EPA Tier 4. "We now apply this solution for all our engines, scaled up for the larger ones. The certification for this equipment will be done at our factory within this year after which we can supply SCR installations." Banck said that Caterpillar Motoren has also developed EGR solutions. "But the sulfur in the fuel causes major problems here, even with the 0.1 percent sulfur fuel, causing clogging and corrosion, so we decided not to offer this for our marine solutions." Another technology he points out is their Part Load Optimization Technology, developed during the last recent years and now being introduced on ships, aims at boosting fuel consumption over a wide load range. It uses flexible camshaft and waste gate technologies as well as the possibility to use cylinder bypass valves in variable speed applications.

(Photo: Henrik Segercrantz)

Caterpillar is in the process of converting its entire range of medium speed MaK engines to dual fuel. "In the marine business we think that dual fuel engines will be the solution for IMO Tier III.

Andeas Banck, Engineering, New Technology Introduction and Performance & Simulation, Caterpillar Motoren

GE &

IMO Tier III & EPA Tier 4

"A 90% reduction in overall emissions has taken place in 15-17 years. This drives new technology development and also results in completely new engines," Rob Mischler, Principal Engineer, Engine Performance and Controls, GE Transportation, said in his presentation at CIMAC on its new medium speed diesel engine. He presented GE's Evolution Series engine, of which more than 8,000 have been built, which now has been updated for EPA Tier 4 and is available for maritime applications.

The engine is fitted with EGR exhaust gas recirculation and has two-stage turbocharging. The Norwegian road ferry Bastø I was in April repowered with GE's 16V250MDC marine diesel engine certified to meet both IMO Tier III and EPA Tier 4 emission standards. Thanks to its EGR exhaust gas recirculation it does not need urea based after treatment. Another two engines are to be installed on Harvey Gulf's latest multipurpose field support vessel for deepwater operations in the U.S. Gulf of Mexico.

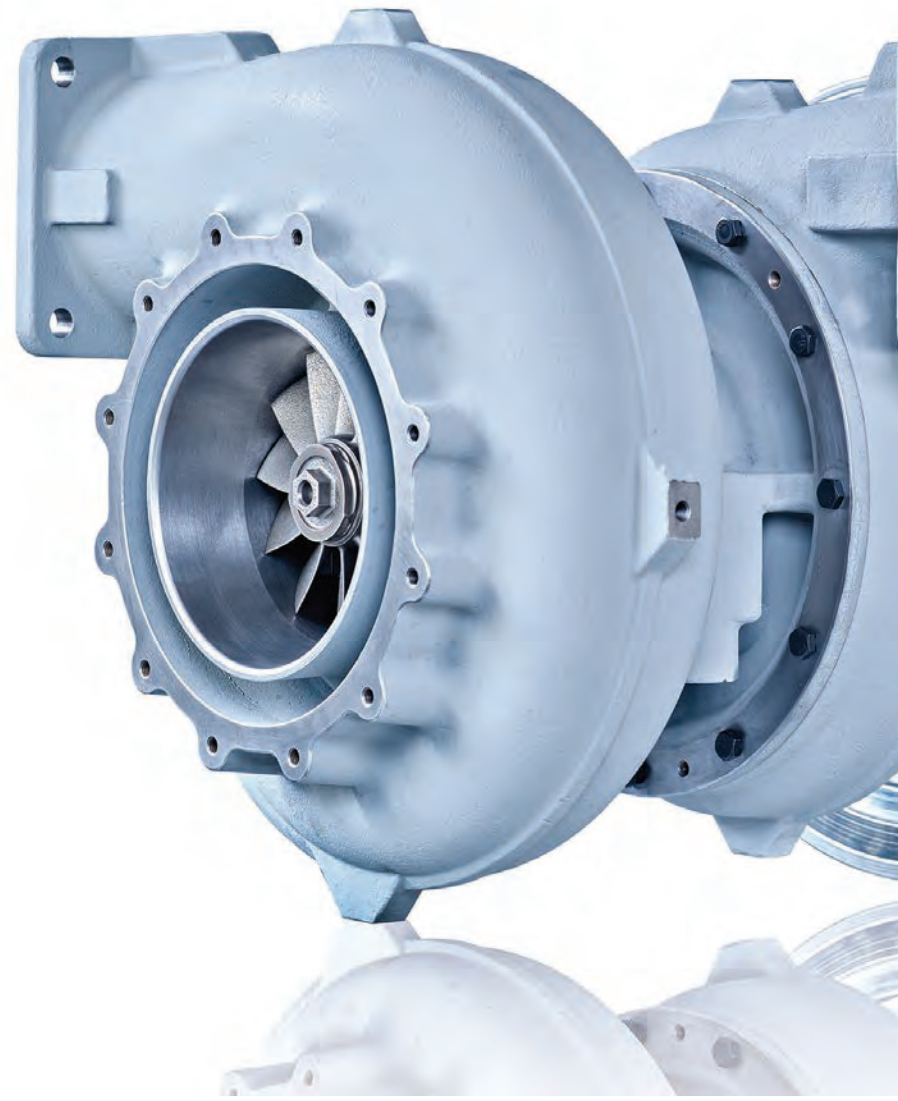
Rob Mischler, Principal Engineer, Engine Performance and Controls, GE Transportation

(Photo credit: Rob Mischler)

CIMAC 2016

Seen & Heard

Some things old. Some things new.



REPORTING BY HENRIK SEGERCRANTZ

35 years ago there were more than 30 engine builders, LNG carriers had steam turbines and there were not many diesel engine driven ships. Today emission reduction, electronic control and automation are on the forefront, gas engines are emerging fast, with further efficiency increases in the focus of engine developers, despite the dip in fuel prices. New emission regulations continue to drive the industry further, faster. With this backdrop, earlier this summer CIMAC once again served as the gathering ground for some of the world's best and brightest propulsion minds.

The Evolution of:

- **The break specific fuel consumption has decreased** from some 210 g/kwh to some 165 g/kwh (with shaft efficiency reaching above 50% reducing also CO2 emissions). This has been possible by advancements in combustion shape combined with fuel injection and increased maximum cylinder pressure, reduced heat transfer, reduced friction and parasitic losses, reduced flow losses and two-stage turbo charging.

- **The specific output (BMEP - break mean effective pressure) has nearly doubled,** with large engines being the forerunners.

- **The maximum firing pressure** (in the cylinder, improving efficiency, lowering emissions and setting more requirements on strength) has increased to some 270 bar from some 130 bar.

- **Tier III limits, cutting NOx to 75% below original,** entered into force from ships keel laid from this year in the ECA areas. With Tier III you really

GISIGER, ABB

TONON, MAERSK MARITIME TECH

PAULSEN, KONGSBERG

ROBERTSSON STENA REDERI

(Photo: Henrik Segercrantz)

ABB has developed its first dedicated MXP turbocharger in cooperation with IHI Corporation. (Photo: ABB)

need to change the assets you are running, with emission treatment systems, exhaust gas re-circulating systems, or changing to gas fuel or working with LNG.

Paolo Tonon,
Maersk Maritime Technology

- **The Energy Efficiency Design Index,** which entered into force in January 2013, was one of the first things that happened after the Kyoto Protocol. The target is, by 2030, to reduce CO2 emis-

KOCH, ROLLS-ROYCE

Comparing Costs Across Propulsion Systems and Fuel Types

Switching Fuel: What is it Going to Cost?

(Photo: Arctech Helsinki Shipyard)

Finnish icebreaker Polaris, is delivered this summer from Arctech Shipyard. The vessel has three azimuthing electric pods, and is the first icebreaker in the world powered by dual-fuel engines.

Christos Chryssakis, DNV GL, Christian Morch and Niels Clausen at MAN DT presented the results of a comparison of HFO/MGO and LNG, LPG, Methanol, and Hydrogevated Vegetable Oil (VGO) used on a 75,000 dwt product tanker, on a route between Houston in U.S. ECA, to Rotterdam and to Ventspils in the Baltic ECA. Financials highly dependent on fuel price scenario. A global sulfur cap favors a single-fuel variant. Additional investment costs are highest:

- LNG ($9.5m)
- LNG/HFO ($7m)
- LPG ($4.8m)
- LPG/HFO ($4.3m)
- Methanol ($3m)
- Methanol/HFO ($2.8m)

Results: In the high price scenario the annual cost difference during operation is positive for LNG and LPG, in particular for the one-fuel variant with global sulfur cap. Methanol can provide an interesting alternative if the price is low enough (approx. 18% below the MGO price in the high price scenario to have a payback time similar to LNG and LPG. In the low price scenario, the methanol price needs to be reduced to 27% below the MGO price to have a payback time similar to LPG. In the two price scenarios used in this study the current and expected price of methanol and ULSFO did not result in financial feasibility. LNG and LPG were both financially interesting alternative fuels and LPG was found to be at least as good as LNG. For these best fuels, the best alternative is to use it both in the SECA and non-SECA regions. Methanol (Black Liquor) has the lowest GHG, NOx and SOx emissions.

The physical upper limits for engine efficiency have not been reached yet. One can improve them still by some few percentages, but the large efficiency improvements lies in the system (integration) giving for example in some cases 25-30%, and by connecting ships (or power plants) to smart grids, with big data, and condition monitoring.

Marko Dekena, AVL List

sions by 30% from the average between 2000 and 2010. This is challenging.

Paolo Tonon, Maersk Maritime Technology

• **The physical upper limits for engine efficiency have not been reached yet.** One can improve them still by some few percentages, but the large efficiency improvements lies in the system (integration) giving for example in some cases 25-30%, and by connecting ships (or power plants) to smart grids, with big data, and condition monitoring.

Marko Dekena, AVL List

• We are expecting at the next IMO MEPC70 meeting an announcement for the North Sea and the Baltic Sea on NOx to enter into force in 2021 (for Tier 3 level on NOx emissions). In the EU we just now settled Stage 5 for the Inland Waterways. We have now reached our target to harmonize IMO and EU regulations with those of EPA.

Klaus Pöpsel, Director Research & Technology, Corporate Functions, MTU

New emission regs

• Looking at coming 'IMO minus 80%' emission cuts (from those of year 2000) SCR will be a viable solution for the future, with technologies now on the market for HFO and LFO. Gas will be one important ingredient for the future as well. We come into technologies that brings you close to this minus 80%, but not all the way. Two-stage turbo-charging brings you 30% to almost 40% down on NOx. A combination of technologies will be important. For instance by combining methanol with two-stage turbo-charging we start to be there.

Robert Ollus, Wärtsilä

• An Otto (gas) engine has a better, faster, combustion than a diesel engine with lower temperatures and lower NOx. The problem has been to keep away from misfiring and knocking with too high or low air to fuel ratio.

Robert Ollus, Wärtsilä

What is New?

• ABB has developed its first dedicated MXP turbocharger in co-operation with IHI Corporation of Japan for auxiliary engines up to 2MW. With 40% less parts the unit is designed for user-friendly guided condition-based maintenance. ABB is also developing a new range of turbochargers specifically for high-speed diesel engines aiming at maximum reliability and durability, high available boost pressure, wide compressor flow range and enhanced part load performance. With this, ABB brings the well-proven reliability of its current products TPS and A100 to the high-speed diesel market.

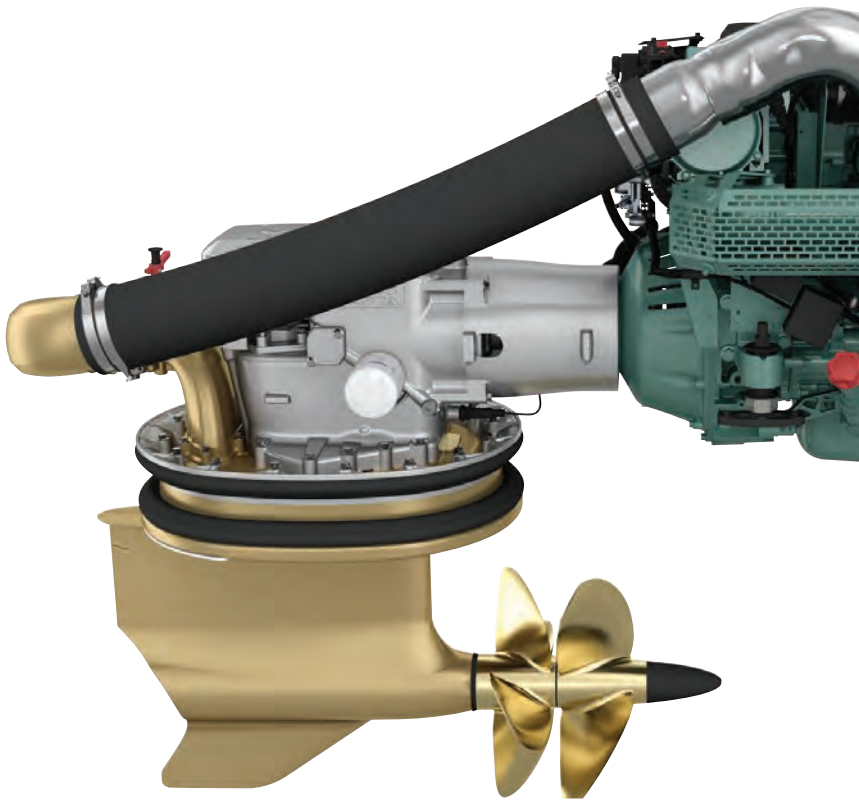
Michael Gisiger, ABB

• Mitsubishi has developed a state-of-the-art low speed marine diesel engine that includes all of the advanced technologies which MHI-MME has accumulated over the years. Latest technologies applied on its UEC Engine result in very low fuel consumption and Tier 3 compliance, with EGR or SCR.

Katsumi Imanaka, Mitsubishi Heavy Industries

• The New Bergen B33:45 medium speed engine series is designed based on 30 years of experience of the B-Series engine. It has a completely new engine architecture, provides 600kW per cylinder and is available also for natural gas. Common rail is now also available.

Peter Koch, Rolls-Royce



Test Drive

Volvo Penta Debuts New Engine, IPS Drive

BY GREG TRAUTHWEIN

Volvo Penta has steadily pushed its range of engines and drives to more completely cover the demanding commercial sector. With the recent debut of its D8 diesel engine and the IPS15 propulsion drive, the Swedish propulsion company rounds out its line up. Maritime Reporter & Engineering News was recently invited to its global marine testing center in Krossholmen, Sweden, to put the Volvo Penta product line up to the test.

As most in the maritime market will attest, a strong leisure boat pedigree sometimes proves an impediment to cracking into the rigorous commercial market sector. But backed by the Volvo name and with perseverance and a steady expansion of product and service – including the recent introduction of the D8 diesel engine and the IPS15 drive – Volvo Penta today offers a compelling argument as a one-stop-shop for a variety of vessels workboat sectors, "able to supply everything from the prop to the helm," said Stefan Carlsson, Volvo Penta's Marine Diesel segment head.

The D8 Diesel Engine

Last month Volvo Penta effectively broadened it product range to compete more efficiently. The company introduced the D8 engine – which will replace the D9 – built to U.S. Tier III and IMO II specification and available in 450, 510 and 550 hp models. The 8-liter engine expands the offering between the D6 and D11 models, for applications that require low weight with high power suited for propeller, waterjet and Volvo Penta IPS applications. The new engine has been designed for use in planing craft, and commercial uses include fast patrols, coast guard and rescue launches, police and ambulance boats, water-taxis and high-speed passenger ferries, fishing boats and offshore support vessels.

While the D8 is new to the marine market, it is a proven platform, manufactured since 2013 serving the truck, bus and off-road industrial market. The D8 is an in-line six-cylinder engine with a cylinder capacity of 7.7 liters, twin-entry turbo and sea-water cooled heat exchanger, a heat exchanger manufactured of composite material to eliminate corrosion. The engine has a Denso common rail system working up to 2,000 bars. The injection is electronically controlled, and pre-, main, and post-injection are essential aspects for the engine's power, torque, fuel efficiency, low noise and emission levels.

"The high power-to-weight ratio together with the new common rail injection system where the nozzle has been optimized, together with a piston bowl of re-entry type, will provide excellent fuel efficiency," said Anna Pettersson, chief project manager for Volvo Penta's marine engines.

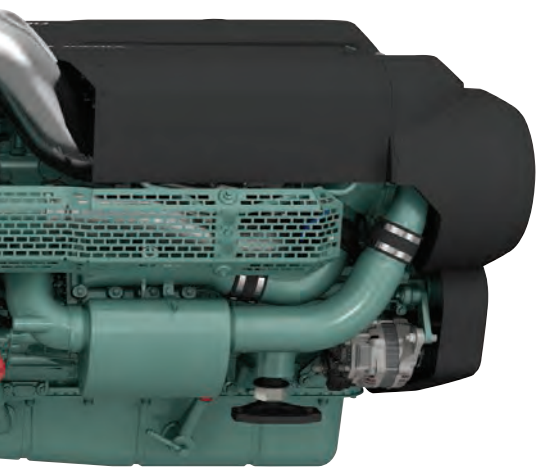
Volvo Penta has developed three power outputs for the D8 inboard range – of 450, 510 and 550 hp. The engines are designed to conform to the US EPA Tier 3 emissions standards, as well as IMO II and EU IWW. EPA certificates are expected in January 2017. Power ratings will be set at R3 (for 450hp), and R4 for both 510 and 550hp. The IPS system, engine, drive and propellers are expected to be approved by DNV-GL. The inboard engine will also require certificates, which will be applied for from the classification societies: DNV-GL, RINA, LR, China CSS, RS and the Indian Register of Shipping (IRS). The engine will be ready for delivery in June 2017.

The IPS15

Volvo Penta's Inboard Performance System (IPS) is the showcase of the company's innovations in marine engineering, and the IPS family now has a fourth member, the IPS15. The unit was developed and optimized to fit the D8 engines for the commercial market. "It is all about propulsion efficiency and productivity for the yards, designers and operators. This is a fantastic move for us and our customers," said Jakob Ursby, strategy manager for Volvo Penta's Marine Commercial sector. The IPS design features forward-facing twin counter-rotating propellers which are mounted beneath the hull. As the propellers operate in undisturbed water, they cause less drag, which Volvo Penta claims improves performance and fuel consumption by up to 30% compared to traditional inboard engines. Features of the type approved IPS15 package include:

- Improved materials for heavy-duty commercial use.
- Reduced ratio of weight and hydrodynamic resistance.
- Reduced ratio of hull insert size.
- Optimized backpressure with 6-inch exhaust system.
- A new propeller series (N) custom fit for the system.
- Improved maneuverability with increased steering angle at low speed.

Left: Volvo Penta's new D8 and IPS15 package was unveiled to the boating and commercial maritime press in June in Sweden.



(Photo: Volvo Penta)

Volvo Penta D8 Diesel Engine Highlights

HP range	450, 510, 550
Cylinders	6 inline
Cylinder Capacity	7.7 liter
Cooling	Sea Water
Fuel Injection	Common Rail, electronic control
Emission Standards	U.S. Tier III; IMO Tier II
RPM	600 to 1600
Available	January 2017
Control System	EVC E3

Integrated Solutions

Volvo Penta's commercial marine market push involves a comprehensive, integrated solution. While the engines and IPS are central components, the entire package includes a family of intuitive and integrated controls, encompassing a joystick option, docking mode and dynamic positioning; it includes Humphree trim and stabilization products, as Volvo Penta recently took a majority stake (80%) in the iconic company; and it include the 'glass cockpit' solution, which ties together critical operational information in one neat, customizable package. Installation of the IPS with 8-liter engines can be made for twin and triple configurations. For triple installations, one pod can also be disengaged and the engine can be used in PTO mode – for example, in powering a water canon on fire rescue boats – while still keeping maneuverability on the other two. The new package has three power settings: D8 IPS600; D8 IPS650; and, D8 IPS700. The package has been designed to conform to US EPA Tier 3 emissions. The D8 IPS models will be

Put to the test: Helgoy Vind

(Photo: Volvo Penta)

available for delivery in May 2017.

Test Run Results

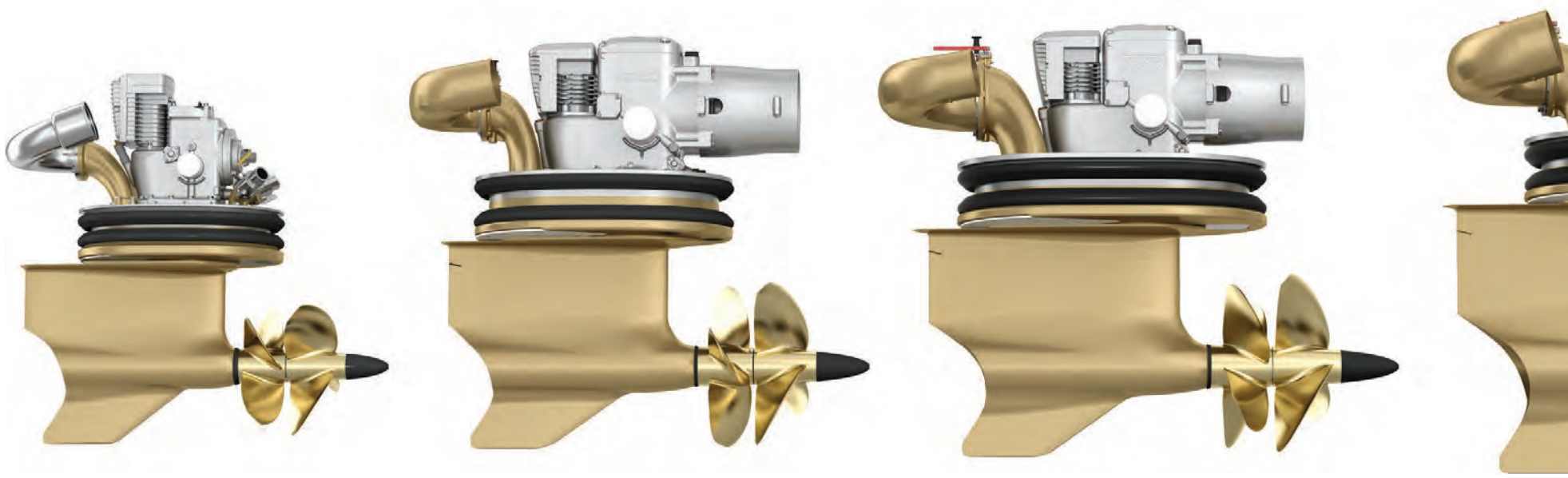
While at Volvo Penta's Global Marine Testing Krossholmen, *Maritime Reporter* took the opportunity to take the helm and test-drive four different styles of boat, each with different propulsion outfit and set-up. All boat specifications are outlined in Figure 1. In overview, the performance of the machinery during the five hours of running these four boats through their paces was excellent, with the D8 (paired with the IPS15, twin screw and single screw configurations) packing an ample punch to bring a variety of hulls to plane quickly (specific performance criteria presented at the event was impressive, and based on professional test drivers running the boats earlier in the year. But the data was labeled proprietary and not available for publication at this time).

In its presentations prior to the test drives, Volvo Penta executives were naturally quick to extol the virtues and performance of the complete system, from the torque of the engine/IPS combination to the control afforded courtesy of the Humphree trim and stabilization products to the ease of control with Volvo Penta's advance control systems.

While it is not easy or practical to equally compare one feature versus another, we were most definitely impressed the intuitive, easy-to-use joystick control.

The joystick delivered as promised, whether it was tested using the new D8/IPS15 set up (as tested on the former Finnish rescue boat Rescue PAF/PTA81) or tested using a more traditional twin-engine, shaft and propeller with electronic rudder and bowthruster (as tested on the Cranchi 48 Atlantique yacht).

The Volvo Penta IPS Range



Boat in Focus

Njord Offshore and The IPS900 Quad

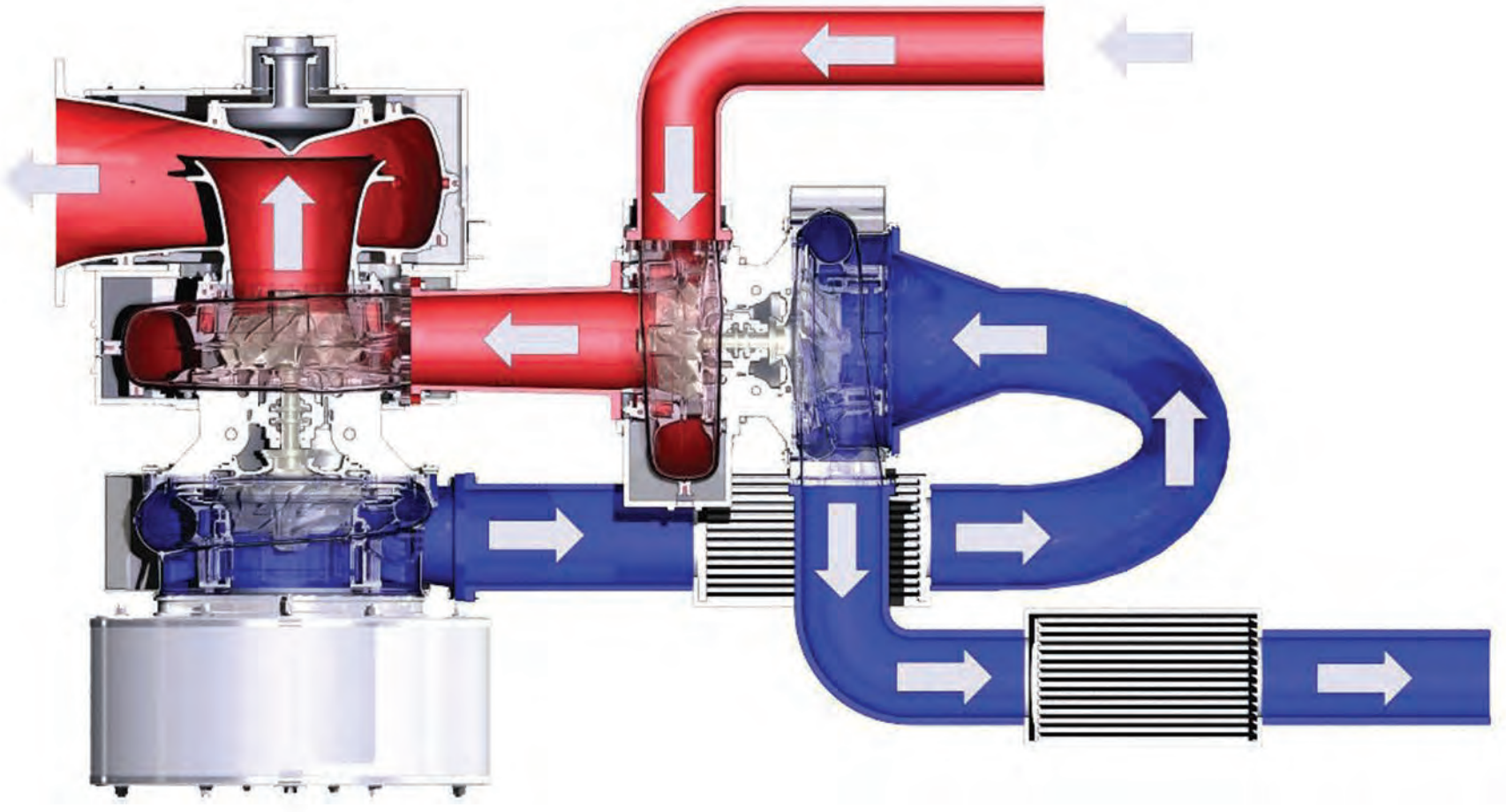

(Photo: Volvo Penta)

As it pushes further faster in to the commercial marine business, Stefan Carlsson, Volvo Penta's Marine Diesel segment head was quick to identify offshore wind farm vessels as an area of particular growth, headlined by Njord Offshore's two new 26m, 24 passenger offshore crew vessels that are equipped with Volvo Penta's IPS900 Quad drives, for operation in the North Sea.

After a year operating four new 26m crew transfer vessels (CTVs) fitted with Volvo Penta's IPS900 Quad drives, Njord has added another two new boats with the same propulsion system to its fleet. In total, the U.K. company now has 15 CTVs of 21m and 26m in its fleet.

"We've been using Volvo Penta's IPS900 Quad system in our 26-meter CTVs for over a year now and all expectations have been fulfilled," said Tom Mehew, director at Njord Offshore. "We, and our customers, require speed, maneuverability and efficiency combined with high static bollard push. The joystick controls are intuitive, the control response times are fast and accurate which ultimately makes docking on a boat landing in rough weather easier and safer."

The 26m CTVs were designed by BMT Nigel Gee and built by Singapore-based Strategic Marine. They have two Volvo Penta IPS900 drives in each hull. The precision handling and maneuverability provided by the system's joystick steering, high thrust propulsion and Dynamic Positioning System, help to ensure that a vessel can be held in a steady position against wind turbines, even in conditions of strong currents and high waves. With four IPS drive systems, the catamarans can operate at high speeds even when fully loaded, reaching 27-29 knots.



Above: Working principle of the **MAN ECOCHARGE** Two-Stage Turbocharging System.

Turbocharger

More Air is Key

Better Turbocharger Performance, Proven Tech

Engineer wisdom: Nothing is worse as the right idea at the wrong time. But with the new ECOCHARGE Two-Stage Turbocharging System MAN D&T has reached both goals.

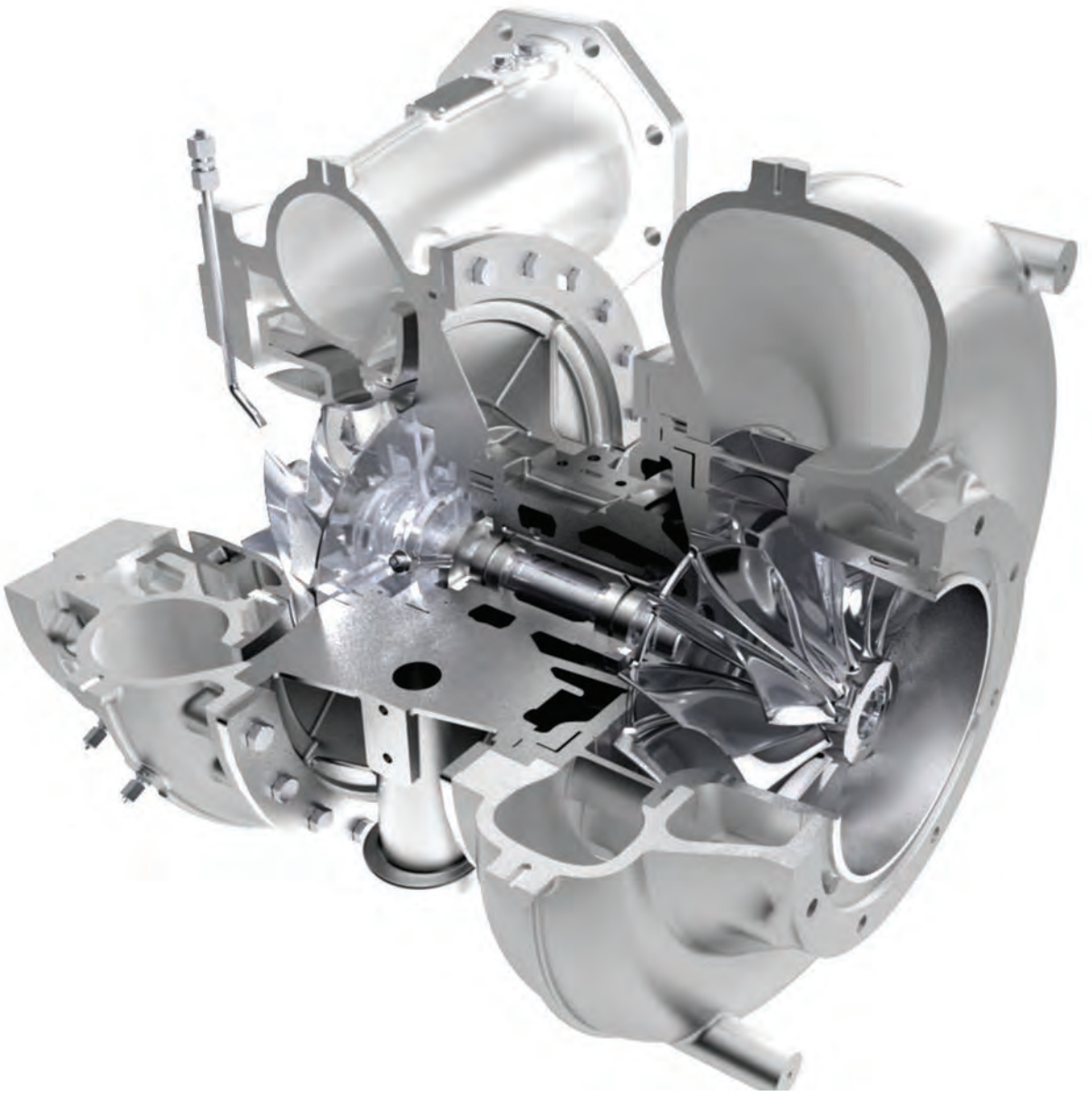
REPORTING BY PETER POSPIECH

Aside from the ever-popular "Fuel Consumption Reduction," a leading player in the development of large combustion engines since the second halve of the 1980s has been reducing harmful exhaust emissions.

In view of increased environmental awareness and the future price movements for fossil fuels, these two factors will remain a dominant force in future engine developments for the immediate future. Even more, since the beginning of air pollution control, the greenhouse gas emissions has been the main point of dispute because the CO2 emissions are directly proportional to fuel consumption.

Therefore, the development activities intensively concentrates on favorable fuel consumption values with, at the same time, reduced harmful emissions without additional fuel consumption.

Consequently, legislation for further limitation of nitrogen oxide (NOx) emissions on large diesel engines lies at the heart of the current engine developments at MAN Diesel & Turbo in Augsburg, Germany.



The new MAN D&T TCX17 Turbocharger for the high-pressure stage.

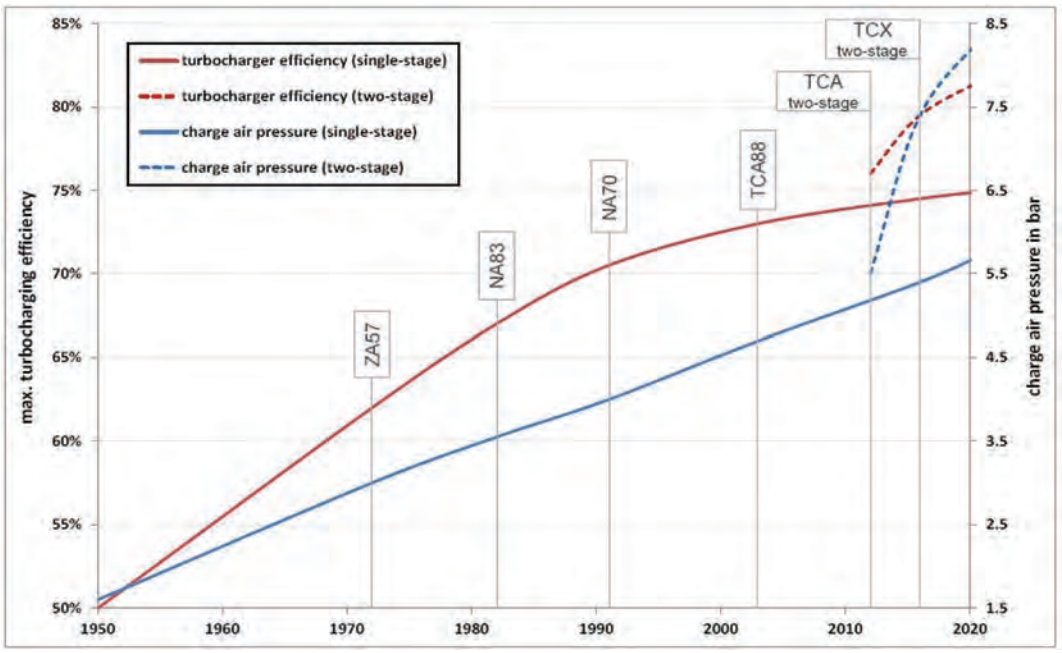
Technical Turbocharger Update

During a press seminar in the Spring of 2016, MAN D&T Business Unit Turbocharger published its current development activities in the field of combustion air supply. Being a traditional turbocharger pioneer, MAN D&T never gave up its technological leading position since the beginning of turbocharger development and production in the early 1920's. Just a few years later, in 1940, MAN developed the fundamental turbine group concept, which, at all sizes of turbocharger, became predominant.

The well advanced turbo-charging technology introduced by MAN D&T, significatnly increases the efficiency of large two and four-stroke diesel and gas engines, while at the same time helping to reduce NOx emissions.

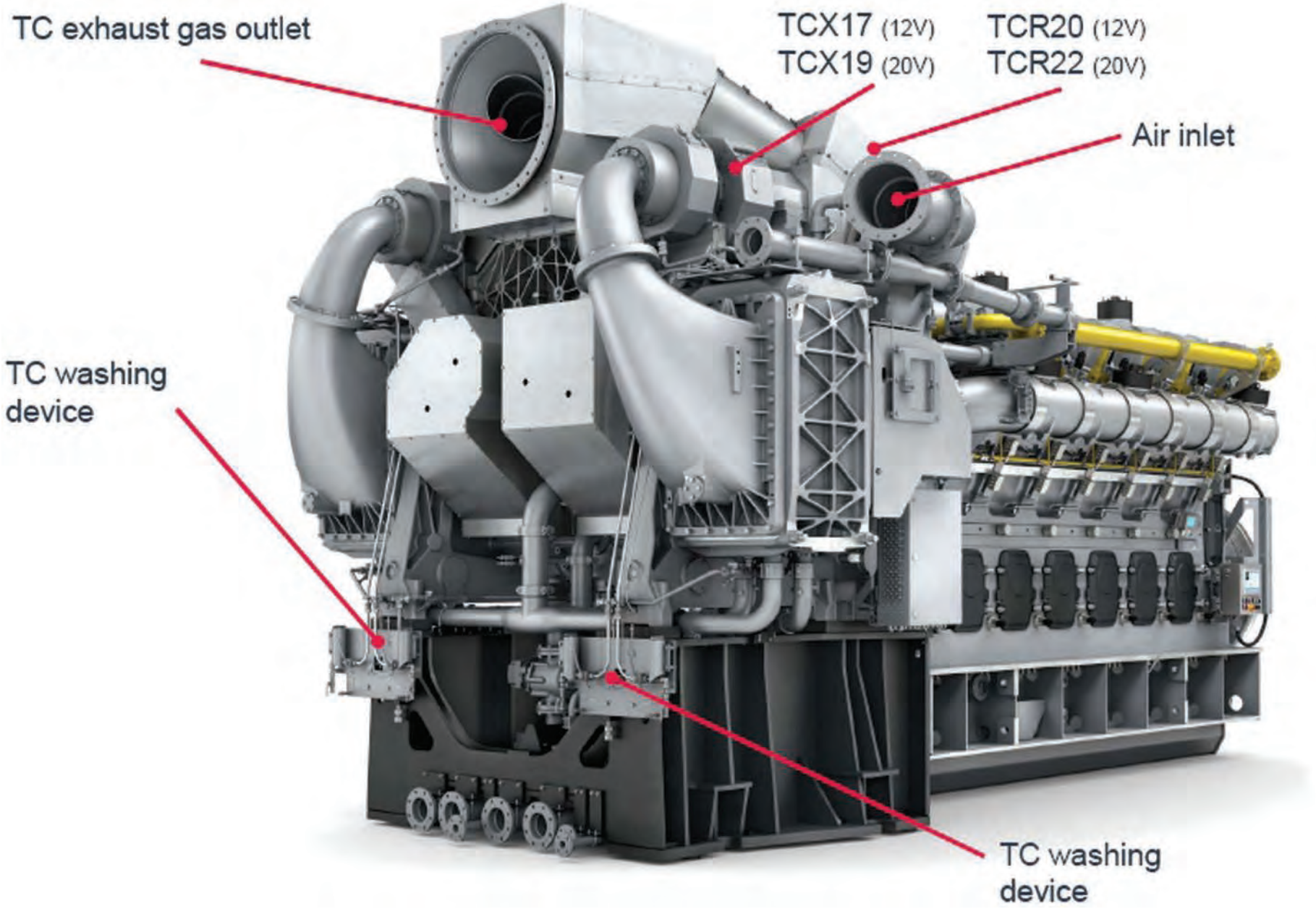
MAN ECOCHARGE: High-Pressure Turbo-Charging

"The combination of a MAN TCR20 – for the low-pressure stage – and an MAN TCX17 – for the high-pressure stage – offers significant potential for today's demand for more economical and environmentally-friendly engine operation," said Daniel Albrecht, Project Manager TCX. "This is because two-stage turbocharging supplies engines with improved scavenging air pressures ranging from 5 to >10 bar,



ECOCHARGE Turbocharger Efficiency & Charge Air Pressure in Comparison to Single Stage Turbocharging.

A V35/44G TS with the new TCX-Turbocharger.



as well as significantly improved turbocharging efficiencies."

According to MAN D&T the benefits for the customers are tremendous:

The new MAN ECOCHARGE Two-Stage Turbocharging System offers major benefits for engine builders. The increase in turbocharging efficiencies, in comparison to single-stage turbochargers, is mainly related to the intercooler – positioned between the low-pressure-stage and high-pressure-stage turbochargers – that significantly reduces the energy required to compress the intake air to high pressure. The resulting higher efficiencies have an instantaneous impact on the engine by advantageously increasing the air pressure over the cylinder during the scavenging process. Additionally, greater turbocharging efficiency fosters the reduction of NOx emissions through the Miller engine cycle while the improved scavenging efficiencies provided by the ECOCHARGE system make the engine more fuel efficient, as Albrecht underlines: "Fuel saving of up to around 8% are possible". Additionally he reports that the ECOCHARGE system has been developed for both gas- as well as HFO-burning engines.

MAN D&T recently introduced its engine portfolio with the ECOCHARGE Two-Staged Turbocharged System which includes, for the time being, the following engine series: The 18V48/60TS which is already in operation since 2012, followed by the newly 12/20V32/44CR TS with an power increase of approx. 11 percent, the 12/20V35/44G TS with an power increase of about 20 per-cent, as well as the 18V51/60G TS with cylinder outputs of 1050/1150 kW/cyl.

Retrofit & Modernization for Turbocharger

Retrofitting, particularly for the new ECOCHARGE Two-Staged Turbocharged System, is a key element of MAN D&T. "Whether replacing an existing turbocharger or introducing the latest (ECOCHARGE) technology for four- and / or two-stroke engines, the company provides end-to-end-support," said Albrecht. The first retrofit of the new ECOCHARGE has been done on Holland America Line's MV Westerdam, and two more HAL cruise ships will follow shortly.

A New Player: MAN 175D

"With the MAN 175D, we are supplementing and completing MAN Diesel & Turbo's and MAN Truck & Bus's product portfolio in the maritime sector," said Lex Nijsen, Vice President, Head of Four-Stroke Marine. The new engine range will be offered with an output spectrum from 1,200 to 3,700 kW.

The 12-cylinder version of the MAN 175D is designed to fit in precisely with the needs of commercial shipping market, optimized for propelling ferries, offshore supply vessels, tug boats and working vessels. Other applications, such for super yachts, are served by additional specialist model versions.

"The MAN 175D is compact, reliable and efficient – properties that are of essential importance for use on working vessels to allow safe maneuverability in the most challenging and roughest weather conditions," said Nijsen. "The business case behind it also has to be right for the customer. And this is where the engine sets standards in more than just fuel consumption. Our aspiration is to make the MAN 175D the overall most efficient engine throughout its lifetime."

The MAN 175D also scores highly in terms of its eco-friendliness. Its compact and modular exhaust gas after-treatment system uses the selective catalytic reduction (SCR) method and is based on the MAN Ad Blue technology that has undergone many thousands of hours of testing. The engine will therefore satisfy the strict environmental standards of the IMO Tier III from the moment it hits the market.

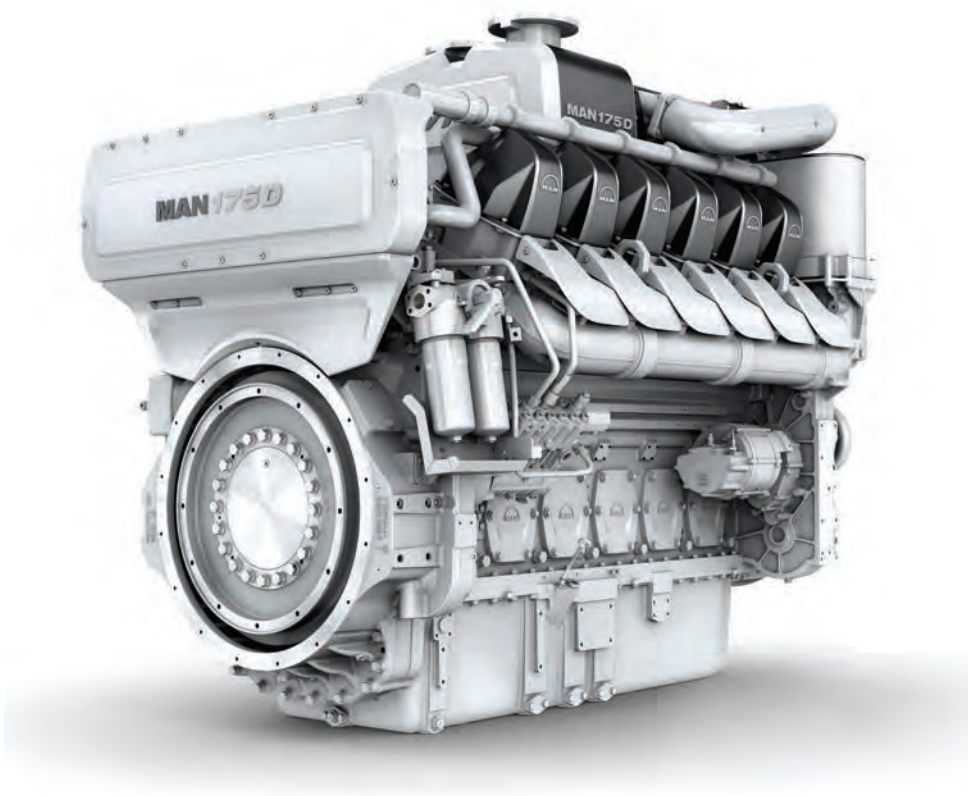
The compact and robust engine is designed for user-friendliness and efficiency: "Simple commissioning, simple operation, simple maintenance," said Nijsen. "Its compact dimensions and low weight make the MAN 175D an efficient power house."

In the first instance it has been announced by the company that they come with a 12-cylinder only. But meanwhile MAN D&T has extended the number of cylinders.

The 175D, a conventional diesel engine, is available as 12, 16 and 20 cylinder in V-configuration with a V-angle of 60 degrees for all cylinder variants. The new engine series features, according to the company, a modular engine design for a high number of identical components – even the crankcase will be the same for all numbers of cylinder. This is done by integral balancing gears on the 16- and 20 cylinder units.

With a bore and stroke of 175 mm x 215 mm (displacement of 5.2 l per cylinder), the 175D will be set to deliver 135 - 185 kW/cylinder at 1,200 – 1,900 rpm (1,620 to 3,700 kW) with a bmep of 25.96 / 22.46 bar; the max piston speed is of 14.3 m/s, ensuring that the traditional reliability and robustness of MAN D&T Marine engines is maintained. The 175D is a turbocharged, charge air cooled, non-reversible four-stroke diesel engine. The engines feature MAN D&T SaCoS (Safety and Control System on engine), TCR12 Turbocharger, Common Rail injection system and SCR after-treatment.

MAN D&T's newly developed 175D which supplies power from 135 – 185 kW/cyl at 1,200 – 1,900 rpm.



Driving Ballast Water Technology Right Out of Business

JOSEPH KEEFE

I must admit that I often struggle to understand where we are headed with the ballast water treatment quandary. But, every once in a while, someone puts things in perfect perspective, so even I – a former boat driver with no engineering skills whatsoever – can understand it. Last month, this brilliant flash of enlightenment came from the U.S. Coast Guard's own Maritime commons, or what they characterize as their 'Coast Guard Blog for Maritime Professionals.'

The blog is typically very informative and I encourage everyone to dial in and soak up the wisdom. I usually look forward to it. For example, on May 16, the headliner involved, "Ballast water treatment, uncertainty and what to learn from it all." The writer was none other than U.S. Coast Guard Rear Adm. Paul Thomas, assistant commandant for prevention policy. If you aren't familiar with him, well, he's the guy at the pointy end of the spear when it comes to ballast water compliance and, more importantly, the regulatory approvals necessary for BWT manufacturers to be able to sell their products into the market. As for the latter item, we currently have no approved systems here in these United States. But, I'm drifting off course a little.

The Blog

Within that May 16 entry, RADM Thomas tells stakeholders: It's no secret; there is a great deal of angst over the International Maritime Organization (IMO) Ballast Water Management (BWM) Convention, the U.S. BWM regulations, and ballast water management system (BWMS) type approval processes. Many in the shipping industry have called for measures to ensure that never again are we put in a position where regulations call for technology that doesn't yet exist, or type approval requirements that cannot be met by commercially- available technology; however, the very nature of the environmental challenges facing the shipping industry not only precludes the elimination of such dilemmas – it demands them. Regulation can provide the critical forcing function that drives innovation and encourages technological developments to meet the environmental challenges. This occurs when regulations set 'stretch' goals and incentivize investment to meet those goals. Regulations that embrace the status quo and codify existing commercially-available technology only serve to stifle innovation and prevent industry from meeting environmental challenges. Both the IMO BWM Convention and the U.S. BWM regulations set a discharge standard that represents a stretch goal, and they drive investment and innovation towards the development of solutions that are both effective and practical. Future environmental challenges will require similar regulatory-forcing functions.

He's right about one thing: there is a great deal of angst amongst industry stakeholders. But, that's where he and I diverge. I'm told privately that the BWT sales situation is agonizingly slow, as ship owners hedge their bets against what the coast guard might come up with next. You can't blame them. On the other hand, at least 50 firms await some sort of edict from the U.S. Coast Guard on what's acceptable and what isn't. Not all of them will have the wherewithal to hang around until it comes. To be fair, that's not the problem of the Coast Guard. Or, is it?

Regulations Driving Innovation?

Getting back to RADM Thomas' narrative, it is clear (at least to this writer) that we have come full circle in the effort to effectively battle the scourge of invasive species. That's because you could probably take the Coast Guard position – as laid out above – on BWT, and find someone from the great state of California advocating the exact same thing. You see, that's the position they adopted when pushing their insistence of a ballast water treatment standard that was 1,000x the IMO benchmark. You couldn't even measure to that standard then – and you still can't. But saying it again now is no less silly than it was when the Golden State came up with it many years ago.

Thomas – as did California before him – would have us believe regulation can provide the critical forcing function that drives innovation and encourages technological developments to meet the environmental challenges. He calls this policy one of incentivization and one that produces 'stretch goals.' On the surface, that's a fine way to produce future results, but unfortunately, we're dealing with the here and now, especially when it comes to ballast water treatment.

If the Coast Guard, EPA, individual states and/or the IMO want to encourage innovation, I'm all for it. But 'stretch goals' don't solve today's problems, especially when the technologies now exist to eliminate 99 percent of our invasive species issues – based on anyone's criteria, including the U.S. Coast Guard. It is time to get the equipment onto the ships, and actually start to solve the problem. And, there are many layers to the onion that makes this so true. If I concede for a minute that regulations can and do drive future innovation, then I'm also allowed to say that the innovation that the Coast Guard seeks – if it comes at all – will be a long time coming and furthermore will eventually emanate from just a handful of players. That's because many of the firms in this space right now exist to fill just one business niche. Sure, there's a few who have multiple business units and can in theory weather the regulatory storm until something concrete arrives from inside the Beltway. I'm also betting, however, that some of those more solvent and diversified firms will also eventually decide that it just isn't worth the hassle. And, who could blame them? At the point where this "incentivized innovation" does arrive, I would argue that neither the manufacturing capacity, nor the dry dock space will exist to take on the immediate challenge of getting everyone in compliance. Installing BWT equipment isn't like heading over to the price club to shop for discount tires. It is a multiple month process of planning, measuring, ordering the equipment for production and securing shipyard time to get it done. As it stands now, we're still years away from full global compliance.

The Future is Now

With all due respect to RADM Thomas, when it comes to ballast water treatment solutions, we no longer have the time to incentivize innovation. The time to do it – if it ever was possible at all – was 15-20 years ago. Furthermore, I would argue that – in the eyes of most of the world – OEMs have over time responded with resounding success. Today, thousands of ship operators await some sort of signal to do what all of them want to do: operate in an environmentally correct manner with approved equipment. But, that's not going to happen.

The current regulatory climate isn't driving innovation. It is instead driving the innovators out of the market. And, that's a far more serious problem than deciding how to determine what's dead, what's alive, what is viable, and everything else in between. As for me, I'm holding out for that magic box that accurately measures 1,000x IMO BWT efficacy.

BY STEVE FISHER, TOM CURELLI AND JIM WEAKLEY

OpEd Ballast Water Without the Hype

An Op-Ed issued by the Lake Carriers' Association, American Great Lakes Ports Association and Great Lakes Maritime Task Force addresses the "exaggerations and inaccuracies" surrounding the Vessel Incidental Discharge Act (VIDA), and explains how the legislation will best protect the Great Lakes from aquatic nuisance species.

Recently, several articles, editorials and letters have perpetuated exaggerations and inaccuracies about the Vessel Incidental Discharge Act (VIDA). We believe the public deserves the rest of the story.

VIDA consolidates vessel ballast water regulatory authority under the U.S. Coast Guard (USCG), confirms the current USCG ballast water regulations, and provides for a periodic process to upgrade the USCG ballast water discharge standard (BWDS) with input from states and the EPA.

Some VIDA opponents claim it eliminates current requirements that vessels treat their ballast water, inferring that only judicial enforcement of the Clean Water Act (CWA) drives this requirement. Others claim this consolidation would make the Great Lakes vulnerable to more aquatic non-native species (ANS). Most cite the Lakes' experience with zebra mussels as an example of what will happen. We agree that ANS introduced into the Lakes years ago caused harm, but the rest is hype.

What they do not say is that Lakes ANS were all introduced before 2006, when the USCG, under a separate authority than the CWA, began requiring vessels entering the Lakes from outside U.S. waters to exchange their ballast water with ocean water. Since then, no new ballast water-borne ANS were introduced into the Lakes, despite thousands of foreign vessels entering the Lakes since then.

These articles, editorials and letters claim the USCG's rules for treating vessel ballast water are too weak, but they are just beginning to be implemented so their effectiveness cannot yet be fairly assessed. Also, ballast water treatment is in addition to the Lakes' already highly effective ballast water exchange requirement. Equally important, the USCG and the EPA independently determined that the technology doesn't yet exist to meet a more stringent BWDS. VIDA opponents also claim VIDA would freeze the current USCG discharge standard. This is a wild exaggeration of VIDA's process for reviewing and improving the USCG BWDS. Also, contrary to some statements, the USCG has far greater experience regulating vessel discharges and inspecting vessels than the EPA or the states.

Some VIDA opponents claim it's exemption from ballast water treatment for vessels serving only Lakes ports ("lakers") will spread ANS among these ports. However, current EPA and USCG regulations already exempt lakers from ballast water treatment and instead require extensive best ballast water management practices. Since the USCG began requiring mid-ocean exchange for other vessels, lakers have discharged approximately 66 billion gallons of ballast water from the lower Lakes into Lake Superior waters. According to the EPA, U.S. Geological Service, and National Oceanic and Atmospheric Administration, no ANS have been moved anywhere in the Lakes by lakers. Clearly, lakers are not the problem.

Why is there opposition to VIDA? Some groups focused on general environmental goals see lawsuits against Federal, state and private entities as their preferred mechanism of change and confuse competing and conflicting regulations with progress. However, laker operators were one of the first groups to sound the alarm on ANS. In 1993 we instituted our own best management practices to prevent ANS interlake movement. Laker operators work with government agencies, universities, research institutions and environmental and engineering experts to move the state of science and technology forward. The Federal government is establishing ballast water management technological standards, inspection and monitoring criteria and enforcement capabilities. We see few signs that VIDA opponents are working equally as hard for solutions that really work.

CWA was specifically designed for fixed industrial facilities handling substances such as industrial wastes, sewage and garbage, not the Lake water used as ballast by lakers. Commercial aircraft and trains do not have to meet varying equipment requirements for each state they serve or pass through; they meet nationwide Federal standards. Applying the same approach to vessels will not have a disastrous effect on the health of the Lakes; it will just reduce conflicting and redundant regulations that cost good-paying jobs and increase consumer prices.

VIDA is well-reasoned, common sense legislation, and it will result in significant new protection against ANS threats. VIDA keeps the gate closed to aquatic non-native species and gives the Coast Guard, the agency who closed the gate, primary responsibility as our national invasive species gatekeeper.

The Authors

Steve Fisher is Executive Director, American Great Lakes Ports Association. Tom Curelli is President, Great Lakes Maritime Task Force. Jim Weakley is President, Lake Carriers' Association.

Candid Conversation

FRANK COLES

CEO, Transas

"THESIS is ...

A globally-connected ecosystem for the shipping industry. It is a platform for the shipping industry, a way of creating maximum integration with the stakeholders in the shipping industry for safety operations and navigation."

Frank Coles, Transas' candid and visionary leader, discusses how the proliferation of information is driving everything onboard commercial ships.

By Greg Trauthwein

You joined Transas to take the top spot a little less than a year ago. What drew you to this job? What drew you to Transas?

I was sitting in the Caymans, I'd been sitting there for nine months doing a lot of diving and just having some time off for the first time in my life. And, I have a friend who works at Transas, who has been at Transas since 1997… George Toma. I was with George at Sperry (Marine) when he left, and I was one of the people he talked to about leaving Sperry to go to Transas. So when I got the call, for me, it was a rounding off of my career. I'd gone to sea when there were sextants and no GPS. I'd gone to sea when there were no satellite communications. And then I was here in the middle of the maritime communications evolution. I had gone as far as I could in maritime communications. So when the opportunity came with Transas, with its technology – particularly on the navigation side – I thought, "This is an opportunity for me to bring all of the pieces together."

So you come to Transas, you step into the top spot; what are the opportunities you saw? What are the challenges?

The opportunity is endless, as there's a lot of smart and enthusiastic people here. The opportunity is to feed off the clever technology and the clever entrepreneurs in-house. The opportunity is to work with an engineering team that is leading edge, not a team that is just building boxes.

And what about the challenges?

The challenges are more boring simply because it's the same with any new company, or same with any company actually. Transas is 25 years old, so it's still relatively young, but it's also a company that's grown up quite fast. This usually means that you get left behind in some of the usual operational things that need to be improved. But for the most part everyone's very open to the change and very open to positioning the business for future growth and success. But change of this magnitude takes time. When you want to turn a supertanker, you don't just turn the wheel and the tanker turns – it takes time to move the ship.

Okay. That leads into my next question: Which way are you turning the ship? What are your near-term and long-term vision for the company?

The first way is that Transas has been largely driven by four business divisions. We started a process of moving it into a single functional organization so that our divisions will go away, becoming one Transas.

So the responsibility becomes a global picture rather than in four different little groups. In this way we can be one company across the globe, and it also strategically fits with where we want to take the products and where we want to take the market, and where we see the market going. Let me explain. Right now, you've got a simulation division and then you've got a navigation division and then you've got a shore-based division. They operate independently. The Simulator guys build a simulator, they sell it to a school, they sell content to the school. The Navigation guys sell an ECDIS, and there's no link. Shore-based guys go out and they build a port vessel service, or they build a coastal vessel service – there's no link. In line with the thesis, and in line with the whole idea of creating global connectivity and a less fragmented marketplace, I see in our vision in taking the company, that ship, that ECDIS (which is an information system), and connecting it with the office a lot more. There's going to be a more interplay of the services.

It's about sharing information seamlessly across the value chain and with partners (ship traffic control and coastal surveillance, for example). There's no reason why training programs can't go backwards and forwards between the ship and the simulation organization,

or into the ship owner's operation center. (9:20) And then if you look at it at a different layer, from a technology advancement of the business, we shouldn't be developing stuff in four different agnostic kind of scenarios. We should be looking about how they interconnect.

THESIS is obviously a major focus. We have ample background and have published much information on it. But if you had to bust it down into a sentence or two, what is THESIS?

It is a globally-connected ecosystem for the shipping industry. It is a platform for the shipping industry, a way of creating maximum integration with the stakeholders in the shipping industry for safety operations and navigation.

Moving from theory to reality, where are we today? Put a realistic spin, how close are we to your vision of operations at sea via THESIS?

If you look at the top end of the market in the cruise industry or the container market, (they are moving toward) the idea of operating a ship with a fleet operations center, seeing the ship as a remote floating asset on that network. But that isn't to say that some of the others are not already thinking about it too. Particularly this idea of a fleet operations center where they are monitoring much more about what's going on with the ship.

Obviously there are drivers for every business decision. What do you see as the driver to take this further, faster, from concept to reality?

I believe the driver will end up being financial, because they'll end up realizing that they can operate the ship more efficiently.

You hear a lot about Big data, and you hear a lot about getting (and using) analytics. It's really easy to talk like that until you realize that to make it effective you need to change the attitude of how you treat the human element. You need to set up an operations center where you have people who can make decisions based on this information. Once that happens, I believe there is an opportunity to cut down the number of crew on board.

From your aspect, how are you going to sell it, particularly given the tough times across several major sectors … not to mention the historic thriftiness of ship owners?

We're going to sell it on the fact that this allows you to have much more flexible operations, with the chance to decrease your operating costs simply.

But it's about much more than that. It's also about the fact that we would be able to share the data with the ports, or share the data with the coastal surveillance, and join a number of dots. The other part of THESIS is that your ship and your office and your coastal surveillance and your simulation training … before THESIS, they operate independently. But what can happen if everyone is sharing the same data or using the data in the same way. What if you're taking a particularly rough passage where you've got a particularly tough port and that data is shared on board the ship, from the ship is then shared to the simulator, then the other offices can use the same data to run through training programs. What if there's online training that the simulation or the academy has prepared that then the owners on board, the crew on board can run through training programs, or other schools can share that data. Or the ship-owner's office can have a simulator in his office for running crisis management tests. It is providing an ecosystem and an ability for all these segments to be connected.

Finally, all that we're discussing plays into another conversation, that of Autonomous Ship operations. What are your thoughts on the future of unmanned ships sailing the high seas?

Could we run a ship from A to B today autonomously? Yes. Depending on how many sensors and how much stuff you've got on board and how much risk you want to take. I think to get to an autonomous ship there are a lot of hurdles and a lot of stakeholders to overcome. I don't think technology will be the inhibitor.

Economies of scale: the Omnirise ECM subsea boosting pump system.

(Illustration: courtesy FSubsea)

Pump Battles

Subsea Notebook: communications, telemetry & underwater connections

In one corner, call it Oslo, there's military and offshore marine pump maker, Fuglesangs Subsea (Fsubsea), with technology aimed directly at radical cost reduction and compelling all players to take note. An ally of FSubsea (and of other pump makers) is NEBB engineering, an area builder of variable-speed drives, or VSDs, and a dynamic controls and communications outfit with its own pool of reliable, digitizing engineers in that most subsea of all places — Macedonia. Acutely aware of what this alliance brings is big rival Aker Solutions, with its own subsea control systems and compressors.

By William Stoichevski

Neither camp is alone in trying to meet oil company demands for seabed pump technology that increases oil recovery (IOR) or taps smaller reservoirs while lopping off costs. In Norway's pump battles, digital drives for those pumps can define whether there's a great new market or the old one dominated by big players.

In joint industry projects (JIPs) National Oilwell Varco (NOV) and German engineering firm Voith Subsea have been along for FSubsea's subsea trials for seal-less, topsides-free pump systems for drilling fluids, water-injection and well stream called Omnirise (collectively).

"The aim was as little topsides control as possible," said Alexander Fuglesang, chief exec of FSubsea. In 2013, the subsea business was spun out of Fuglesangs Engineering which was "under the radar making pumps for nuclear submarines the navy and offshore applications." A U.S. investor put 20 percent into the new entity. You reap what you sow, and now trials have brought oil company letters of intent and German interest in at least water pumps.

Sensing what's at stake, arm's length Norwegian grant-giving bodies have also pitched in. The Ominrise's novel electrical centrifugal pump drive and coupling system, based on a permanent magnet trademark called Hydromag, aims to dramatically simplify seabed boosting and aims to cut costs by "tens of millions of dollars" per project. The JIP in search of a cost-cutting pump (FSubsea), motor (Voith) and controls (NEBB Engineering) in one system has yielded the successful trial of a lightweight cooling pump for Kongsberg Subsea that cools single-phase fluids (gas, oil or water) about to travel from the seabed as export volumes or for re-injection in the reservoir (see NOV's trademark Seabox). It is understood that a MW of lift is provided by the pump shaft. A multi-phase version (gas, oil and water) is under development.

FSubsea

The Omnirise is the "world's first seal-less subsea process pump" and is smaller and more autonomous for having variable speed functionality in the pump. Normally, an electric variable frequency drive (VFD) on surface topsides or a separate subsea housing do the controls job. A special coupling system applies a hermetic pressure barrier between the pump's process and the motor's cooling fluid. In comparison, the VFD is described as part of a "pricy, complex" barrier-fluid pump system which can weigh several hundred tons.

A Smile for Progress:
FSubsea CEO Alexander Fuglesang.

(Photo: William Stoichevski)

The built-in VSD pump would make the VFD superfluous.

At first glance, FSubsea's trademark Omnirise seems destined to provide lift for smaller fields (although partner NEBB is working on a large VSD). Aker's compression and subsea electronic modules seem right for the big projects, and in Norway, oil company planning placed Aker Solution's compression trains and control systems at the Ormen Lange, Gullfaks and Aasgard fields. It's easy to envision alliances forming roughly around large field compressor types versus the IOR (EOR in Houston) crowd. This battle of pump and control system makers pits the newly tested and promising against the heavyweights of subsea with their own "next generation" kit (see OneSubsea). The FSubsea spun out of 100-year-old Fuglesang AS already employs at least 30 years' worth of Aker compression expertise.

Variable-Speed "Magnetism"

In the middle of this subsea compression world are the veteran father and son team behind NEBB Engineering, a veteran maker of control systems and

VSDs, including a 45kW version that appears to be central to Omnirise.

While subsea pump maker FSubsea challenges the bigger players on cost by eliminating the need for protective fluids in a cooling or compression pump, NEBB and Voith have engineered the pump's built-in VSD and permanent magnet coupling to match the motor's speed (low) to the pump's process. The resulting "magnetism" creates a "suspended," "virtual" or hydrodynamic "separation" between managed well stream and motor fluid spun at low speed. Normally, a subsea pump needs a physical separation of fluids. Since the seal-less FSubsea pump also eliminates the need to place the pump or VSD topsides, it's potentially a killer savings machine for maintenance-weary oil companies accustomed to the symptoms of seal failure (said to be associated with "75 to 80 percent" of pump failures and emissions).

NEBB Engineering

Along with Statoil, FMC and others, the 20-year veteran NEBB identified three groups of VSDs that would suit Statoil's declared vision of arranging all production components on the seabed to create a "subsea factory": 22.5 kW, 45 kW and up to 1,500 KW.

The 45 kW version was qualified with Kongsberg Group in 2014 using a standard Ethernet connector and "active cooling". Managing director Alexander Risoy, who went to university in Scotland but lives with his finance-director dad, Aasmond Risoy, in downtown Oslo, says NEBB investigated old land-based VSDs for subsea use, especially Italian versions, and learned, "The challenge of subsea VSDs is to get rid of the heat. We need to keep the 45 kW unit below 30 degrees Celsius. The electronics will dry out if the temperature is too high."

NEBB's JIP with FSubsea, Voith, ABB, Statoil, Total and EON on a prototype to control smaller pumps offers the allure of financial support in developing a 500 kW VSD starting in 2017.

"To develop the 500 kW unit we need the support of the oil company," said the elder Aasmond Risoy. At $1.25 to $2.5 million each, the 500 kW price tag would be considerably cheaper than the $12.3 million version used at Ormen Lange. Size determines price with VSDs as with

(Photo: Courtesy NEBB)

pumps, it seems. So it's the 45 kW version for now, and oil company interest in it has already brought orders for a couple hundred units.

Unlike some of the competition, Fuglesangs and NEBB have established pump, VSD and controls business with other industries. Apart from the military, Fuglesangs pumps serve gas and water companies. Subsea mining looks promising. NEBB's controls business serves an increasingly large swathe of the burgeoning Norwegian land-based process industry, including mining, but also the digitized machinery of automated mass production. Siemens, National Instruments and Schneider are understood to be customers and competitors.

Helping NEBB meet the demand are a pool of digitizing engineers in Skopje, Macedonia, a forgotten engineering hub of the former Yugoslavia. The rest of Europe has been stripped clean of such brainpower: "We're finding the engineers the others missed," said CEO Risoy. "When the trend shifts, we have other areas we can serve (with the talent pool)." For now, however, there are regasification controls offshore and SCADA work for moon-pool controls.

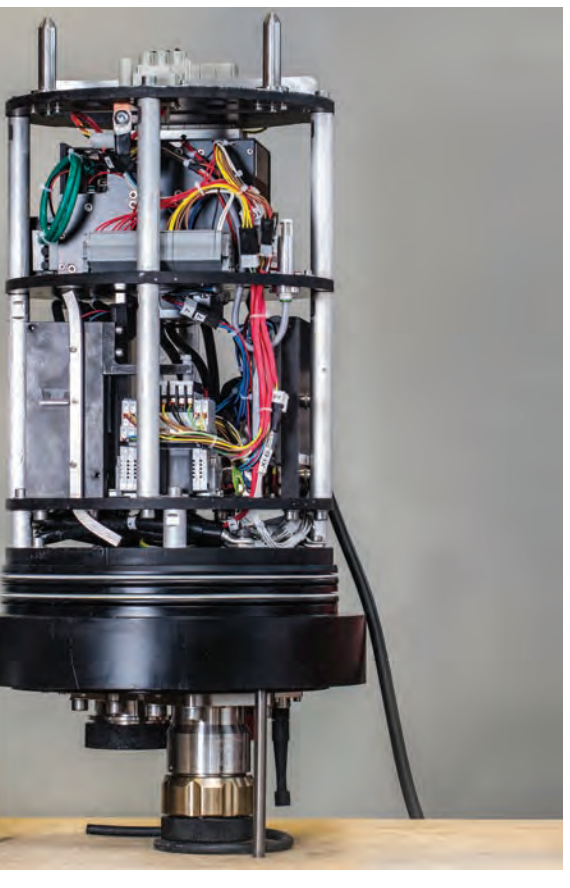
Omnirise's Rise

Fuglesang, meanwhile, is proud of the 28 pumps installed for dredging and drilling operations worldwide. After the success of seabed tests in Oslo, the Omnirise series, too, can target an estimated 1,500 subsea fields that could benefit from 20 percent more IOR.

"One percent IOR can be a billion kroner," said Fuglesang, adding that some 520 tons of weight need not be installed, along with its complement of umbilical that can be $1.5 million per kilometer: just a single cable to a switch and a low-pressure casing make it easy to incorporate several Omnirise units.

"It's not a breakthrough but two or three proven technologies," said Fuglesang. "We're happy and proud to stand on the shoulders of others."

In early 2018, the hydro-magnetic system will go through an industry qualifying stage, and Fuglesang hopes pump orders will follow. A year after that, "If all goes according to plan," a multiphase (oil, gas and water at once) pump will be qualified.



Five Minutes with Paul SwitzeR

Manager, Shipbuilding & Offshore, Viega

For readers not familiar with Viega, please give a 'birds eye' view, putting the company in perspective in terms of the products and services you provide, global reach, etc.

The Viega Group, with a tradition of innovation for more than 115 years, has more than 4,000 employees worldwide and is a leading manufacturers of pipe fitting installation technology for shipbuilding, industrial, commercial and residential projects. In the U.S., Viega LLC employs nearly 500 people and offers more than 3,000 products. These include Viega ProPress for copper and stainless, Viega MegaPress for black iron pipe and Viega PEX Press systems in Zero Lead bronze and high-performance polymer.

In a world where many may consider pipes and fittings 'standard' fare, please discuss points of differentiation in the Viega process.

There is nothing "standard" about Viega. Press technology is an alternative method to installing piping instead of traditional methods like welding or threading. Viega offers a quick, reliable and safe way to install piping, while allowing the completion of complex projects within strict deadlines and budgets. Installers are mobile, which allows them to easily install fittings using a battery tool and move from deck-to-deck without bulky equipment. When considering the Viega advantage, press technology is only part of the picture. We maintain five strategically located manufacturing and distribution centers across the U.S., which means we deliver faster than our competition. We also offer industry-focused training opportunities onsite and at our educational facilities in Nashua and Denver. With the most innovative tooling and the most comprehensive line of fittings and materials, Viega is a good match for shipbuilding, from new construction to repairs.

Please put in perspective the different markets you serve. Specifically, our readership is most interested in Maritime and Offshore Oil & Gas; what percent of your annual sales is to these markets?

Military, Commercial, Oil & Gas Offshore, Cruise and Mega Yacht are the key marine markets for Viega. Because we are diverse and don't rely on one market segment, we have a semi-balanced sales ratio between markets. Military represents 30% of our sales, with Commercial a close second with 23%, O&G Offshore at 20%, 17% for Cruise (repair only) and Mega Yacht new construction and repair at roughly 10%. We predict a change in these percentages in relation to our plans to introduce new systems into the maritime market through 2020.

Maritime and Offshore markets are obviously cyclical; what is your company's philosophy to successfully navigate various and unpredictable peaks and troughs?

Our philosophy is simple: You can do more with less. Press technology helps complete projects with less time, budget and manpower. This is ever-important in a maritime market searching for the best practices in today's environment. We are continually evolving our press solutions, which offer new systems and products to our customers. This offers a unique opportunity to always be an educator and innovator and experience growth even in downturns in the maritime market. Currently we are adding talented individuals to our Technical Marine team. We also are fortunate to be the leader in the industrial, commercial and plumbing markets where the same products are integrated into new construction projects and MRO solutions.

Please discuss a recent case studies where Viega products have been used.

It is unfortunate and unsafe when a ship finds problems with the fire main. In one case we were asked to assist a large customer with a series of ships that were built with welded stainless pipe and fittings in the fire main. After three years in service the pipes were failing, and they needed to find a solution to repair them. Viega proposed changing the material to copper nickel (CUNI) and pressing in our SeaPress system as a permanent solution. After some consideration they agreed to try our idea. We planned to remove and replace a 160-ft. section of the fire main and all the branches and drops that started on the stern and ran into the house and through each stateroom to a flange. The existing system was drained, cut apart and removed. At this point, the Chief Engineer got nervous because the ship had to be back in service in two weeks. Seeing all this pipe and fittings gutted from the ship made him a bit uneasy that they would be stuck when it was time to sail. The new CUNI pipe and SeaPress fittings were fitted into place where the existing lines had been. We were even able to reuse the hangers and run through existing penetrations. Some areas were located in very tight areas, so the pipes had to be cut and placed above the ceiling in sections sometimes as small as three feet long. Viega manufactures all types of fittings to accommodate

challenging installations. Where the pipes had to be cut into small pieces, the installer used repair couplings that slid down the pipe and back to easily fit the pieces together. After the fire main was replaced and fitted properly, the installer went back and pressed the SeaPress connections with a battery tool. During this time he was able to work in tight areas and not disturb cables, insulation and finished areas. After two days of removing and replacing, the system was ready for hydro test. The SeaPress system passed hydro on the first attempt. In conclusion, we had a very happy contractor and crew.

That's a good one for when a ship is at dock. Are there applications for your solutions in an emergency at sea?

Emergency piping repairs are never easy to prepare for or complete while the ship is underway. A military support ship was underway during the Iraq war when they had a two-inch cooling pipe burst. The crew had been trained in Guam by Viega on how to install Viega fittings and responded with urgency. They were able to repair the pipe without the need to "go dark." They built a SeaPress spool with a valve. They installed half of the spool by bolting on a flange and then incorporating a shut off the valve to isolate the leak. The next step was to install the remaining spool piece and press into place. When you get an email from a Military ship that says "Thank you, SeaPress was a lifesaver," there is nothing more satisfying than to have helped them out of a critical situation.

FLOATING PRODUCTION SYSTEMS
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INTERNATIONAL MARITIME ASSOCIATES

Big Order for BOB

Maersk Fluid Technology's "Blending-On-Board" (BOB) Lube-oil Management

Top Left: Maersk's SEA-Mate Blending-On-Board system; **Top Right:** Maersk Pearl – one of the vessels to be equipped with B1000 Blending-On-Board system from Maersk Fluid Technology.

Late last year Maersk Fluid Technology debuted to the maritime market a new version of its cylinder oil 'Blending-On-Board' (BOB) system, targeting medium-sized two-stroke propulsion engines with a cylinder bore between 420 and 680 mm.

Recently the company announced that the first volume order was placed for retrofit of the SEA-Mate B1000 system onto 12 tankers delivered to Maersk Tankers between 2005 and 2008 – 10 vessels equipped with Wärtsilä (WinGD) RTA and RT-Flex engines with a bore between 580 and 620 mm and two vessels with engines designed by MAN Diesel & Turbo.

"With the flexibility of the B1000 Blending-On-Board (BOB) system from Maersk Fluid Technology, we get the ability to match our cylinder oil lubrication to the fuel sulphur," said Tommy Thomassen, CTO, Maersk Tankers.

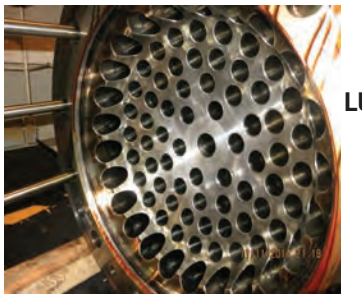
"The BOB system is expected to facilitate up to 40% reduction of current lube-oil consumption, cleaner main engine system oil and fuel savings of at least 0.5% for both MAN Diesel & Turbo and Wärtsilä (WinGD) two-stroke engines. Investing in BOB allows Maersk Tankers to stay flexible and ready for future lubrication challenges."

The BOB systems are engineered to be simple to retrofit onboard existing vessels and will be installed during 2016 without the need to interrupt vessels schedule. With the systems installed the vessels will be able to blend from 30-140 BN cylinder oil, using the in-use system oil as a base-oil. The system is fully approved for the MAN Diesel & Turbo and Wärtsilä (WinGD) engines in question.

"Vessels will be able to reduce lubricant supply to the lowest allowed consumption of lubricant as specified by the engine manufacturer," explained Sune Lilbaek, Head of Sales and Marketing at Maersk Fluid Technology. "This is possible because cylinder lubricant from the BOB system always will be matching the sulphur content in the fuel. The BOB system also facilitates better engine performance through utilization of the in-use system oil as a base for the cylinder oil. This way, it will be possible to add fresh system oil to the main engine, improving overall cleanliness and viscosity of the system oil."

www.maerskfluid.com

Alu Design



LUKOIL

SKF

Xylem

Alu Design Goes Hollywood

Alu Design claims that several of its chairs 'boldly goes where no maritime chair manufacturer has before,' as a MH OCH 300 operator chair has landed a role in the movie *Star Trek Beyond*, globally released July 22, 2016. Alu Design created the MH OCH 300 in 2012 to deliver the best possible working environment for drilling operators working on offshore rigs.

"We were first contacted by Paramount Pictures, which produces films for both the Transformers and Star Trek franchises, in 2013," said Einar Ulrichsen, CEO, Alu Design. "They were looking for set furniture with breath-taking, futuristic designs to help bring their stories to life. During an online search the MH OCH 300 caught their eye. They were so pleased with how it looked on film – and the actors were so happy with how it felt – that it became the natural choice for this new, space age cinematic experience. We are of course somewhat blown away by all this. To have our product in two productions, with such a massive global appeal, is, quite literally, out of this world." Alu Design supplied six MH OCH 300s to Paramount Pictures for a duration of 10 weeks.

www.alu-design.no

Lukoil Crankcase, Cylinder Oils

LUKOIL Marine Lubricants introduced the newly formulated NAVIGO 6 CO crankcase oil and NAVIGO 70 MCL AW cylinder oil, offering newly designed additive packages and additional benefits with regard to thermal and oxidation stability, corrosion prevention and wear protection.

NAVIGO 70 MCL AW is a cylinder oil for marine two-stroke engines covering a wide field of applications and fuel Sulphur contents between 0.5 percent and 3.5 percent. The new cylinder oil is based on the same additive technology for NAVIGO 100 MCL. As the new formulation offers increased engine protection against cold corrosion and enables extended piston overhaul, the name of the established product NAVIGO 70 MCL has been extended by 'AW' for 'Anti-Wear'.

NAVIGO 6 CO is a crankcase oil developed by LUKOIL Marine Lubricants for latest design two-stroke engines. "Our customers benefit from the improved formulation with enhanced detergency and dispersion and improved crankcase cleanliness and deposit control of oil-cooled piston undercrowns," explained Stefan Claussen, Technical and Marketing Director at LUKOIL Marine Lubricants.

NAVIGO 6 CO is suited for iCOlube, LUKOIL Marine's onboard unit for intelligent cylinder oil lubrication. This unit combines high BN cylinder oil and new or used system oil to tailor the cylinder oil for each engine.

www.lukoilmarine.com

SKF Tank Skimming Equipment

SKF launched a new mechanical device for the fast and easy separation of oil and water in tanks in marine and offshore applications. Sludge oil is a term commonly used to describe the waste oil mainly derived from the process of purifying fuel oils and lubricating oils in order to ensure proper operation of ship's machinery. During the process, the separated water from the purifying process mixes with the waste oil in the sludge tank.

The SKF Turbulo Sludge Buoy has been developed to eliminate the need for laborious and time consuming manual drainage processes as it floats inside on-board tanks for constant, hassle-free and effective separation.

www.skf.com

Xylem Bilge Pumps

The LoPro 900 Series Bilge Pump from Rule, a Xylem brand, provides intense pumping power and can pump up to 900 GPH at 12 volts for compact spaces. The LP900S automatic, and LP900D standard have four discharge port options for additional flexibility to accommodate a variety of boat installations. The LP900S and LP900D low-profile pumps can be mounted horizontally or vertically and the discharge body swivels a full 180 degrees for easy installation. To prohibit additional water, tricuspid check valves are included to help prevent backflow. The LP900S features two automated modes. In high or low water sensing mode the pump starts when water reaches a 2-inch level or at 1.3 inches if the motor cartridge is turned upside down. In electronic automatic mode for vertical installations, the pump turns on every 2.5 minutes to check for water and stays on until the water is gone.

www.xylemflowcontrol.com

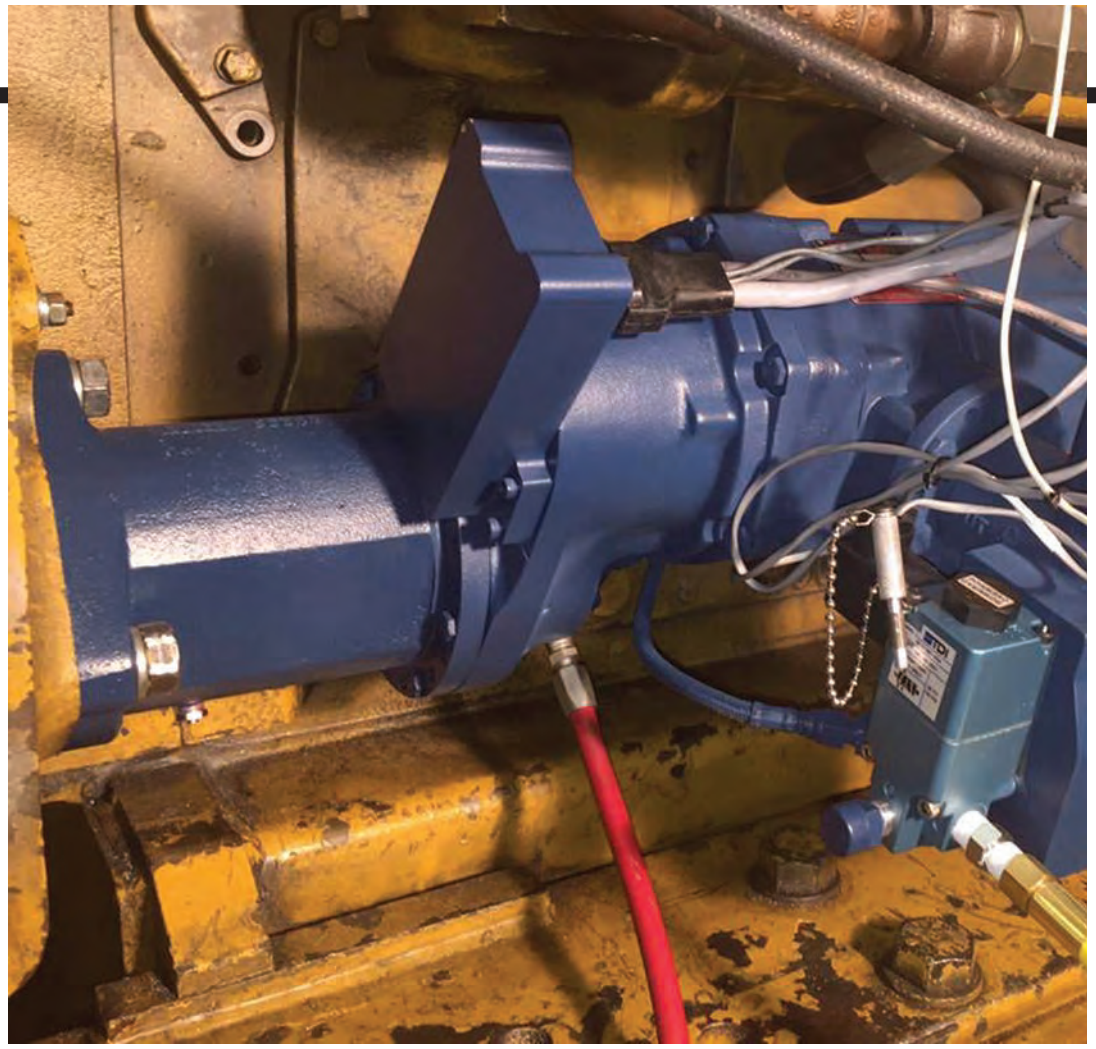
MERUS Water Treatment Rings

Avalon's fleet is among the youngest on the European waterways – significantly younger than the industry average. Currently, 11 Avalon vessels are equipped with MERUS rings. The newest vessel of the Avalon fleet, the Avalon Passion, was recently equipped with the MERUS technology and more will follow.

The rings were installed on the complete freshwater system of the vessel, i.e. at the hydrophor, the boilers and the kitchen feed lines.

The MERUS technology is designed to slow-down corrosion, scaling and microbiological problems in fresh and seawater lines. Applying the MERUS rings in a vessel can save maintenance and cleaning costs.

www.merusonline.com



The new TDI TurboGuard air starter is designed to provide large reciprocating engines a safeguard against significant damage, downtime caused by hydroLock.

New TDI TurboGuard Air Starter

Maintaining a vessel's engine is tops on any operator's maintenance list, and reciprocating engines that sit idle or have extended periods of time between starts can be susceptible to coolant leaking into cylinders. When the engine is started in this condition, coolant is driven through the compression cycle at very high pressures causing a potentially damaging consequence called hydrolock. The result can be bent piston rods, damaged ring gear, a cracked block, damaged crankshaft and downtime that can take as much time as it takes to get a new engine.

TDI's TurboGuard Smart Starter detects the presence of coolant or other obstructions during the start sequence. TurboGuard automatically shuts down the starting process before any damage occurs. "We are able to regulate air pressure and speed in such a precise way we can determine if there are cylinder obstructions. If so, the start is aborted before the inertia of the system has enough energy to cause damage," said Dave Rawlins, Senior Product Manager at TDI, in introducing the product. "This is a significant engineering accomplishment because a typical turbine air start cycle can go from 0 to 150 rpms (engine speed) in just a couple of seconds."

Engine operations looking to safeguard their engine applications will be very interested in TurboGuard as well as any operation with black starts like unmanned compressor stations, or peak power generation stations. Marine engines and any engine application that has extended periods of time between starts would also be good candidates for TurboGuard.

The TurboGuard's intelligent control system extends the normal three to five-second start cycle to ~10 seconds using the relay valves, solenoids and regulator to precisely control the crank. As the engine is slowly rotated, the starter system monitors for anomalies in the process indicating a hydrolock condition. If an obstruction is detected, the starter sequence is aborted. If no obstruction is detected, the engine will be brought to normal crank speed utilizing a "soft-start pressure ramp" to minimize impact torque between starter pinion and engine ring gear. This is an additional benefit to reduce pinion and ring gear wear.

TurboGuard is a complete engineered start system made up of the turbine air starter with the control unit, integrated relay valves, solenoids, regulator and other components. TurboGuard is targeted for large reciprocal engines from 70-300 liters. It fits the same engine market as TDI's T100-B and T100-V models.

"We realize every engine has its own normal operating conditions which is why we have included a programmable "immediate start" which allows the safe start feature to be by-passed since the engine has been started in normal operation so would not need a safe start," said Rawlins.

www.tdi-turbostart.com

Marseille Mega-ship Initiatives

The two main construction projects in the Marseille harbor area of French port Marseille Fos are nearing completion following a decisive stage in works costing almost $72 that will cater for mega-ships by enlarging the Passe Nord port entrance and recommissioning the No.10 drydock. The drydock has been flooded for the first time since work started in January 2014 to enable flotation of a new 9,100 ton dock gate and three 4,500 ton caissons – under construction there since March – that will form the remodeled ends of sea walls guarding the harbor entrance. In total almost 23,000 tons of concrete was used. Twelve meter tall caissons will be towed to the Passe Nord site in a phase lasting until October, when afloat construction taking them to a height of 22m is due to end. The 15-m diameter, 30-m long units will then be sunk on to platforms 18 m below sea level and injected with up to 10,000 tons of concrete, with project completion scheduled by the year-end.

The works will enlarge the entrance from 190 to 240 m and also enhance turning space for the latest generation vessels. Last year Marseille (excluding Fos) handled more than 170 vessels over 300 m long and, in particular, is now braced for regular calls from cruise ships exceeding 360 m such as Harmony of the Seas.

Renovation of Drydock 10, third largest in the world after Lisbon and Dubai at 465 x 85 m, was mainly inspired by the growing world fleet of mega-cruise ships – 65% of which operate in the Mediterranean – but will also provide a minimal-deviation repair and maintenance option for giant container, gas and bulk carriers as well as offshore platforms. The drydock was built in 1975 as a supertanker facility but was mothballed in 2000 after the market shifted east. The $35 recommissioning initiative includes overhaul of the pumps and electrical network in addition to the new gate, which will be moored on site for fitting out and testing when the dock is handed over to operator Chantier Naval Marseille (CNM) in September.

Real-Time Shipbuilder VR Module

"Shipbuilder VR allows the real-time publication of project management data, technical data and logistical data in 3D on smartphones, tablets and PCs," said Shipbuilder director Geert Schouten. "This enables users to retrieve all the information relevant to spaces within a vessel and visualize them as if they were actually on board. Shipbuilder VR offers a highly attractive form of information management and we expect that this new type of accessible, integrated information provision will become the standard in our industry."

Shipbuilder VR is designed to provide major benefits for yards and operators alike. "Shipbuilder VR enables mechanics to study the space in which they will be working and immediately see which materials they will need for construction or maintenance work before they go to the yard," Schouten says. "They can also view the drawings which belong to the space they are virtually observing and examine other available information. This saves a lot of time and money because they can set out well prepared and will always have the latest correct information at hand."

Shipping operators also have benefits when the yard where their vessel is being built or maintained is using Shipbuilder VR. "They can see in real time and in virtual reality whether the planned work, materials and components exactly match their wishes," Schouten said. "And all this takes place in a live environment before construction has even started. Moreover, the operators can use Shipbuilder VR to follow the project's progress live on remote. The advantages are so significant that this functionality is expected to become a requirement in the near future. Shipping operators will have a strong preference for yards which use Shipbuilder VR."

E: cees@shipbuilder.nl

OpEd Standardizing Shipboard "Green" Product Use

BY JOHN PAPARONE

A major paradigm shift is needed in relation to "green" cleaning products that are used aboard ships. Standardizing the use of these items is critical to ensure the "real" safety of the environment while maintaining best practices for preserving equipment on an ongoing basis. While other aspects of maritime operations have detailed requirements and regulatory oversight, the use of some cleaning products, particularly those claiming to be environmentally friendly, are not well understood.

For example, existing guidance via the EPA's "Design for the Environment (DfE)" or "Green Seal" is not targeted to the aquatic environment. The criteria is focused on land-based applications that also have waste water treatment facilities. The land-based scheme is based on toxicity of cleaning product formulations, residue to treat, etc. The bottom line is it is treated before release, which is not necessarily analogous to onboard applications.

The DfE products are less toxic than their predecessors and are designed to be readily biodegradable, meaning they will provide complete biodegradation by way of converting their components into carbon dioxide and water within 28 days. The substance of DfE and other products could be any number of items, such as a cleaner/degreaser, neutral cleaner, window cleaner, barge cleaning product, etc.

However, to open another "can of worms," products are often so altered by industry, that questions arise as to whether a formulation of components, which individually may be readily biodegradable, may continue to biodegrade to their natural state in 28 days or less. This is a much larger and more technical discussion/argument than is appropriate here. Suffice to say that all aspects of the issue must be taken into consideration when looking to improve the true viability of these purportedly "green" products.

The goal should be to qualify cleaning products used aboard ship and the quantity stored, based on their toxicity to the aquatic environment. There is precedence for this kind of scheme. The Centre for Environment, Fisheries and Aquaculture Science (Cefas) is a world leader in marine science and technology, providing innovative solutions for the aquatic environment, biodiversity and food security. The Offshore Chemical Notification Scheme (OCNS) manages chemical use and discharge by the UK and Netherlands offshore petroleum industries. The area of focus is the North Sea.

The shipboard waste stream is part of a contained gray water, system. The system essentially holds this waste stream until arrival at port in some cases, and it is pumped off to be treated ashore. Or, where permitted, it is discharged into the ocean beyond the 3 nautical mile limit.

Let's briefly review what is in the gray water and its most prolific sources. The galley and other food prep areas are major contributors, with cleaning products, fats, oils, and grease (FOG). Commonly used housekeeping cleaning products include window cleaners, soaps, shampoos, etc. There is a great deal of water with "stuff" in it in the gray water holding tank. "Stuff" that would be treated in a wastewater treatment facility ashore and "stuff" that gets discharged, where permitted, at sea without treatment.

It is generally acknowledged that products other than oil, such as solvents, etc., are discharged overboard as they are not detected by the oil content monitor and OWS. This unsafe and irresponsible practice is polluting the oceans with unknown quantities of phosphates, caustics and alkalis, for instance, all because we are not focused on using the best products, not only for the ocean and the environment, but for desired results in the cleaning process.

Clearly the government is not the answer. I am suggesting that Classification Societies set and agree on a scheme or provide a listing of products that are acceptable for shipboard use and the quantity permitted on board. The evaluation criteria has to be based on toxicity to the aquatic environment and be directed to cleaning products that find their way into the bilge and gray water.

The listing should include products such as cleaning products, solvents, oils/lubes, etc. There may be several levels of acceptability from poor to great. Most importantly, products used would be subject to evaluation at inspections and a weight given to encourage the use of the least toxic products.

Making changes now means getting ahead of potential incoming regulations. The projections are for the shipping and cruise industries to continue to grow. As a collective, we need to take greater steps, on our own initiative, to create a cleaner, greener environment and foster more social responsibility by urging this much needed change.

Note: The link for Cefas is: https://www.gov.uk/government/organisations/centre-for-environment-fisheries-and-aquaculture-science

The Authors

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SMM 2016

Hamburg, Germany will once again host the world's largest, most influential – and arguably best – shipbuilding and technology exhibition, SMM 2016, to be held at the Hamburg Messe und Congress from September 6-9. The biennially held trade fair is huge in every way, from the size of the exhibition complex (roughly 90,000 square meters) to the size of the exhibits, to the number, and more importantly, the quality of attendees driven to Hamburg every other September. SMM's 2014 running welcomed some 2,100-plus exhibitors and more than 50,000 visitors from around the globe, according to the event's organizers, Hamburg Messe und Congress GmbH (HMC). Scheduled to run Tuesday through Friday, with opening hours of 9 a.m. to 6 p.m. daily, each day of the fair will be dedicated to one particular theme, with a special focus throughout on digitalization and green propulsion. For this year's SMM, a special hall has been built to showcase the latest in low-emissions technologies. Also new for 2016, the Maritime Future Summit will be held September 5, the day before SMM starts, providing a venue for industry leaders to discuss the future of shipping, with particular regard to digital shipping and shipbuilding, automation and data management.

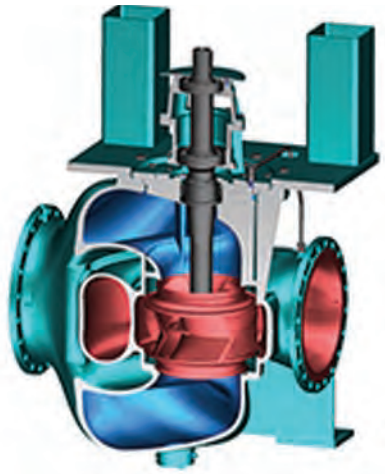
September 5: Maritime Future Summit
September 6: Global Maritime Environmental Congress
September 7: Maritime Security and Defense
September 8: Offshore Dialogue
September 9: Maritime Career Market

Following is a small selection of the new products and services set for debut at SMM 2016.

E-MS

Economy and ecology characterize electric power supply and propulsion solutions from E-MS. Environmental friendliness combined with economic viability characterize the electric network topologies for almost all types and sizes of ships and offshore power plants designed by E-MS, e-powered marine solutions GmbH & Co. KG, Hamburg. Operating the auxiliary generating sets without synchronization, however, with variable speed, leads to best possible utilization and lowest lifecycle costs. The internal combustion engines are running at any time with their respective best efficiency, thus saving fuel and minimizing undesired emissions considerably. Beyond that, E-MS offers a start-stop function for the operation of generating sets for additional operating cost savings, and a diagnostic device to control the complete onboard power supply system.

Hall B6, Stand 614



(Photo: Colfax)

Colfax

Colfax Fluid Handling will exhibit two advanced developments for Marine applications, the MI-D centrifugal pump with a capacity of up to 3,900 cu.-m./hr. and delivery head of up to 50 m and the turnkey version of the CM-1000 electronic pump controller for use in control cabinets. The MI-D pumps seawater and fresh water for cooling and ballast systems. The CM-1000 for cooling water pumps can be pre-installed in new ships or installed while underway and brought into service without downtime.

Hall A2, Booth 219

(Photo: Alphatron)

JRC & Alphatron Marine

JRC & Alphatron Marine

At this year's SMM, JRC and Alphatron Marine will showcase its lineup of bridges featuring a new level of operational ergonomics and user-friendliness, suited for a wide array of types of vessels.

The new fully integrated one-man bridge features three 46-inch screens for use in law enforcement, semi military and/or coastal patrol vessels, combining radar, WECDIS (by Transas), conning, alarm monitoring and DP data in an easy to use format, and where all operating panels are within arm's reach. Interfacing between thermal camera's and WECDIS allows full integration with the vessel's tactical mission specific parameters.

The AlphaBridge premium has no less than five 46-inch screens that provide a clear overview of all the navigation information. These monitors and the center console offer safe and efficient operating environment possible as well as allowing access to all the control panels and other equipment on the vessel, such as the lighting and engines. In the overhead of the AlphaBridge will be the AlphaLine Repeaters, a full lineup of instruments that are easy to operate via an intuitive color touchscreen display available in three standard sizes and two colors. In the center console will be three new products based on the manufacturer's uniform product philosophy, creating a consistent bridge and operational approach: the 6.5-inch autopilot with rotating button and touch display; the 5-inch VHF; and the AlphaS-SRS, a new sound system reception system designed to receive and detect foghorn signals from other vessels.

Also on display will be a tugboat bridge offering full control from a sitting position and exceptional all-round visibility. The bridge comprises of two ergonomic and dynamically designed consoles with a central captain's chair mounted on rails. The consoles contain the majority of controls and instruments required to operate the tug with at each end a semi-retractable screen for radar or other multifunction screen displaying navigation and other operational data. This second generation tugboat bridge includes many enhancements that contribute to an improved ergonomic working area. Newly incorporated into the design are nonreflective displays, improved winch control operated on a large 8.4-inch display and bridge dimming divided in three areas, connected with LED lighting in the overhead. Also other practical improvements to the operator is a place for a mobile phone, USB charging facility, multiple cup holders and documentation storage.

Hall B6, Stand 300

DNV GL

In line with SMM 2016's focus on digitalization and alternative propulsions technologies, DNV GL will highlight its modern classification solutions for the deployment of drones in inspecting hulls and cargo holds, the use of high-resolution helmet cameras during visual inspections with subsequent integration of the imagery into a 3D ship model, fleet performance management solutions for shipping companies to help increase the efficiency of ship operations, as well as battery/hybrid systems and the use of LNG as a ship fuel.

These and other topics will be presented during the DNV GL Forum (East Entrance) and at the classification society's exhibition booth where DNV GL experts will be discuss the latest concepts.

Hall B4, Booth 211

Recycled Plastic Deck Covers

ALP Maritime Services reached a milestone with the naming ceremony and christening of the ALP STRIKER at the Niigata Shipyard in Japan May 13 It concerned the first of a series of four state-of-the-art

Hatz

Motorenfabrik Hatz will introduce its new liquid-cooled three-cylinder diesel 3H50 3H50TIC engine in Hamburg for the first time to the marine industry at SMM 2016. Hatz will also show the bigger, marinized four-cylinder 4H50TIC as well as a propulsion solution powered by its air-cooled single-cylinder Hatz 1B50. The smaller three-cylinder model range is scheduled to be ready for market by 2018. Thanks to the turbo charger and the intercooler the engines have a maximum torque of 200 newton meters and a maximum power of 46 kW. This all requires an installation space of less than a fifth of a cubic meter. With a capacity of 1.5 liters and a maximum speed of 2,800 revolutions per minute this three-cylinder engine sets standards.

Hall A3, Booth 201

Marine world premiere of the small Southern German power package: the liquid-cooled three-cylinder Hatz 3H50TIC.

SX-157 Ulstein Design ultra-long distance towing and anchor handling vessels with a bollard pull 300+ tons. The ALP STRIKER is the first offshore vessel in the world with recycled plastic KLP Deck Covers instead of a traditional hardwood work deck, which results in a sustainable, effective and safe solution.

The use of KLP Deck Covers instead of a traditional wooden deck together with installing KLP in both chain lockers saves around 35 m3 tropical hardwood for this vessel with a deck space of approximately 350 m2. Lankhorst offer high quality products and by using recycled plastic instead of wood, Lankhorst indirectly contributes to supporting the environment.

Whether it's for a new build vessel or a ship deck renovation project, KLP Deck Covers offer a sustainable and effective solution to protect your vessel during towing and anchor handling operations. The Lankhorst products neither rot nor splinter, are resistant to most chemicals, oil, solvents, UV, (salt) water, weather conditions and will last significantly longer than any type of wood, and they are fully recyclable.

Simply Water

When will the use of oil for lubricating propeller shafts become something of the past? For almost 60 years oil has been the dominant lubricant in the marine propulsion market, but now more governments and

classification societies are supporting and promoting the use of water as an environmental friendly and necessary alternative for oil. For instance, the U.S. VGP requirement and DNV/GL/LR and BV has revised their rules for shaft withdrawal intervals in benefit of the water lubricated systems. DNV GL has even set the required interval to unlimited. The trend to design "green shaft installations" at Maprom engineering started already more than 35 years ago. Its shaft systems are successfully used on Navy-, inland-, dredging and seagoing ships, both national and international.

The 135 m container vessel Bolero (pictured above) built in 2003 has operated for more than 75,000 running hours, approximately 6,000 per year, without shaft withdrawal and without overhauling of the seals. Royal Dutch navy Supply vessel Zr. Ms. Amsterdam, sailing with water lubricated bearings installed in 2009 is expected to last more than 160,000 running hours after 2014 inspection. Cutter suction dredge Halternsee which had a Maprom designed water lubricated cutter shaft bearing installed in 2001, is expected to last more than 110,000 running hours after 2011 inspection.

Hall 3, Stand 316

RSC Bio Solutions

RSC Bio Solutions will launch a new product line at SMM 2016. Headquartered in Charlotte, N.C., RSC Bio Solutions has 20 years of history and is committed to providing sustainable solutions for unforgiving environments by offering equipment operators high-performing, sustainable alternatives that allow them to meet the demanding needs of their operations while reducing environmental and employee risk. RSC Bio Solutions' EnviroLogic branded technology includes a

full line of lubricants – hydraulic fluids, gear oils and greases – additionally offering an innovative line of cleaners and solvents for industrial markets.

Hall A5, Stand 107

Becker Marine Systems

Hamburg-based Becker Marine Systems will introduce another new product segment. "We'll be presenting our three product lines of Maneuvering Systems, Energy-Saving Devices and LNG Hybrid Concepts at the usual location – our main stand in Hall A1," said Dirk Lehmann and Henning Kuhlmann, the two Managing Directors of Becker Marine Systems. In addition, Becker subsidiary Hybrid Port Energy (HPE) will premier an exhibition stand of its own, where it will present its alternative solutions for shore-side power supply, specifically dedicated to "Green Propulsion", environmentally friendly propulsion technologies showcasing SMM's issue of the future. Apart from the LNG Hybrid Barge used to supply energy

Rolls-Royce's MTU Gas Marine Engine

Rolls-Royce will present the new MTU gas engine for commercial marine applications – the first from Rolls-Royce – which has undergone some 3,000 hours on the test bench and is now ready to enter series production as the first high-speed pure-gas marine engine.

"We can now confirm that the engine meets both our requirements and those of our customers: its performance and its acceleration behavior are similar to the excellent characteristics of a diesel engine," said Dr. Ulrich Dohle, CEO of Rolls-Royce Power Systems AG. "It is economical, reliable and clean."

The new engine from MTU, part of Rolls-Royce Power Systems, offers reduced fuel costs and high performance while meeting IMO III emission standards with no additional exhaust gas treatment.

As a result of dynamic acceleration behavior, low environmental impact, reliability and economy, the new MTU gas engines are suited to tugboats, ferries, push boats and special purpose vessels such as research vessels, and Rolls-Royce said it has already received orders for new commercial vessel builds.

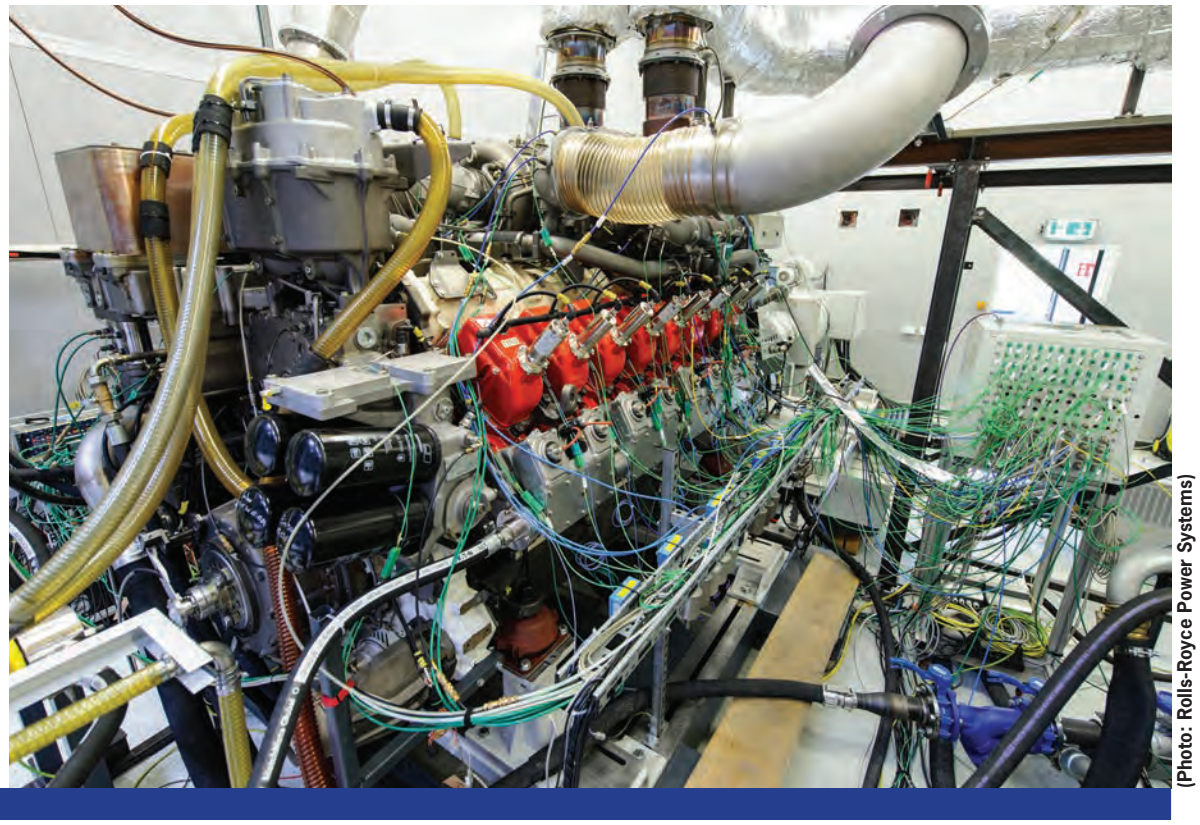
The 16-cylinder gas engine will cover a power range from 1,500 to 2,000 kW and will be based on MTU's 16V 4000 M63 diesel engine for workboats. By the end of 2017, the first series engines will be used to power a tug built by Damen Shipyards for Svitzer towage and salvage company; the two companies have entered into collaboration with MTU to jointly put the world's first tug powered by high-speed gas engines into service.

The gas engine portfolio will initially be supplemented by an eight-cylinder engine, which is to be available on the market with a power range of 750 to 1,000 kW. In 2019, this MTU gas engine will provide the propulsion for a new Lake Constance ferry operated by the local public utility, Stadtwerke Konstanz, which will ply between the two Lake Constance towns of Constance and Meersburg. The new ferry will be one of the first in Europe to be powered by a high-speed pure-gas engine.

The new MTU gas engines will be equipped with a multipoint gas injection system, a dynamic motor management system and an advanced turbocharger. The multipoint gas injection system is designed to provide the engine's dynamic acceleration behavior, increased performance and reduced emissions. The competition concept ensures that the IMO III emission standards are met without the need for additional exhaust gas treatment.

Controlled combustion ensures that fuel is used efficiently. The safety concept, which has been optimized for gas operation, includes double-walled gas supply lines, which means that no additional complex safety precautions are required in the engine room. On the test bench, it was possible to simulate real-life maneuvers, which represented the dynamic acceleration behavior of a diesel engine.

Hall 3A, Stand 305

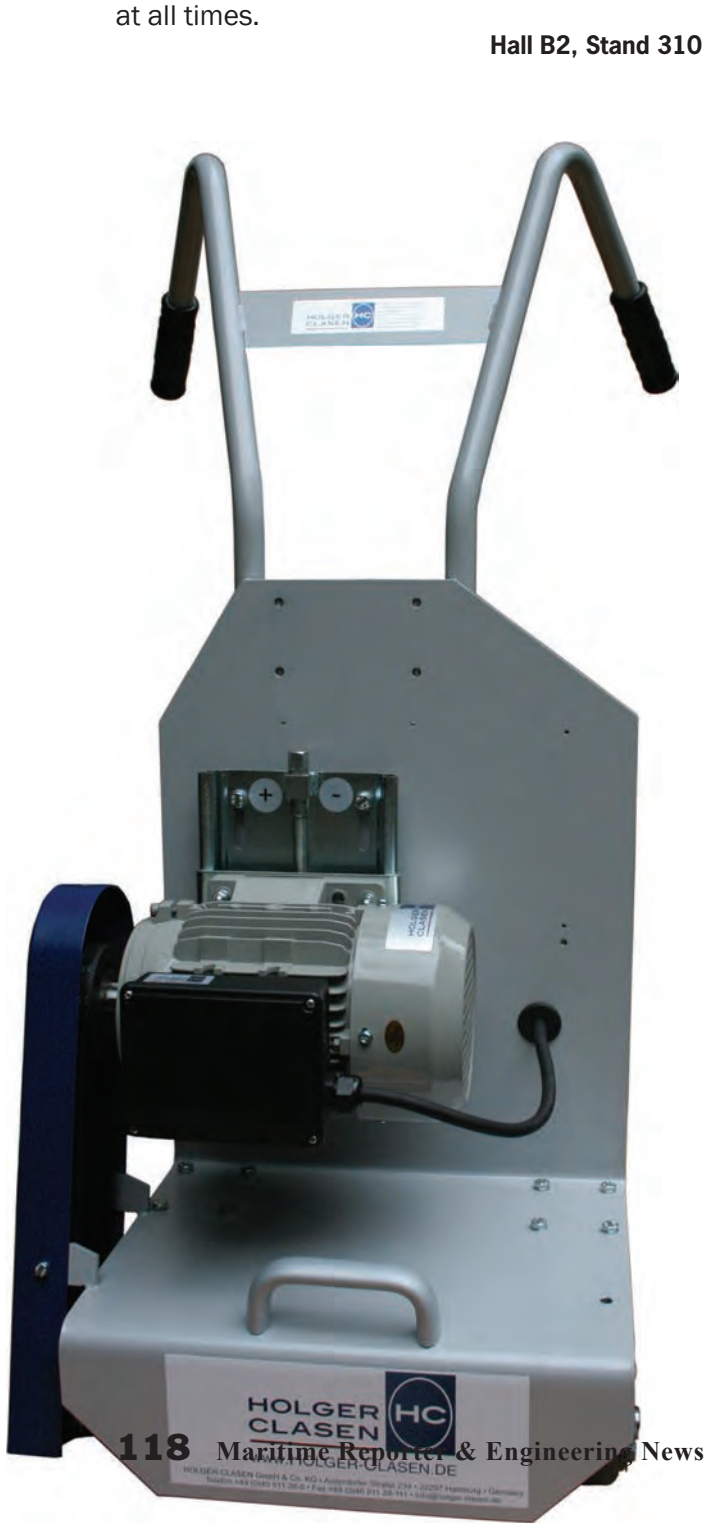


(Photo: Rolls-Royce Power Systems)

Holger Clasen

At SMM 2016, Hamburg company HOLGER CLASEN GmbH & Co. KG will present its latest innovations, Record II and Mammut IV, enabling trade fair visitors to see rust removal machines in action. With its flexible shaft, the Record II has been developed for the flexible processing of medium-sized surfaces and edges. The device is available for voltage basis 115 V, 230 V and 400 V and as a compressed air variant. With protection class IP 55, it is optimally geared to the rough usage conditions at sea and in the dockyard. The Mammut IV is designed for removing rust from large areas and, with its large working width of 260 mm, ensures powerful removal. The Mammut IV is available for all voltage levels (115 V, 230 V and 400 V) as well as for compressed air operation. The sophisticated design allows very quick and easy tool changing and the robust splash guard allows safe working at all times.

Hall B2, Stand 310



to cruise ships while berthed at port, the company's products include the LNG PowerPac, a specially-designed modular container system used to supply power to container ships and other types of vessels.

"The focus of the fair will once again be on innovative ideas resulting in energy savings and an accompanying reduction in operating costs," said Lehman and Kuhlmann. This is where Becker Marine Systems is positioned with its core products, versatile high-performance rudders as well as the Becker Mewis Duct and Becker Mewis Duct Twisted energy-saving devices. **Hall A1, Stand 225**

Hall A5, Stand 200A

KBB Turbochargers

KBB will showcase its ST7 and K2B turbocharging solutions to the maritime market at SMM. The ST range with radial compressor has been designed for an engine output between 500 and 4,800 kW per unit at a maximum pressure ratio of 5.5, development of the ST range begun in 2008 and its now showcasing its seventh generation of turbochargers produced by KBB. KBB also adds that it is further developing an update to its ST range, which will reach a maximum pressure ratio 6.0: 1. KBB will also exhibit a scale model of its more recent K2B 'knowledge to boost' two-stage turbocharging system. The model consists of the HPA7000 and one HSR6; the HSR6 is a high-pressure turbocharger (second stage) with the HPA7000, the larger of the two units, is a low-pressure turbocharger (first stage). The K2B range is the eighth generation of turbochargers produced by KBB, and can be used on different L- and V-engines (diesel, HFO, gas). The two-stage turbocharging with K2B can be applied to engines with outputs between 0.5 and 5MW and has an overall compressor pressure ratio of up to 10:1.

Hall A3, Booth 102

Raytheon Anschütz

At SMM 2016, German navigation system manufacturer Raytheon Anschütz will present its suite of latest navigation systems, including the new SYNAPSIS NX INS and the next generation of smart heading and radar sensors.

SYNAPSIS NX is type-approved according to the INS performance and test standards, offering better situational awareness, safety and simplified operation. Featuring an advanced network infrastructure, the INS makes available radar video, sensor data and charts in a redundant and highly capable LAN navigation network. Innovative system modules and smart system components also enable much better integration of the various bridge systems. Further, SYNAPSIS NX features new concepts for touch screen operation as well as better integration and uniform, consistent operating interfaces for various bridge control systems. SYNAPSIS NX also introduces new applications such as SynGuard, a versatile display supporting situation analysis and decision making. SynGuard can be used for automatic monitoring of the ship's surroundings, including the integration of camera systems, the identification and classification of other ships and objects, the definition and monitoring of certain alarm- or prohibited zones, or even the exchange of information with peers at sea or at shore.

As for Raytheon Anschütz's latest in heading and radar sensor technology, the new Standard 30 MF gyro compass and the NautoScan NX network radar are designed to support the sharing of data and status information via Ethernet. This not only enhances system performance but also adds value through an optimized data processing and usage by a respective end-user application. Further the sensors distinguish through less need for maintenance and reduced service costs.

Hall B6, Booth 304

3D artist impression of the next generation Synapsis NX Integrated Navigation System

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Connected Ships & Smart Data

BY JIM RHODES & FRANK SOCCOLI

You will have noticed that this journal and other shipping trades have been filled with headlines on Big Data in shipping. Sounds great, but what exactly does it mean?

Strictly speaking, the term Big Data is incorrect and misleading in this context. In the IT world, Big Data is usually defined by the "3Vs": the volume of data, the variety of data sources and the velocity at which it is processed. Other definitions add two more: veracity and value. Big Data involves data crunching on a massive scale, often measured in petabytes (1 quadrillion bytes) or even exabytes (1 billion gigabytes). To put this in perspective, consider that 200 petabytes would encompass all of the printed matter in the world. Big Data is hard to manage and requires highly advanced programming power to manipulate. Nonetheless it is at the heart of corporate strategy within the halls of Microsoft, Uber, Amazon, LinkedIn and Google.

The solutions currently on offer in the shipping industry, on the other hand, are really what the IT community calls "Small Data," yielding information that is accessible, understandable and actionable for specific tasks. It's been said that, "Big Data is for machines, and Small Data is for humans."

To extract a petabyte of data from ships at sea would take an enormous satellite pipeline, which would be impractical and expensive. And what would you do with it if you could get it?

It's been reported that one of the world's largest shipowners initiated a program of methodically collecting and analyzing noon reports, and achieved significant gains in efficiency fleetwide by identifying trends and anomalies. The point is that even small data sets can produce big results.

It seems to us that a more descriptive and accurate term would be "Smart Data."

Whatever you choose to call it, the point is that in the current business climate shipping companies must maximize ROI on capital expenditures and minimize operating expenses without compromising safety of ships and crew. Data from ships – Big, Small or In-Between – is critical, since it's impossible to optimize assets if you can't extract timely data on their performance. To make good business decisions, shipowners need to get more and better data from their ships at sea.

This is not easy, since most shipboard equipment simply was not designed for easy data mining. Retrofitting a ship for data gathering can be complex and expensive.

It involves running cables and/or setting up wi-fi connections with devices. Some of them may be virtually inaccessible. Others may have been designed with proprietary output formats and different types of I/O ports, which means lots of custom interfaces and external data conditioning devices. And then there's a matter of pushing the data sets through the satellite connection to offices ashore.

Risky Business

There is also another consideration. Connecting shipboard and shoreside IT networks opens the door to new risks. The shipping industry is just now coming to grips with the threat of cyber attacks. Experts warn that ships' navigation and communication systems are particularly vulnerable. It's no wonder that cyber security is starting to displace Big Data as the leading headline in the maritime media.

The threat is real and the impacts can be mind boggling. At the recent Global Insurance Forum in Singapore, delegates were told that cyber attacks could trigger a crisis on the scale of the 2008 financial meltdown. And at the German Maritime Law Association annual meeting, an executive from Munich Re stated that the estimates of the total annual loss due to cyber risk vary from $114 billion to $1 trillion, making actuarial risks impossible to calculate. As a result, insurance coverage for marine cyber risk is difficult, if not impossible to obtain. Only a handful of specialized underwriters have the knowledge that would enable them to cover the risk.

Happily the shipping industry has started to wake up, and we are now seeing a proliferation of cybersecurity guidelines from flag states, classification societies, international organizations and third-party specialist firms. Columbia Shipmanagement last month announced plans to work with DNV GL to be the first to achieve ISO 27001 certification for information security management systems. More will do the same.

Connect and Communicate

Ship connectivity, actionable data and communication/IT security will be central themes at the 5th SHIPPINGInsight Fleet Optimization Conference & Exhibition, which convenes October 18-19 in Stamford, Conn. The two-day 2016 conference will present four themed sessions, each addressing a major area of concern:

- Regulatory Compliance
- Ship Connectivity & Cybersecurity
- Big Data/Smart Data & Shipping Intelligence
- Fuel & Propulsion

Each session will include formal presentations from industry experts as well as open-discussion roundtables. Speakers will address current solutions and peer into the future of ship technology. You can bet that a recurring theme throughout these sessions will be pulling timely data from ship systems and using it to improve decision making.

As in past years, SHIPPINGInsight 2016 will provide a forum that brings together shipping companies and technology partners in an intimate setting with ample opportunities for formal and informal networking. New for this year is an open-dialogue Q&A-driven "Shipowners Roundtable," in which senior executives from major ship-operating companies will share their perspective and answer questions from delegates.

Paradigm Shifts and Disruptive Technologies

We'll leave you with this thought. New ships are being built with more automated systems and IT networks wired for connectivity, and the heavens are starting to fill with high-throughput satellites offering abundant capacity. We will surely see lot more information flowing from ship to shore in the coming decade. While it may not rise to the threshold of true Big Data, these availability of data in near real-time from ships will doubtless change the way shipping fleetss are operated. Marine transportation may begin to look more like land and air transportation.

Industry thinkers like Dr. Martin Stopford and futurist K.D. Adamson have argued for a radical transformation in the business model for shipping – something revolutionary comparable to the introduction of containerized cargo by Malcolm McLean in 1956.

In June, Rolls-Royce proclaimed the autonomous ship revolution has already begun, predicting the first computer-controlled ships at sea by the end of the decade. "

As disruptive as the smartphone, the smart ship will revolutionize the landscape of ship design and operations," said Mikael Makinen, president of Rolls-Royce Marine.

And consider this. A Chinese affiliate of Amazon, a Big Data giant if there ever was one, recently registered with the Federal Maritime Commission to become a licensed ocean freight forwarder, and Amazon has filed an application with the Shanghai Shipping Exchange to serve as a broker for 12 trade routes. Might Big Data be closer than we think?


KVH
Bruun


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Tridon


Blohm + Voss
Pladeck


USCG
Lake


WQIS
Diamond


Volvo Penta
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NAMEPA
Pappadakis


EBDG
Allen


EBDG
Olson


HII
Leonard


C. Raymond Hunt Associates
C. Raymond Hunt Associates

KVH Promotes Bruun to COO

KVH Industries promoted Brent Bruun, currently EVP of mobile broadband for the company, to the newly created position of chief operating officer (COO).

Blohm+Voss Promote Tridon, Pladeck

cBlohm+Voss appointed Jean-Gabriel Tridon as General Manager and Dieter Pladeck as Finance Director for its new maintenance and refit facility in La Ciotat in the south of France.

Capt. Lake Takes Helm of Shipyard

Captain Matthew Lake of the United States Coast Guard assumed command of the U.S. Coast Guard Yard on July 1, 2016. He is the 42nd Commanding Officer in the 117-year history of the Yard, the only shipbuilding and major ship repair facility of the U.S. Coast Guard.

Diamond Celebrates 21 Years

Harry Diamond, Vice President and Chief Claims Officer at WQIS, is celebrating 21 years with the company this year. Diamond began his insurance career directly out of college when he was hired by a brokerage firm whose main client was Keystone Shipping Company.

Volvo Penta Promotes Brown

Dave Brown has joined Volvo Penta of the Americas as director of commercial marine sales.

Navico Under New Ownership

Navico – a provider of marine electronics and parent company to the Lowrance, Simrad, B&G and GoFree brands – announced that Goldman Sachs Merchant Banking Division and Altor Fund IV have partnered and signed an agreement to acquire Navico from the Altor 2003 Fund. "The company has grown from a merger of three smaller companies into a technological leader in the marine electronics industry," said Leif Ottosson, president and CEO of Navico.

Pappadakis to Get NAMEPA Award

Nicky Pappadakis has been unanimously selected to receive the North American Marine Environment Protection Association (NAMEPA) 2016 Lifetime Award, announced Joe Hughes, NAMEPA Chairman. "Mr. Pappadakis has dedicated his life to the shipping industry and demonstrated his commitment for the sea, seafarers, safety and the environment," Hughes said. Pappadakis began his career in 1961 with the family firm A.G. Pappadakis & Co. in London, England.

Allen, Olson Join EBDG

Elliott Bay Design Group (EBDG) has hired two additional professionals at its Seattle office: Elizabeth Allen as Human Resources Manager, and Bradley Olson as Naval Architect.

ABS Expands in India

ABS expanded its captive delivery center in Pune, India with a move to the new Tech Park One location in order to accommodate the addition of professional software developers who will expedite product development. According to Anindya Talukdar, ABS Managing Director in Pune, ABS has built a knowledge base and leadership in Pune, where software engineers not only code and support earlier versions of the software, but are developing web and mobile versions of NS Enterprise using newer tools and technologies.

HII: Leonard is Corporate Director

Capt. Joseph J. Leonard (U.S. Navy, Ret.) has joined Huntington Ingalls Industries (HII) as corporate director of customer affairs, large surface combatant program, the shipbuilder announced.

C. Raymond Hunt Associates Celebrates 50

C. Raymond Hunt Associates, a boat design firm that continues to expand on the legacy of its founder, C. Raymond Hunt, to produce innovative boats with rugged seaworthiness, is now celebrating its 50th year.

"Ray Hunt was a genius, able to intuitively know how boats work and with the courage to experiment," said C. Raymond Hunt Associates President, Winn Willard. "We have taken Ray's ideas and applied them, honing our expertise and knowledge from the days of the early deep-v hulls. Now we have an 11-meter RIB on virtually every large ship in the U.S. Navy, designed the vast majority of American pilot boats, and helped boat builders develop new products in new markets across the marine industry." Ray Hunt's innovative approach to design resulted in several transformative designs in the 1950s and 1960s. The Boston Whaler 13 and the Bertram 31 changed the paradigm of the fast powerboat. The Concordia Yawl and the 5.5-meter sailboats were trophy winners especially with Ray at the helm.

In 1966, and in his late '60s, Ray partnered with John Deknatel to form C. Raymond Hunt Associates to expand the application and refinement of the Hunt deep-v hull to a wide range of boats. Under Deknatel's leadership, the firm expanded its presence in the production boat and custom yacht markets.

Designs have been created for major boat manufacturers including: Bertram, Grady-White, Boston Whaler, Robalo, Cruisers, Chris-Craft, 4 Winns, Southport, Grand Banks, SeaArk, Regal and Wellcraft. Significant was the Eastbay 38, the first of the fast traditional cruisers that spawned an entirely new market; the first Robalo in 1970, a center console flats boat with offshore capability. Hunt has designed all Grady-White hulls for more than 25 years. Custom Hunt designed yachts have been built around the world at such yards as Burger, Palmer Johnson, Hinckley, Lyman-Morse, Nautor and Royal Huisman. Starting in the late 1970s Willard led the firm's entry into the commercial and military markets. Designs have been done for the Navy, Coast Guard, police and fire departments worldwide. "The Hunt designed and Gladding-Hearn built pilot boats have proven to be the choice of the majority of U.S. pilots for their unmatched capability in rough seas. Pilotage is perhaps the highest use of the Hunt deep-v, given the demands of all-weather operation," said Willard, President of the firm since Deknatel's retirement last year. "That same experience has been applied across the breadth of Hunt designs."

www.huntdesigns.com

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

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BALLAST MONITORING

KING-GAGE Systems / King Engineering (tank level & draft monitoring), 8019 Ohio River Blvd, Newell, WV , USA , tel:855-367-2494, marine@king-gage.com, www.king-gage.com

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

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UT 99 AG Oil Mist Separators, Schaubenstrasse 5 CH-8450 Andelfingen , Switzerland , tel:+41 52 397 11 99, fax:+41 52 397 11 90, info@ut99.ch , www.ut99.ch/en

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Category: Vessel Operations
Description:
Curtin Maritime is a company that believes in investing in people and their development. We respect and value the individual talents of each employee, recognizing that it is our combined strengths that that is the key to our success. We currently have an opening for the position of Chief Engineer.
Job responsibilities include:
-Performs maintenance and repairs to main engine, machinery, and equipment indicators when vessels are underway.
-Maintains electrical power, heating, ventilation, refrigeration, water, sewage systems, and electrical equipment, excluding radio and navigational aids.
-Responsible for routine maintenance of machinery and equipment, which includes, but is not limited to, changing oil and filters, greasing steering gear, anchor windlass, etc., performing electrical systems' maintenance, testing for and maintaining proper levels of diesel engine water treatment, and taking/mailing of lube oil samples.
-Upkeep and cleanliness of all engineering spaces.
-Start engines to propel ships, and regulate engines and power transmissions to control speeds of ships, according to directions from captains/chief engineers.
-Monitor and test operations of engines and other equipment so that malfunctions and their causes can be identified.
-Maintain and repair engines, electric motors, pumps, winches, and other mechanical and electrical equipment, life boat motors, or assist other crew members with maintenance and repair duties.
-Perform general marine vessel maintenance and repair work such as repairing leaks, finishing interiors, refueling, and maintaining decks.
Requirements:
-Previous engineering experience on a vessel
-QMED/DDE4000 license
-Valid Driver License
Please forward all resumes to **randi@curtinmaritime.com.**
Curtin Maritime is a tugboat and barge company headquartered in the Port of Long Beach. Services provided include ocean towing, marine construction and dredging, salvage, Navy Contracts and marine afreightment. The Company also has a shipyard component to support the design and construction of our vessels and equipment. While we are relatively "young" company, we have been successful in breaking into the marine industry to offer a full range of services to our customers.
Curtin Maritime operates under the core values of safety, efficiency, integrity, and innovation. Our company is engaged in the continuous improvement of our operations and we are committed to the well-being of our employees. We have an outstanding crew of highly motivated people, state of the art equipment and the ability to perform a broad scope of work in the maritime industry. We invite you to learn more about us at **www.curtinmaritime.com**
We offer competitive benefit and compensation programs that include health (medical, dental, & vision) insurance, life insurance, and retirement plans.
Curtin Maritime is an Equal Opportunity Employer and a Drug Free Work Place. Curtin Maritime participates in the E-Verify Employment Verification Program.

Tropical SHIPPING

TROPICAL SHIPPING USA, a leading ocean carrier serving North America, the Caribbean and South America is seeking to fill the positions of **GM Marine Operations, Port Engineer, and Senior Marine Mechanics** at our beautiful facility in West Palm Beach, FL. We own and operate 11 blue-water containerships and are seeking top-level talent to support our growing business and expanding fleet.

RESPONSIBILITIES:
Supervision of mechanics and technical direction for our in-house repair shop; scheduling of vessel maintenance and repairs; conducting voyage repairs and dry dockings; assisting with the department budget.

REQUIREMENTS:
For Director and Managers, Minimum BS in Marine Engineering or related field and a Marine Engineer's License with several years of experience for the engineering positions. Previous shore side experience in the repair, maintenance and overhaul of vessels and machinery is preferred, but not required.
For the Senior Mechanics roles, shipboard experience preferred and shore side experience required in vessel repair, maintenance and overhaul of engines, machinery and systems. Valid driver's license and passport with a willingness to travel internationally as needed.

COMPENSATION & BENEFITS:
Full Relocation is being offered. Highly Competitive Salary commensurable with candidate's experience and skills. Attractive benefits package includes healthcare, dental, 401k plan, paid vacations, paid holidays, and annual incentive bonuses. The ideal candidates will have excellent scope for career development as well as exposure to the International Business environment.

Interested applicants with updated resume should:
Apply online on the CAREER link at www.Tropical.com or send inquiries directly to afernandez@tropical.com
Tropical Shipping USA, LLC is an Equal Opportunity Employer

Maritime Personnel Coordinator (Crewing) Coordinator

Salary: $ $17-20 per hour , Full Time , Mid Career
Category: HR / Recruitment
Job Location: Willow Pass Road Concord, California, 94520
Contact HR Manager
Email: arubin@hroptions.com
Willow Pass Road Concord, California, 94520
Requirements (Knowledge, Skills and Abilities)
• A minimum of 1 years' experience in demanding administrative position or closely related position
• Able to demonstrate administrative, organization, cooperation, interpersonal and multi-tasking skills.
• Ability to respond positively to crew and customers in an effective manner.
• Proficient in Microsoft Office applications.
• Ability to prioritize tasks, perform detailed execution of tasks and adapt to a changing environment.
• Understanding of business processes and functions.
Additional Requirements:
• Must have ability to work overtime and nights or

weekends as per workload demands.
• May require phone calls at night or on weekends. Must comply with all work rules, including those that pertain to safety and health.
JobDescription: Working with maritime union partners, or recruiters relative to specific vessel, position and applicable collective bargaining agreement, Coordinator's duties pertain to identification, vetting and personnel records of qualified mariners to fill positions aboard company contracted vessels and arrangement of mariner travel to/from the vessel. Vessel activities encompass world-wide operations.
Required Education: H.S. Diploma or equivalent. College courses desired. Associates degree or bachelors degree preferred
Key Responsibilities:
• Verify crew USCG and STCW credentials
• Verify regulatory, customer and company training
• Arrange for and verify mariner fitness for duty
• Obtain and verify drug free status
• Obtain required position and qualification documentation
• Maintain personnel record for mariner by data entry to NS5 and to documentation files
• Arrange and make travel arrangements and notifications in accordance with company policies to include; air, ground or water taxi arrangements and lodging
• Input and verify accuracy of sign on and sign off dates and vessels
• Working knowledge of vessel contractual union requirements
• Maintain good relations with customers, union hall personnel and mariners
• Assist with company administrative reporting requirements and auxiliary crewing functions such as I-9, DOT verification, EPIC, E-verify, discharge, medical billing, reimbursements, training, investigations, budgeting, accounting, invoicing, activations, compliance, etc.
• Assist with other projects as assigned.

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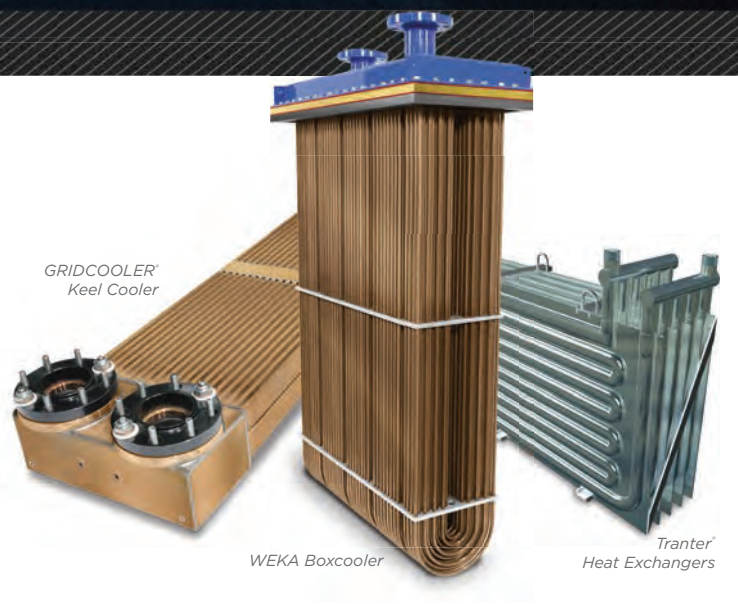

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