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MARITIME REPORTER AND ENGINEERING NEWS

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October 2016

MARINE DESIGN

LNG, Digitalization Trends Drive Design

Ballast Water Management
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Implications for Maritime

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Remi Eriksen CEO, DNV GL

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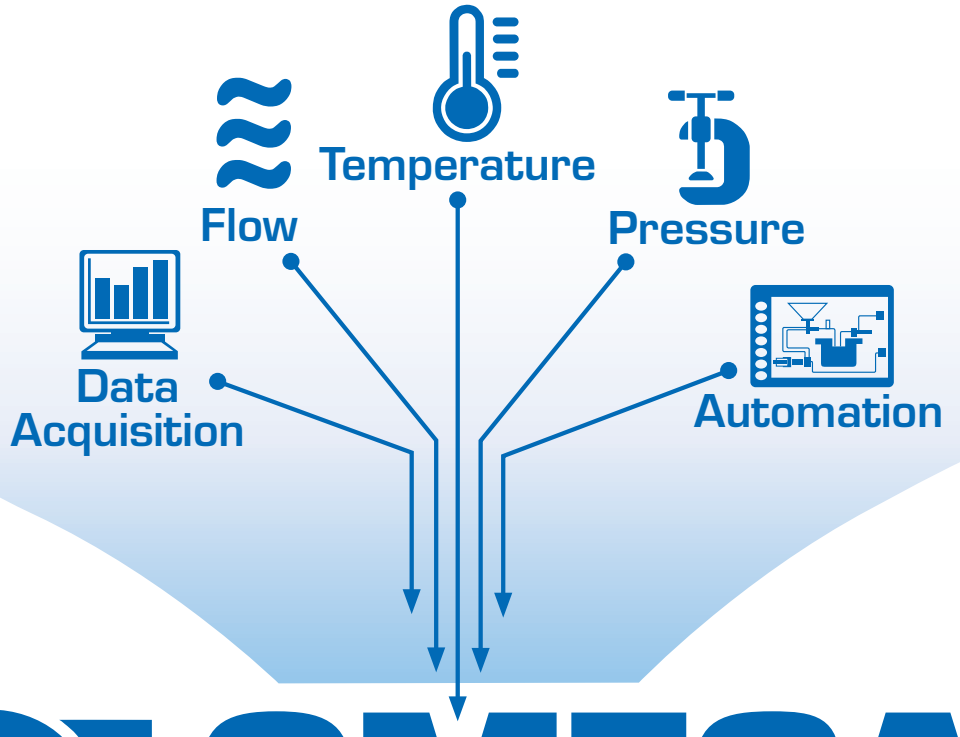

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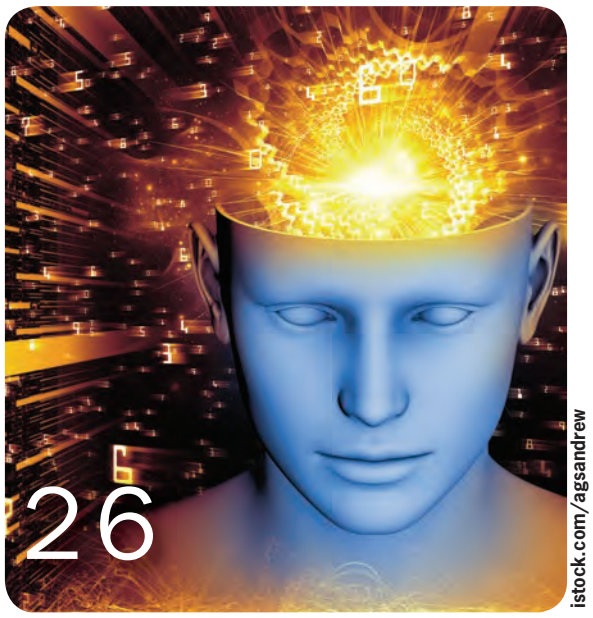

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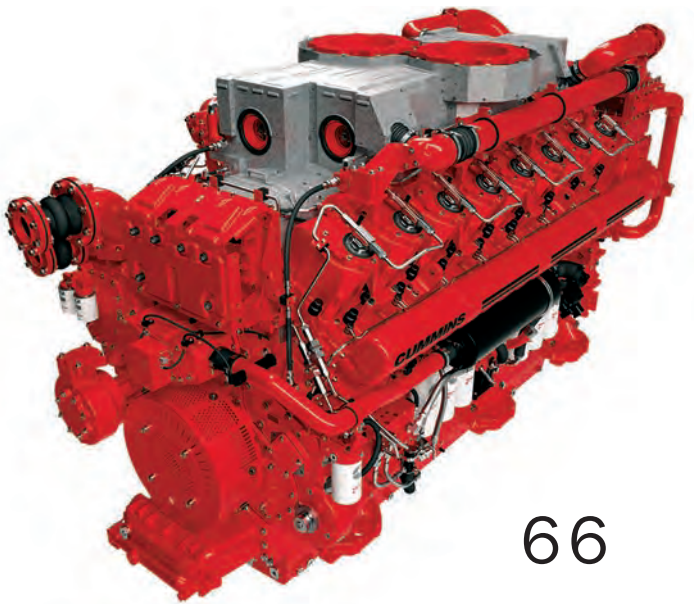

Cummins

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ERIKSEN

After 12-months in the top spot at DNV GL, Remi Eriksen gives a blunt assesment of the maritime and offshore markets today and the challenges ahead.

By Greg Trauthwein

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THE COVER

LNG-Ready Iceabreaker Polaris
Pictured on this month's cover is the business end of the "Eco" Icebreaker Polaris, built by Arctech, powered by Wärtsilä and driven by three electrically driven ice strengthened ABB Azipod units, two at the stern (6,500 kw each) and one at the bow (6,000 Kw), which combine for 19 MW. The advent of LNG as a marine fuel continues to drive innovative marine design, featured throughout this edition. Information on the delivery of Polaris is found on page 70.

(Photo Courtesy Arctech)

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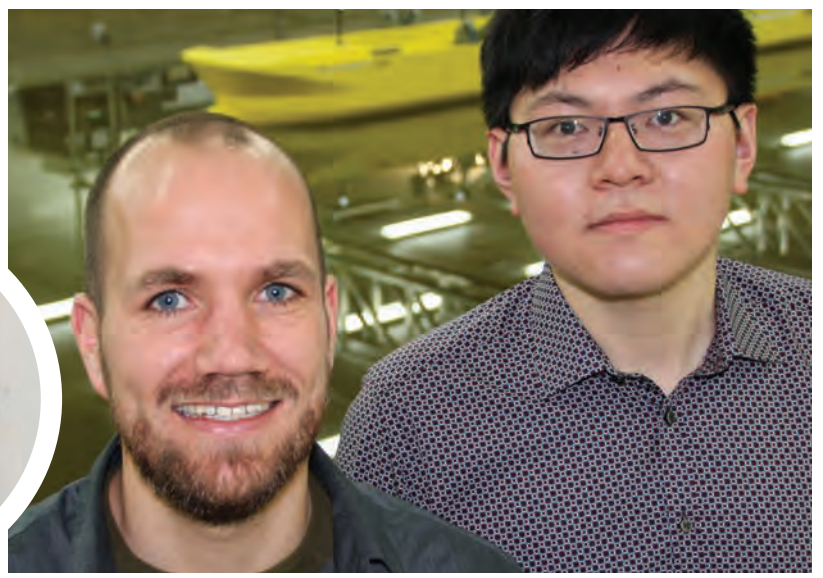
Hasselaar

Bryant

Haase & Jin



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GREG TRAUTHWEIN, EDITOR & ASSOCIATE PUBLISHER

To be perfectly honest, I'm quite tired of writing, saying and thinking "Big Data." Don't get me wrong, the very essence of what those two words represent will drive this industry for a generation. It's just that those two small words have been bandied about with such vigor and repetition that they're starting to muddle in my mind (note: please DON'T turn to page 44 at this moment!)

The trends towards harnessing the power of data and information in the name of industrial efficiency and cost savings is certainly not unique to the maritime and offshore markets, and per usual those doing business on, in and under the water are a bit slower on the uptake of this phenomena. Yet the industry's well-recorded conservative nature is not solely to blame: historically costly communication links between ships and shore has conspired to keep ship owners on the sideline.

All of this is changing, in rapid fashion.

We are just back from the SMM 2016 in Hamburg, and for those of you that have never ventured to Northern Germany for this biennial event, you are missing the biggest, best shipbuilding and marine technology event on the planet. Traditionally the exhibition is long on heavy industry, heavy machinery and mega machines of every sort to build and drive the biggest vessels an structures on the water. A walk through the exhibition halls again confirmed the stature of heavy industry and machinery, but this exhibition was different.

To put this into context, this was my 13th SMM dating back to 1992 – before the internet, email and mobile phones were regular fixtures in our lives! My goals at SMM are generally unchanged, and that is to meet and engage in conversation with as many industry executive leaders as humanly possible during the four days of exhibition and social events. I estimate that at about 80% of these conversations and meetings, discussion centered not on horsepower or steel, rather on the "digitalization transformation" sweeping all sectors of the market, from shipbuilders to ship owners, major equipment manufacturers and service providers.

Case in point: as we were going to press we were posting on MarneLink.com ABB's announcement of its far-reaching strategic partnership with Microsoft (MSFT) to develop next-generation digital solutions on an integrated cloud platform. In Hamburg my discussions ranged from a presentation by Bureau Veritas regarding its digitalization transformation in partnership with Dassault Systèmes, a conversation with **Howard Fireman**, ABS' CTO regarding the increasing threat of cyber attacks, and last but not least, my one-on-one interview with **Remi Eriksen**, CEO, DNV GL, which ranged on everything from the near-term prospects of the offshore oil and gas market (not good) to the near-term prospects for digital transformation in the maritime and offshore sectors (really good).

Speaking of digitalization changes, please take a moment to check out the re-designed ***MarineLink.com*** which incorporates our new ***"Maritime Reporter TV"*** initiative, which includes 30 interviews recorded in Hamburg, including 12 CEOs. I invite your feedback on both.

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Ballast Water Management Systems

Let the games begin

DENNIS BRYANT

With the accession by Finland to the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (better known as the Ballast Water Management or BWM Convention), there are now sufficient ratifications for the Convention to enter into force. Entry into force will occur on 8 September 2017. It has been an agonizingly slow process for a convention that was adopted with such high hopes.

Starting in the late 1970's as vessels became larger and faster, concern arose that they inadvertently might be transporting viable organisms from one port where they were endemic to anther port where they were not naturally found but could survive. Hard evidence of this was found in 1988 when zebra mussels, native to the Black Sea, were identified for the first time in Lake St. Clair near Detroit. The zebra mussels were found to have been transported on bulk carriers traveling from Soviet and Warsaw Pact ports on the Black Sea to the Great Lakes to load US and Canadian grain. Those ships discharged their ballast water in the Great Lakes in preparation for taking on the exported cargo. Zebra mussels have since spread throughout the Great Lakes and many smaller lakes in the region, causing billions of dollars in damage, particularly to local water systems and power companies.

As the number of invasive species proven to have been or suspected of being transported by ballast water increased, governments took action. In the United States, aquatic nuisance species statutes were adopted requiring high seas ballast water exchange. Other nations took similar steps. The IMO adopted guidelines on how such ballast water

Costly Critter

Pictured is the Bythotrephes longimanus, more commonly known as the Spiny Water Flea, a species native to N. Europe and accidentally introduced through ballast water into Lake Huron in 1984. Emerging Ballast Water Treatment System rules will potentially cost shipowners millions per ship.

(Photo Source: Michigan Sea Grant; Spiny Flea Information Source: U.S. Department of Agriculture)


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exchanges should be performed. The dangers, though, of emptying a ship's ballast tanks underway were highlighted by the severe listing and near-capsizing of the car carrier Cougar Ace off the Aleutian Islands in July 2006.

This incident provided impetus for acceleration of the effort to identify and implement methods for effectively treating a ship's ballast water so that it could be discharged in a port distant from where it had been onloaded with minimal risk of the introduction of marine invasive species. Companies started research and development projects to identify processes that could be installed on commercial vessels to achieve this goal.

All eyes, though, turned to the International Maritime Organization (IMO) to come up with an internationally acceptable standard against which such processes could be measured. It proved to be a difficult task. Manufacturers wanted standards that they felt confident could be met within a reasonable timeframe. Ship owners wanted standards that would incur minimal installation and operational costs. Nations that considered themselves at risk of aquatic nuisance species invasions wanted standards as high as feasible. Negotiations were long and arduous. At the conclusion, the BWM Convention of 2004 proved to be incomplete and flawed.

Because the negotiators assumed that the Convention would be quickly adopted, it contained hard deadlines for ships to install ballast water management systems. The Convention provides that ships constructed before 2009 (five years after the Convention was finalized) with a ballast water capacity of between 1500 and 5000 cubic meters would be required to have compliant systems installed by 2014. Ships constructed before 2009 with a ballast water capacity of less than 1500 or more than 5000 cubic meters would be required to have compliant systems installed by 2016. Ships constructed after 2009 would be required to have compliant systems installed during construction. The IMO recognized this conundrum once it became apparent that the Convention would not enter into force quickly. It contended, though, that a Convention could only be amended once it entered into force. Common sense eventually prevailed and resolutions are in the process of adoption that will extend those deadlines.

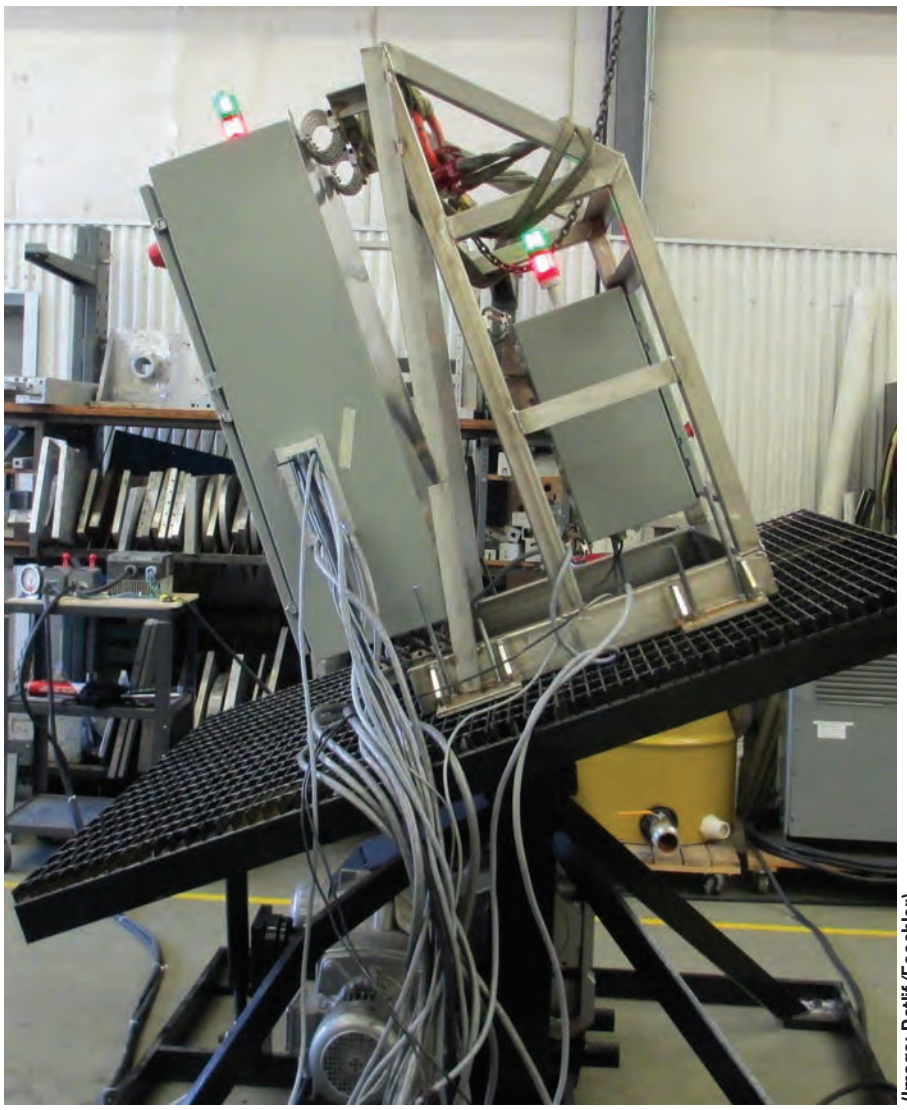
Another problem that was overlooked during negotiations involved mechanisms for ensuring that the ballast water management systems would continually meet the established standards, not just meet those standards while undergoing approval testing. Work on this issue continues, but ship owners and operators are very concerned. They fear installing an approved system only to fail port state control inspections because, after installation, the system can't regularly process ballast water to the required standard.

The United States is not party to the BWM Convention and it is unlikely that it will become party thereto within the foreseeable future.

The United States, though, has adopted the identical ballast water discharge standard as that contained in the BWM Convention, with the important exception of the word 'viable', which appears in the BWM Convention but not in the counterpart US statutes and regulations.

The major difference between the US and the Convention standards is with respect to the process for testing the performance of the various BWM systems seeking approval. The US testing requirements are more robust. Test results are accepted only if those tests were performed by an independent laboratory. The quality assurance/control processes must be fully documented. The test procedures must be validated. Any scaling must be done in accordance with the BWM Convention requirements. The US requires that certain tests be conducted on BWM systems actually installed on ships. In addition, the US does not accept test results based on the 'average most probable number' of viable organisms in discharged ballast water. Rather, the US has rejected the acceptance of any BWM system that acts to make organisms unviable or unable to reproduce rather than killing or removing them.

The US Coast Guard has implemented an Alternative Management System (AMS) program that allows a ship with a BWM system that have received type approval in accordance with the BWM Convention to continue to utilize that that system in US for up to five years after the applicable compliance date provided for in the US BWM regulations. This is a temporary measure, adopted in recognition that no BWM system has yet successfully completed the US testing requirements and been granted USCG type approval. It is based on the Coast Guard's determination that using a BWM Convention-approved BWM system is at least as effective as conducting high seas ballast water exchange in reducing the risk of the introduction of aquatic nuisance species.



(Image: Retlif/Ecochlor)

Put to the Test

Ecochlor had its Ballast Water Technology System at Retlif in Ronkonkoma, NY for more than two months of testing and verification recently. The Ecochlor system is a system that employs a two step process to treat ballast water: First, a filtration system removes sediments and larger organisms, and then a chlorine dioxide treatment system eliminates smaller organisms and pathogens. Testing of the system was fairly standard according to Retlif, including electrical, inclination, environmental and Electromagnetic interference (EMI) Testing.

With the scheduled entry into force of the BWM Convention, one should not expect any substantial change in the US position regarding ballast water management. The differences between the programs, particularly with regard to system testing, are too great and there is no indication that the BWM Convention will be changed to accommodate the US concerns.

As a result, the maritime industry will be in a situation similar to that following adoption by the United States of the Oil Pollution Act of 1990 (OPA 90). There will be two similar, but not identical, BWM systems: one for covered vessels operating in US waters and another for covered vessels operating in the waters of other nations. Vessels in compliance with the US BWM standards will be able to operate worldwide. Vessels in compliance with only the BWM Convention standards will eventually not be able to operate in US waters. With luck, a number of IMO type-approved BWM systems will also garner US type-approval. The first application for USCG type-approval has now been received.

The Author

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Light @ the end of the tunnel

Depending on which sector that your maritime business resides on the global waterfront and within the world's supply chain, the past 18 months may not have been your best ever. The recent confluence of three separate, but related events may just form the basis for a way forward to better times. In other words: the light at the end of the tunnel.

JOSEPH KEEFE

They Come in Threes

The old wives tale holds that 'bad things come in threes.' And it is true. Take the global waterfront, for example. The collapse of shipping giant Hanjin dominates today's news cycle, especially where it impacts the supply chain, but seemingly endlessly low bulk freight rates (overcapacity) and the low price of oil are also taking their toll on the bulk trades and offshore industries. Here in United States, the 'war on coal' exacerbates that impact on the bulk trades, albeit this time, on the inland and Mississippi Rivers. All of that negatively impacts the shipbuilding industries; here and abroad.

Fortunately, it turns out that good things also come in threes. And if the summer optimistically enough kicked off with the long-awaited release of the U.S. Coast Guard's Subchapter M towboat rule, then it is also going to end in a decidedly more robust fashion. The contract award by the U.S. Coast Guard for its future Offshore Patrol (OPC) to Eastern Shipbuilding Group is of course good news for Eastern, but the deal should resonate through the supply chain, as well. The first OPC is expected to be delivered in fiscal year 2021; the service plans to build 25 OPCs.

Notwithstanding the understandable disappointment of the also-ran yards, the total award is reportedly valued at $110.29 million, something that ought to ripple through the waterfront nicely. If all goes according to plan, the service plans to build 25 OPCs, putting the contract's potential value at $2.38 billion. Those ships aren't going build themselves, so the manpower required will present not only opportunities for the yard and its personnel, it'll also tighten a flagging shipbuilding employment sector that desperately needs a kick in the pants.

Separately, the IMO's ratification of the Ballast Water Management Convention, and its entry into force on the 8 of September 2017, presents a robust opportunity for shipyards everywhere. It also represents a significant challenge to industry, especially where that ruling involves scheduling drydock space for the world's 60,000 hulls that might be impacted, the OEM's who need to ramp up their manufacturing base, and yes, the Coast Guard, who hasn't yet approved any devices for vessels traveling in U.S. waters. While it isn't altogether clear as to how all of that will come together, the downstream impact that equipment installations that can cost as much as $1 million at a pop should not be underestimated. And, not a moment too soon.

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The Macro View

There's something for everyone: blue water, brown water and everything in between. Those three events, all by themselves, don't of course provide the complete panacea that we're looking for, but as a combined punch, it is certainly better than a sharp stick in the eye. On the other hand, a closer look at the subchapter M towboat rules provides a glimpse at a rule – some stakeholders in the inland waterways industry had positively quailed over what was coming in the many months before its announcement – that simply isn't nearly as strong as it could have been, provides many 'outs' in the form of delayed entry into force and grandfathering of certain issues. Still, there will be work to be done, and that's good news for the boatbuilding and repair sector, as well as the many OEM providers that service them.

The IMO ballast water convention ratification also holds some uncertainty, especially in the face of the excruciatingly slow approval process on this side of the pond. But, with 95% of all freight entering the United States doing so on a boat and all but a handful of those vessels registered to a flag of convenience, most of the Ballast Water Treatment solutions will probably be installed somewhere else, when they do happen. Still, savvy shipowners are reluctant to install something which hasn't yet been U.S. Coast Guard approved, even with the deadline date looming large in the proverbial porthole. It will be a mess when it happens, but the rule will eventually help put some repair yards back on their feet.

Elsewhere, Reuters was reporting that U.S. drillers last week added oil rigs for an 11th week in the past 12, despite the fact that crude oil prices remain below "the key $50 a barrel level that spurs a return to the well pad." Well, maybe they (the drillers) know something I don't.

Bad things can come in 'threes.' We've certainly seen enough of that over the course of the past two years. Good things can and do follow a similar pattern. In fact, I think it was John F. Kennedy who said, "When the tide comes in, all the boats float." Has the tide started to come in? I don't know. And, you are free to make of current events what you will. From where I sit, however, I'd call the cumulative impact of this summer's events and announcements, 'The Light at the End of the Tunnel.' Let's go with that, for now.

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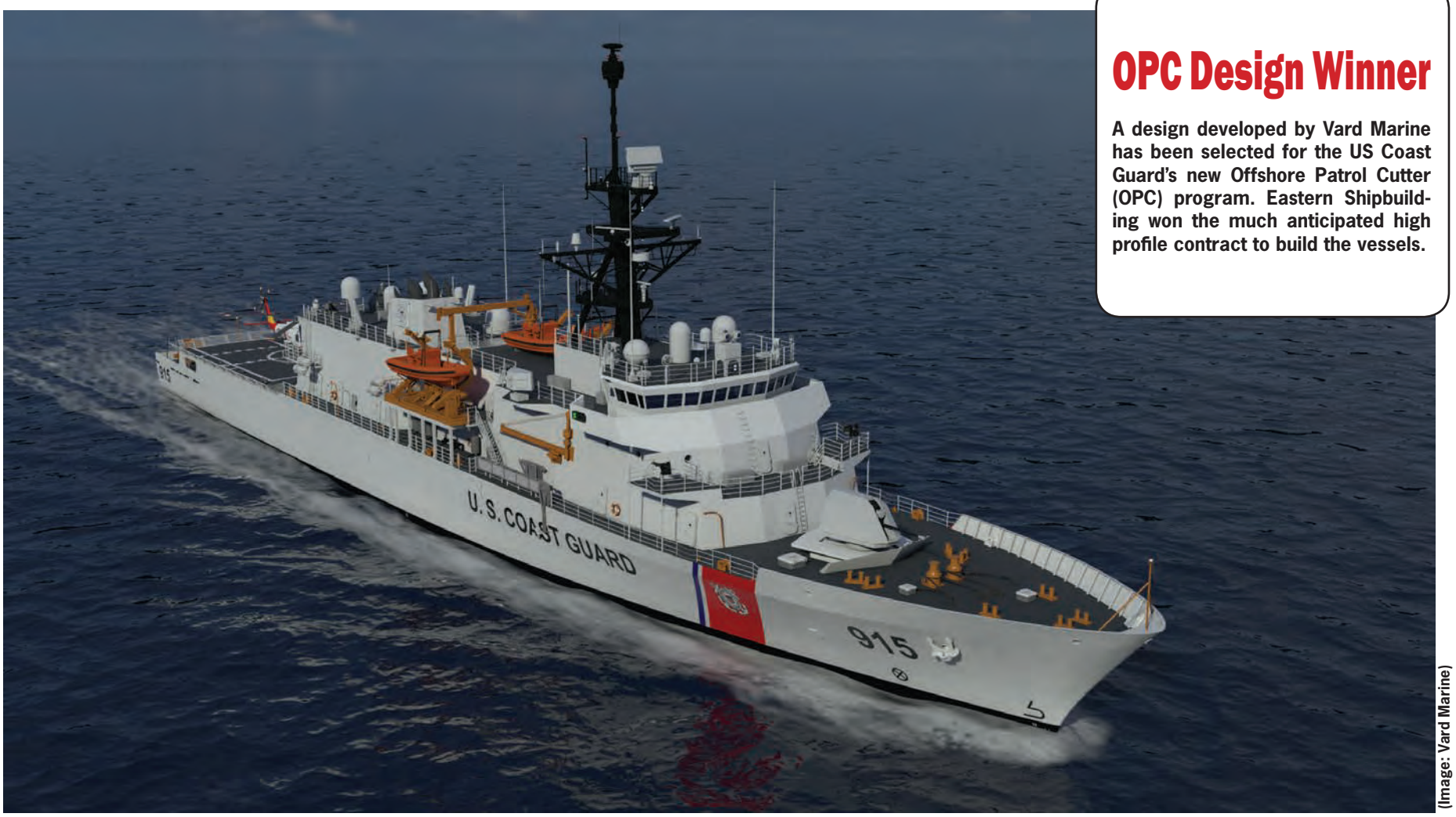


(Image: Vard Marine)

OPC Design Winner

A design developed by Vard Marine has been selected for the US Coast Guard's new Offshore Patrol Cutter (OPC) program. Eastern Shipbuilding won the much anticipated high profile contract to build the vessels.

Implications for the Maritime and Oil and Gas Industries

South China Sea Arbitration

JOAN M. BONDAREFF

A recent decision by an international tribunal in The Hague, Netherlands, has significant implications for other maritime disputes, freedom of navigation, and future oil and gas claims in the Arctic.

The arbitral award issued on July 12, 2016, by a unanimous five-member panel or Permanent Court of Arbitration (PCA) in the dispute between the Philippines and China over rocks and elevations in the South China Sea, sounded a clarion call for the rule of law and the clearly defined maritime boundaries and environmental principles established by the United Nations Convention on Law of the Sea (Convention). It remains to be seen whether China will abide by the decision and enter into negotiations with the Philippines to resolve all remaining disputes to these territories and waters. To date, China, which never participated or recognized the authority of the PCA to arbitrate this case, has rejected the ruling and is continuing to build up its military presence in the region.

The Dispute

Both the Philippines and China are parties to the Convention, which requires that parties to maritime disputes resolve them through arbitration. The dispute essentially revolved around China's drawing of a so-called "nine-dash-line" around several outcroppings in the South China Sea that borders both China and the Philippines. China claimed that it had historical rights to these outcroppings and that no tribunal under the Convention could rule on its alleged sovereignty to this territory. Tired of having their fishermen harassed in open waters, and their vessels being harassed by Chinese law enforcement vessels, in 2013, the Philippines brought this dispute to the Hague in claiming that China was interfering with traditional Philippine fishing activities at Scarborough Shoal, an island in the South China Sea; that China had no "historic rights" with respect to the maritime areas of the South China Sea; that China had violated its duties under the Convention to protect and preserve the marine environment; that China had breached its obligations under the Convention by operating its law enforcement vessels in a dangerous manner causing serious risk of collision to Philippine vessels navigating in the vicinity; and that the reefs that China had claimed as low-tide elevations did not generate any entitlement to an exclusive economic zone or continental shelf. The Philippines were well-represented by a team of skilled U.S. lawyers, while China refused to attend or participate in the PCA's deliberations because of its position that the tribunal could not rule on matters of sovereignty, which China claimed over all islands and reefs in the South China Sea, including the Spratly Islands and Scarborough Shoal. [See map left.]

(Credit Blank Rome LLP)

The Ruling

The PCA first had to determine whether it had jurisdiction to hear the dispute. The PCA found that it did so because the dispute was not over territorial sovereignty—over which they admittedly had no jurisdiction—but was a dispute under the Convention over maritime boundaries and protection of the marine environment.

The PCA turned next to the merits of the case and found that China's claim to historic rights to resources and waters of the South China Sea was fundamentally incompatible with the allocation of rights and establishment of maritime zones in the Convention. Significantly, if China had any historic rights to resources and waters of the South China Sea, these rights were extinguished by the entry into force of the Convention and were incompatible with the Convention's system of maritime zones, i.e., 12-mile territorial seas, and 200-mile Exclusive Economic Zones (EEZ). As a party to the Convention, China has accepted these boundaries.

The next question was whether the outcroppings in the South China Sea were entitled to a territorial sea or EEZ. The PCA found that certain reefs were above water at high tide; therefore they were entitled to a 12-mile territorial sea. However, other outcroppings claimed by China as having their own EEZ—encircled by the nine-dash-line—did not because they could not sustain human habitation or economic life on their own, despite China's efforts to place runways and other buildings on these islands. Although Chinese and other fishermen had used the Spratly Islands, this temporary usage did not amount to habitation by a stable community and therefore these features are just "rocks" that do not generate an EEZ or continental shelf. Finally, the Tribunal concluded that China had violated its duty to respect the traditional fishing rights of Philippine fishermen by halting their access to Scarborough Shoal after May 2012, and that its large-scale land reclamation and construction of artificial islands at seven features in the Spratly Islands had caused severe harm to the coral reef environment, thus violating China's obligations under the Convention to preserve and protect the marine environment. Regrettably, the PCA cannot enforce its award so it is up to China to decide how to react. So far, the reaction has been fairly negative and China is continuing to operate patrols there, sending its aircraft to the Spratly Islands, and once again using Chinese coast guard ships to block access by Philippine fishermen to the Scarborough Shoal.

Implications for U.S. Shipping and O&G Exploration in the Arctic

An estimated $5.3 trillion of maritime commerce

passes through the South China Sea every year as a major shipping route between China, Japan, South Korea, Europe, and the Middle East. Should China choose to impede the rights of innocent passage and freedom of safe navigation, according to Esben Poulsson, President of the Singapore Shipping Association, this "would potentially drive up shipping costs, resulting in a detrimental impact on maritime trade."

Although no U.S.-flag vessel has been harassed to date by Chinese vessels, the United States is taking no chances and is sending its own ships to patrol the open waters of the South China Sea. On August 6, amphibious assault ship USS Boxer completed a routine patrol in international waters of the South China Sea in order to "help promote the rights, freedoms, and lawful uses of the sea and airspace guaranteed to all countries," according to Captain Patrick Foege, commander of U.S. Navy Amphibious Squadron 1. Some Members of Congress, including Senator Dan Sullivan (R-AK), are calling on the United States to send two aircraft carriers there on a permanent basis to protect the fundamental right enshrined in the Declaration of Independence of freedom of navigation. (From a keynote speech of Senator Sullivan on July 12, 2016, at the 6th Annual South China Sea Conference of the Center for Strategic and International Studies.)

Impacts of the Ruling on Other Claims

Now that the PCA has made clear the obligation of parties to the Convention to abide by its principles and boundaries, it is more important than ever for the United States to ratify the Convention, which creates not only a 200-mile EEZ but also an extended continental shelf out to 350 miles. This is critical if the United States wants to protect its claims to the vast oil and gas resources of the outer Continental Shelf (OCS) in the Arctic and counter claims of other nations, e.g., Russia, that may interfere with its own claims based on the U.S.-extended continental shelf adjacent to Alaska.

Russia and more than fifty other nations have staked their claims to an extended OCS by filing submissions to the Commission on the Limits of the Continental Shelf pursuant to Article 76 of the Convention. The United Nations was prepared to consider Russia's claims this summer during the Commission's 41st session. The United States is an observer at the Commission proceedings, but since it is not a party to the Convention, it has no official role there. While the United States can claim to and does abide by maritime principles under the Convention as a matter of customary international law, it will have better standing in the world to protect its own and other countries' legitimate maritime boundaries and encourage China to abide by the rule of law if the United States is itself a party to the Convention.

Oil and gas companies and their respective trade associations and many other groups have long urged the United States to ratify the Convention; it is time for the Senate to quickly and responsibly do so.

The benefits of ratification clearly outweigh any perceived costs.

The Author

Joan Bondareff, Of Counsel at Blank Rome LLP, focuses her practice on marine transportation, environmental, and legislative issues and represents clients in many industries and state and local governments.

An Update & Analysis of
Climate Change & Rising Seas

DUNCAN MELLOR

The maritime Industry offers by far the most efficient means of transport, yet does get more than its share of attention for contributing to "climate change." The reality is that the Maritime Industry faces a disproportionally high risk of damages if the projections for accelerating sea level rise associated with climate change are real. Here, we are bypassing the politically charged topic of climate change, to take a closer look at observed sea level rise relative to the projections, or forecasts, that have been made by climate change scientists.

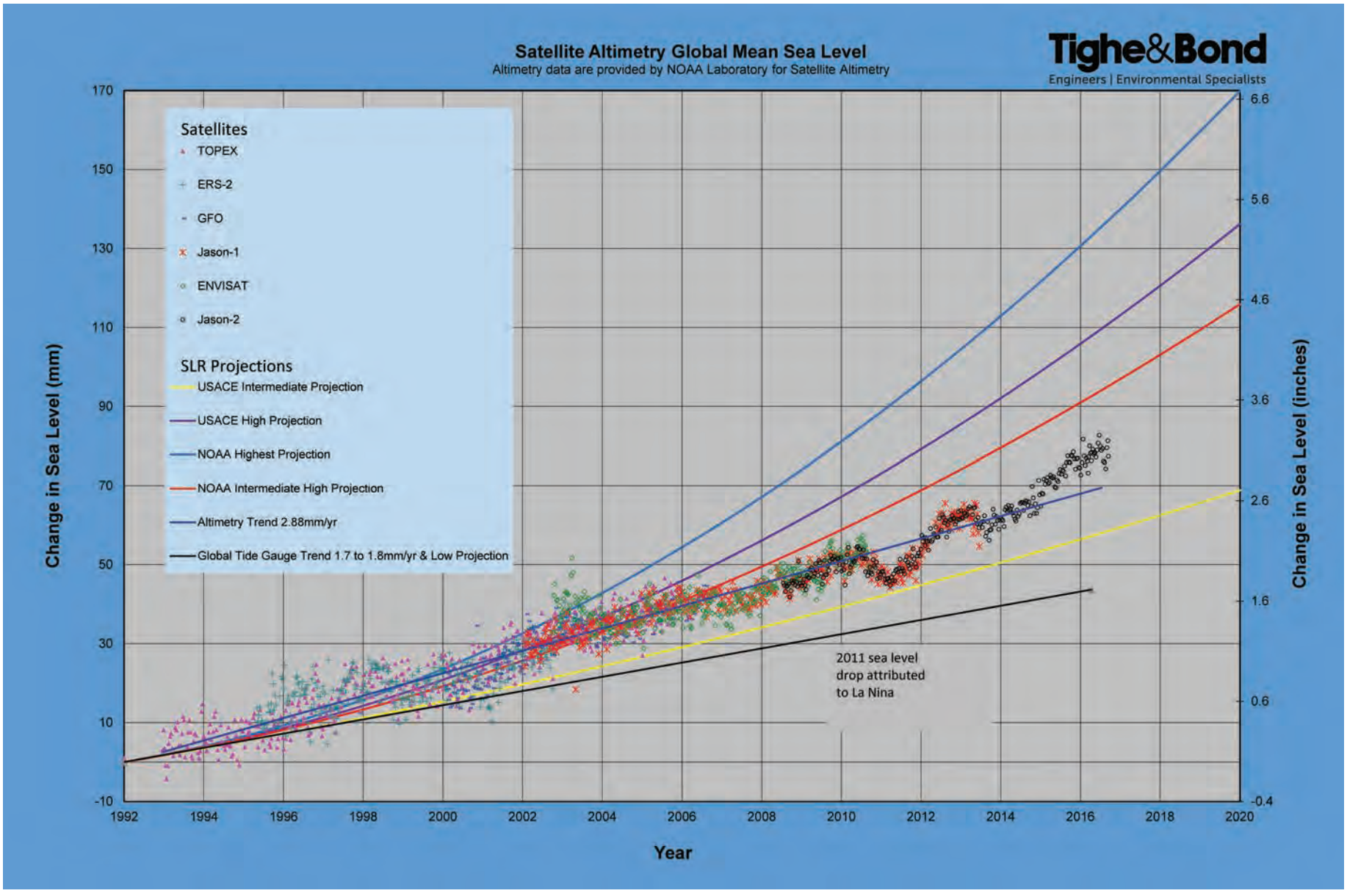
As an engineer, I work with materials and design concepts that have evolved over hundreds or thousands of years. These engineering concepts are well understood and provide predictable behavior when transformed into real world structures.

In contrast, man-made climate change science is a new field, academic in nature, most closely linked to the Intergovernmental Panel on Climate Change (IPCC) formed in 1988. At the center of this study of global climate is an extremely complex system, not well understood, with many data gaps and large degrees of uncertainty, especially when dealing with the deep oceans and polar regions.

So where do we stand on sea level rise, and its projected acceleration?

The trends in observations of global sea level vary, but in comparing the observations to the forecast sea level rise acceleration projections, the observa-

Figure 1



tions show sea level rise is still quite linear and at rise rates less than forecast.

There are two types of ocean observation data available to help track sea levels. The traditional data is tide gauge observations from ports around the world, with records going back hundreds of years. These long duration data sets provide accurate long-term trends. However, this data includes changes in land elevation, so it is really measuring sea levels relative to the local land. Some land, such as in Canada and Alaska, is rising due to crustal rebound (where the weight of ice sheets during the last ice age previously depressed the land and now the ice sheet weight is gone). The crustal rebound areas are actually seeing relative sea level drop. Other areas have land elevations subsiding due to crustal movement, oil or water extraction or soil consolidation effects that are combining with global sea level rise to show higher local relative sea level rise.

The tide gauge data does have some disadvantages including uneven distribution around the globe and they are only located along coastlines. Tide gauges record the tide rising and falling every day. This includes storm surges, effects of atmospheric pressure changes and wind direction. The moon strongly influences the tides, with orbital effects that take 18.6 years to repeat a cycle. This leads to the establishment of a "tidal epoch" defined as 19 years, and it is the minimum length of time needed to record the tides and average out the variations due to the moon's orbit cycle. Therefore, any tide gauge data needs to be averaged over at least 19 years, with two or more tidal epochs preferred. It is not accurate to look at shorter ranges of tidal data to establish rates of sea level change1.

The other type of ocean elevation data more recently available to examine sea level trends is sea height measured by satellite altimetry. These measurements began in 1992 and several satellites have recorded global sea levels using altimetry. The satellite data has the advantage of crossing most of the ocean areas within days (typically to 66 deg N & S), thus offering a global perspective apart from the Arctic Ocean. However, altimetry has significant amounts of error and uncertainty with many corrections applied to the data and the data record length is still quite short.

Figure 1 presents a summary chart showing the corrected satellite global sea height observations, the long-term tide gauge observation trend, and a number of the sea level rise acceleration projections by the National Oceanic and Atmospheric Administration (NOAA) and the US Army Corps of Engineers (USACE). A key point of this chart is the linear rise trend in sea level rise observations for both tide gauge data and satellite altimetry data. The early observation data did somewhat match the initially flat acceleration projection curves; however, after about 2006 the higher acceleration projections have been diverging from the observations. Since the projections of sea level rise acceleration are exponential, these divergences will increase over time as long as the observed sea

level rise trends remain linear.

A key point in reviewing the Figure 1 data is noting the satellite observations of sea level rise typically don't match the tide gauge data. How can they be different? The two types of observations use differing measurement methods and cover somewhat different areas of the oceans. The tide gauge data often has been collected over a long time and is averaged over at least a 19 year tidal epoch to remove much of the Moon effects and mid term variation. In contrast, the satellite altimetry is recorded every 10 days to get global coverage, and then has corrections applied. In looking at the European satellite ENVISAT, which was collecting observations from 2002 to 2011, its observations showed a lower rate linear sea level rise trend of about 2.1 mm/yr (0.8 inches per decade), which agrees well with global tide gauge sea level rise trends (about 1.7 to 1.8 mm/yr (0.7 inches per decade)). The other satellite altimetry data suggests a higher linear rate of sea level rise with the combined data indicating a linear sea level rise trend of about 2.88 mm/yr (1.1 inches per decade).

So, what is really happening, and how much sea level rise will we be seeing?

As shown in Figure 1, the globally averaged tide gauge observations and the global satellite corrected observations are indicating a linear rising trend, currently tracking below the higher carbon emission sea level rise acceleration projections. The projections for sea level rise acceleration, which climate scientists made 24 years ago, need revising.

Global climate - including deep ocean temperatures, precipitation and snowfall are complex and not well modeled. An example is the sea level drop that occurred in 2011. One theory is the 2011 La Nina event in the Pacific Ocean resulted in increased precipitation onto

Another potential risk for the Maritime community from inaccurate sea level rise forecasts may be loss of government funded channel dredging. Actual sea level rise will be reflected in a rise of Mean Lower Low Water datum with each new tidal epoch based on tide gauge data and non-shoaling areas will gradually get deeper. **There is a risk that sea level rise projections will be used by dredging opponents to argue that channel dredging is not needed because sea levels are rapidly rising.**

(Photo: Public Service of NH)

land, causing a temporary drop in global sea level. Until the climate and sea level rise models are refined and start matching the observations, we will need to continue to update the sea level rise projections on an empirical basis. Long-range extrapolation of accelerating sea level rise is inaccurate when not supported by observations.

In a recent journal paper2 we are now seeing the climate change scientists acknowledge the lack of sea level rise acceleration.

The paper suggests the anticipated acceleration in sea level rise is being masked in satellite altimetry data due to ocean cooling and contraction caused by the 1991 eruption of Mount Pinatubo which occurred at the start of the satellite altimetry observations.

What does climate change and sea rise mean for the Maritime community?

Since sea level is rising, though not at such a rapid rate as forecast, pre-planning now for coastal resiliency should be considered and that planning may need to be revisited periodically to see if sea level rise observations are matching the rise projections. Currently many local, state and federal government agencies are moving forward with policies and codes to restrict and discourage waterfront development due to anticipated sea level rise. This will put an especially heavy burden on water dependent property owners who do not have the option to relocate inland and due to the high cost and value of maritime facilities. There is an additional burden being applied by local and state agencies as they start posting detailed mapping showing properties they expect to be flooded as sea levels rise. Many of these inundation maps are illustrating conditions in the future, but these agencies have not yet recognized the nearer term potential adverse impacts of their mapping, such as when banks refuse mortgages on inundation mapped properties. One city on Boston Harbor in Massachusetts has published inundation maps as early as year 2030 showing many maritime facilities being flooded by sea level rise. Any bank doing their due diligence on a 30-year mortgage request for those inundation mapped properties might well question the potential risk and refuse the mortgage, which can make it more difficult to invest in or sell those properties, leading to reduced property values.

Another potential risk for the Maritime community from inaccurate sea level rise forecasts may be loss of government funded channel dredging. Actual sea level rise will be reflected in a rise of Mean Lower Low Water datum with each new tidal epoch based on tide gauge data and non-shoaling areas will gradually get deeper. There is a risk that sea level rise projections will be used by dredging opponents to argue that channel dredging is not needed because sea levels are rapidly rising.

These examples do help illustrate the potential adverse impacts that can be caused by inaccurate sea level rise projections. Over estimating sea level rise might be considered a conservative planning approach, but it will have adverse financial impacts for those living and working on the waterfront. As illustrated in Figure 1, the higher carbon emission sea level rise acceleration projection curves are not supported by ocean observations to date and it is time reevaluate the outdated forecasts.

The Author

Duncan Mellor, PE Bio is a coastal and waterfront engineer with a background in civil and ocean engineering, including wave mechanics, corrosion and marine structure deterioration, design, permitting for shorelines, waterways, ports and harbors.

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Geometry for Propeller Replacement & Repair with HydroComp PropCad

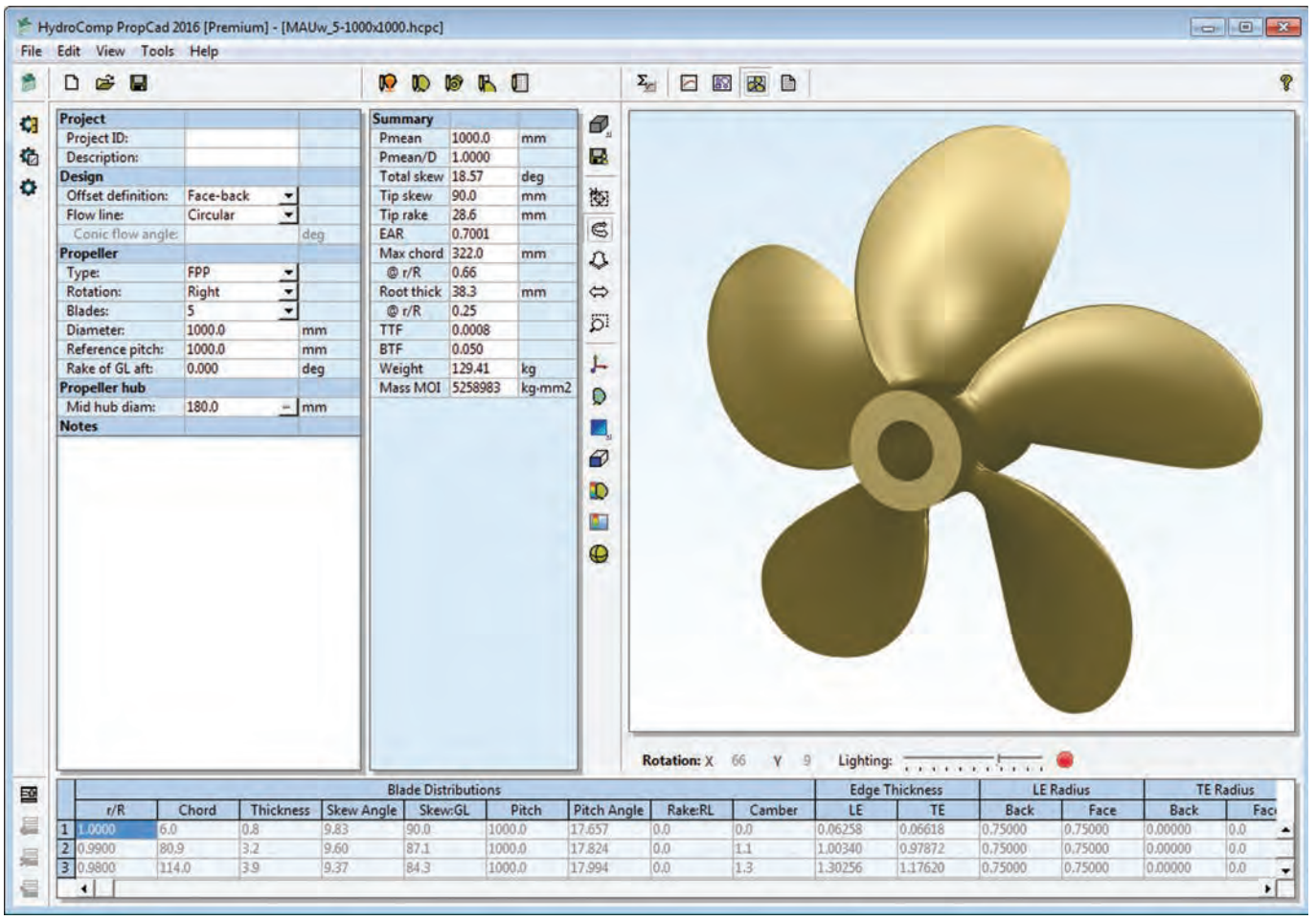
DONALD MACPHERSON

The repair of large commercial propellers is more than beating a blade back into shape. It requires reference geometry as the target objective for the repair, as well as way to document the inspection and compliance for the repair. In some cases, existing drawings are available. Other times, the geometric features must be extracted from the propeller itself. Virginia-based company Argonaut Enterprises VB LLC focuses on the documentation, repair, and manufacture of marine propellers. They can design and deliver propellers from as small as 24 inches (0.6 m) to as large as 26 feet (7.9 m) diameter, and many of these projects are for the repair or replacement of existing propellers.

Replacement Propellers

"It is not uncommon that a customer requires a replacement for a propeller based on a drawing which could be 30+ years old", comments Darryl Doerr, Managing Director of Argonaut. "A few years ago we had a propeller project based on such a drawing. During that time we did not know that there were design errors in the drawing that dramatically influenced the final result. It is unfortunate that it takes a failure to identify a problem, but often that is exactly what happens. It became clear to me that we needed a solution that would be efficient and effective to analyze a propeller design and identify possible design-related issues. That solution was HydroComp's PropCad software." HydroComp's PropCad is industry-standard software dedicated to the geometric modeling of marine propellers. PropCad provides automatic preparation of CAD/CAM data, 2D design drawings, 3D offsets, and thickness classification reports. The latest additions to HydroComp's PropCad software supplement the typical propeller design tasks with support for manufacture and inspection.

Figure 1: The main interface of HydroComp PropCad 2016.



Feature Extraction for Propeller Repair

Argonaut is using the advanced manufacturing features in PropCad Premium to repair propellers. Mr. Doerr explains, "In repair, propellers come to the facility often with no drawing or design data. To repair a propeller to Class or to ISO-484 requirements, design values are needed. Without a drawing, we must fully inspect each propeller to extract key design data to determine design intent and create a repair drawing before repairs can be made. PropCad is instrumental in nearly every project to reproduce a design model and repair drawing."

PropCad can interpret existing propellers, patterns, and scan reports in order to support legacy designs. The Scan Converter utility in PropCad Premium is used to extract propeller parameters such as pitch, chord, skew, rake, and thickness using 3D data points collected from a physical propeller.

Scan Converter processes the data and recreates the propeller blade by extracting individual sections from the geometry and deriving the geometric distributions. Once the design is in PropCad, additional documentation such as 2D drawings, pitch inspection reports, and 3D offsets can be easily generated for customers, clients, and record keeping.

Inspection Documentation for Repair

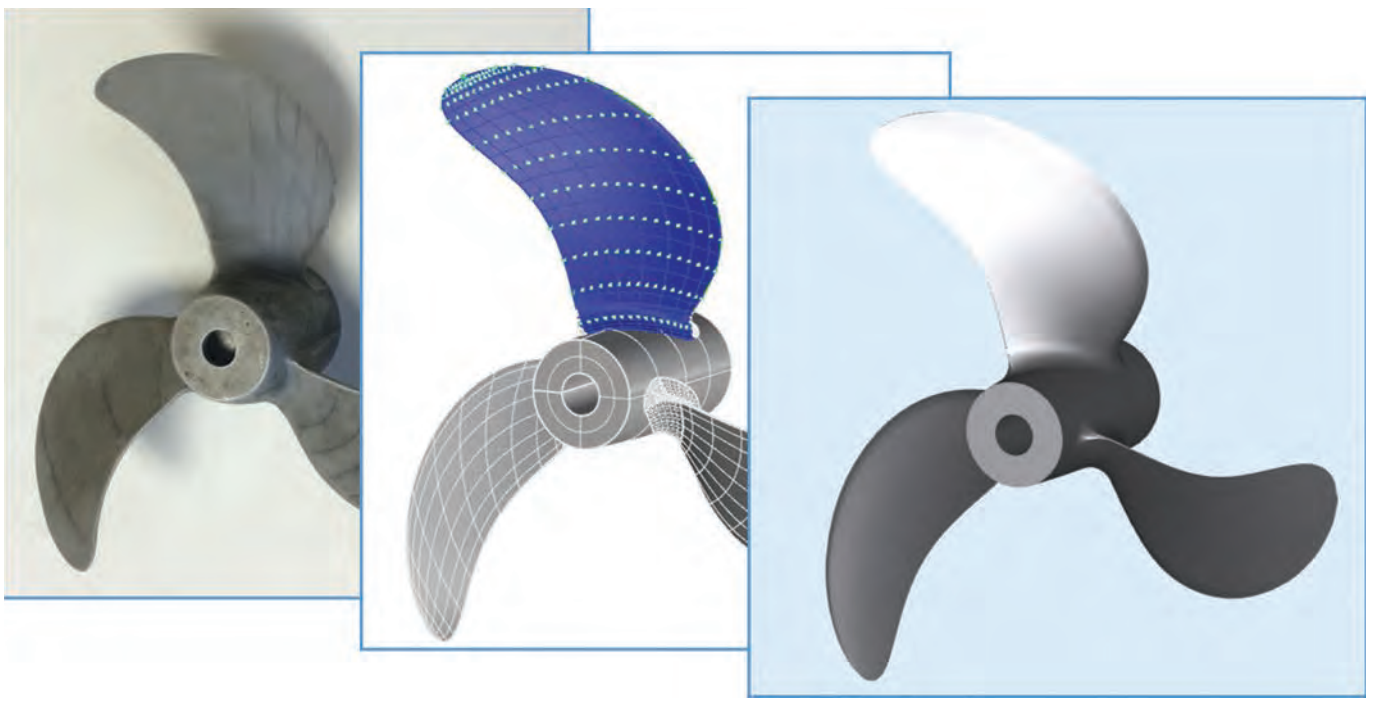
The proper inspection of marine propellers ensures the manufactured product meets the thickness and pitch specified by the design. Traditionally, the offset positions are manually laid onto the blade surface and checked against the published offsets for the propeller. To improve this process, PropCad Premium offers a powerful tool for propeller builders and manufacturers – Inspection Maps. These maps provide guidance for propeller craftsman and foundry work-

ers, allowing them to quickly identify the inspection points on the blade and provide a proper comparison for the design thickness and local pitch values.

PropCad includes four inspection maps for determining inspection point location and inspection values for thickness and local pitch. These maps produce a template of the developed blade outline, which can often be directly laid on top of constant pitch propellers to approximate the inspection point position. The inspection maps that are now featured in PropCad Premium are:

- Thickness map – provides the local thickness values of the blade at each inspection point. The maximum thickness is also identified and labeled separately.
- Local pitch map – provides the measured value of local pitch for a segment of the blade surface at each inspection point.
- XYZ location map – provides the coordinates of the inspection points in a Cartesian coordinate system. Each inspection point has an X value representing the axial height of the blade at a specified Y and Z ordinate from the shaft axis.
- X-R-Theta location map – provides the coordinates of the inspection points in a cylindrical coordinate system. Each inspection point has an X value representing the axial height of the blade at a specified radius (R) and angle (Theta) from the shaft axis.

Figure 2: Scan Converter can be used to extract the design parameters and recreate the blade.



Castings and Patterns

Manufacturing a new propeller or replacement blades typically requires geometry different from the final design as part of the foundry process. Building a propeller by sand-casting, for example, requires three critical geometries:

- The final design shape (of course).

Figure 3: Inspection map for measuring blade thickness.

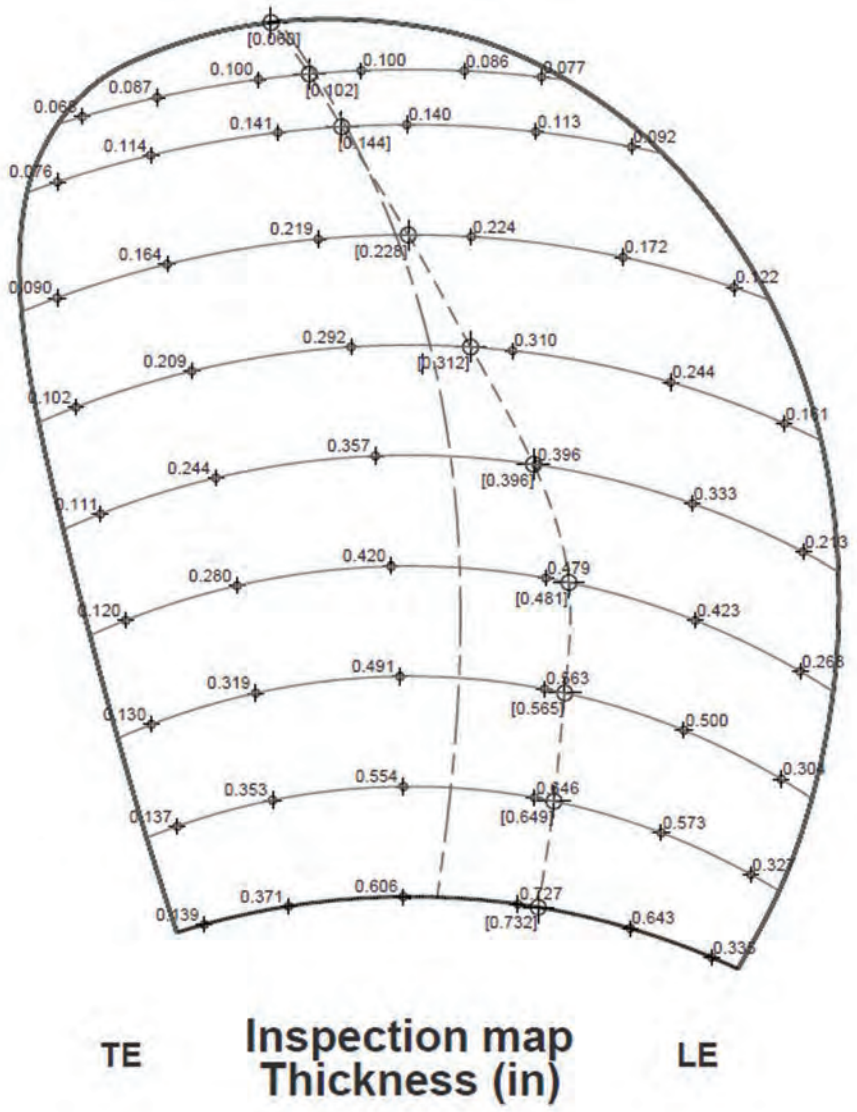


Figure 4: The Pattern corrections utility allows users to easily account for machine stock and shrinkage factors.

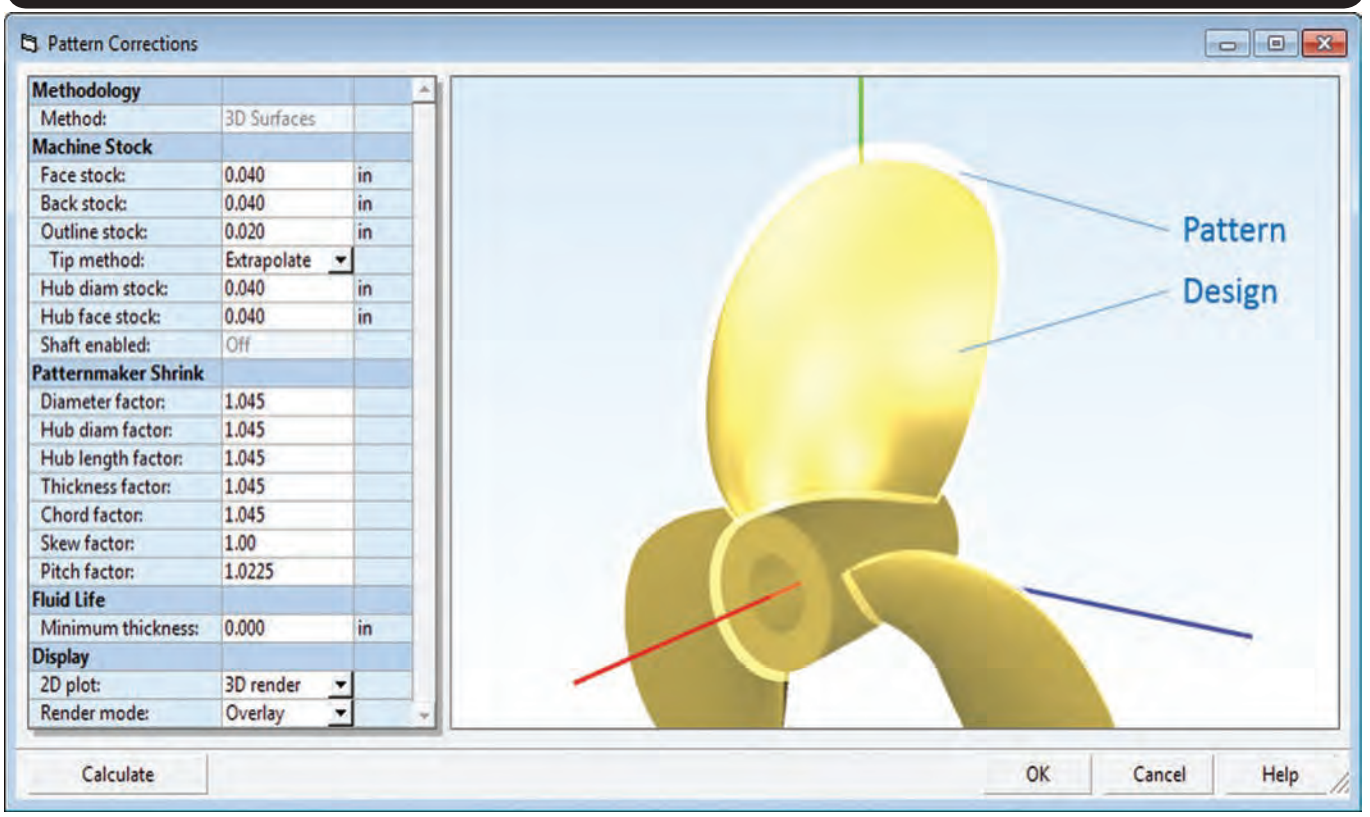


Figure 5

Figure 6

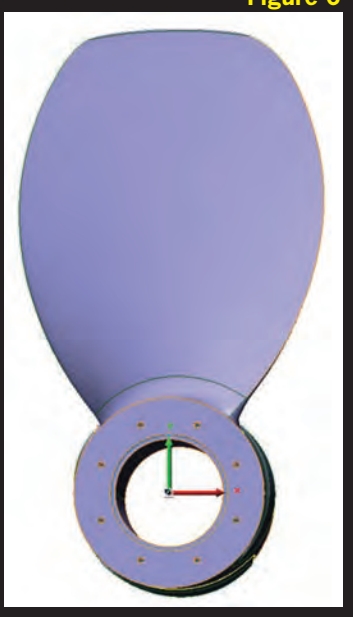


Figure 7

Figure 5: 3D scan of existing blade.

Figure 6: CAD model of replacement propeller created with PropCad.

Figure 7: Scan of replacement propeller overlaid with CAD model (tolerance of ±0.030" set for Pass/Fail).

• An expanded geometry that includes additional "mill stock" thickness for machining or grinding.

• Pattern geometry which will account for deformation and shape changes during casting.

In other words, the shrinkage and deformation during the casting plus the additional material for machining or handfinishing must be built into a production or patter model.

Generating rational pattern geometry can significantly increase the workload for a propeller designer, but much of this process can be effectively automated. PropCad Premium's Pattern Corrections tool allows users to directly specify mill stock and shrinkage to create machining models, casting patterns, and mold geometries. A major advantage is that these corrections are applied directly to the design parameters, allowing calculation and visualization of sections, blade parameters, and radial distributions. The Pattern Corrections utility will document these important corrections by storing them with the PropCad design file. Consequently, adjustments to the pattern can be made rapidly and easily.

Case Study

The value of PropCad to Argonaut Enterprises for propeller inspection and documentation was described by Mr. Doerr. "Since 2012 when we first purchased PropCad, we have found several customer-supplied drawings to have numerous design errors. PropCad has truly saved us time and money on these build-to-print projects."

"Last year a customer provided a 144 inch four-blade stainless steel propeller with a broken blade. This customer did not have a drawing for the 30-year old propeller but was happy with the performance right up to the day they struck something and had broken off the blade. As long as there is an ocean floor or river bottom, there will always be a need for a propeller repair facility. This project was Classed by ABS so all aspects of the project required ABS approval; from the initial drawing, casting and final inspection of the newly manufactured propeller."

"We started by scanning the propeller with a 3D CMM device and created a three-dimensional model of the damaged propeller. PropCad's Scan Converter was then applied to develop the cylindrical sections and build the design as scanned into PropCad. We used the Class Feature within PropCad to determine if the design meets ABS Class requirements. Once the design model is completed, we used the Pattern Compensation utility in PropCad Premium to create a pattern drawing and 3D data."

Shown in the figures below is an example of an Argonaut propeller project where they a) scanned the existing blade, b) created the geometric model and compensated pattern in PropCad, and c) cast and machined a replacement. The newly manufactured replacement propeller was also scanned into a 3D CAD model for inspection and QA. As can be seen, the finished replacement propeller faithfully matched the original with very high precision – and does so in a way that that blade is mathematically smooth and erases existing design errors.

Propeller Replacement and Repair Success with PropCad Premium

As Darryl Doerr puts it, "PropCad Premium is an integral part of our business. We began working with the folks at HydroComp in 2012 and have expanded that relationship over the years on several naval and commercial projects. HydroComp has specially tailored numerous upgrades to PropCad to help us get the desired result we need. It is rare when a company will take the time to work one-on-one to develop features and enhancements that did not previously exist. Going the extra mile is truly a trait instilled in the HydroComp philosophy."

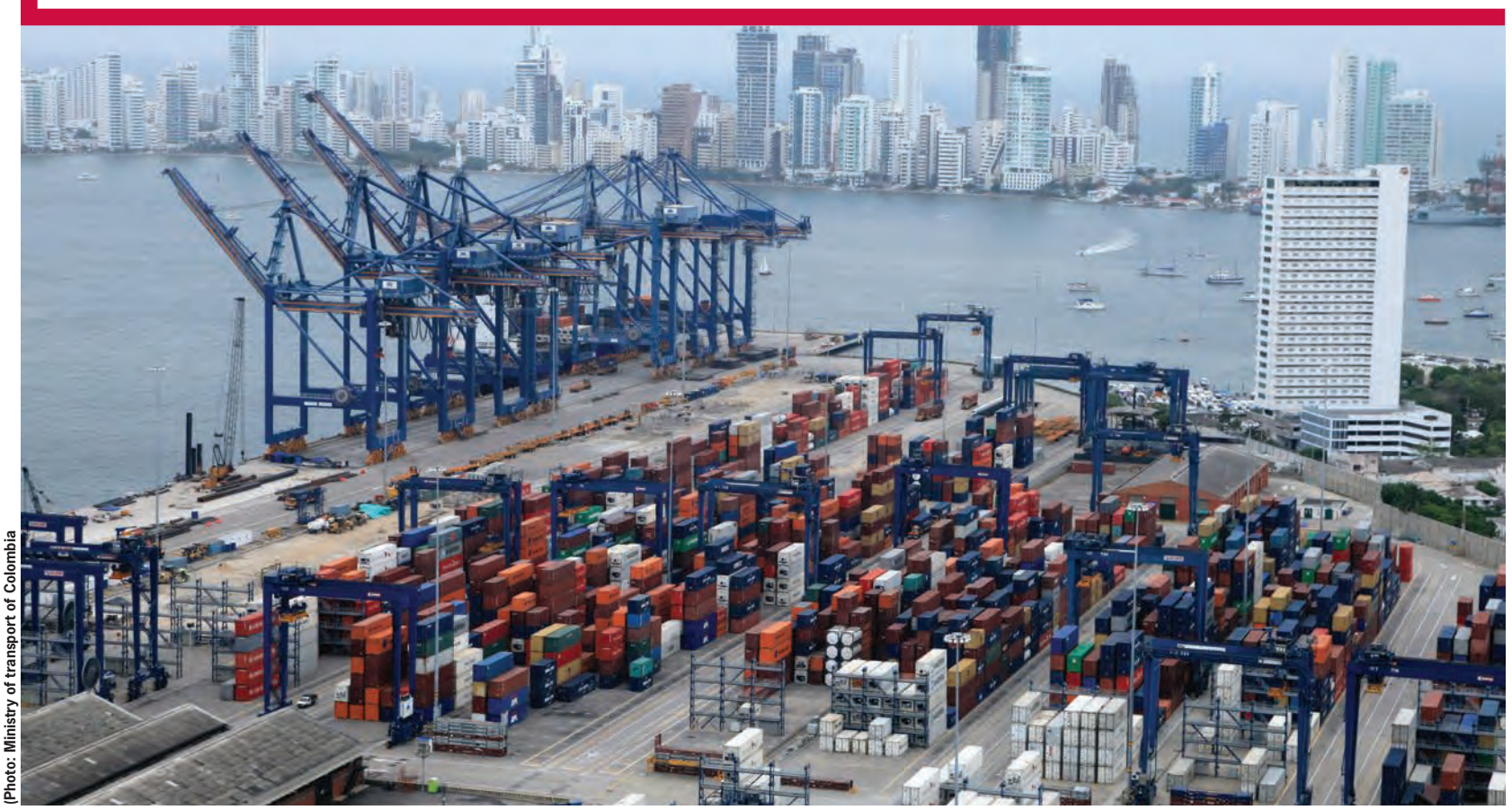
The Author

Donald MacPherson is co-founder and Technical Director of HydroComp. Widely regarded as one of the industry's foremost experts in parametric performance prediction for marine vehicles, MacPherson oversees all software product development and technical consulting services. He is a graduate of the Webb Institute of Naval Architecture, a Fellow of the Society of Naval Architects and Marine Engineers, a member of the SNAME H-8 Propulsion Hydrodynamics Panel, and a frequent author and speaker on ship resistance and propulsion, sea trial and bollard pull analysis, and propulsor design.

(Photo: OAS/CIP)

Jorge Duran

& the CIP; the glue that binds the Hemisphere's Port Agencies



(Photo: Ministry of transport of Colombia

(Photo Credit: T21)

In July 2013, Jorge Duran was asked to lead the Secretariat of the Inter-American Committee on Ports (CIP). First and foremost, the CIP's Members are the National Port Authorities of the 35 sovereign nations of the Americas (with the exception of Cuba). All countries in the hemisphere except for the United States and Canada have a Federal Port Agency that, in one way or another, may be responsible for regulation, enforcement, planning, development, and/or granting concessions to private-sector firms to manage the port and/or terminals. The U.S. is well represented in the CIP through the U.S. Department of Transportation's Maritime Administration and a productive relationship with the U.S. Coast Guard.

As he, unlike any other, has a unique position, connection to and perspective on the ports in the hemisphere, Maritime Reporter asked Mr. Duran to assess the primary challenges faced by ports today.

1 **One of the main challenges the region's ports face is having the necessary and adequate infrastructure to compete in the modern global arena.** With the expanded Panama Canal now in operation and larger vessels now traversing Caribbean and Central American waters, ports around Latin America and the Caribbean are poised to reap benefits from these changes in global shipping patterns. Larger, newer ships require state-of-the-art port facilities, and the Port of Cartagena in Colombia and the Port of Kingston in Jamaica, for example, who see themselves as regional trans-shipment hubs, are investing heavily in modernized infrastructure to expand operations by accommodating larger ships and, in theory, larger volumes of trade. However, these two ports are not alone in this focus. Mexico, for instance, is investing $3.6 billion in 25 port infrastructure projects on the Pacific and Gulf/Atlantic coasts to handle over 500 million tons of cargo per year and become a logistical platform for value-added activities in the region.

2 **As ports in the region grow and aim to become more efficient, they must consider the intermodal connectivity required** for their countries to benefit from improved port efficiency. That is, it would not do anybody any good to be able to receive the larger ships and unload them very efficiently if the cargo is going to sit at the port for a week. Thus, countries will need to overcome the intermodal transportation connectivity challenge. Colombia, for instance, is dredging and investing in port infrastructure on the Magdalena River, which crosses the country from north to south and provides access from both Cartagena and Barranquilla to the hinterland. Argentina and Uruguay are already using the Paraguay and Paraná rivers to carry products to their hinterlands as well as to Asunción in Paraguay and even Bolivia and Brazil.

3 **Finally, as these ports move ahead with investments and modernization projects, they must take environmental protection and sustainable port operations** into consideration. Today, shipping firms and cruise lines give considerable weight to being able to call on a "green port." For instance, Mr. Hector Bautista, Director General for the Port of Ensenada, Mexico, mentioned that after being certified as "green" by EcoPorts, Ensenada began to receive more cruise and container ship calls.

Put to the Test

RETLIF TESTING LABORATORIES

***Walter Poggi** founded Testing Laboratories in 1978, and since he has been a ubiquitous figure in the world of independent lab testing, playing a critical role in the process of bringing new equipment from concept to reality.*

By Greg Trauthwein

Walter Poggi founded Retlif Testing Laboratories in 1978 with $5000. “Today, I couldn’t start this business with $5 million,” said Poggi, in assessing how regulation, accreditation and consistent investment in new testing equipment has helped to effectively push many smaller companies out of the business.

In fact when Poggi reflects on the company he started 38 years ago, he sees little resemblance to his company today. “Everything’s different, that’s why there aren’t as many labs anymore. The changes have been radical; it was a much simpler regulatory environment when we started. There was FCC testing, for example, but it was simpler. There weren’t quite as many hoops to jump through.”

Poggi is a proponent and founder of accreditation within his industry, but he laments “you have a cottage industry of standards writers who do nothing but write standards. All of these (ever evolving) standards have accreditation and capital impacts, investment in new equipment to adhere to the standard.”

Despite the hoops and obstacles, Retlif today stands as a leader in the sector, a private company with approximately 75 employees across three primary locations: its 30,000 sq. ft. headquarters in Ronkonkoma, NY; its 8,000 sq. ft. facility in Goffstown, NH (electromagnetic compatibility); and its 20,000 sq. ft. facility in Harleysville, PA outside of Philadelphia. From the outset Poggi built Retlif to endure, and it has consistently recorded growth in the range of 5 to 8% annually.

“One thing (that is key to longevity and prosperity) is you never stop learning. I was involved early on with this American Council of Independent Laboratories, which was like getting a PhD in lab management,” said Poggi. “It was the Rock Stars of the testing industry, and I don’t think that it could ever be duplicated.”

In addition to learning, Poggi has always been astute to invest in the business and his people. “I’m always going to be driving a Ford – maybe a Mercury – but never a BMW. Testing is capital intensive, and it takes continual investment.” And the investment is not limited to equipment.

“We are not a large company, but we have a deferred compensation plan in place for senior managers. If anything happened to me, my son will have four or five key managers here,” said Poggi. “That in itself helps to provide for consistency and stability in management.”

Strength in Diversity

Touring Retlif’s headquarters in Ronkonkoma, NY, one thing is immediately clear: Retlif is a diverse company serving many markets. *Maritime Reporter & Engineering News* was on hand to review testing of the new Ecochlor Ballast Water Technology System, a BWTS that employs a two step process to treat ballast water. First, a filtration system removes sediments and larger organisms, and then a chlorine dioxide treatment system eliminates smaller organisms and pathogens.

But the Retlif business extends far beyond maritime industry, and includes rail, air and a variety of military and government sectors.

Regardless of the client or market, Retlif must maintain its objectivity and standards, regardless of test results. That’s not to say that it isn’t a resource for times when a product may fail a particular test.

“If an engineer comes in with a product and you tell them it fails, it’s like telling them that their child failed the last test,” said Poggi. “We’ll give them some technical tips on helping them correct the problem, but we don’t go too much in depth as it might be a conflict. But we do have a cadre of independent consultants with which they can connect.”

Did You Know?
The name "Retlif" comes from the word "Filter" spelled backwards.

Winds of Change

While nearly everything in his business has changed, the constant is investment. "Investment in our business is never ending, and today there are three things that we're doing," said Poggi:

■ **Investing in People:** Retlif recently renovated its personnel evaluation program, getting away from yearly reviews and increases and replacing it with a true evaluation program, a program with a heavy influence on self-evaluation, goal setting with management and additional training … "pushing them to push themselves," said Poggi.

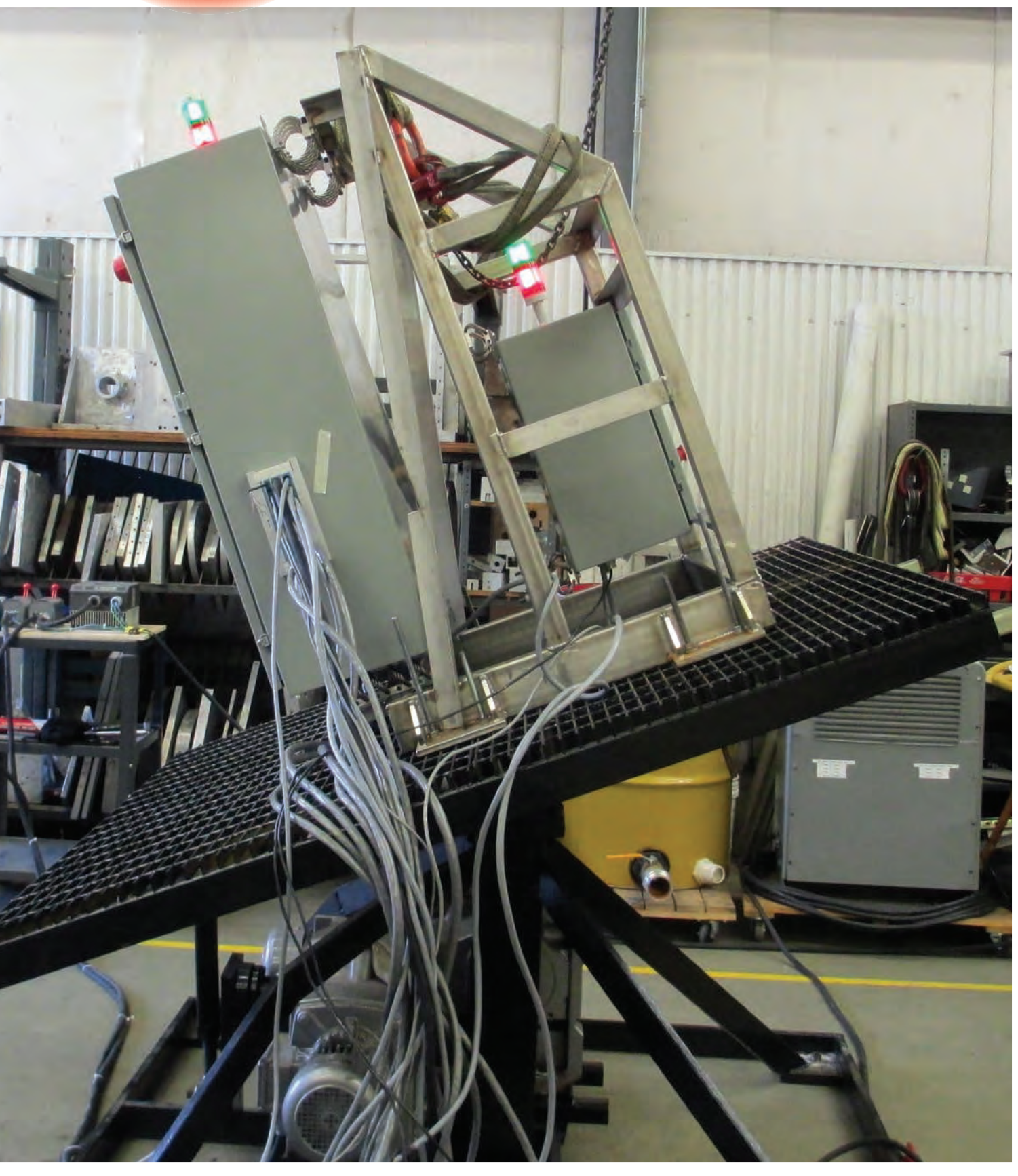
■ **Investing in the Business:** New equipment and technologies.

■ **Investing in related service expansions:** Retlif recently built a composites testing laboratory in Plainview, NY.

It is plain to see that Poggi is proud of Retlif's investment in people, and he said that the Human Resources department has been the biggest area of growth of late.

He particulalry revels in the ability to bring in people at a young age and keep them for their career, and he can point to Richard Reitz, the companies recently appointed Director of Engineering, as a prime example. "Richard Reitz has been with Retlif since 1985," said Poggi. "He came to us from Smithtown High School and now he's our Director of Engineering, overseeing Retlif's testing and staff engineers at all the testing facilities."

When talk turns to his proudest achievement, Poggi is remiss to name one test, one product, as standing out above all others. Rather his answer is similar to the company he's built: big picture with a long-term view: "To me what is more memorable is the long-term changes you see in industries rather than a single product or technology," said Poggi. "We take great satisfaction being involved in the positive changes within different industries that make them safer and more efficient. You see a lot of crazy things, but you also see a lot of good things. We have been involved in the railroad testing business for more than 20 years, and you really see a change in that industry, from the old electro mechanical relays to micro processors. The change (in terms of technology and safety) that I've seen in the rail industry is amazing, and you are starting to see more high tech in the maritime industry, too."



Ecochlor had its Ballast Water Technology System at Retlif in Ronkonkoma, NY for more than two months of testing and verification recently. The Ecochlor system is a system that employs a two step process to treat ballast water: First, a filtration system removes sediments and larger organisms, and then a chlorine dioxide treatment system eliminates smaller organisms and pathogens. Testing of the system was fairly standard according to Retlif, including electrical, inclination, environmental and Electromagnetic interference (EMI) Testing.

16,580 & Counting

Since he opened in 1978, Walter Poggi said that Retlif has conducted 16,580 Testing Programs as of the end of August 2016, or an average of about 437 per year for each of its 38 years in business. Impressive numbers for a company started on $5,000. When pushed to identify what he considered the most odd test of all, Poggi laughed and recalled:

"There was a gentleman who wanted us to test him, as he was convinced that he was being controlled by a spy satellite. He actually wrote a letter to a local Congressman, and he received a letter of apology from one of them. No matter how I tried to dissuade this testing, it wasn't working. He was convinced that because he was being controlled by a spy satellite that he in turn was radiating signals. He wanted us to test him for that. This was going on for weeks when I eventually told him we could not test him, because to test him we would have to put him inside of a shielded room, and once I do that, the satellite can't control you." He said 'I fully understand. The only time I have peace is when I'm in the Mid-Town Tunnel.'

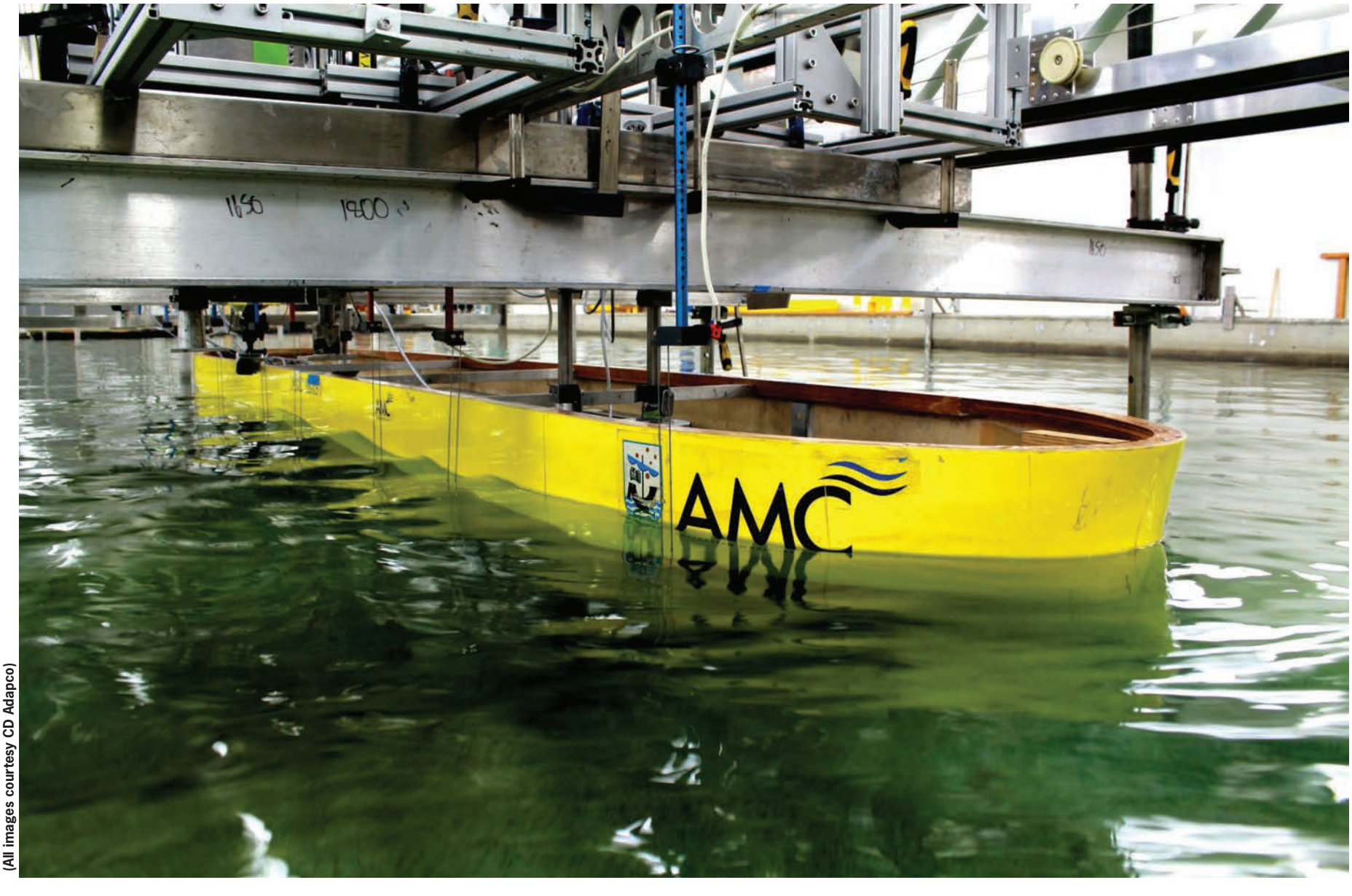
Photo: istock.com/agsandrew

Computing Power

Simulating a FLNG unit in waves with STAR-CCM+

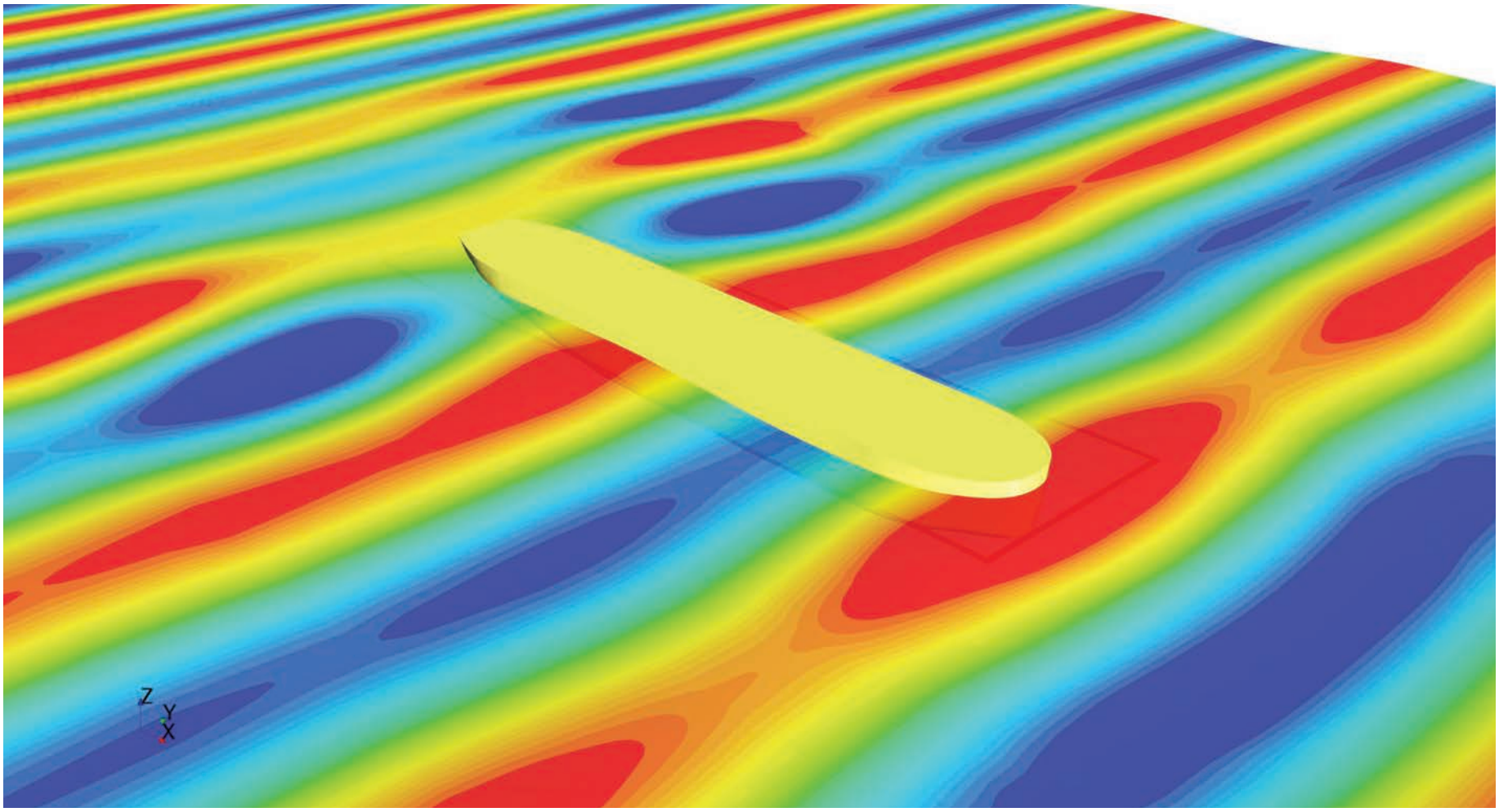
475 km off the western coast of Australia, Prelude FLNG, the world's first floating liquefied natural gas platform, is about to revolutionize the way natural gas is produced. As the largest offshore facility ever constructed, Prelude FLNG boasts a length of 488 meters, a width of 74 meters and weighs around 600,000 tons. Still in its early days, the floating liquefied natural gas (FLNG) technology will allow the freshly extracted natural gas to be processed and stored aboard, before being loaded onto LNG tankers, thereby permitting the exploitation of offshore resources that had been too costly or difficult to develop otherwise. In a scientific study undertaken by the Australian Maritime College (AMC) – a specialist institute at the University of Tasmania that focuses on seafaring and maritime engineering – numerical simulation was used to investigate how various wave scenarios will affect the motions and operations of such a facility. The computations were performed using STAR-CCM+.

FIGURE 1: Model test experiment in the AMC model test basin



(All images courtesy CD Adapco)

FIGURE 2: Analyzing the motion response of the FLNG unit in STAR-CCM+



By Max Haase & Yuting Jin, AMC / AMC Search Ltd.

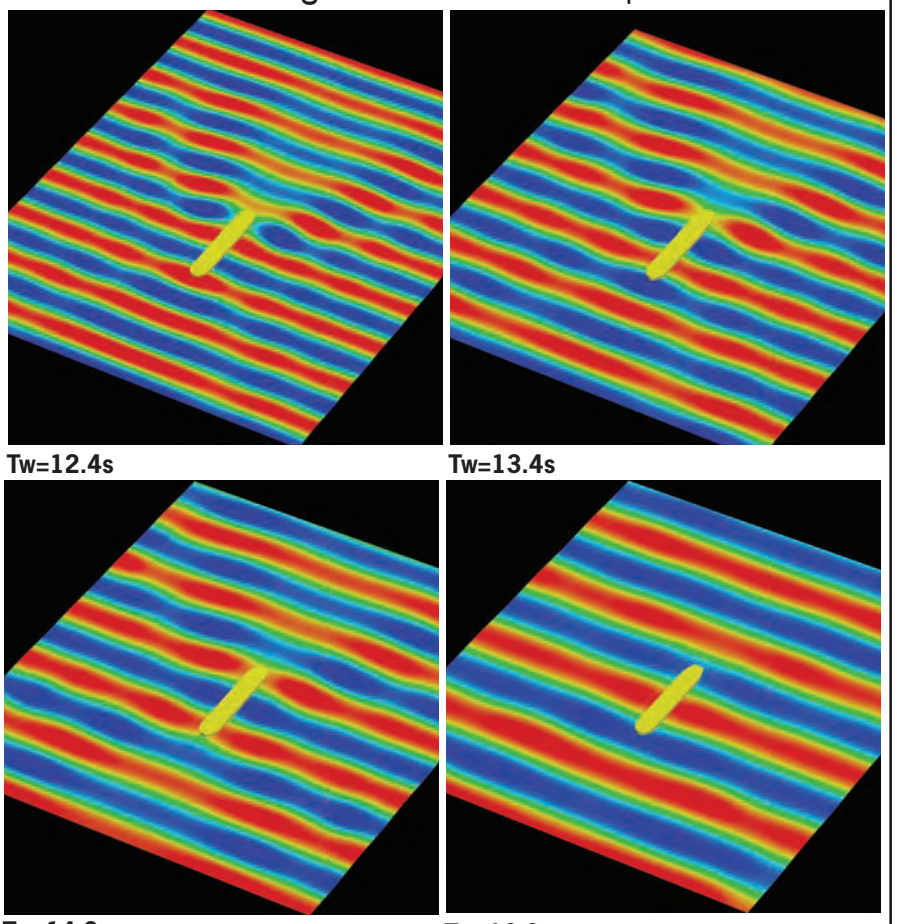
The Prelude FLNG project, initiated by a consortium in which the energy group Royal Dutch Shell is the majority shareholder, is the first of its kind. In principle, the FLNG processing units are similar to the FPSO facilities (floating, production, storage and offloading) used for oil extraction, although Prelude FLNG will work on a much bigger scale. The natural gas produced at the field will be cooled to -162°C, at which temperature it turns into a liquid and its volume is reduced by a factor of 600. The liquefied gas can then easily be stored in tanks and loaded onto liquefied natural gas (LNG) tankers for onward transportation.

To reach the full potential of this technology, it must be ensured that in extremely adverse weather conditions, such as storms and heavy seas:

- the ship's structure is able to withstand the enormous strains that arise;

- and it is possible to maintain operations with as little disruption as possible, including the docking and loading of the LNG tankers.

FIGURE 3: Resulting waves at various frequencies



In order to gain a detailed knowledge of the conditions to be expected and ensure undisrupted operation, the AMC has analyzed, in a scientific project involving numerical simulation and experimental validation how such gigantic FLNG facilities behave at sea.

The Project

The three-year research project started in March 2014. The initial phase, which has now been completed, consisted of investigating the influence of different wave frequencies on the motion response of the FLNG unit.

In the second phase, which is still in progress, the primary focus is on operational aspects of the facility, specifically on the interactions between the FLNG facility and the much smaller LNG tankers and supply ships during approach and mooring. These include the emergence of frequencies causing pitching and rolling movements, and undesired resonance waves.

The project is conducted by Yuting Jin, who currently is a Ph.D. candidate

at AMC. His intent is to provide specific information to help with the development of the following target areas:

- **Planning:** determine design configurations suitable for critical conditions;

- **Operation:** establish efficient procedures for safe operations;

- **Crew training:** enable precise and practical crew training.

CFD Simulations at AMC Search

The AMC specializes in shipping and maritime engineering. The institute has an extensive range of testing equipment, including a 100 meter long towing tank, a circulating water tank, a cavitation tunnel and a 12x35 meter model test basin. Also, it has access to a computing capacity of over 1,500 cores.

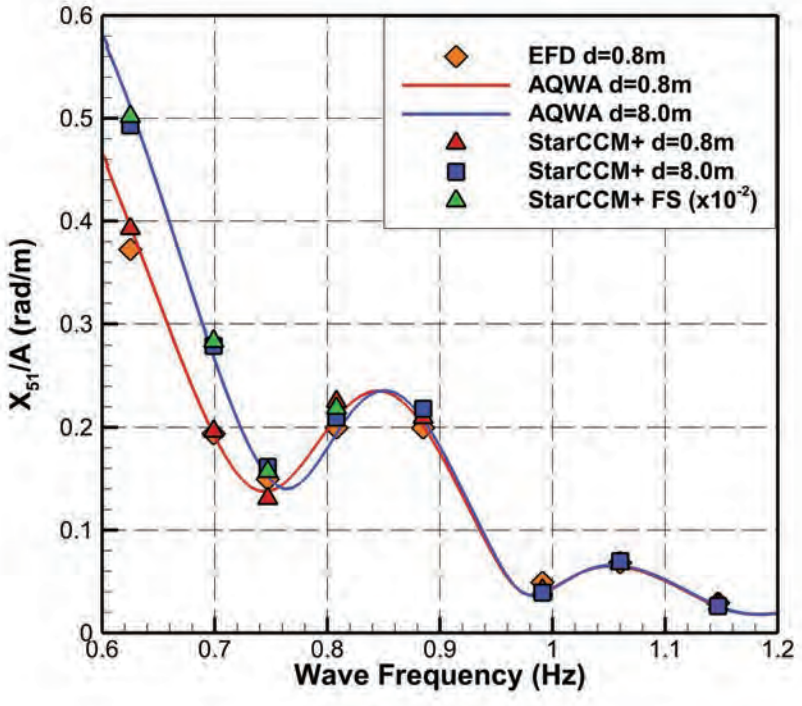
AMC Search, the commercial arm of the institute, has been making the acquired knowledge and the developed techniques from research and experimental testing available to the maritime industry in Australia, New Zealand and across the world for over 30 years. Dr. Max Haase is responsible for implementing CFD simulations into commercial projects. He states that in recent years, CFD has played an increasingly important role, due to more sophisticated requirements in performance evaluation and design optimization which cannot be achieved by model testing in a timely and cost-effective way. At AMC Search, STAR-CCM+ is a popular choice for CFD studies due to its versatile simulation capabilities, its user-friendliness, and its computational speed.

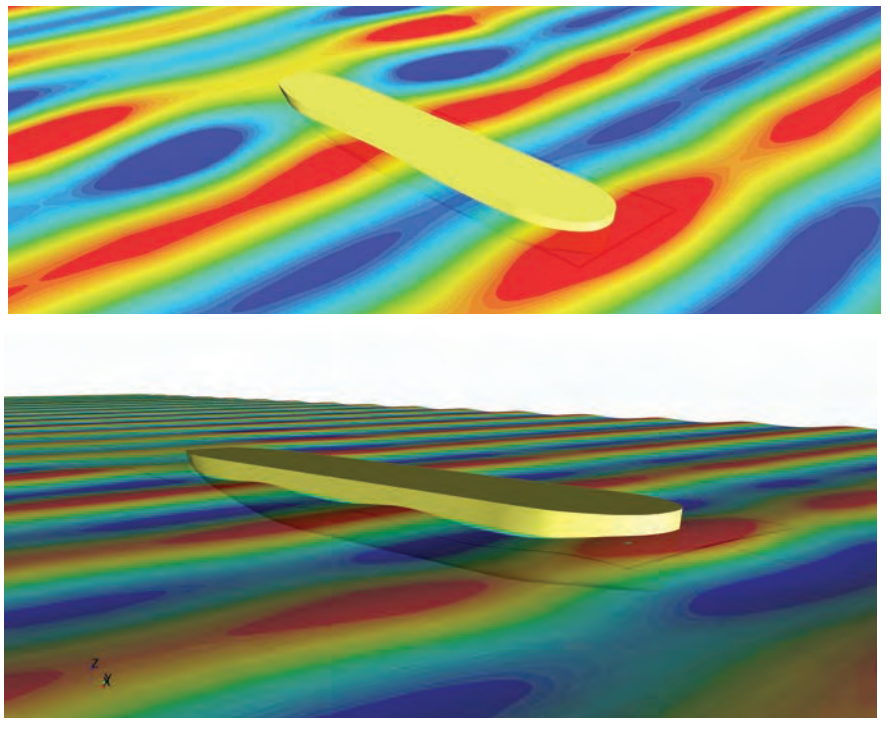
Towing Tank Vs. Simulation

Towing tanks have been an indispensable tool for ship design, optimization and performance assessment for over 150 years. Over time, procedures used have proved their value and achieved a high degree of accuracy. However, model testing is typically not available until a late development stage, when design and construction are well underway. In addition, the construction and alteration of the prescribed scale models can be both time-consuming and expensive. Overall, the flexibility and ability to innovate as required in today's development cycles is clearly limited by the use of towing tanks only. Furthermore, they are limited to scale models that are significantly smaller when compared to the full-scale device, potentially restricting the ability to investigate innovative designs.

As a result, a growing number of engineers are turning towards numerical simulation in order to assess complex systems at a much earlier stage of the design process. Simulation software, such as STAR-CCM+, has been proven to be as accurate as towing tank tests, and given realistic assumptions, allow ships and offshore platforms to be simulated at full scale, thereby eliminating some important uncertainties introduced by the scaling process. Scale model testing remains relevant in terms of not only demonstrating software robustness, but also the validity of assumptions relied upon in carrying out various design investigations.

FIGURE 4: FLNG pitching rate obtained through both simulations and experiments, plotted against the wave frequency.





Analysis

The dimensions of the computational domain for the full-scale calculations were 3,000 x 800 meters. For these calculations, meshes from 4 to 12 million cells were used depending on the wave frequency being investigated. A total of 40 calculations were performed. The calculations required around 700 hours using between 48 and 64 cores. Although the Prelude FLNG operates in water depths comprised between 200 and 300 meters, a water depth of between 80 and 800 meters was simulated in order to assess the shallow water effects that may occur during towing tank tests and lead to inaccuracies.

The following STAR-CCM+ features were used:

- **Overset mesh:** The overset mesh capability permitted easy positioning of the LNG tanker in the vicinity of the FLNG unit, for example to analyze the effects of approach and mooring (for example, resonance waves).

- **Motion model:** The dynamic fluid-body interaction (DFBI) model was used in order to account for the coupling between waves and ship movement.

- **Wave model:** The non-linear Stokes 5th order wave model was chosen for its accurate representation of wave propagation in open water. The wave height, set to 4 meters, was determined using BMT Global Wave Statistics for the sea area of interest. Particular attention was paid to wave damping in order to avoid unwanted wave reflection.

- **VOF model:** The Volume of Fluid (VOF) multiphase model was used in order to correctly capture the interface between water and air, and accurately depict the interaction between the hull and the free surface.

The simulations revealed that:

- The wake from the FLNG overlays the ocean waves and forms a relatively calm area;

- With high frequency ocean waves, steep waves (with deep troughs and sharp crests) are formed around the FLNG.

Future investigations will look at how the berthing of LNG tankers and supply ships will affect this configuration, in particular how to avoid resonance waves between the different hulls, how to control the pitching movement of the ships involved, and whether regulations need to be adopted to make the operation safe.

The comparison between simulation and model test results at a model to full-scale ratio of 1:100 shows an excellent agreement over the entire frequency range. It highlights the impact of a limited water depth especially on the pitching movement of the FLNG for waves of low frequencies.

Conclusion

This study highlighted how the use of CFD simulations can help engineers make decisions concerning not only hull design and layout configurations, but also ship operations.

At AMC Search, these results will be used to develop recommendations and operating guidelines for three target areas: planning, operations and crew training. For Haase, this project is valuable for another reason: “Increasing attention is being paid to CFD technology in the hitherto rather conservative maritime field. Nevertheless, compared with Europe where there are a number of model test basins, organizations and service providers with comparable interests, CFD has not yet unfolded its considerable potential for the maritime industry in Australia. We believe that with this project we have demonstrated the capability and scope of CFD simulations and have achieved an important milestone in the establishment of this method for maritime applications.”

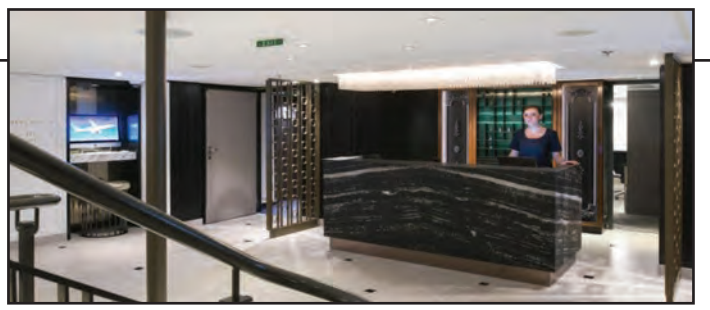
The Authors

Max Haase, Consultant at AMC Search Ltd.

Max Haase graduated with a Master of Science in naval architecture from the University of Rostock, Germany, in 2008 and received his PhD in maritime engineering from the Australian Maritime College at the University of Tasmania in 2015. His expertise is the numerical performance prediction of marine surface vessels, ranging from small unmanned autonomously acting rescue vessels to large fast catamarans. His current role at the Australian Maritime College includes academic duties and the implementation of computational fluid dynamics into commercial projects for the maritime industry.

Yuting Jin, PhD candidate at AMC

Yuting Jin completed his Bachelor of Engineering degree in ocean engineering with first class honors from the Australian Maritime College at the University of Tasmania in 2013 and is now pursuing a PhD degree in maritime engineering. His work focuses on computational fluid dynamics for predicting surface vessel maneuvering performance and ship-ship hydrodynamic interactions. He is looking forward to apply the outcome of his research to real-time handling of large offshore structures.



Interior Design Project

Crystal Cruise's Mozart: Humming Along with New Interior Outfit

Mozart is Crystal Cruises first venture into European river cruising and began passenger service in July 2016. R&M Sea Level Marine was contracted by Crystal Cruises to renovate all the cabins and suites as well as the reception lobby. Designed by II BY IV Design of Toronto renovations included:

69 Deluxe and Window Suites

Completely refit bathrooms with new natural sandstone walls and floors, European sliding glass shower enclosures and Vanities with In-mirror TV connection to the vessels entertainment network. Cabins include all new custom wardrobe, desk and night stand built-in furniture and luxurious upholstered headboards. Lighting is all Lutron automated LED that offers passengers easy touch control of the cabin mood throughout the day and evening. Guests control entertainment, lighting, temperature and communication with hotel staff and room service via an IPad located conveniently bedside.

12 Penthouse Suites

In addition to the Lighting, entertainment and IPad controls offered in deluxe suites, the twelve Penthouse cabins offer passengers increased space to relax and view the European scenery through floor to ceiling sliding vista windows. Suites feature walk-in closets with private vanity dressing area as well as en-suite tubs and showers.

2 Crystal Penthouses

The most luxurious accommodations aboard Mozart are the two Crystal Penthouses. These feature a marble entry foyer with Crystal signature chandeliers, a living/dining room with fireplace and TV concealed behind a framed mirror, a full bedroom, an entry powder room and a complete master bath with luxury tub, Hadrian marble walls and mosaic marble floors.

Lobby

As the central entry to the vessel and reception area the lobby features a seating area with a fireplace surrounded by book-matched Hadrian marble walls and a bistro where snacks coffee and beverages are available. The room is partitioned by metal sculptured art screens and at the perimeter nine carved plaster relief panels provide the tone. The white marble reception desk is central to the lobby and faces onto the central stair, behind the desk a glowing emerald green glass furniture piece represents an old hotel key box.

Tomas Tillberg

Celebrating 20 years of high design in the Global Cruise Market

This year ubiquitous cruise vessel design house Tomas Tillberg Design celebrates its 20th anniversary. MR speaks with Tomas Tillberg regarding evolving trends in design over the past two decades, as well as insight into "what's next."

By Greg Trauthwein

Many thanks for taking the time again to share your insights with Maritime Reporter. Twenty years is a nice milestone. Discuss if you will how Tomas Tillberg Design today is most the same, and most different, from when you opened up shop in 1996?

Florida is the 'Cruise Ship Capital of the World,' so the idea of moving to Fort Lauderdale In 1996 was a wonderful opportunity to expand and better service our clients, and resulted in the formation of Tillberg Design US. We set out to hire the best talent the industry could offer, and once under one roof, this team of designers and architects sparked fierce competition. Weathering many storms, Tomas Tillberg Design has survived and come out stronger 20 years later. From the test of time when drawings were still being printed and packages sent out by mail, we have now pushed and embraced the electronic era. We are now able to streamline drawings via the internet either thru Skype or GoToMeeting, and it also enables us to use consultants globally. It has been amazing to see the increase in efficiency and economy as we have entered into this new age.

What is most the same is the spirit and philosophy of the company as well as the great designs created by our talented and creative colleagues; no electronics can change that.

Similarly, and I know this is a broad question, how is the business of designing for passenger vessels most the same, and most different in that 20 year span?

The basics are still the same. For example; the functionality of a dining room is the first consideration - after that is sorted out, the design follows. The biggest difference is that ships are getting bigger, becoming a destination within themselves, while allowing for more versatility and functionality, catering to a more diversified, technologically savvy groups, namely the millennials and their families, thus creating the demand for more specialty restaurants, lounges and retail spaces and even cabins, incorporating interactive elements and environments.

We are also seeing a trend among baby boomers seeking adventurous and exotic locations bringing back the smaller class of vessels carrying less passengers resulting in a more intimate, educational and service oriented experience.

In looking at your design style: What factor(s) have had the biggest impact on the designs you are able to deliver to seagoing ships today? Please be specific.

The constant innovative work of suppliers and manufacturers with new materials and solutions to age old problems play a big role. The expansion of materials meeting the maritime fire regulations has allowed us to push many boundaries of the past, specifically textiles, light weight stone products, glass materials, films, carpet, the use of digital printing technologies, LED lighting to name a few. We're constantly challenging these aspects to better the product range and bring our design to their highest potential.

As you know, many maritime sectors are in the doldrums at the moment, but the business of cruise shipping – from the mammoth oceangoing liners to the smaller inland and coastal vessels – is quite 'hot' at the moment. How do you see the market today, and where do you see opportunity for near- and long-term growth?

It seems that the expansion possibilities are enormous and that we are still just at the beginning. The Asian cruise shipping has an incredible potential, after the majority of our planet's population is in that area, and as its prosperity is increasing more and more people to look to cruising as a great way to spend their vacations. There is also a continuing expansion in other areas of cruise shipping such as expedition and river cruises.

Can you share with us details on a recently completed (or soon to be completed) design project in details, discussing the challenges of the project, the approach you took to a solution.

We have just completed the new designs of an expedition ship. In this case it was an interesting balance between the charterer and the owner of the vessel. The challenge was to deliver a design beyond the expectations of the charterer and at the same time stay within the owner's budgetary framework. We approached it by creating high resolution renderings as a base for further discussions and followed up with a very productive dialogue between the charterer, the owner and us. The result was happy clients and a great design.

Of all the ships in the world, Tillberg's Favorite ...

"The Queen Mary 2. She is a ship bridging the past and the future. She is a liner and a modern cruise ship with modern technology all the way from the systems of propulsion to the onboard amenities and all technical systems. And yet, as you come onboard you are in the elegant era of the liners. She is built to travel at speed through north Atlantic storms - quite a ship!"

(Picture right: The iconic 2,620 passenger ocean liner, pictured in the Norwegian Fjords.)

(Photo courtesy MCCUE Marine; © Bildagentur Huber/Gräfenhain)

... and from his own body of work ...

The 3,600 pax Cruise Ferry Tanit (below) is a favorite, owned by is the Tunisian maritime company COTUNAV.

"The cultural studies we did to create authentic designs while mentoring a shipyard new to passenger cruise line building (DSME) were an incredibly rewarding experience."

(Photo courtesy Tomas Tillberg Design)

I know this is a tough question, but in looking at your body of work, which design project is your favorite, and why?

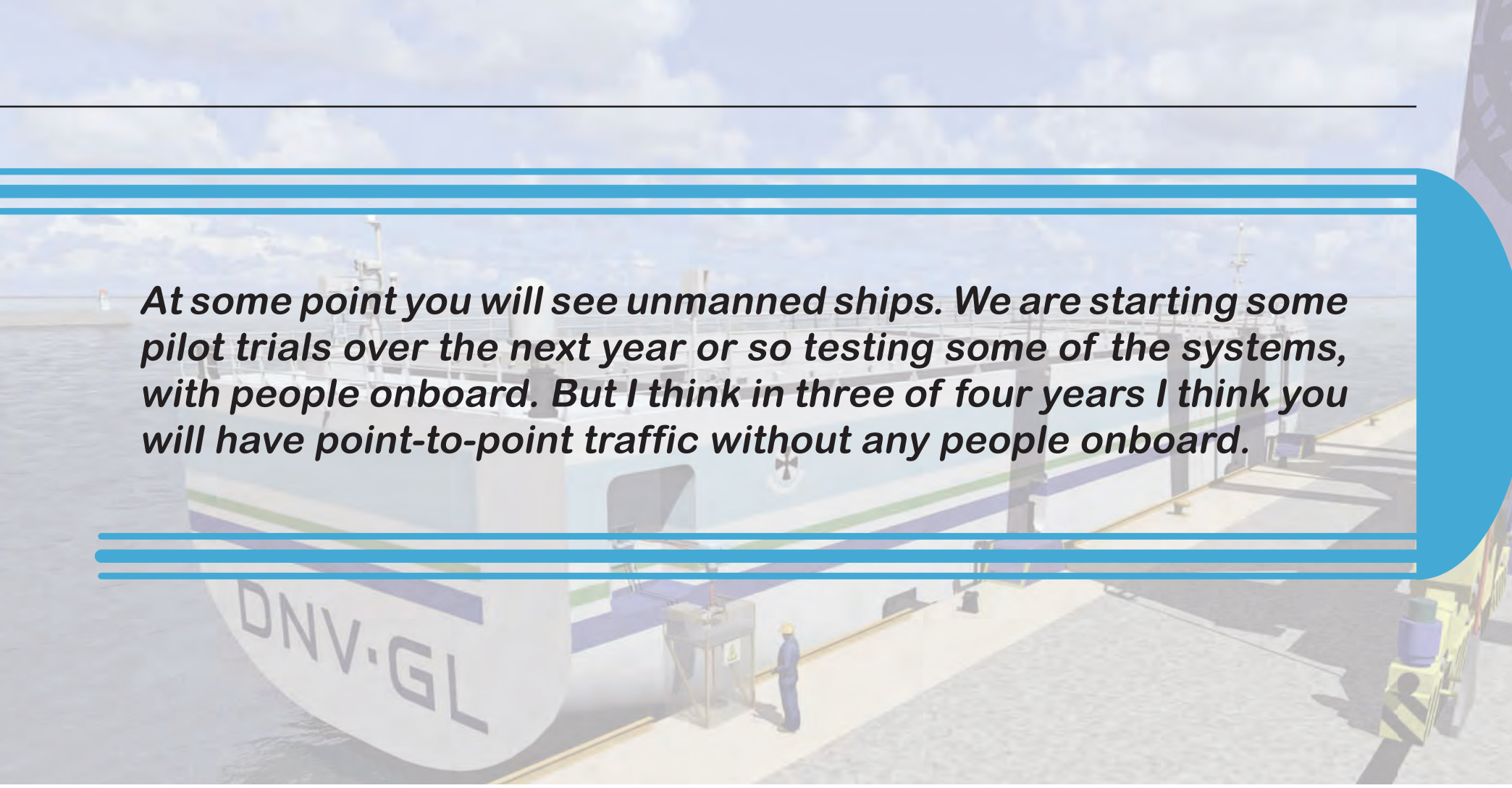
Surprisingly perhaps, I would say it is the 3,600 pax Cruise Ferry Tanit. She was built at DSME, one of the three main yards in South Korea. The owner is the Tunisian maritime company COTUNAV. We designed all public areas as well as suites and cabins and the crew areas. We also designed all signage (in three languages) and supplied the art work. The work was completed in record time with design, engineering and construction completed in 22 months. It was an exciting project all around not the least as we started it before the revolution in Tunisia and completed it after it was over. The trips to Tunis were exciting to say the least. But more importantly the cultural studies we did to create authentic designs while mentoring a shipyard new to passenger cruise line building were an incredibly rewarding experience.

Another favorite is the World Residen-Sea which is in essence a floating condominium quite different from a passenger Cruise vessel catering to a group of people who shares ownership and call it their home. Creating unique and luxurious designs to accommodate most Residents was quite a challenge but we fully embraced it and out of it came exquisitely designed spaces we're very proud of.

What can the maritime industry expect from Tillberg Design in the coming decade?

A continued quest to deliver innovative designs that propels us into the new age of technological expansion which is key while keeping a grip on environmental impact and the highest standard for safety at sea. And helping our clients in exceeding their expectations is always our utmost intention.

Photo: DNV GL



At some point you will see unmanned ships. We are starting some pilot trials over the next year or so testing some of the systems, with people onboard. But I think in three of four years I think you will have point-to-point traffic without any people onboard.

Remi Eriksen

CEO, DNV GL

At SMM 2016 in Hamburg Maritime Reporter & Engineering News had the opportunity to sit with Remi Eriksen, the CEO of DNV GL. After his first year on the job in the top spot,Eriksen shares with MR his blunt assessment of the maritime and offshore O&G markets in the near-term, and discusses DNV GL's role in these key markets as they re-emerge in the coming years.

INTERVIEW BY GREG TRAUTHWEIN

IT HAS NOW BEEN JUST MORE THAN ONE YEAR SINCE YOU TOOK THE TOP SPOT AT DNV GL. WHAT WERE YOUR EXPECTATIONS AND GOALS COMING IN, AND HOW HAVE THEY CHANGED?

Before this I had been with the company for almost 24 years, so I knew what I was getting into. I wanted to complete the merger and start growing the company, but then the market did not cooperate. We completed the merger by the end of 2015, but the market did not come back. The biggest surprise and adjustment: I didn't believe that this downturn would have lasted this long, particularly on the oil and gas side of the business. (In context) 70% of what we do in DNV GL has to do with maritime and oil and gas. Our projections today are a recovery in the deep sea segment at the end of 2018 beginning of 2019; with oil and gas, rigs in particular, it will take a bit longer. We might not see any rig building activity until 2020/21.

CAN YOU QUANTIFY HOW YOU HAVE HAD TO ADJUST WITHIN DNV GL TO COUNTER THIS MARKET.

It basically means that we have to adjust our manning capacity, part of which was in step with reductions taken with the merger taken in 2014 and 2015. But this year we had to make some more adjustments. Last year we had reductions of about 1000 staff, from 15000 to 14000, and this year we'll probably have another reduction in the range of 1200 to 1400 people.

IS THERE ANY GOOD NEWS?

There is. The good news is that we are growing certain parts of our operation. While we see 70% of our business declining, we see 30% growing – renewable, power transmission and distribution, healthcare and food. Most of our people are engineers, they are highly educated, and they can do other things. We're trying to leverage this flexibility in our workforce to build where we are growing, to avoid laying off highly competent people.

WE SEE THIS A LOT WHEN WE INTERVIEW CEOS; PEOPLE ARE THE BIGGEST CHALLENGE, PARTICULARLY WHEN THERE IS A DOWNTURN AND A SHIPYARD, FOR EXAMPLE, IF FORCED TO SHED VALUABLE WORKFORCE.

But for us it is even more dramatic, more so than shipping companies and oil companies. What we do is deliver our services to people. The only asset we have are our people. They are the revenue generators and the cost. It is really a fine balance.

WHAT DO YOU COUNT AS DNV GL'S BIGGEST SUCCESS (DURING YOUR TENURE)?

Completing the merger. Another goal was to ensure that we are becoming a customer-centric organization, more attentive and responsive to customers, and to be more agile. We are on the way. A great example of this is our DATE Centers (Direct Access to Technical Experts). This is not a call center, rather a physical facility (five facilities total covering all world time zones) where technical experts are sitting, shifting the question to the next time zone when necessary, responding now within six hours. We are looking to lower that response time to four hours on challenging technical questions.

Also, we were quite early to emphasize the importance of digitalization and its impact on the industry as a whole. We have made investments in modernizing

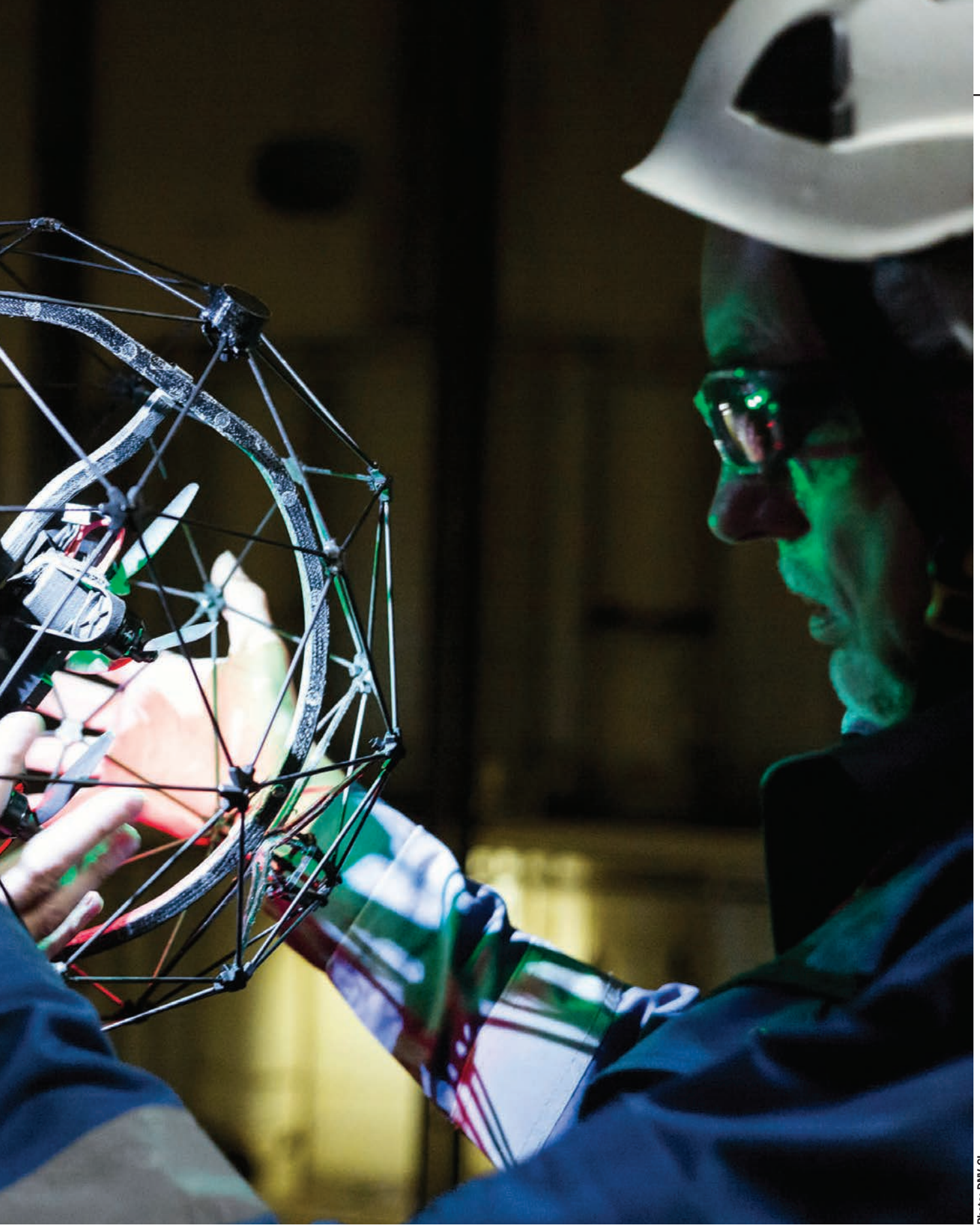


Photo: DNV GL

to offer digital solutions. Not to sound arrogant, but I think we are now far ahead of the competition when it comes to this digitalization journey.

WHAT DO YOU CONSIDER (PERSONALLY) YOUR GREATEST 'LESSON LEARNED?'

There is something new to learn every day, you can never underestimate this. Of course, I didn't anticipate the oil and gas market to be down for so long, so that too is a lesson learned.

TAKE ME BACK TO WHEN YOU FIRST ENTERED THE WORK FORCE FOLLOWING UNIVERSITY. HOW ARE YOU MOST THE SAME?

I've always had the drive to push myself and improve. I still have that. I also have always been curious, and I've always enjoyed working with people. I had that when I graduated, and I think that I still have that today.

AND HOW ARE YOU MOST DIFFERENT?

I think I've become more humble. Back then the world was more black and white, and today it is more shades of gray. I take a more balanced view on things. I also am less impatient today. I also think that today I have a much deeper appreciation for the purpose and values of our organization … the basic DNA for how we do things. That is something I learned, that when I was younger didn't perhaps identify or appreciate at that time. I think it has to do with maturing in life.

HOW IS THAT PURPOSE, THAT VALUE, IMPORTANT TO THE COMPANY AS A WHOLE?

It's inspiring for people to work for a company that has a purpose. It's not only about making money. Many companies were started because they had a grand idea, they had a purpose, and as a consequence perhaps they earned a lot of money. Sometimes you may have the tendency to forget why it was started in the first place.

WHEN DID YOU REALIZE THAT YOU WERE ON A TRAJECTORY FOR THE TOP SPOT AT DNV GL?

I have always been ambitious in my whole life. That was instilled in me by my parents: 'be as good as you can be.' I always wanted to work for a big corporation; I always wanted to do big things. But of course I did not visualize early on I would have this job. About 10 years back I realized I was building some really valuable experience that could help this company and bring me to a senior position.

THE ROLE OF BIG DATA IN SHIPPING CAN NO LONGER BE DENIED, BUT "BIG DATA" MEANS 100 THINGS TO 100 PEOPLE. WHEN THE DISCUSSION TURNS TO THE USE OF DATA IN THE MARITIME SECTOR, WHERE DO YOU SEE IT HAVING THE BIGGEST IMMEDIATE IMPACT IN THE COMING YEAR? WHY?

A lot of people talk about big data, but the key question is: what can it really do for you? For us it means it will help to improve safety at sea, it will help to improve efficiency and it will help to reduce costs. You need to ask yourself … can this technology help you to do one of these things, and ideally all three. So what are some of the real, tangible benefits? It will help to improve condition monitoring, so that you are doing maintenance based on the condition, not the calendar; you can have situational

awareness systems like you are starting to see on the new cars, helping to take away some of the human errors; and hopefully you can reduce manning. At some point you will see unmanned ships. We are starting some pilot trials over the next year or so testing some of the systems, with people onboard. But I think in three of four years I think you will have point-to-point traffic without any people onboard.

WE OFTEN TALK ABOUT 'TAKING THE DOWN TIMES TO INVEST AND PLAN FOR THE FUTURE.' BUT MANY SHIP OWNERS, AS YOU KNOW, ARE STRUGGLING TO SURVIVE. WHAT IS THE REALITY ON THE STREET?

Some companies are literally turning over every stone to save money and to survive, then you have companies that are more robust, companies that can take this opportunity to invest for the future. But the reality is: there is not another China. China drove a lot of international trade and shipbuilding. This is a (down) cycle, but the super cycle that we saw from 2004 to 2008 will not come again. (Also, with the fact that) money is so cheap right now, you will see many new players coming into this market, speculating and bringing in new capacity. I think it will recover, but I don't think it will be as strong as we have seen in the past.

CAN YOU PUT IN PERSPECTIVE OF HOW MODERN COMPUTATIONAL POWER AND SOFTWARE SOLUTIONS HAVE MADE SHIP CONCEPTION AND DESIGN MORE EFFICIENT AND EFFECTIVE.

We have the ability to optimize ships for certain routes, meaning you can measure fuel savings for example. And there is the ability to perform more advanced calculations, meaning that we can more accurately put steel at the best locations, meaning we will get a more robust ship.

EMERGING REGULATIONS ARE PUTTING A TREMENDOUS STRESS ON SHIP OWNERS TO "KEEP UP." HOW DO YOU SEE THE ROLE OF "CLASS" IN ASSISTING VESSEL OWNERS AND OPERATORS COMPLY WITH THE NEW RULES?

There are two lines of thought. One is that we can help to identify the changes and determine the impact, as well as determine the options available under changing regulations. The second is that we have the purpose to safeguard life, property and the environment, and that we can help to ensure that regulators really know the impact of their regulations so they are not introducing regulation with unintended consequences. It is a dual role: to ensure that the regulations are good and not causing unintended effects; and to help ship owners understand so they can make better decisions.

THE FUTURE OF CLASS: FROM YOUR PERSPECTIVE, WHAT ARE THE TWO OR THREE TECHNOLOGIES OR CAPABILITIES WILL HAVE THE MOST DRAMATIC IMPACT.

1. Condition based monitoring and maintenance.
2. Remote surveying with drones, for example.
3. Connectivity: Gives us a better understanding of how trends change over time.
4. Autonomous Ships (beyond 2025)

THERE ARE ONLY A HANDFUL OF 'PREMIER' CLASSIFICATION SOCIETIES. WHAT MAKES

The Power of People

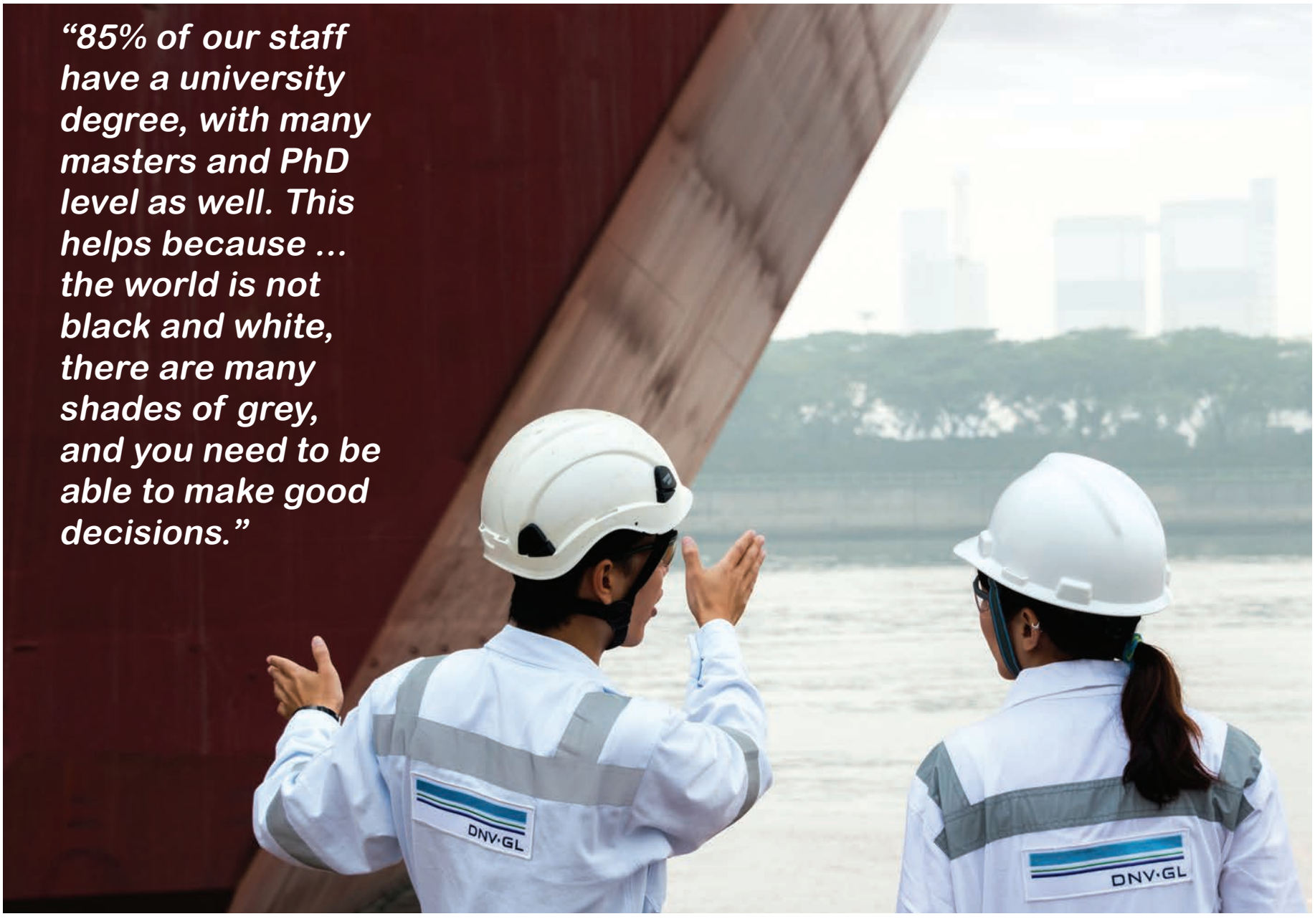


Photo: DNV GL

DNV GL STANDOUT?

1. **R&D:** We have a strong commitment to research and innovation. That is so important, to not only have innovation in technologies but also in regards to business process. Year after year we invest 5% of our revenue in research and innovation, either in house or in conjunction with our customers.
2. **People.** 85% of our staff have a university degree, with many masters and PhD level as well. This helps because as I said before, the world is not black and white, there are many shades of grey, and you need to be able to make good decisions.
3. **Accessibility:** Our global structure makes us highly available to our customers, an accessibility enabled by 350 offices in 100 countries.
4. **Future Rules:** By virtue of the merger, we had the opportunity to really review all of the rules, to take a fresh look and develop something that is fit for the future.
5. **Diversity:** We are diverse for a class society, and that's a big plus for us. Two of the biggest themes across all of our business are digitalization and de-carbonization. Alternative fuels, automation, machine learning, connectivity is equally relevant to power plants to offshore platforms to ships at sea. We are in a unique position to take 'lessons learned' from one area and accelerate progress across other areas.

"Quotable"

"There is not another China. China drove a lot of international trade and shipbuilding. This is a (down) cycle, but the super cycle that we saw from 2004 to 2008 will not come again."

"Our projections today are a recovery in the deep sea segment at the end of 2018 beginning of 2019; with oil and gas, rigs in particular, it will take a bit longer. We might not see any rig building activity until 2020/21."

Ship Performance Monitoring Systems as Maritime Big Data Generator

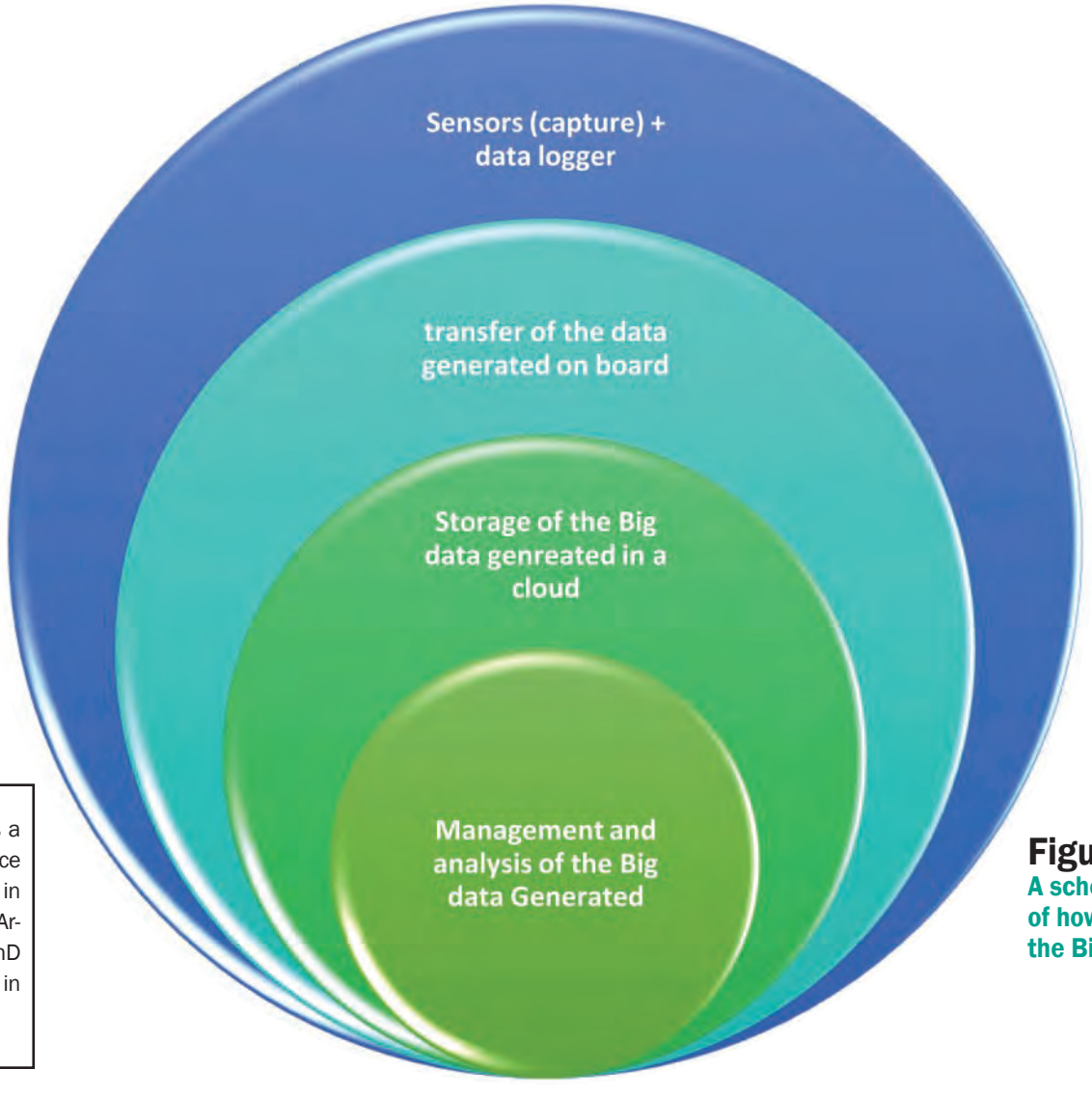


Figure 1
A schematic representation of how the process to produce the Big data on board.

Source: author

NOTE: The author, Carlos Gonzalez is a project manager and vessel performance analyst at Kyma AS. He has an MSc in Marine Engineering and BSc in Naval Architecture. Currently, he is doing a PhD about Ship Efficiency and sustainability in Universidad de Cantabria (Spain).

BY CARLOS GONZALES

All industries continually invest money, time and effort to minimize cost and raise profit, often as a means of survival in an ever competitive world of business. The shipping industry is no different.

Today, ships are fitted with an armada of sensors and communication networks designed to allow data transfer from ship to shore offices more easily, which is a big step forward on two levels:

- One, it can reduce 'human factor' errors, specifically the interference of the crew in the gathering and reporting of data
- Two, it provides information real time allowing shore staff to take action in real time.

Naturally, increased automation and computerization onboard commercial vessels results in larger amounts of data generated and made available, ie. "Big Data." But Big Data in and of itself is not a solution, as companies need to determine best use of this information to optimize their operations. Here is where Big Data evolves into "Smart Data," as companies choose more selectively the data is required to be evaluated in order to raise the efficiency of their fleets and keep their operation in the most optimal levels."

By building a good ship performance monitoring systems generator of valuable Big Data for performance evaluation, shipping companies can control the operational status of their fleet, evaluating in real time the ship efficiency and detecting quickly if anomalies are happening on board. It allows to them to manage the status of all the systems installed on board, continuously monitoring the whole ship.

Data recorded can be stored and transferred to the shore at the frequency deemed necessary by the company, creating opportunities as well as challenges to the companies to manage all the data to receive maximum benefit.

Maritime Big Data

"Big data is a term that describes large volumes of high velocity, complex and variable data that require advanced technique sand technologies to enable the capture, storage, distribution, management, and analysis of the information." (Tech America Foundation's Federal Big Data Commission, 2012).

A schematic representation of how the process to produce the Big data on board is shown on Figure 1.

Taking as reference Figure 1 and focusing on the ship performance monitoring systems (SPM) as a generator of big data, at the outset the SPM onboard must be built carefully and with deep thought, generating the essential parameters that will give valuable information about the ship efficiency.

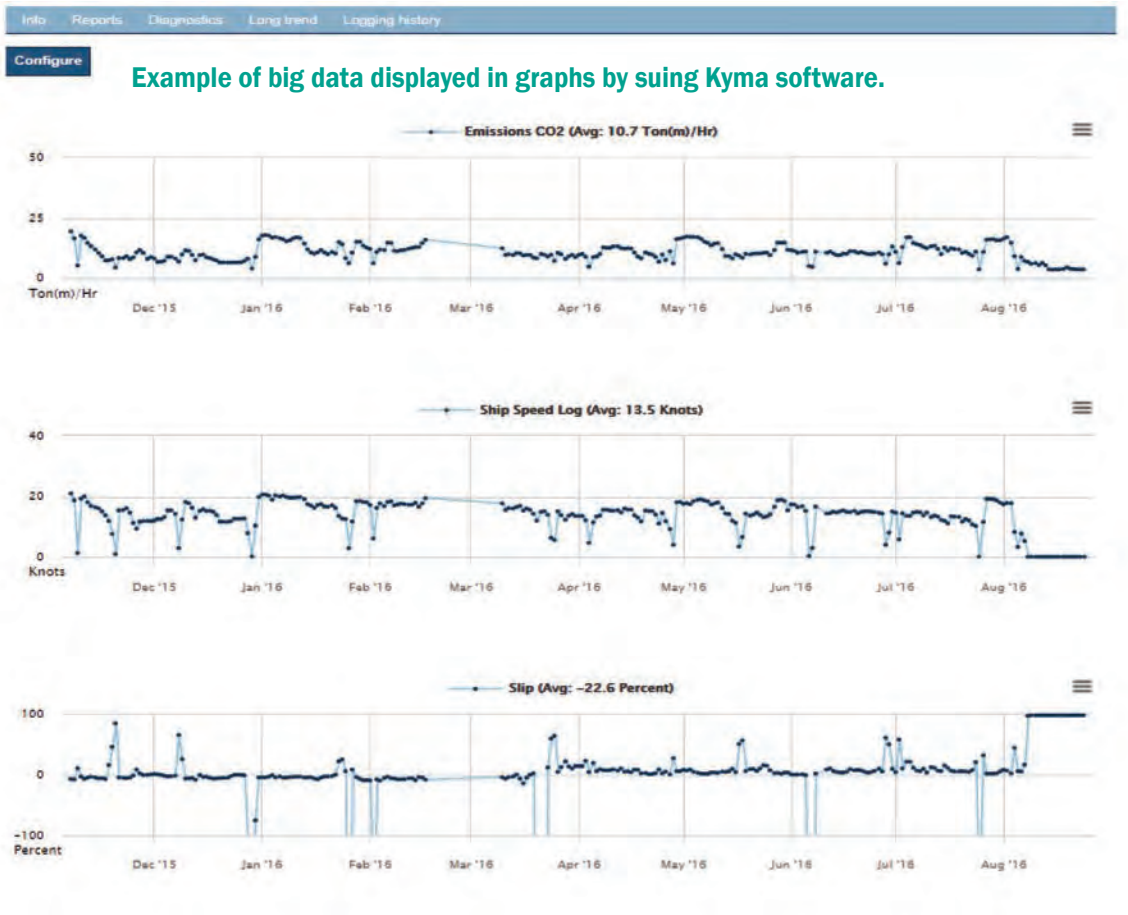
The data is collected from the sensors and sent to the data logger (normally supplied by the SPM maker) and then, this data is often transferred to a cloud for storing purposes. Storage of generated information is commonly in clouds, due to the size requirements of the data generated on board. It is each individual company's responsibility to determine when and where information is accessed, allowing it to analyze the data at the office. In addition, and an obvious point given the importance of cyber security, the cloud must have proper security.

There is no standard set of data collection, as operators and routes vary dramatically around the world. In this document, I do one approach of the most essential parameters that should be monitored on board according with one of the leader companies in Ship Performance Monitoring systems, the Norwegian company, Kyma as.

Big Data Cenerator Onboard

To build the Big Data generator on board, I use the standards from Kyma and I try to fulfill with the regula-

Figure 2



Example of big data displayed in graphs by suing Kyma software.

tions ISO 19030 "Measurement of changes in hull and propeller performance" and the "IMO Ship Fuel Consumption Database."

The first consideration for a Big Data generator on board is that the monitoring must be continuous, meaning that all parameters shall be created and stored constantly, avoiding any gap on the data recording. Kyma uses a logging period of 15 seconds. Every 15 seconds the system will record and create a new entry with all the parameters in the database, ultimately creating a huge database which will be transferred to the shore office. Therefore, the ship should have a network that allows data transmission without any gaps or at least, minimizing them. The minimum sensing points to make the Big Data generator by SPM might be:

- **Hull Performance:** shaft power meter (propeller rpm, propeller shaft torque, thrust and power delivered to propeller), speed through the water, ship speed over ground, wind relative speed and direction, ship course, depth of water and rudder angle indicator.
- **Main Engine Performance:** engine power (understood it as same power delivered to propeller if the engine is directly connected to propeller) water cooling temperature (Low and High temperature circuits), scavenging temperature, cylinders pressures, cylinders temperature, lube-oil consumption for cylinders, fuel oil temperature and mass fuel consumption.
- **Ship Overall Efficiency:** mass fuel consumption for all the combustion processes on board, electrical production from auxiliary engines, evaporation from boilers, running time for each auxiliary engine, running time for each boiler and cargo carried.
- **Fuel Efficiency:** fuel properties of each type of fuel on board (density at 15.6 DegC, Sulphur content, low calorific value)

Commonly, much of the data onboard can be found on the VDR (Voyage Data Record). Here all the sensors available on board are sending data continuously. The VDR systems have been installed since 2002 in most of the ships (SOLAS 1974). However, the main purpose of VDR is data analysis in the case of accidents. Therefore, on most ships, data is just recorded during the voyage and, if not needed, the data is abandoned and deleted.

Otherwise, the goal of this documents is to explore the possibilities of using specific SPM system to generate Big Data in order to evaluate the ship performance.

By using a specific system to gather and analyze ship performance data, great innovations may be achieved by ship owners. In addition to the innovations, by evaluation of all the pertinent data on SPM, the owners can have a full control of how the ships are being operated. They can use the data analyzed to try to raise the performance by acting on the areas subjected to improvements. Additionally, and as example, they can check continuously the status of the ship performance comparing with the time charter party agreement (if applied), which could cause large savings to the companies.

Below are listed some of the main advantages of using SPM systems as Big Data generator:

- Continuous evaluation and possibility to establish trends of any parameter, including the three major performance indicators (hull performance, propeller performance and main propulsion system performance).
- Comparison of the performance of any vessel within the fleet
- Evaluation of the route efficiencies for the ships
- Control of the atmospheric emissions of the fleet
- Calculation of the carbon footprint for each ship and for the whole fleet.
- Control the status of the ship behavior comparing with the time charter party terms.
- Complete data base stored, ready for evaluation at any time.
- Reliable evaluation of any new technical or operational solution adopted by analyzing the Big data
- Applying the continuous and automatic generation of data by SPM system, it is reduced the human interference in the data collection, reducing the error by human factors.
- It is straightforward to see the time that the ships spends at berth and sailing tracking all the time the position, power and speed of the ships. Helping to improve the voyage planning.
- A powerful decision-making tool. Collecting and analyzing the data almost in real time, it is possible to act in advance, saving costs and time.
- As this Big data is created by SPM, the problem of the "data variety" is solved because all the inputs are related to do an accurate ship performance analysis.
- With the correct filtering at shore side, the data received can be normalized giving a very high veracity evaluation levels.
- It can empower shoreside technical staff to create models which will help to make a plan of action to raise the ship performance.

Maritime Big Data Defined

"Big data is a term that describes large volumes of high velocity, complex and variable data that require advanced techniques and technologies to enable the capture, storage, distribution, management, and analysis of the information."

(Tech America Foundation's Federal Big Data Commission, 2012).

Challenges Ahead

The large volume of data and the velocity of the data reception on the shore office can make processing and interpretation difficult. If companies do not have proper systems installed at their office, which interface and manage the data receive from the ships efficiently, then they could experience an overload of data input without enough resources to manage them. In that case, the benefits offering by the Big Data are lost. The potential problems to manage huge amount of data should be counteracted by designing systems which show all the data received in the manner that its interpretation is intuitive.

A final challenge within the maritime industry is the industry itself: Being that it is traditional and conservative by nature, maximizing the benefits of Big Data require a committed continued investment in new and emerging technologies and training.

F/V Blue North:
Transforming the Fishing Industry

Seattle's Blue North christened F/V Blue North, a state-of-the-art vessel designed to transform the fishing industry by improving conditions for workers, reducing environmental impact and harvesting seafood more humanely. Designed with sustainability in mind, the new longliner is geared specifically for the Alaskan cod fishery, built by Dakota Creek Industries, Inc. of Anacortes, Wash. from a design (ST-155L) by Norwegian firm Skipsteknisk AS. The result, according to Blue North: "the most modern, low-impact and innovative vessel to ever enter the North Pacific fishing fleet."

The new fish harvesting vessel, christened September 9 at the Port of Seattle's Fishermen's Terminal, features a number of new technologies.

"Blue North is dedicated to sustainable practices, and we spared no expense when it comes to the features we included on the F/V Blue North that reduce environmental impact," said Kenny Downs, president and CEO at Blue North. On board all water and waste is captured and treated, leaving nothing behind to contaminate the ocean.

The vessel's engine-cooling and heat recovery system recycles water used to cool its engines, and repurposes the captured heat for creating potable water, creating hot water and heating the ship. These features mean less fuel is required to heat the vessel and no waste water is put back in the ocean. Engine power is monitored by a smart grid that detects electrical loads and appropriately distributes energy for maximum efficiency. Blue North is equipped with a diesel electric twin propeller dual-azimuth propulsion system and will be one of the first fishing vessels in the U.S. to meet new Tier III emissions standards.

In order to improve working conditions for the crew, all fishing gear is inside and hauled through an interior moon pool – another first for the U.S. – so the fishermen are no longer exposed to unpredictable weather and associated risks of fishing in the Bering Sea. This also helps extend the time of fishing operations under severe weather conditions and gives high maneuverability and station keeping capabilities, according to the designer. Additionally, the shipbuilder said the vessel has been built with a heavily weighted box keel design to keep weight low, and an antiroll tank to provide a more stable working platform.

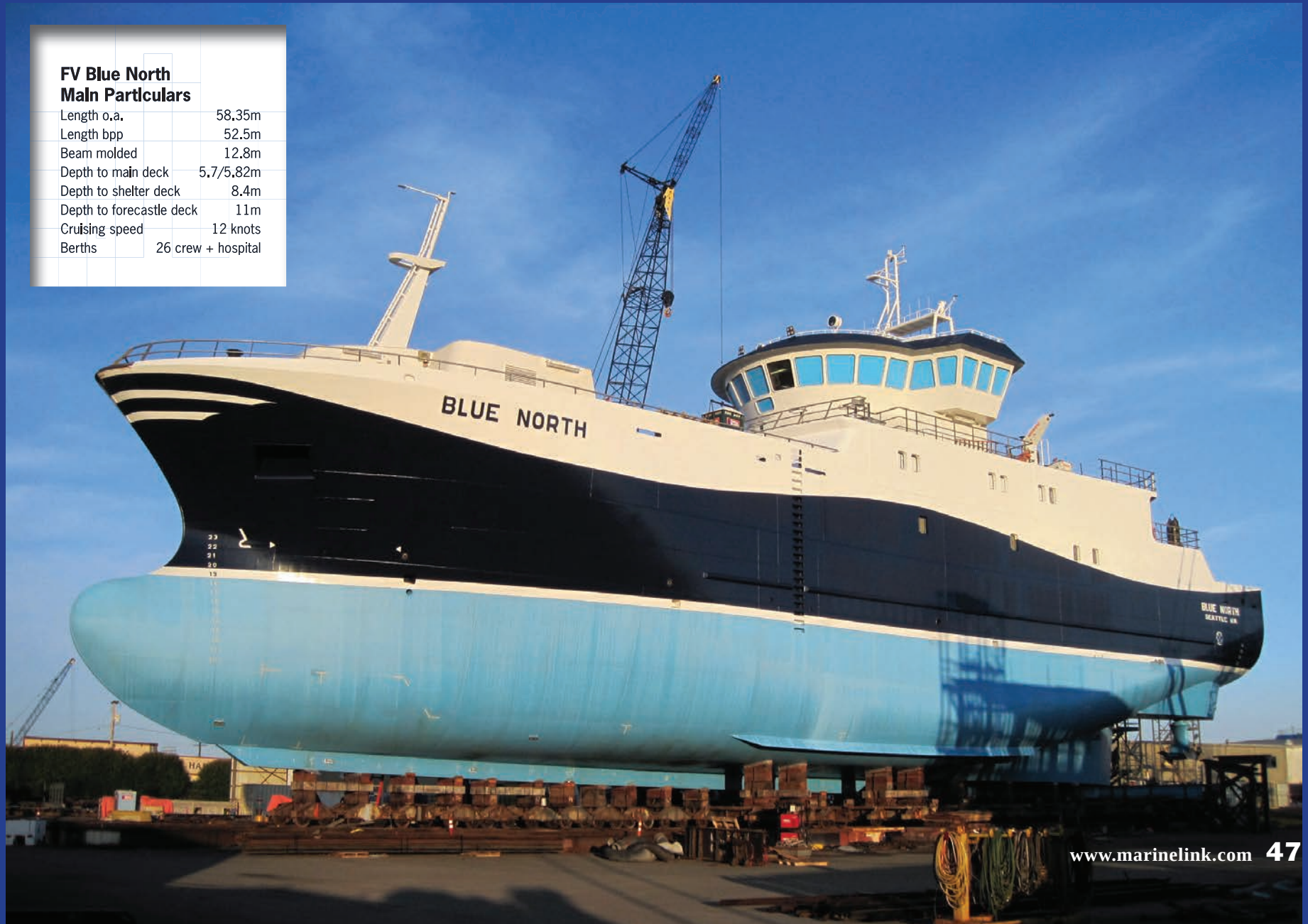
Further improving crew conditions, elevator and conveyer systems reduce the work of loading and unloading ship supplies and seafood products, while auto freezers eliminate the manual loading and unloading freezer trays. Deluxe staterooms are a mixture of private and double rooms, with a private lavatory in each. Workers sharing staterooms are scheduled for different shifts, so that each can rest privately in the room when off duty.

"As veterans of the industry we recognize that fishing is often grueling and dangerous work," said Blue North Chairman Michael Burns. "We've done everything we can to make the F/V Blue North a safer and more pleasant environment for our hardworking crews."

The F/V Blue North also includes an innovative system designed to ensure more humane harvesting of seafood. A hook-and-line fishing system ensures one fish is handled at a time, and fish on the lines are pulled into the moon pool at the center of the boat. Fish are only out of water for a few seconds before being stunned, processed and frozen on board. Hooks are removed after stunning to reduce stress to the fish.

FV Blue North Main Particulars

Length o.a.	58.35m
Length bpp	52.5m
Beam molded	12.8m
Depth to main deck	5.7/5.82m
Depth to shelter deck	8.4m
Depth to forecastle deck	11m
Cruising speed	12 knots
Berths	26 crew + hospital



(Photo: Dakota Creek Industries)

Fisheries Fleets Review: *Part IV China & Australasia*

Quiet Expansion

Photos: (start top, go clockwise): Asia Ready: the Piriou PS 80-1780-1960 Advanced tuna seiner features a helipad and 1780 m2 of storage in brine or dry freeze. (Illustration: Courtesy/© PIRIOU); Vuot Song's three designs for the Vietnamese market (two tuna long liners and a trawler) (Illustration: Antoine Leporc); and Added Value: Wartsila's stern trawler for the Australasian market. (Illustration: handout)

BY WILLIAM STOICHEVSKI

China's fleets dispersed in 2016 to fish in the world's economic exclusion zones after a painful, self-imposed fishing ban that signaled the economic giant's renewed hunger for wild, shoaling fish. Yet, before the year's mad oceangoing dash, its fleet modernized, attracted investors and grew by acquisition. In fact, from Darwin in Australia to Dalian in Northeast China, the aim is the same — conserve species, upgrade the fleet and grow.

(Photo: Courtesy/© PIRIOU)

Stern View: The Morn Seselwa-2 showing some of the same lines as its Piriou peers.

Valuable Vietnam

After China, Vietnam is the centre offering the most upside, as a "caretaker" government attempts to lift all boats with economic aid for upgrades of equipment and vessels. The presence of Dutch shipbuilding giant Damen suggests even more upside, but staff confirm for us that while its yard interest in the country has grown this year (by equity stakes in the national yard champion) the growth hasn't encompassed fishing vessels. While Dutch logistics and cranes giants have also arrived in Vietnam, they're not alone: Korea's Samsung, France's Piriou; Taiwan's Shing Sheng and Norway's TTS Group are just a sampling of suppliers set up and hoping government money traslates into the enmasse transformation of Vietnam's 30,000-strong fleet of predominantly near-shore shrimpers, seiners and offshore tuna boats.

For Ching Fa, Taiwan's largest fishing net supplier with 20 years of history in Vietnam, times are good and Vietnam has a lot to do with it. "For the time being, our markets in Taiwan, Indonesia, Philippines, Korea, Singapore and Japan have been solid for our products, but weak in other Asian nations, says managing director, Steve Wang. "(The Vietnam market) might grow in future provided the Vietnamese government supports fishermen updating their vessels."

While seine nets are a great indicator, Yards like Nha Trang have been doing brisk business upgrading wooden hulls to steel using government tax, insurance and investment credits for new-builds. The incentives are part of Decree 67, a pricy government program from 2014 that's still active but being scaled back using fishing and boatbuilding licensing halts on concerns for near-shore stocks. Still, Nha Trang has been hiring, according to Hanoi's Web site, and the yard should build a dozen vessels this year if the sudden drought in permits eases.

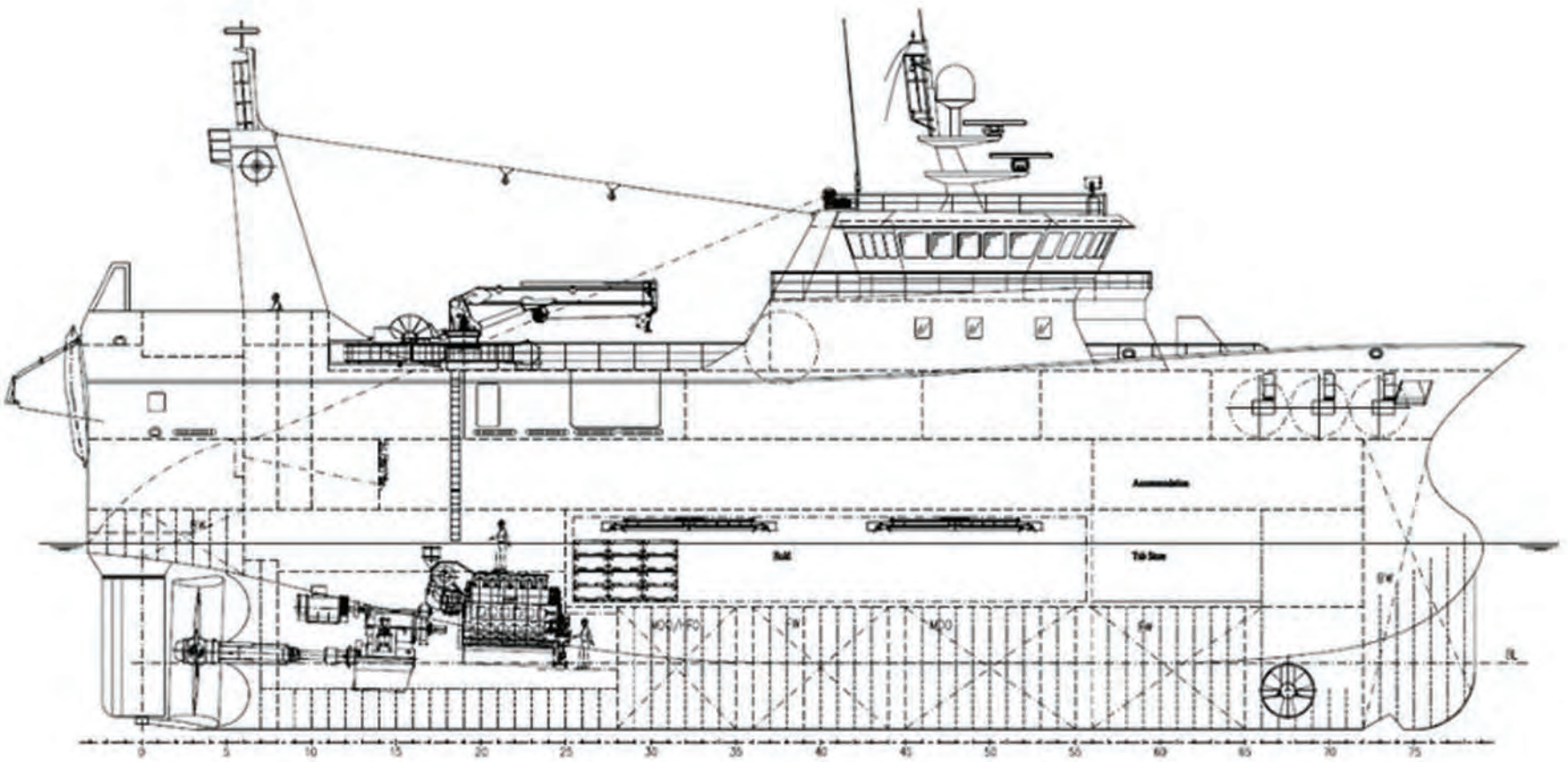
As we wrote these lines, Hanoi said it had two government ministers in Quang Ninh province "to promulgate legal documents" related to loans and "the building of offshore fishing vessels".

A taste of the 80's

By August 2016, loan applications for 15 of 28 local ship owners had been processed, and Vietnam's ministry of finance could report "11 ship owners" have been loaned "143.5 billion dong (USD 6.5 million) with USD2.9 million already dispersed. On top of this, falling Asian free trade area tariffs on imports bode well for insuring foreign new-builds and spares.

Helped by Hanoi's Plan of the Seas 2020, shipyard Vuot Song is offering a 16m trawler and two long liners through local hub Roy's Maritime managing director, Antoine Leporc. "The (trawler) is designed to operate on the Vietnamese coastline," Mr. Leporc says, adding that a crew of four can operate its 450 horsepower Guascor Engine out to 120 nautical miles from shore while running the motor continuously. A Kaplan 19 propeller gives the boat 6 tons of Bollard pull. Mr. Leporc, who splits his time between France and Vietnam, is also counting on a 21m long liner which "takes back the traditional shapes of the 80's" with a Lindgren-Pitman longline system modified to meet IMO and French Class rules. Cold and frozen storage is made possible by two Beta generators of 49 kVA each. The 21m liner offers tropical relief: "The comfort onboard is French Division 215 (sound and fire insulation). The central AC is made by seawater running throughout the boat. Everything has been designed in order to save gasoil, maximize comfort and (afford) the best possible cold and frozen fish storage," he says, adding that seaworthiness on the 21m is good to "Beaufort Scale No. 5.

Another French connection is shipbuilder Piriou from Brittany. Its Asia design successes include the delivery of long liner Cap Kersaint to Cap Bourbon. It was built at Piriou's Vietnamese yard and designed by Norway's Skipsteknisk (keep reading). Piriou's design bureau, Piriou Ingenierie, can also boast two 80m tuna purse seiners to France's Sapmer. Company spokesperson Nadine Rolland assures us all three vessels can operate in the Indian and Pacific oceans,



(Illustration: courtesy Xiamin Shipbuilding)

Fine Lines: Xiamin Shipbuilding's 51m fresh fish trawler.

"The difference being the availability of shore maintenance structures, or not".

China krill

If Vietnam's growth picture and government is attracting business then so, too, is China's ongoing economic expansion and its No. 1 effect: demand. China needs fish and fishing vessels, and its business leaders are trying new things to secure both.

Chinese acquisitions of other nation's fishing fleets and seafood distribution networks have been reported from Germany and Spain to Argentina and Canada. Also impressive are recent Chinese partnerships to charter high-end vessels and upgrades. The world-beating China National Fisheries Corp. in May 2016 bought into a design by Norwegian NSK Ship Design to convert an ordinary trawler into a uniquely krill trawler, a design destined for Antarctic waters.

Chinese interest in Krill hammers home the awareness of a burgeoning trend toward high-end vessels that can produce pricy fish oils and value-adding fish meal while securing a catch. Earlier in 2016, Wärtsilä agreed to design another modern giant of a krill vessel for Jiangsu Sunline Deep Sea Fisheries Co. It is understood the shipyard Hansail Marine & Offshore Design will build the Wärtsilä VS 6206 FT design for Jiangsu Sunline. The design features "continuous pumping" for fish handling that augments the net for a healthier catch. The

115m long vessel accomodates 99 people.

Modern partners

The presence of ship designer Ulstein along with Scandinavian buyers (Iceland) of Chinese-built new-builds appears to be inspiring a new generation of local designs. Xiamin Shipbuilding has embarked on a new-build drive with foreign partners sharing the "risk" in owning local vessels. Since the 1990's, Xiamin's managers have used its German office to attract Swedish and other international owners.

Only the joint investments of New Zealand and Japan can compare to Xiamin's international partnering. New Zealand's partly government-owned Sealord seafood company is investing USD70 million in its fleet, starting with an advanced vessel from Norway's Skipsteknisk and outfitter Simek. Maori and Japanese shareholders (Nippon Suisan Kaisha) aim to make the most of an 82 m vessel that will exploit all of each barracuda, squid and jack mackerel fished into its 20,000-ton-capacity hold. Sealord's first new vessel buy since '96 means it won't have to contract as many species-specific fishing boats.

Taiwan savvy

Meanwhile, across the East China Sea in Taiwan there are still two new-build purse seiners under construction at Jong Shyn Shipard in Kaoshiung. Mr. Wang says they're scheduled to start fishing together at year-end 2016 for a Taiwanese seafood company he won't disclose the name of although they're his clients for vessels over 1,000 t.

Mr. Wang has neatly divided the pelagic tuna fishery into two customer categories: American purse seine nets and nylon monofilament long lines. With new vessel types arriving in all its markets, Ching Fa's willingness to invest in overseas fishing gear expertise in the 80's and 90's is about to pay off. Vessels like Jong Shyn yard's streamlined mackerel seiners and pelagic trawlers look like they might have been built nearer the Arctic Circle. Compatriot yard Shing Sheng Fa Boat Building offers a squid boat, the 290 GT, with an elegant prow and lines that draw on 40 years of boatbuilding.

"I think Taiwan should prove to be the best Asian market (for) 2014-2016, says Mr. Wang. "It remains stable and doesn't fluctuate too much. There are many new tuna vessels with Ching Fa netting from those two years."

As we went to press, 13 vessels of the U.S.-listed Pingtan Marine Enterprises Ltd. Of Fuszhou, China were modifying their gear to legally fish offshore the Democratic Republic of Timor-Leste (modified from drift-netting to trawling), about 3,000 kilometres south of Hong Kong. Chinese vessels inspected offshore Africa were reportedly "brand new". It seems whatever reputation they've acquired for zealously fishing economic zones, the "ghost ship" stereotype appears silly. Like the other Pacific Rim fleets we surveyed, China's are doing their best to adjust and grow.

(Photos courtesy: TEEX)

Students practice fighting **live LNG fires** at TEEX.

Fighting Fire with Fire

TEEX By the Numbers: FY 2015

Acres (College Station):	297
Total Served Worldwide:	173,421
Total Classes:	6,755
Total Contact Hours:	2.8 million
International Service:	81 countries
Full-Time Employees:	459
Part-Time/Adjunct Employees:	658
Annual Operating Budget:	$82.7 million

For fire and emergency services training, the Texas A&M Engineering Extension Service (TEEX) in College Station, Texas, is arguably one of the biggest and most comprehensive facilities in the world. To see if it lived up to its slogan: "The Ultimate Fire & Emergency Training Destination," Maritime Reporter & Engineering News visited Mike Wisby, the Associate Division director for TEEX, the man tasked with ensuring that the cumulative facilities are built, maintained and kept to world-class standard to teach crews to handle any disaster that might come their way.

BY GREG TRAUTHWEIN

While the saying "Everything's Bigger in Texas" doesn't necessarily apply to everything, it certainly applies to the Texas A&M Engineering Extension Service (TEEX) in College Station, Texas. Simply put, if there's a disaster in the world, it's a fair bet that one or more responders has spent time with a TEEX instructor. When you look at TEEX you have to start with the numbers, and they are Texas-sized: a 297-acre main facility in College Station, 173,421 students served by 6,755 classes in 81 countries; 459 full-full time employees, 658 part-time/adjunct employees and an annual operating budget of $82.7 million. (Note: All numbers FY 2015).

Fighting Fire

While TEEX is diverse both in terms of disaster training and the markets it serves, at its very core are its firefighting courses. TEEX has been offering marine firefighting courses for mariners and offshore workers since 1976, and these courses have evolved over the years into the USCG approved/STCW compliant Basic, Advanced, and Combined Marine Firefighting courses, as well as the Basic and Advanced Refresher courses.

TEEX also conducts shipboard firefighting course tailored to land-based firefighters and several LNG (liquefied natural gas) courses, to meet the needs of shipping companies and terminal operators.

All of our courses revolve around hands on live fire training.

"We trained a group of land-based fire fighters; they certainly know fire fighting, but they didn't know ships," Wisby said.

While simulation plays an ever increasing role in training in general and in the training offered by TEEX, its marine firefighting courses have retained a heavy reliance on hands-on live fire training, using flammable liquids, LPG (propane) and / or LNG (liquefied natural gas.) Simply put there is no way to adequately simulate the experience of fighting live fire, and without question the LNG firefighting area is a unique 'show stopper' at the TEEX facility. TEEX operates an LNG live fueled training project at Brayton Field. This prop uses live LNG and allows students to observe the safe handling protocols used for an LNG leak and/or fire scenario. LNG shipping companies and terminals worldwide participate in the training provided, using this prop.

ARDENT

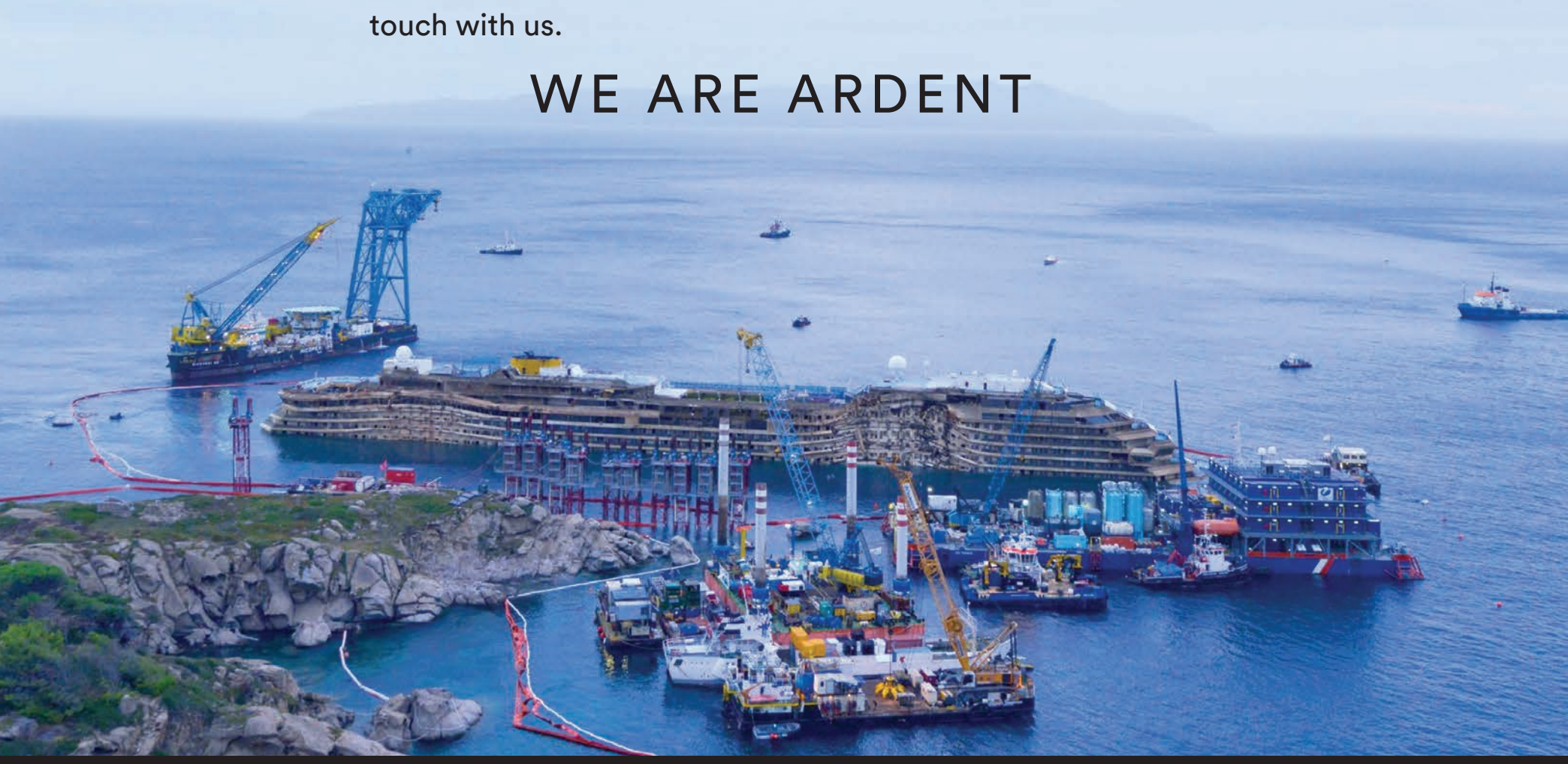
A global marine services network. We have come together to build a more modern and effective service for businesses in the maritime sector.

In an increasingly risk conscious but uncertain world, we believe that businesses need a marine services partner that is both responsive and responsible. One that always remains focused on the long-term interests of its clients.

Building on the heritage of two respected salvage companies, Titan and Svitzer Salvage, our offer covers risk mitigation, emergency response, wreck removal, offshore decommissioning and underwater services.

If you are looking for an experienced maritime partner that has safety and sustainability at its heart, then please get in touch with us.

WE ARE ARDENT



To learn more about our services please visit us at ardentglobal.com or contact us at response@ardentglobal.com

Global Emergency Response Phone Number: +31 255 56 26 66

ARDENT

TITAN + SVITZER SALVAGE

(Photos courtesy: TEEX)

(Photos courtesy: DST)

LEFT
The Emergency Operations Training Center – a facility which ties together all facets of an emergency response operation, from Command to Logistics to Planning to Finance to Administration – can run two simultaneous full scale ops.

RIGHT
Pick a disaster, any disaster, and it is likely that it has already been a training course at TEEX.

Disaster City

Firefighting onboard a ship presents its own unique challenges, but firefighting in the maritime sector is certainly not confined to a ship's crew sailing on the high seas.

The interaction between maritime and port/intermodal facilities is a complex and ever evolving relationship, and live fire and emergency response training for the maritime industry continues to evolve.

As vessels, terminals, and offshore facilities become more complex, personnel must be prepared to adequately deal with any type of emergency. Incidents vary from fire fighting, confined space rescue, water rescue, hazardous materials, and others.

In addition, personnel must be adept at managing the incident, using the appropriate Incident Command structure.

In addition to the maritime-specific props in College Station, TEEX boasts many industrial set-ups, from fighting fire in a refinery setting to responding to a rail collision.

The pinnacle perhaps is TEEX's 'Disaster City,' boasting an enviable array of disaster props enabling first responders to practice dozens of disaster scenarios, from acts of mother nature to acts of terror.

Operations Command & Control

While TEEX provides the facilities and tools to physically learn emergency response, arguably its Emergency Operations Training Center – a facility which ties together all facets of an emergency response operation, from Command to Logistics to Planning to Finance to Administration – is the crown jewel.

In fact TEEX's Emergency Operations Training Center features two fully equipped facilities, allowing it to run two full scale ops simultaneously.

Whether the disaster scenario is a flood, tornado or terrorist attack, the Emergency Ops Training Center allows disparate groups of specialists to link together to run the response operation in unison, even allowing digital links back to the trainee's city center, in fact, allowing multiple cities to be on line simultaneously for role playing purposes.

"Say you have a scenario where you're calling in 50 police officers from a neighboring town … or 10 dump trucks for that matter. Did they all show up? How and when did they get paid?," Mike Wisby asks rhetorically. Simulating through the minutia of all that makes up emergency response goes a long way to ensure smooth operations if and when disaster strikes.

The TEEX Texas-sized story is backed by a long list of government and private sector organizations that train with the it, from FEMA and the Department of Homeland Security to individual state and municipality agencies, as well as oil majors and major shipping companies.

New Product

NEW Teekay Axilock Fire Proof Coupling

The Teekay Fireproof Coupling features a patented, internal fire sleeve that cannot be lost, damaged or removed. At SMM 2016 in Hamburg, the company launched the second generation Axilock Fire Proof Coupling, improving the first which was invented by Director Ian Webb in 1995. The new, enhanced Axilock Fire Proof Coupling replaces the original internal fire sleeve with layers of advanced fire proof material, and it also gives a more positive lock off on torque.

Current test conditions require the coupling to be subjected to temperatures in excess of 800 degrees, which the Axilock Fire Proof resists with ease. The company said its tests have proved the new coupling is capable of withstanding temperatures beyond this limit, with the lock parts both up and down. There are no noxious fumes, no smoke and no leakage.

Having survived a flame test designed to simulate a hydrocarbon fire the Teekay Axilock-FP Coupling remains leak free at a pressure of 32 bar – in this instance, twice the working pressure.

The expected changes to IACS P2 regulations stipulate 'thermal insulation materials applied on couplings should be non-combustible' – the Axilock Fire Proof coupling meets those regulations before they are required and does so with room to spare for the future.

www.teekaycouplings.com

Buoyant Body Armor for Maritime

With the advances of technology many manufacturers are turning their interest towards developing body armor with increased buoyancy to meet the requirements of the maritime industry personnel in terms of safety. The most common problem of this type of body armor is its weight and restrictive nature. Modern body armor is extremely thin and lightweight, albeit still limiting when it comes to flexibility. Heat retention is another drawback that manufacturers are trying to overcome. Recent technologies have been successful in making body armor cooler and increasing airflow, which is particularly beneficial for environments with intense humidity and heat, such as the maritime industry. There are additional products that can be worn underneath the armor, such as the CTAV from Cortac, which relies on a bumped and ridged surface to naturally stimulate airflow apart from adding some padding and comfort for the wearer. Other similar products have the added benefit of improving weight distribution of the armor.

New types of body armor incorporate inflating technology, so that upon contact with water, the body armor provides an extra layer of safety for any personnel working in the maritime industry. In the event of an injury from a pistol or melee weapon, the new BCB's Inflatable Body Armor System automatically inflates within seconds of coming into contact with water, which means the person will remain afloat without any effort on his or her part. This upgrade on existing buoyant body armor models is a leap forward in guaranteeing the safety of maritime personnel in their line of work. BCB's Inflatable Body Armor System is reportedly the first of its kind with the capacity to handle 275 Newtons of buoyancy, which means that even if the wearer is carrying heavy gear, the armor will still keep them afloat. Products for the maritime industry personnel typically focus on different issues, such as providing body armor with better UV protection and odor control for instance. An added benefit of many of these products is increased comfort as manufacturers use softer materials.

Email: ctaylor@safeguardarmor.com

IUMI: Containership Fires Need Study

Two recent onboard containership fires have fueled concerns from IUMI (International Union of Marine Insurance) over the challenges involved with managing these incidents at sea.

"At sea, below-deck fires cannot be fought with water and so CO2 is used instead to displace the oxygen and extinguish the fire," said Uwe-Peter Schieder, Vice Chairman of IUMI's Loss Prevention Committee. "However, if the fire is burning within a container, the box will protect it from the CO2and so this method of fire-fighting is rarely successful. Currently there are no other methods of fighting a containership fire below deck. Even on deck, the crew only have access to hoses and nozzles. They do not have sufficient monitors or foam and so cannot cool the vessel's structure".

Specifically, IUMI is concerned that seafarers are being asked to tackle onboard fires with inadequate equipment. The Association highlights the incident concerning MSC Flaminia where three seafarers lost their lives. The vessel burned for almost six weeks, 70% of the cargo was destroyed and the ship was declared a Constructive Total Loss (CTL). IUMI – which is well aware of the SOLAS regulations – is nonetheless calling for further dialogue involving IMO, class, shipbuilders and shipping companies to further improve firefighting capabilities onboard containerships.

The two recent containership fires referenced by IUMI are:

- **NNCI Arauco** - 1 September 2016: A fire broke out whilst alongside in Hamburg during welding operations and 300 firefighters were deployed. The hold was sealed and flooded with CO2, this was unsuccessful. Water was then used for flooding the hatch and stopped before stability problems occur. Finally, foam was used to bring the fire under control.
- **Maersk Karachi** – 13 May 2016: A fire caused by welding operations needed more than 100 firefighters to control the blaze. Water monitors were needed to flood the hold to extinguish the fire.

3Si's Constant Wear Lifejacket

Safety and Survival Systems International's streamlined new lifejacket, the Ocean Safety Constant Wear, is designed for working seafarers. The unique shape of the Constant Wear is extremely comfortable and sculpted to fit the body for uninhibited upper body movement. It comes in three variations; wipe-clean, nylon and PVC. Its robust characteristics minimize wear and tear during demanding conditions met by offshore and wind-farm personnel.

www.3Sisafety.com

3M Novec 1230 Fire Protection Fluid

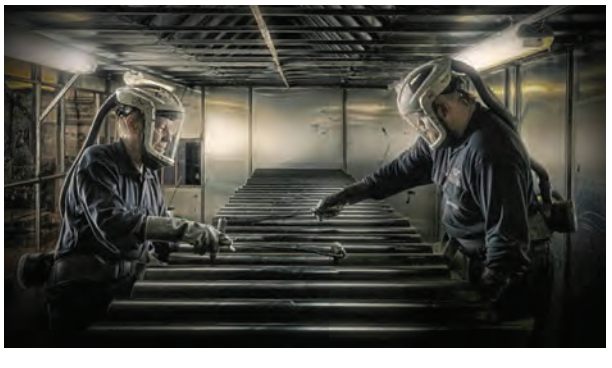
Novec's 1230 Fire Protection Fluid is an advanced halon and CO2 replacement, offering a number of advantages over other clean agents and CO2 in marine applications. Based on 3M proprietary chemistry, its low acute toxicity, combined with high extinguishing efficiency, gives Novec 1230 fluid a wide safety margin – even at relatively high extinguishing concentrations, making it ideal for occupied spaces, including engine and pump rooms.

www.3m.com

Trelleborg Materials

Trelleborg's newest offerings include Vikotherm, made from non-syntactic silicone and can be cured at room temperature without exposure to air, making it resistant to cracking and shrinking. Vikotherm R2 offers improved elasticity, as well as enhanced process and manufacturing flexibility. Using Trelleborg's Mobile Production Unit (MPU), the system can be applied on site, anywhere around the world.

www.trelleborg.com/offshore



New Product

The Robotic Fireman

Unifire AB developed a fully automatic fire detection and extinguishing robot – FlameRanger – that the company claims is like having a firefighter on watch 24/7/365. Unifire combined its firefighting robotic nozzles with its PLC and software so that they can take in signals from, and send commands to, a virtually unlimited variety of electronic devices – from sensors & detectors to cameras and infrared cameras, to video displays, to valves & actuators, lights, computers, tablets, phones, etc.

By combining the robotic nozzles with advanced flame detectors, the system is able to detect a fire within seconds and begin suppressing the fire directly at its source. The technology can be used for a wide variety of firefighting applications, such as to protect tunnels, oil & gas facilities, large storage areas on naval vessels, yachts and ships, warehouses and manufacturing facilities, and aircraft hangars, to name a few.

Image: Unifire

Moreover, the system can be monitored and controlled remotely over a secure network by desktop computer, or even mobile devices. It can immediately alert officials of the exact location of the fire, allowing them to evacuate the building, call responders to the scene, and even allow firefighters to take over manual operation by remote control.

www.FlameRanger.com

New Lifeboat Simulator

(Photo: Virtual Marine Technology)

Virtual Marine Technology delivered a second lifeboat simulator system to Prosafe. The simulator was custom built for training lifeboat coxswains onboard the Safe Zephyrus, one of Prosafe's new accommodation rigs which was built at Jurong Shipyard and can accommodate up to 450 people. The installation of the lifeboat simulator took place in Scapa Flow, off the northeast coast of Scotland.

www.vmtechnology.ca

Crewsaver Workvest Lifejacket Range

Survitec Group's Crewsaver single chamber Workvest range is ideal for workboats. Bladder design is integral to Crewsaver lifejackets and all Crewsaver lifejackets come with a unique chin support, keeping crew comfortable and well supported should they fall overboard. Designed to remain robust and reliable when used constantly, they offer the option of a wipe clean cover for the harshest of conditions.

www.crewsaver.com

Float-Free EPIRB with VDR Memory Capsule

Ocean Signal and AMI Marine introduced a new float-free EPIRB with integrated voyage data recorder (VDR) memory capsule at SMM in Hamburg. The Ocean Signal E101V is designed to provide a solution for commercial vessels of 3000+ gross tonnage to store recorded data in a float-free capsule within its VDR systems, as required for compliance with the revised recommendation on performance standards for VDRs. The E101V is supplied with AMI's regulation X-Series VDR which incorporates IEC61162-450 network protocol, applicable to the collection, storage and playback of important data.

www.oceansignal.com
www.amimarine.com

New Product

Personal Sea Survival System

SRG International introduced the PS³ which incorporates a combination of a SOLAS life jacket with an auto-inflating single person life raft. Packaged into a slim, detachable, lightweight backpack, the PS³ weighs in at less than 5kg. Designed for low maintenance and approved to the latest SOLAS regulations, the automatic system is designed to be simple to operate with a front zip closure and separate side adjustment. The one-size-fits-all lifejacket is comfortable and unrestrictive while the single person raft is simple to board and quickly provides the survivor with thermal protection. With high-visibility colours, SOLAS reflective tape and an automatic light to aid detection, the PS³ is a stable craft, even in extreme conditions.

Email: info@srg-international.com

(Photo: Vigor)

Vigor Delivers San Francisco's New Fireboat

Vigor delivered an 88 x 25 x 14-ft. fireboat to the San Francisco Fire Department, the first fireboat to join San Francisco's fleet in 61 years. Designed by Jensen Maritime and built at Vigor's Seattle shipyard, the vessel is not only a firefighting tool but also a mobile pumping station powerhouse, the shipbuilder said. It's capable of pumping millions of gallons of water directly from the Bay into the City's Auxiliary Water System – a feature that will keep fire hoses flowing in the event an earthquake damages San Francisco's water mains. "It's a complex vessel with multiple modes of operation and different systems that need to communicate with each other seamlessly to give the city's firefighters the best possible tool for the future," said Keith Whittemore, Vigor Executive Vice President of Business Development.

Cummins was key to the vessel's pumping and propulsion power. The vessel features three QSK19-M US EPA Tier 3 engines that provide 750 hp at 1,800 rpm pumping power to Counterfire ESF 300-550 with capacity for 6,000 gpm each - total of 18,000 gpm of flow with all three engines in pumping mode. Power is transmitted to the pumps via three Logan LC318 SAE #0 air actuated clutches and Elbe cardan shafts with a Centa Centaflex-R flywheel mounted torsional coupling.

In addition to providing pumping power, the two outboard engines also provide 591 hp at 1,800 rpm for propulsion operations from the front of the engine. Propulsion power is transmitted through a Centa CX-56 torsional coupling and a Reintjes WAF 364 reduction gear provided by Karl Senner. Special attention was paid in noise and vibration reduction by the designers. All three engines are mounted on Christie & Grey TSC T-10 vibration isolators resulting in excellent performance.

The new fireboat will be christened on October 17, which also happens to be the anniversary of the 1989 Loma Prieta earthquake. This infamous quake burst the domestic water lines beneath San Francisco.

Lürssen Werft Acquires Blohm+Voss

Bremen-based Lürssen Werft GmbH & Co. KG is well regarded in the yachting and naval sectors. It has acquired Blohm+Voss.

(Image courtesty: www.luerssen.de © Wolfgang Kundel (terra-air service))

Family owned and Bremen based shipyard, Luerssen announced a deal to acquire storied shipyard Blohm+Voss in Hamburg. With the acquisition of Blohm+Voss, Luerssen said it is entering into a long-term relationship to strengthen its portfolio in the repair and refit activities for yachts, naval and commercial ships as well as enhancing its naval new build activities within its corporation. The contract between Luerssen and the funds of British private equity investor. Star Capital Partners has been signed and the agreement is currently subject to approval from the German Fair Trade Commission (Bundeskartellamt).

"With the acquisition of Blohm+Voss we are taking over a shipyard with a strategically advantageous location and versatile production facilities. We want to use these facilities to complement our existing refit and repair activities and also to offer our customers an ever better service," said Peter Luerssen, Managing Partner at Luerssen Maritime Beteiligungen GmbH & Co. KG. "In addition, we would like to use the competence and experience of the shipyard and its employees for the new build of complex naval ships and continue their production at the Hamburg site. The construction of yachts at the Hamburg yard will depend on the overall market situation and it is difficult to judge at this time."

If approved, Luerssen will combine six highly specialized shipyards with approximately 2,800 employees in Northern Germany. The family owned Luerssen Group was founded in 1875 and specializes in the design and production of yachts over 60m as well as naval and coast guard ships.

Pocket Tanker for Puget Sound

"We wanted a vessel that would allow us to quickly and efficiently serve our diesel and lube oil customers in Puget Sound," said Maxum Petroleum's Mike Curry of the new 126-ft. product tanker that the firm is having built. "We have 15,000 barrel barge doing the job now but this boat will be more efficiently handle our ATB customers. Most of our customers take smaller deliveries, so the new boat, with its six cargo holds taking 3,700 barrels of fuel and 24,000 gallons of lube oil, will fill an important niche." Global Provider will be less than 100 gt and so qualifies for a two-man day-boat operation around Seattle. It also has accommodation for four crew making longer runs practical. "We have one barge each on the Columbia River and in San Francisco Bay," said Curry, "So if we have a barge in the dry dock in any of these ports we can send this boat down as relief."

With a 10-ft. draft on a 14-ft. molded depth and a 32-ft. beam, the Grade B product tanker, to be named Global Provider, is fully double-hulled. Fuel tanks located port and starboard of the engine room will carry a total of 8,900 gallons. Additional trim tanks are located in the forepeak and the stern quarters. Designed by the Elliot Bay Design Group, the boat is being built by Jesse Co. Metal Fabrication and Machinery in Tacoma, scheduled for delivery in February 2017. In the engine room, aft of the six separate cargo holds, a pair of Cummins QSK 19M Tier 3 diesels, each generating 660 hp at 1,800 rpm will provide propulsive power. These two in-line six-cylinder engines will each turn into Twin Disc gears swinging 48-in. four-blade stainless steel props. A pair of Northern Lights generators will meet the boat's electrical and hydraulic power requirements. On deck, a Rapp Marine HP30 5F crane will handle the hoses for product being pumped by a six-inch Blackmer pumps.

WSDOT Christens New Ferry Chimacum

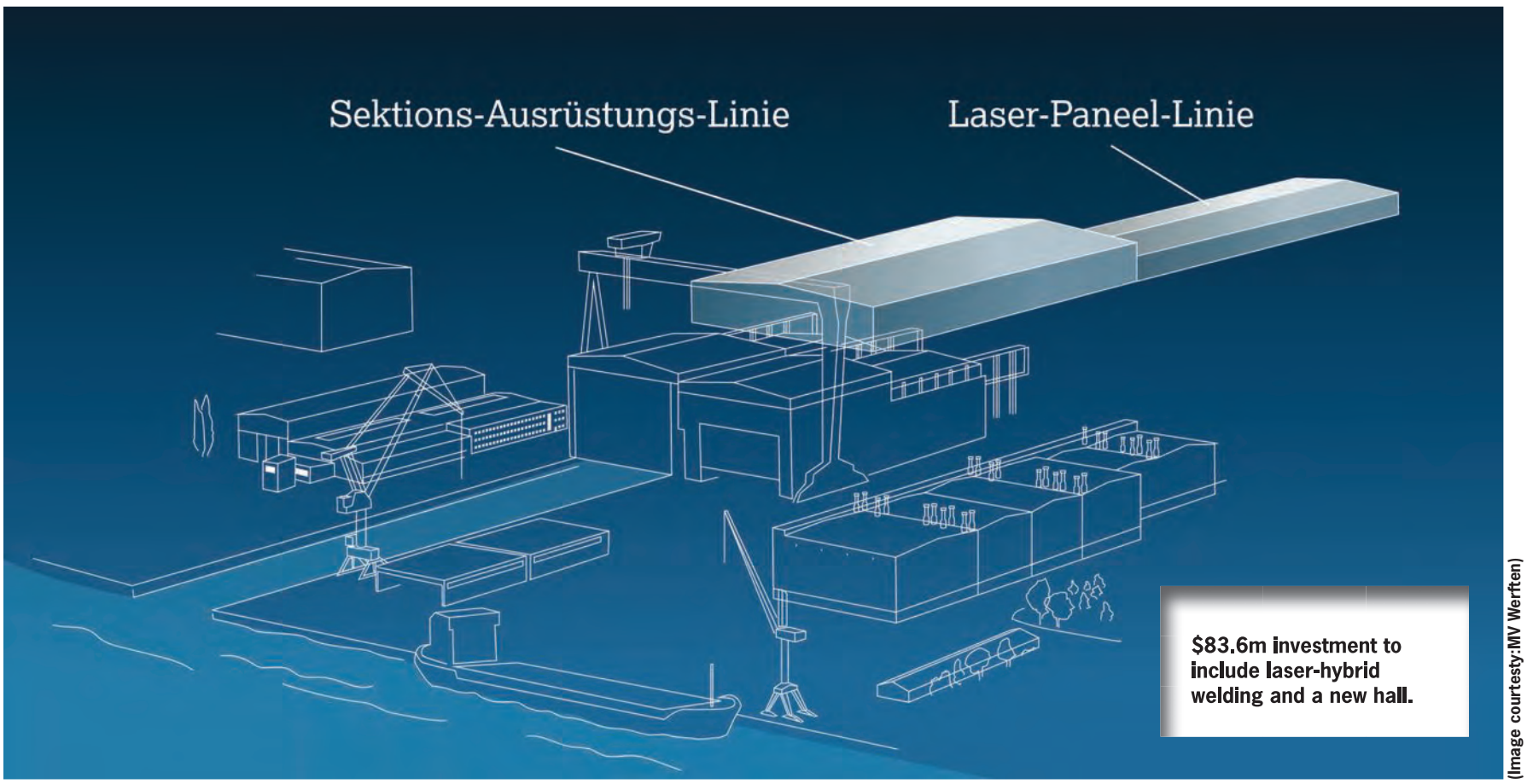
The Washington State Department of Transportation (WSDOT) christened Chimacum, the third Olympic Class vessel to join the Washington State Ferries (WSF) fleet. The ceremony took place at Vigor's Harbor Island Shipyard in Seattle, and marked the vessel's final stage of construction and its preparation for sea trials. In a traditional maritime ceremony, Washington State Ferries Assistant Secretary Lynne Griffith broke a bottle of champagne to officially welcome the new ferry to the fleet. Gov. Jay Inslee, along with Secretary of Transportation Roger Millar and Bremerton Mayor Patty Lent, spoke during the event.

The 144-car Chimacum will begin its sea trials in early 2017 and will start carrying passengers on the Seattle/Bremerton route next spring. The Washington State Transportation Commission selected the vessel name in 2014 to honor the gathering place of the Chimacum people, which is now the present day town of Chimacum near Port Townsend. Chimacum is the third of four funded Olympic Class ferries that replace the Evergreen State Class vessels. The first Olympic Class vessel, Tokitae, joined the Mukilteo/Clinton route in June 2014. The second, Samish, started service on the Anacortes/San Juan Islands route in June 2015. Suquamish, the fourth vessel in the class, is under construction at Vigor and will enter service in 2019.

(Photo: WSDOT)

(Photo: Elliot Bay Design Group)

MV Werften Invests $83.6m in Rostock Yard



(Image courtesty:MV Werften)

The shipyard group is to build a new production hall with an advanced laser-hybrid welding line in Rostock as part of its total investment plan. Contracts with Pemamek, Inros Lackner and Warnow Design were signed in Rostock on September 27, 2016.

MV Werften announced plans to invest $83.6m in its Rostock yard, an extensive investment program for the purchase of a new thin-plate laser panel line with welding and production automation specialist Pemamek, the construction of a new hall with engineering company Inros Lackner and design services with service engineer Warnow Design. "This investment clearly indicates our long-term commitment to our yards and our plans to make MV Werften one of the world's most modern and efficient cruise shipbuilders," said Tan Sri Lim Kok Thay, Chairman of the Genting Group.

"With the investment in our Rostock yard and especially in this new and most efficient welding method, we will further increase our steel prefabrication capacity and thus improve our productivity," said Jarmo Laakso, Managing Director of MV Werften. With the new line, the shipyard group will have one of the most modern welding stations in Europe and will then be able to handle the planned cruise shipbuilding projects with large amounts of thin steel plate construction. The advanced laser-hybrid welding station will be installed in the new hall from September 2017. Commissioning will be in February 2018.

The so called laser-hybrid technique offers a new high-quality and effective welding method by providing higher speed at less energy and heat input, thus causing less distortion and subsequently considerably lowering straightening work. In contrast to traditional steel processing, this technology allows improved stability at much lower costs and in highest precision.

Ground-breaking ceremony for the construction of the new hall in Rostock will be in early 2017. The shipyard group will furthermore invest in a new block building line by the end of this year.

Gladding-Hearn Delivers for Hy-line

Hy-Line Cruises received Grey Lady IV, a new 493-passenger, high-speed catamaran from Gladding-Hearn Shipbuilding, the Duclos Corporation. The fourth Incat-Crowther fast ferry built by the Mass.-based shipyard for the Cape Cod passenger ferry company is larger and more stylish in design than previous vessels. The new ferry will provide year-round passenger service between Hyannis and Nantucket Island. The new, all-aluminum ferry measures 153.5 x 34.5 ft., and draws approximately 8 ft. loaded. The vessel is powered by four Cummins QSK60-M, EPA Tier 3 diesel engines, each delivering 2,200 Bhp at 1,800 rpm. Each engine is propelled by a Hamilton HM721 water jet through a Twin Disc MG61500SC horizontally-offset gearbox. The ferry's top speed is more than 34 knots when fully loaded at a deadweight of more than 64 metric tons, including 6.4 metric tons of luggage, said Peter Duclos, president of the shipyard. In the event of a failure of one of the propulsion systems, the boat will still keep the schedule, but will require full power from the remaining three engines. "This kind of margin and redundancy is just prudent business for a ferry that will operate close to 5,000 hours per year," said Duclos. Each hull is equipped with a 125 kW Cummins QSB7-D (M), EPS Tier 3 generator.

(Photo: Gladding-Hearn)

Seri Camelia

LNG Carrier for MISC

(Photos: MISC Berhad)

Seri Camellia is the first in a series of five MOSS-type 150,200 cu. m. liquefied natural gas (LNG) carriers delivered last month to MISC Berhad (MISC). The ships are being built at Hyundai Heavy Industries Co., Ltd. (HHI) in South Korea, and upon delivery, the LNG Carriers will be chartered to PETRONAS for the next 15 years. Seri Camellia will be part of the new generation of the Seri C Class LNG fleet, comprising MOSS-Type vessels that provide a more robust and superior cargo containment system and ensuring a higher degree of operational flexibility for MISC to operate in harsh meteorological conditions. “MISC strives to fulfill our role in moving energy to build a better world and in this sense, we will continue to contribute significantly towards developing Maritime Malaysia as well as the global shipping industry. Capacity building is our primary focus to support this agenda, from fostering the dynamic talent of our seafaring professionals to modernising and expanding our fleet of vessels that is aligned with global standards in technology, safety and reliability,” said Yee Yang Chien, President/CEO of MISC. The new generation of LNG carriers incorporate technologies in various forms including the Integrated Hull Structure (IHS) with four spherical tanks shielded by the continuous cover, which improves the overall structural strength of the hull.

Additional green technology features adopted for these new carriers include energy efficiency, emissions reductions, biodiversity management and end-of-life disposal.

These features also include the installation of the Selective Catalytic Reduction (SCR) system for the diesel generator to comply with the latest IMO Tier III requirement and the Ozone Ballast Water Treatment System. The carriers will be powered by an Ultra Stream Turbine (UST) plant, and installed with pre-swirl duct and Propeller Boss Cap Fin (PBCF).

The MOSS-Type newbuilds are part of MISC’s long term fleet expansion program to cater to the energy transportation needs of PETRONAS. They have been designed for worldwide trading capability to enable them to call at all major LNG terminals in the world. Seri Camellia embarked on its maiden voyage from South Korea to Bintulu, Malaysia.

Designing for Ship Performance

Monitoring and Analysis for CO2 Emission Reduction

Example of vessel whereby the amount of cargo carried is difficult to quantify in single MRV indicator.

(Picture courtesy of Spliethoff)

In April 2015, the European Union adopted a mandatory Monitoring, Reporting and Verification (MRV) regulation for CO2 emissions resulting from maritime transport. The MRV requires operators of large ships to monitor and annually report the verified amount of CO2 emitted on journeys to, from and between EU ports.

Using basic input data (distance, fuel, time, cargo weight) and indicators the ship's performance is determined and reported publicly. Over the past two years MARIN has worked together with the Royal Dutch Shipowners' Association (KVNR) to evaluate the implications of these performance indicators for general cargo ships and reefers.

The performance of these vessels is difficult to determine in comparison to tankers and containerships, due to the large variety of cargo types. Daily performance data from more than 200 ships was collected and analyzed to evaluate and suggest fairer performance indicators, and these new indicators were then put forward to the European Commission.

Although the MRV performance indicators generated from only basic data may be useable for global CO2 monitoring, they provide little information to the operator. Through several JIPs, commercial projects and in-house research directly related to service performance analysis, MARIN has led the research into the causes of scatter in performance indicators. Even with the availability of monitoring systems providing almost real-time data, and the use of state-of-the-art correction methods for wind and added wave resistance, scatter is still a widespread phenomenon. Having confirmed the reliability and accuracy of important sensors such as the speed log, power meter and weather data, research over the past year focused on added resistance. The ship's resistance is often defined as RT = Rcalm + Rwind + Rwave. And the effect of drift and asymmetric drop in propeller efficiency with drift is often neglected.

CFD ReFRESCO calculations with a steady wave pattern, free surface and rotating propeller proved relations found in service performance data that leeway drift can lead to an increase in fuel consumption up to 15%. New insights allow corrections to be applied to these off-design conditions and lead to a reduction in performance indicators. In this way MARIN helps shipowners to reduce CO2 by providing accurate performance evaluations.

About the Author

Thijs Hasselaar is Project Manager at the Business Unit Trials & Monitoring 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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Helicopter Carrier Delivered to the Egyptian Navy

LHD Anwar El Sadat.

LHD Anwar El Sadat (All photos: DCNS)

DCNS delivered LHD (Landing Helicopter Dock) Anwar El Sadat, the second of two helicopter carriers acquired by the Arab Republic of Egypt.

The flag transfer ceremony took place September 16, 2016 in the presence of the two Chiefs of Staff of the Egyptian and French navies, Admiral Rabie and Admiral Prazuck, the chairman and CEO of DCNS, Hervé Guillou, and the president of STX France, Laurent Castaing, together with senior French and Egyptian officials. By 2020, DCNS will have supplied seven combat vessels to Egypt, thus contributing to the modernization of the Arab Republic of Egypt's defense system.

On October 10, 2015, DCNS signed a contract with the Ministry of Defense of the Arab Republic of Egypt for the supply of two Mistral-class Landing Helicopter Dock vessels (LHDs), the first of which, LHD Gamal Abdel Nasser, was delivered June 2, 2016. The flag transfer for the two helicopter carriers forms an integral part of the continuity of the strategic partnership with the Egyptian Ministry of Defense formalized already in July 2014 through the signature of a contract for the sale of four Gowind corvettes, then in August 2015 through the delivery to the Egyptian Navy of the FREMM multimission frigate Tahya Misr. DCNS has also secured long term multiannual maintenance contracts for Egyptian Navy vessels, as well as a technology-transfer agreement allowing the Alexandria shipyards to build three of the four Gowind corvettes acquired in 2014.

The LHD Anwar El Sadat left Saint-Nazaire to sail to its home port of Alexandria. On this occasion, the Egyptian and French navies will participate in a joint exercise. Since June, 180 Egyptian sailors have been receiving training in Saint-Nazaire on this LHD. In all, close to 400 Egyptian sailors will have received training in this way.

Able to conduct a wide range of civil and military missions, the Mistral-class LHD is a vessel that responds to the needs of numerous navies thanks to its versatility.

With a length of 199m, a displacement of 22,000 metric tons and a speed exceeding 18 knots, the Mistral-class LHD vessel is characterized by its high capacity for the transportation of troops, equipment, heavy helicopters and landing craft, which it is capable of projecting around the world. It is equipped with an electric propulsion system that uses pods.

It also has an onboard hospital, and can carry out large-scale humanitarian missions. Its highly capable communication system makes it a good command vessel within a naval force.

New Ferry Design for Asia Specific Challenges

(Image: Deltamarin)

Challenges of the Asian ferry market include large regional variations in cargo volume and composition, huge economic pressure on operators and unsatisfactory safety records especially in the developing countries, according to ship design company Deltamarin, who has answered these with its DeltaSAFER design family unveiled at the SMM 2016 exhibition in Hamburg.

DeltaSAFER is a family of RoPax ferries, a design which the company says combines cost-effectiveness with an exceptional levels of safety in a modular platform developed to meet the needs of different kinds of routes.

The safety of the design is visible in various features. The selected set of the hull dimensions is characterized by a relatively large beam of 30 meters. This, together with enhanced subdivision of the spaces below the main deck (including a triple bottom and triple side structure below the main trailer deck) results in high intact stability and survivability in case of damage. A simplified layout of the passenger spaces allows for smooth embarkation and evacuation. A redundant propulsion system helps to tackle extreme weather conditions, while an optimized hull form ensures low accelerations in waves and reduced power requirements. The hull shape and structure give not only hydrodynamic benefits but also reduced construction costs. This includes utilizing standard plate thicknesses and profiles as well as simple connection details, developed in cooperation with an Asian shipyard. Other cost-effective measures include aligning the interior standard with local expectations, and using a mix of several comfortable suites with a number of large common sleeping spaces for budget travelers. A selection of affordable equipment manufacturers has also been identified to keep the costs of the machinery as low as possible. The DeltaSAFER family covers a wide range of combinations considering passenger intake, cargo capacity and speed. Three variations are available so far:

• **DeltaSAFER25** – a "base case" design with high deadweight (9,800t), reduced speed 16kn design speed and 800 passengers. Other dimensions are Loa 188.8 m, B 30.0 m, T 6.4 m, and Lane maters 2,500 m.

• **DeltaSAFER21** – a Sino-Korean version with higher speed (20kn), 2,100 lane meters for cargo and a capacity of 1,000 passengers.

• **DeltaSAFER15** – a South-East Asian option with reduced cargo capacity (5,500dwt) but increased passenger intake of 2,000 people.

DNV GL AIP for HMD's Feeder Design

DNV GL presented Hyundai Mipo Dockyard (HMD) with an Approval in Principle (AIP) recognizing the technical feasibility of the new Con-Green 2000 vessel design under the new DNV GL rules. The Con-Green 2000 project brought together partners HMD, MAN Diesel & Turbo, Becker Marine Systems and DNV GL to develop a highly efficient, reliable and economic feeder design.

"With the Con-Green 2000 project we wanted to define the next generation of feeder vessels, with maximum fuel efficiency, high quality, reliability and lower maintenance costs and showcase the capabilities of Hyundai Mipo Dockyard," said C.G. Lim, Team Leader and Deputy General Manager, ECO Hull Form Development Team at HMD. The hull form, propeller, general arrangement, midship section and scantling have been designed and optimized by HMD, using their own proprietary software Hull Form Optimizer of Mipo (HOM) and Propeller Optimizer of Mipo (POM). The hull design is based on the new DNV GL rule set and the new IACS S11A and S34 requirements. The design also incorporates the new Cross Over Rudder (COR) developed by Becker Marine Systems (BMS) as well the latest version of the 6S60ME-C10.5 main engine from MAN Diesel & Turbo (MDT).

In preparing the AiP, DNV GL has worked with HMD to verify the performance of the design and assess the compliance of the design with environmental requirements, including the Energy Efficiency Design Index (EEDI). DNV GL also provided technical support on the basic design in terms of stability, cargo loading/unloading, and the machinery arrangement concept and accommodation.

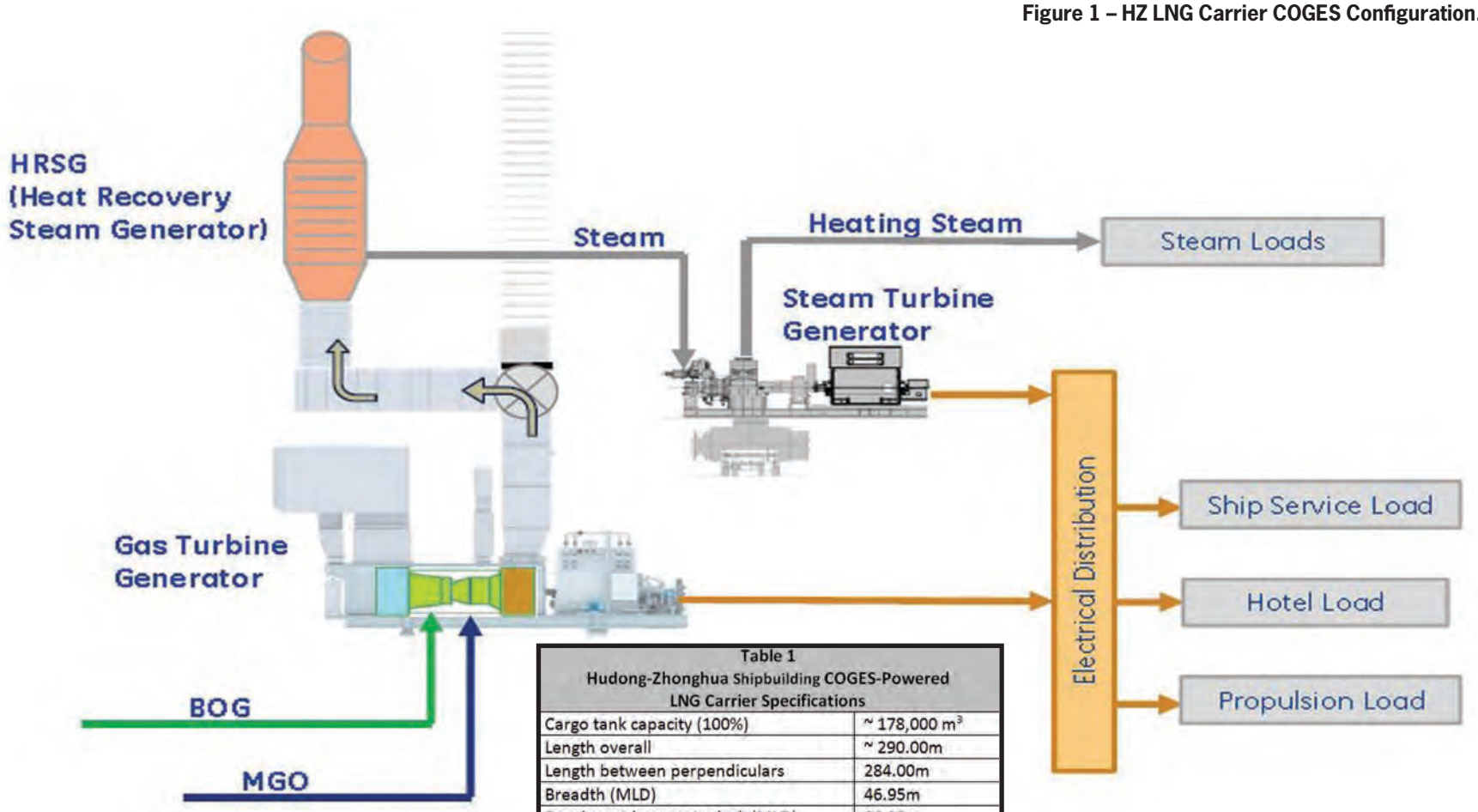
The results of the hull and propeller optimization showed power savings of approximately 7.5%.

(Photo: DNV GL)

From left to right: Ole Grøne, Senior Vice President, Promotion & Sales at MAN Diesel &Turbo; Trond Hodne, DNV GL Business Director Maritime; Dug Ki Min, Vice President of the Initial Planning and Initial Hull Design Dept. at HMD; and Henning Kuhlmann, Managing Director at Becker Marine Systems.

ABS Awards AIP for Innovative LNG Carrier Design

Figure 1 – HZ LNG Carrier COGES Configuration.



(Image: GE)

Table 1 Hudong-Zhonghua Shipbuilding COGES-Powered LNG Carrier Specifications	
Cargo tank capacity (100%)	~ 178,000 m^3
Length overall	~ 290.00m
Length between perpendiculars	284.00m
Breadth (MLD)	46.95m
Depth at side at main deck (MLD)	26.25m
Depth at side at trunk deck (MLD)	33.40m
Design Draught (MLD)	11.5m
Scantling draught (MLD)	12.5m
Deadweight (at design draught)	~ 83,500t

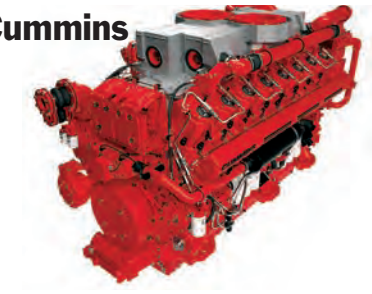
GE's Marine Solutions and Hudong-Zhonghua Shipbuilding (Group) Co., Ltd. (HZ) received Approval in Principle (AIP) from the America Bureau of Shipping (ABS) for a jointly developed liquefied natural gas (LNG) carrier design to be powered by GE's Combined Gas Turbine Electric and Steam (COGES) system. "With AIP in hand from ABS, customers can now procure this LNG carrier that is capable of meeting Tier III International Maritime Organization and Tier 4 United States Environmental Protection Agency emissions requirements today," said GE's Brien Bolsinger, Vice President, Marine Operations. "Thanks to the compact and lightweight attributes of GE's COGES arrangement, customers can realize an additional 4,000 cu. m. of LNG cargo space versus a traditional 174,000-cu. m. LNG carrier powered by dual fuel diesel engines," said HZ President Chen Jun. "Also, since the GE gas turbine is dual fuel capable, it can operate either on the carrier's cargo of boil off gas or on marine gas oil to provide for all power and propulsion."

"New technologies and innovations are essential ingredients for sustainable growth of the marine industry and protection of our natural environment," said Bill Shi, ABS Vice President of Engineering, Greater China Division. "By evaluating this new design concept jointly developed by Hudong-Zhonghua and GE and granting this milestone AIP, we have acknowledged that the eco-friendly propulsion system is in compliance in principle with the requirements of the ABS standards and international regulations. We are pleased to be an integral part of this joint development project with a great potential to reduce exhaust emissions."

Shown in Figure 1 is the COGES system applied on the design of the HZ LNG carrier. The COGES system will feature one GE LM2500-family gas turbine generator, one heat recovery steam generator (HRSG) and one steam turbine generator.

www.ge.com

(Images: Cummins)



Cummins

(Image: ABB)

ABB

Wärtsilä

(Image: Wärtsilä)

Cummins: First QSK95 Engines

Cummins delivered the first four QSK95 engines for a marine application, with four additional units to be delivered in December. The engines were delivered to longtime Cummins partner SEACOR Marine Holdings Inc. for installation into a 57-m catamaran crewboat designed by Incat Crowther.

Two crewboats will be built, each powered by four QSK95 marine engines rated at 4,000 hp (2,983 kW) at 1,700 rpm, matched to MGX-62500SC-H marine transmissions supplied by Twin Disc, Inc. and quad HT-810 waterjets from Hamilton Jet, to achieve a maximum speed of 40 knots. The two forward engines will run Jason FiFi 1 class pumps off the front of the engine. Cummins is also providing auxiliary power; each vessel will have two QSM11-powered generator sets rated at 290 kWe, as well as a fully enclosed QSM11-powered deck generator rated at 270 kWe. Named Puma and Panther, the crewboats will be built at Astilleros Armon Burela, S.A., in Burela, Spain; the first boat is expected to enter into service in April 2017, followed by the second in July 2017.

With IMO Tier II-certified ratings from 3,200 hp to 4,200 hp (2,386-3,132 kW), the QSK95 provides 95 liters of displacement in a 78-liter package. Nested cylinders and a 60-degree V enable a short, narrow engine block relative to other engines of comparable displacement. In addition, the QSK95 weighs in just over 13,000 kg (28,660 lb), between 25% and 70% less than medium-speed platforms of similar power output.

www.cummins.com

New ABB Azipod Model

ABB launched a new Azipod propulsion unit that it says is up to 10% more efficient than previous versions. Azipod propulsion is ta leading podded electric propulsion system and ABB believes the improved efficiency and bollard pull will expand its appeal beyond established strong markets. The new linear flow Azipod XL achieves this jump in efficiency by introducing a nozzle with stator plates, which directs the water flow from the propeller to reduce the turbulence and energy loss and to give the optimum thrust for the vessel.

The Azipod XL represents the biggest jump in the systems' fuel efficiency in recent years. To put it in perspective, if the newest model replaced all existing Azipod units it would save the shipping industry 2.2 million tons of fuel, and 7 million tons of carbon dioxide, over the next 25 years. It is a quarter of a century since the first installation of an Azipod unit, and in that time they have racked up more than 12 million running hours, saving 700,000 tons of fuel in the process.

"The new Azipod XL is completely in step with the needs of the maritime industry. Ship owners always want solutions which improve their bottom line whilst more stringent emission regulations are pushing operators to utilize the most efficient propulsion system possible," says Juha Koskela, Managing Director of ABB's Marine and Ports business. One of the strengths of the modifications is that they are relatively simple meaning there will be no compromise to Azipod propulsion's availability record, currently standing over 99.8%. Azimuth propulsion works by drawing water into the propeller and pulling the vessel, therefore the addition of a nozzle will optimize the water flow as it leaves the propeller. All the improvements have been tested extensively using scaled versions in laboratory conditions.

http://new.abb.com/

Wärtsilä 31 for New FV

The Wärtsilä 31 four-stroke diesel engine has been chosen as the main engine for a new purse seiner/trawler being built by the Danish shipbuilder Karstensen Shipyard. The ship will be owned by Peter Hepsø Rederi AS based in Norway and will be the world's first fishing vessel with the Wärtsilä 31 engine. The contract with Wärtsilä was signed in September.

In addition to the main engine, Wärtsilä will also supply the complete propulsion system comprising a two-speed gearbox, controllable pitch propellers, nozzle, the Wärtsilä Propulsion Control System and the shaft generator.

The 80-meter-long purse seiner/trawler will primarily operate in the North Atlantic, the North Sea and in Norwegian waters.

The Wärtsilä 31 engine comes in three alternative versions; Diesel, Dual-Fuel (DF) and Spark-Ignited Gas (SG).

www.wartsila.com

Full-Spade Rudders for FSG

Loewe Marine received an order from shipbuilders Flensburger Schiffbau Gesellschaft (FSG) to supply the rudder systems for five newbuilds. The order builds upon Loewe's partnership with FSG, coming after five completed rudder projects for FSG over the past two years. It includes a twin arrangement of a high-efficiency flap rudder for a 194.8-m RoPax ferry ordered from FSB by Irish Ferries.

The 10 full-spade rudder systems that Loewe Marine will supply to FSG over the next 16 months will be developed and built in Germany from start to finish. The engineering design work, procurement and logistics planning will be done at Loewe Marine's headquarters in Bremen; the steel construction work will be done by the company's partners in Rostock and Stralsund; and the mechanical systems will be fitted in Bremerhaven and Osnabrück.

www.loewe-marine.com

(Image: Loewe Marine)

(Image: Siemens)

Siemens for Saga Cruise Ship

Siemens won a contract to equip the first new build cruise liner for the British based operator Saga Cruises under contract to Meyer Werft in Papenburg. The package includes a SISHIP eSiPOD propulsion system as well as a power and distribution plant. This new cruise ship to be delivered in the summer of 2019 will be 236 meters long and 31.2 meters wide with a gross tonnage (GT) of 56,850 and will offer capacity of 999 passengers. The contract includes an option to equip one additional cruise liner potentially due for delivery in 2021.

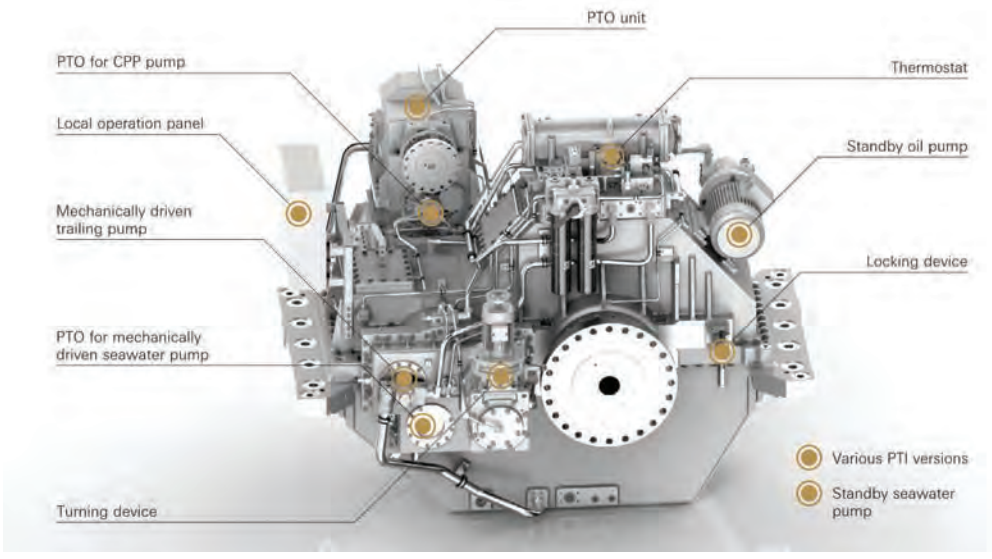
According to Siemens, the major benefit of the SISHIP eSiPOD is its high overall efficiency resulting from the combination of a compact, hydrodynamically optimized design and an efficient permanent-excited synchronous motor. The propulsion motor is integrated into a pod shaped housing located outside the ship's hull and enables full 360 degree steering angle. With the combination of the SISHIP eSiPOD and Siship Drive MV solution, Siemens is able to provide a perfectly balanced integrated propulsion system for this cruise ship with improved propulsion efficiency and maneuverability. In addition, the low-noise and low-vibration operation of the propeller motors make them particularly suited for the high demands of the customers in the yacht, passenger and cruise ship segment. The reliable power supply of the ship is guaranteed by the integrated power plant system Siship Power MV. This comprises four generators with a total electrical output of 21 megawatts. The NxAIR medium-voltage switchgear takes care of efficient and safe power distribution. The power and propulsion plant is internally controlled and monitored by the Siemens integrated protection systems such as the Power Plant Protection (PPP), Generator Power Adaption System (GPA) and Propulsion Control System (PCS).

www.siemens.com

ZF Extends Transmission Range

ZF Marine unveiled the new ZF 83700 transmission equipped with COMOS condition monitoring at the SMM 2016. The new transmission supplants the ZF 63000 as the largest, most powerful transmission in the family, and is designed for high speed vessel applications. The ZF 83700 is a non-reversing twin shaft configuration offering both live and clutchable PTO's as well as a clutchable PTI for flexibility in drivetrain applications. Ratios from 2.412 to 5.591 mean this new transmission family can meet the performance envelope to match most applications. The ZF 83700 comes standard with technology that provides immediate, smooth clutch engagement. Designed by ZF for large stationary wind turbine gearboxes, the COMOS condition monitoring is an example of technology sharing within the organization, as COMOS has been adapted by ZF Marine's engineering team to meet the needs and requirements of the commercial marine duty cycle. Standard monitoring of transmission systems include normal functions such as oil level and pressure, but also include: input shaft speed, clutch monitoring, in/out cooler temp and thrust bearing temp. Additional advanced monitoring includes: dynamic load monitoring, vibration monitoring for gears and bearings and oil condition monitoring of particulate matter and water content.

www.zf.com/marine



(Image: ZF)

To watch Frank Coles discuss THESIS & additional topics pertinent to the future of maritime navigation, please visit the link below to watch him interviewed by Maritime Reporter TV at SMM 2016 in Hamburg, Germany.

http://www.marinelink.com/videos/video/maritime-reporter-tv-interview-frank-coles-ceo-transas-100084

(Image: Transas)

(Image: Maritime Reporter TV)

Transas CEO Coles

THESIS and the Future of Maritime Ops

At SMM 2016 in Hamburg, Transas CEO Frank Coles delivered the company's standpoint on the future of maritime operations.

Coles opened the forum by summing up the situation of maritime technology market today, stating that, "Our industry today is awash with innovation, big data, unmanned ships, decision support tools, fuel saving applications and stress-reducing voyage planning and many other save the day applications."

"However, it is has manifested as a picture of uncoordinated fragmented promises that lacks a structure and platform. Shipping needs a solution not an application. Shipping operations is the complete picture not just the smart phone," he continued.

Coles made the statements when talking about the power and potential of the Transas Harmonized Eco System of Integrated Solutions (THESIS). The vision and reality of THESIS is to create a managed environment to accommodate the regulatory, cultural and technological barriers as we strive for a safe, efficient ship operations eco system.

"THESIS seeks to connect, create and enable the connection of the dots in ship operations. It is designed to create the platform and structure to enable the remote, unmanned or manned ship or fleet. To create an ability to coexist within the legal, geo political and stakeholder restraints that exist today," Coles said.

The Transas CEO believes that the human element remains as the final interpreter of the crisis situations, but is relieved of the tedious administrative work that is still so much a part of the operations of the ship today.

www.transas.com

ABS CTO: CyberSecurity is Priority

With the cyber security spend anticipated to top $1 trillion in the next five years, classification society ABS is aiming to be the proverbial 'tip of the spear' to the maritime and offshore communities, unveiling the first comprehensive cyber security certification and optional notations for marine and offshore assets and facilities at the SMM 2016.

Seen a key plank in ABS' Future Class, the ABS CyberSafety series is the industry's first risk-based management program for asset owners to apply best practice approaches to cyber security, automated systems safety, data integrity and software verification. "Cyber adds a new dimension" as class gets wider and deeper, said Howard Fireman, ABS' Chief Technology Officer. "Our unique approach to cyber safety charts a new path, delivering wider and deeper classification services as technology evolves and becomes more sophisticated, reaching far beyond simple compliance and directly to asset and facility security. The ABS CyberSafety program provides the only actionable guidance for addressing and assessing cyber-enabled systems that emphasize human, systems and environmental safety." The cyber security launch from ABS as SMM was comprehensive, a full five volumes issued with more to come. New volume releases and revisions in the ABS CyberSafety series include:

Volume 1 *– Guidance Notes on the Application of Cybersecurity Principles to Marine and Offshore Operations (revised and expanded)*

Volume 2 *– Guide for Cybersecurity Implementation for the Marine and Offshore Industries*

Volume 3 *– Guidance Notes on Data Integrity for Marine and Offshore Operations*

Volume 4 *– Guide for Software Systems Verification*

Volume 5 *– Guidance Notes on Software Provider Conformity Program*

While Cyber Security may be a relatively new

(Image: Raytheon Anschütz)

(Image: ABB)

(Image: Danelec)

New Gyro Compass

Raytheon Anschütz launched a new gyro compass at SMM. The new gyro, Standard 30 MF, is the latest of the "Standard" series of Anschütz gyro compasses. Standard 30 MF is the second generation of maintenance-free gyro compasses from Raytheon Anschütz. It provides accurate heading, rate-of-turn, roll and pitch information, the manufacturer said. Further, as part of a heading management system, Standard 30 MF provides the same advanced functions Anschütz gyros are known for. According to Raytheon Anschütz, the new gyro features a robust design and offers superior lifetime performance and effectiveness.

ABB Torque Monitoring

ABB launched a new torque monitoring system called Torductor Marine, which is aimed at optimizing engine and fuel efficiency in the maritime sector. The new offering will fit into ABB's Marine Software portfolio, which visualizes the data for the onboard crew and can be shared with the ship's shore-side support team. The launch of Torductor Marine follows on a trial aboard Stena Line's freight ferry MV Stena Scotia, where sensors tracked the performance of the vessel's engines. Sensors are mounted facing the propeller shaft with a gap of approximately 1.5mm. Other than the shaft itself, there are no moving parts meaning the system is almost maintenance free.

Torductor Marine provides a means to comply with the requirements laid down by the International Marine Organization, in particular the Ship's Energy Efficiency Management Plan (SEEMP).

www.abb.com

Danelec's New ECDIS

Danelec Marine rolled out its new DM700 series Electronic Chart Display and Information System (ECDIS) for marine navigation at the SMM. The DM700 ECDIS provides a basic ECDIS solution that fully complies with the new IEC and IHO performance standards which will be mandatory in all ECDIS ship installations beginning August 2017.

With the addition of the new DM700, the company now offers standard and enhanced choices for shipowners to meet the ECDIS carriage requirements. Like the DM800 ECDIS, the DM700 ECDIS is designed with Linux-based software, an intuitive user interface, leading cartography, ruggedized low-power LED monitors and Danelec's exclusive SoftWare Advanced Protection (SWAP) technology.

www.danelec-marine.com

issue for the maritime sector, the root cause of these 'accidents' which introduce cyber threats are hauntingly familiar: carelessness among employees – the human element – is the number one cause of cyber security incidents, an estimated 70%.

From the ABS Guides, optional certification and Classification Notations can be obtained to verify cybersecurity plans and programs for assets and facilities as well as integrated and non-integrated control systems, including factors for software quality management, product design assessment and unit software systems.

"We look beyond the step-by-step approach and deliver an integrated, holistic view of systems, assets and facilities to provide confidence for owners and operators that a multi-dimensional safety component is well-engineered and operated competently," adds Fireman. ABS established the ABS CyberSafety laboratory earlier this year and staffed it with a team of global cyber experts to expand the safety scope and verify cyber systems that look beyond physical asset safety.

Howard Fireman, ABS' Chief Technology Officer

Polaris LNG Powered Icebreaker Delivered

On September 28, 2016, Arctech Helsinki Shipyard delivered the most powerful newcomer in the Finnish Icebreaker fleet, icebreaker Polaris, to the Finnish Transport Agency, which then handed the vessel over to Arctia Icebreaking Oy. The prototype vessel built at Helsinki Shipyard is designed to serve for at least 50 years in icebreaking, oil recovery and sea rescue operations. The last time a Finnish icebreaker of a similar size range was deliverd was more than 20 years ago, in 1994.

Polaris sports a host of innovative design features, from vessel's hull form and propulsion unit arrangement, as well as the fact that vessel is designed to be 'dual fuel,' able to use either liquefied natural gas or low sulphur diesel oil as fuel.

Polaris complies with the international IThe icebreaking capacity of Polaris is 1.8m at speed of 3.5 knots.

"Icebreaker Polaris is extremely versatile vessel what concerns her technical properties. She can operate in all ice conditions in the Baltic Sea and use in all circumstances either gas or diesel oil as fuel. We are proud we had this opportunity to build the vessel that will serve the Finnish winter navigation in coming decades," said Esko Mustamäki, Managing Director, Arctech Helsinki Shipyard.

Polaris is based upon the Aker ARC 130 concept, with an overall length of 110m, beam of 24m and an 8m draft, enabling the vessel to operate in all major Finnish shipping lanes. The technologically complex vessel is outfitted with more than 180 km of electric cabling, a brush collector oil recovery system, a satellite imaging system for ice navigation, an emergency towing winch and a helideck.

Arguably, Polaris' most noteworthy asset is its powerplant and propulsion units; the ship is the world's first icebreaker to run on dual fuel (diesel and LNG), a set up designed to fuel consumption and costs as well as emissions, making it IMO Tier III and Baltic Sea Sulphur Emission Control Area (SECA) compliant.

The Polaris' diesel-electric power plant includes two nine-cylinder Wärtsilä 9L34DF (rated 4,500 kW each) and two 12-cylinder Wärtsilä 12V34DF (rated 6,000 k W each) four-stroke medium speed dual fuel genets, as well as an additional eight-cylinder Wärtsilä 8L20DF auxiliary engine (rated 1,168 kW). All told the combined power output is more than 22 MW.

The vessel's two vertical LNG tanks combine for a total volume of 800 cu. m., enabling 10 days autonomy in typical winter conditions. Another 20 days autonomy is added via a combined 2,500 cu. m. capacity for fuel oil.

Polaris also features a unique propulsion system: three electrically driven ice strengthened ABB Azipod units, two at the stern (6,500 kw each) and one at the bow (6,000 Kw), which combine for 19 mw, making Polaris Finland's most powerful icebreaker to date.

Main Particulars
Length: .....110 m
Breadth: .....24.4 m
Draft, design: .....8 m
Speed: .....17 knots
Gross Tonnage: 9300
Deadweight: ..... 3000 t
Crew: ..... 16 (+8)
Classification: ..... Lloyd's Register
Ice class: PC4
Diesel-electric propulsion
Main engines Wärtsilä 2x 6000 kW, 2x 4500 kW, 1x .....1280 kW, Dual fuel
Azimuth prop. units .....ABB Azipod .....2x 6500 kW (stern), 1 x 6000 kW (bow)
LNG tanks: ..... 2 x 400 m3
Oil recovery capacity: 1400 m3
Towing winch: 3 .....00 m, 110 t
Bollard pull: ..... 214 t
Icebreaking capability .....3.5 kn / 1.8 m
Customer: .....Finnish Transport Agency

(Images: Arctech Helsinki Shipyard)

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www.marinelink.com

MARITIME REPORTER AND ENGINEERING NEWS

2017 EDITORIAL CALENDAR

JANUARY

AD CLOSE: DEC 21

The Ship Repair & Conversion Edition

Market: Fishing Vessel Quarterly
Technical: Marine Salvage & Recovery
Product Ship Repair Tools
Design: Passenger Vessels: Ferries & Riverboats
Roundtable: Maritime Propulsion Directory & Guide
Special Report: Bunker Fuel
Region Report: The Pacific Northwest

BONUS DISTRIBUTION:
PVA Maritrends: Jan 29-Feb 1, Seattle, WA
ASNE DAY: Feb 14-16, Crystal City, VA
Euromaritime: Jan 31-Feb 2, Paris, France

FEBRUARY

AD CLOSE: JAN 24

The Cruise Industry Edition

Market: Shipbuilding: Cruise & Passenger
Technical: Satellite Communications
Design: Marine Pollution Mitigation
Roundtable: IoT: The Internet of Things
Special Report: Cruise Ports of Call
Product : Green Marine Fuels & Lubricants and Emission Technologies
Region Report: Vietnam

BONUS DISTRIBUTION:
Seatrade Cruise Global: Mar 13-16, Ft Lauderdale
Intermodal Asia 2017: Mar 22-24, Shanghai, China
Inland Waterways Conference: Mar 7-8, Cincinnati
Green Ship Technology Conference: Mar 21-24, Copenhagen
INMEX Vietnam: Mar 29-31, Ho Chi Min City, Vietnam

MARCH

AD CLOSE: FEB 21

The Green Marine Technology Edition

Market: U.S. Navy Quarterly
Market: Maritime Simulation Technologies
Technical: Energy Efficient Drives
Product Marine Coatings & Corrosion Control
Design: Port & Ship: Loading and Unloading Technology & Equipment
Roundtable: Tanker Owners
Special Report: Ballast Water Technology
Region Report: Singapore

BONUS DISTRIBUTION:
CMA Shipping: Mar 20-22, Stamford, CT
NACE Corrosion: Mar 26-30, New Orleans, LA
Sea-Air-Space: Apr 3-5, National Harbor, MD
Gastech Japan: Apr 4-7, Tokyo, Japan
SeaAsia: Apr 25-27, Singapore
Commerical Marine Expo: Apr 26-27, New Bedford, MA

APRIL

AD CLOSE: MAR 21

The Offshore Annual

Market: Fishing Vessel Quarterly
Technical: Fuels, Lubricants & Additives
Product: Deck Machinery, Winches and Ropes
Design: Workboat Design & Construction
Roundtable: Energy Port Focus
Special Report: Marine Medicine
Region Report: Japan

BONUS DISTRIBUTION:
Inland Marine Expo: May 22-24, St. Louis
Tugnology: May 23-24, Rotterdam, Netherlands
Bari Ship 2017: May 25-27, Imbari, Japan
NAVExpo: May 10-12, Lorient, France
ASNE Intelligent Ships Symposium: May, Philadelphia
Portsecure 2017: May

MAY

AD CLOSE: APR 21

The Marine Propulsion Edition

Market: Shipbuilding: Oceangoing Ships
Technical: Cyber Security
Design: Hybrid Drives
Product: Navigation: Electronics, Radar & ECDIS
Roundtable: RIB & Patrol Boat Report
Special Report: U.S. Coast Guard Annual
Region Report: Norway

BONUS DISTRIBUTION:
Norshipping: May 30-Jun 2, Oslo, Norway
Electric & Hybrid Marine World Expo: Jun 6-8, Amsterdam
MAST Asia: Jun 12-14, Tokyo, Japan
SeaWork: Jun 13-15, Southampton, UK

JUNE

AD CLOSE: MAY 24

The Annual World Yearbook

Market: U.S. Navy Quarterly
Technical: Dredging
Design: Fire Safety Systems
Product: Pumps, Valves, Pipes & Insulation
Roundtable: Maritime Academies & Training Centers
Special Report: The Yachting Life (YachtingJournal.com)
Region Report: Greece
Special Section: Maritime Reporters Buyer's Guide

BONUS DISTRIBUTION:
Marine Money Week: Jun 20-22, New York, NY

2017 EDITORIAL CALENDAR

MARITIME REPORTER AND ENGINEERING NEWS

JULY

AD CLOSE: JUN 23

The Marine Communications Edition

Market: Fishing Vessel Quarterly
Market: Tugboat, Towboat & Barge
Technical: Oil Spill Response & Recovery
Product: Maritime Software Solutions
Design: Offshore Accommodation
Roundtable: Ship Management
Special Report: Marine Electronics Equipment & Supplier Guide (MarineElectronics.com)
Region Report: Europe

AUGUST

AD CLOSE: JUL 25

The Shipyard Edition

Market: Shipbuilding: The World Report
Technical: Heavy Lifting Solutions: Maritime Cranes, Winches, Windlasses & Capstan
Product: Ballast Water Technologies
Design: Icebreakers
Roundtable: Big Data
Special Report: Cruising Europe
Region Report: Russia

BONUS DISTRIBUTION:
Seatrade Europe: Sep 6-8, Hamburg, Germany
NEVA 2017: Sep 19-22, St. Petersburg, Russia
Offshore Marine & Workboats: Sep 25-27 Abu Dhabi, UAE

SEPTEMBER

AD CLOSE: AUG 24

Maritime Port & Ship Security Edition

Market: U.S. Navy Quarterly
Technical: Drones
Product: Clean Water Technologies
Design: Interior Design: Onboard Amenities
Roundtable: Environmental
Special Report: Offshore Deepwater: Structures & Systems
Region Report: Denmark

BONUS DISTRIBUTION:
Shipping Insight
Danish Maritime Days: Copenhagen, Denmark
OTC Brazil: Oct 24-26, Rio de Janeiro, Brazil
KORMARINE: Oct 24-27, Busan, Korea

OCTOBER

AD CLOSE: SEP 22

The Marine Design Annual

Market: Fishing Vessel Quarterly
Technical: Marine Firefighting, Safety & Salvage
Product: Software Solutions: CAD/CAM
Design: Naval Architecture & Marine Engineering
Roundtable: Ship Classification Societies
Special Report: Propulsion, Thrusters & Gears
Region Report: The Netherlands

BONUS DISTRIBUTION:
SNAME: Oct 23-28, Houston, TX
Europort: Nov 7- 10, Rotterdam, Netherlands
Marintec China: Dec 5-8, Shanghai, China

NOVEMBER

AD CLOSE: OCT 25

The Workboat Edition

Market: Shipbuilding: Workboats
Technical: Alternative Marine Fuels
Design: Offshore Wind Power
Roundtable: Marine Coatings & Rust Control
Special Report: Top 50 Marine Equipment Distributors
Product: Deck Machinery, Winches & Ropes
Region Report: U.S.A.

BONUS DISTRIBUTION:
Workboat Show: Nov, New Orleans, LA
Interferry 2017: Split, Croatia
Clean Gulf: Dec 4-7, Houston, TX

DECEMBER

AD CLOSE: NOV 22

The Great Ships of 2017

Market: U.S. Navy Quarterly
Technical: The Autonomous Ship
Design: Marine Engine Guide (MaritimePropulsion.com)
Roundtable: Ship Registries
Special Report: Prolific Ship Owners & Buyers
Product: Welding & Cutting Equipment

BONUS DISTRIBUTION:
Surface Navy Association 2018: Jan 2018, Crystal City, VA

**Editoral calendar content may be subject to change

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

ANCHORS & CHAINS

Anchor Marine & Supply, INC., 6545 Lindbergh Houston, Texas 77087 , tel:(713) 644-1183, fax:(713) 644-1185, david@anchormarinehouston.com

ANTI-CONDENSATION COATINGS

Mascoat Products, 4310 Campbell Rd., Houston, TX , USA , tel:(713) 465-0304, fax:(713) 465-0302, wconner@mascoat.com

APPROVED U.S. COAST GUARD MARINE SANITATION DEVICES

Environmental Marine, Inc., 711 Colyer Rd., Bronson, KY , USA , tel:(606) 561-4697, bobkenison@aol.com

AUTOMATIC IDENTIFICATION SYSTEM

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

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

BARGE FABRICATION

McDonough Marine Services, 3500 Causeway Blvd., Suite 900 Metairie, LA 70002 , tel:(504) 780-8100, fax:(504) 780-8200, dwalkowski@mcdonoughmarine.com

COATINGS/ CORROSION CONTROL/ PAINT

Hempel A/S, Lundtoftegårdsvej 91 2800 Kgs. Lyngby , tel:45 4593 3800, fax:45 4588 5518, marine@hempel.com , www.hempel.com

Tri-State Coating and Machine Co. Inc., 5610 McComas Road, PO Box 296, Salt Rock, WV V4W 3S8, USA , tel:1-800-477-4460, fax:304-736-7773, brichmond@tscminc.com

COMMUNICATIONS

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

CORDAGE

Helkama Bica Oy, Lakimiehenkatu 4, KAARINA FI-20780, Finland , tel:+358-2-410 8700, sales@helkamabica.fi , www.helkamabica.com

COUPLINGS

Centa Corporation, 2570 Beverly Drive #128, Aurora, IL 48331, USA , tel:(630) 236-3500, fax:(630) 236-3565, bobl@centacorp.com

CRANE - HOIST - DERRICK - WHIRLEYS

Essex Rental Corp., 1601 NE. Columbia Blvd. Portland ,OR 97211

Lifting Gear Hire, 9925 Industrial Drive Bridgeview, IL 60455

DRILLS

Hougen Inc., 3001 Hogan Drive Swartz Creek, MI 48473

DRIVESHAFTS

Centa Corporation, 2570 Beverly Drive #128, Aurora, IL 48331, USA , tel:(630) 236-3500, fax:(630) 236-3565, bobl@centacorp.com

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Responsible for managing all aspects of Engineering Department such as coordination of project management activities, new product development, and software testing. Additional responsibilities include system layout and design and related engineering support documentation in accordance with project specifications and regulatory body requirements for Interior Communications Systems. Occasional travel required. Requires degree in Electrical Engineering and prior experience with Interior Communications Systems. Full-time position with benefits.

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Assistant Manager, Marine Operations, U.S. East Coast & Caribbean

Signet Maritime Corporation
Full Time, General / Operations Manager
Category: Shoreside Operations
Job Location: Jacksonville, FL, 32226 United States
Manager, Human Resources
Email: careers@SignetMaritime.com
Work Phone: 228-762-5700
Houston, Texas, United States

Job description

Signet Maritime Corporation has an immediate opening for an Assistant Manager, Marine Operations, U.S. East Coast & Caribbean for Jacksonville Fleet Operations. The successful candidate must be self-motivated, have an excellent driving record, advanced computer skills and a bachelor's degree. A USCG License and Maritime tugboat experience is required.

Duties and Responsibilities

• Create a safety culture throughout the organization;
• A ssist Manager with implementing policies and procedures by performing personnel functions such as hiring, interviewing, evaluating, and training;
• Recommend operational changes to Ocean Towing Manager;
• Oversee and manage the Marine Superintendents work and scheduling;
• Provide operational and technical management oversight of all vessels in Jacksonville;
• Coordinate with employees, surveyors, inspectors and other parties to ensure the vessels comply with local, national, and international rules, laws and regulations together with classification requirements;
• Monitor fleet performance to ensure vessels are serviced, maintained and records are kept up-to-date in respect to hull, machinery and technical matters. To be completed in conjunction with the Ocean Towing Manager and Engineering;
• Review the purchase of spares parts, stores, new equipment and services;
• Review disbursement accounts with respect to supplies and technical expenditures;
• Assist Captains in the daily operations of the vessels and with crew management, crew changes, and rotational travel;
• Assist Manager with special projects by interacting with customers and outside vendors, performing cost analysis estimates, preparing schedules, and reviewing finished work and payments;
• Assist Manager in preparing employee performance appraisal reports;
• Recommend competency and licensing profiles for marine personnel to Human Resources;
• Interface with vessel crews and customers with the utmost regard for professionalism and confidentiality;
• Serve as the Alternate DPA;
• Participate in customer and business development meetings.

Qualifications

• Bachelor Degree is required with minimum GPA of 3.0;
• Extensive experience sailing tugboats is required, sailing as Captain on ocean going tugs is preferred;
• Familiarity with Jacksonville to Puerto Rico and Dominican Republic ports and transits is preferred;
• An active USCG License is required;
• A valid driver's license and good driving record is required.
• Only candidates within the United States will be considered

Additional Notes

• Signet Maritime Corporation is an Equal Opportunity Employer and promotes diversity in the workplace.
• The selected applicant will be subject to successfully passing a pre-employment drug screening and criminal background check.
• Signet Maritime Corporation is a tobacco free company.

Business Development Representative

Signet Maritime Corporation
Full Time, Executive
Category: Sales / Marketing

Job description

Signet Maritime Corporation is a diverse international marine transportation and logistics services company. Our company has an immediate opening for a detail-oriented, self-motivated and organized Business Development Representative in the Houston, Texas office. The ideal candidate will be experienced developing business and customer relations. The Business Development Representative will be expected to contribute to the economic analysis, strategic planning and tactical execution, needed to drive sales cycles and ensure our existing and future assets are fully utilized. We are seeking a talented, motivated, self-starter to support our expanding operations. The ability to manage multiple projects, in a fast-paced, priority changing environment is a necessity. The person qualified for this role will be an essential and valued member of the Signet Team.

Duties and Responsibilities

• Support business development team efforts by identifying potential leads, collecting and sharing market/industry intelligence both domestic and international;
• Provides regular analysis of existing and future customer needs, so as to anticipate future sales and business opportunities;
• Maintain industry knowledge to identify market, technology and competitive trends;
• Develops and maintains customer relations through strategic relationships with customer management based on a clear understanding of their needs, vision and strategy;
• Establish and maintain on-going client relationships with the various parties to anticipate and resolve potential problems, and develop new business from existing commercial relationships;
• Consistently follow-up on new proposals, collaborate with senior/group management to execute business development activities, status of customers business, changes in requirements to ensure that existing and future contracts and bids can be delivered in the most efficient and effective way;
• Assist with development of Estimated Cost Analysis Documents for Cost Management, Procurement, and Contractions of Projects;
• Collaborate with marketing and public relations to ensure integrity of Signet brand.

Qualifications

1. Bachelor's degree from a highly accredited university is REQUIRED;
   • Maritime Academy graduate is preferred;
   • Having (or held) a USCG License is preferred;
   • Minimum GPA of 3.0;
2. Three (3) years experience in business development, sales support, or quotes/proposal position;
3. Background in the Maritime Industry or Oil and Gas Industry.
4. Only candidates within the United States will be considered.

Additional Notes

1. Signet Maritime Corporation is an Equal Opportunity Employer and promotes diversity in the workplace.
2. The selected applicant will be subject to successfully passing a pre-employment drug screening and criminal background check.
3. Signet Maritime Corporation is a tobacco free company.

Stowage and Marine Supervisor

NYK Line (NA) Inc.
Full Time, Mid Career
Category: Vessel Operations
Job Location: Secaucus, NJ

Bachelor's degree required or currently enrolled and attending in pursuit of degree at time of bid.

Experience/Skills:
• 5 + years' experience within the maritime industry demonstrating progressive levels of responsibility in the areas of vessel/marine operations.
• Supervision experience preferred.
• Advanced knowledge of vessel planning/space calculations.
• Strong communication skills, both verbal and written.
• Strong Computer skills in Word, Excel and Outlook preferable.
• Ability and willingness to work outside of normal business hours, based on vessel movement.
• Demonstrate effective "Integrity Value" by consistently acting courteously and working well with customers, co-workers and vendors.

Responsibilities:
• Supervision and delegation of marine stowage coordinators' assignments as required. Ensuring vessels, terminals, and internal personnel have timely and accurate plans for vessels working. Preparing, distributing, and delegation to stowage coordinators of stow plans for RoRo vessels for all trades being handled in the Americas.
• Preparing, coordinating, and distributing of stow plans for RoRo vessels for all trades being handled in the Americas. This includes both pre stow and final stow plans for vessels and ports assigned.
• Preparation, distribution, and the designation of stow plans to stowage coordinators, including the following:
• Working with Trade Departments for booking info.
• Communicating with Vessels regarding adjustable panels, tentative stow, and stability calculations (Chief Mates)
• Obtaining final Ground Lists from Customer Service Reps for a port pre stow plan.
• Coordinating with Area Managers regarding cargo location in port, loading sequence, gang size, production, etc.
• Distributing plan to vessel, stevedores, and Area Managers for local planning.
• Task includes a Final stow plan and Cargo Summary for all load ports. Info sent to vessels, various NYK offices, stevedores and agents in discharge ports.
• Vessel space calculations and supervision/delegation of stowage coordinators' assignments.
• Obtain booking info from respective Trade departments for space availability and maximization of stow.
• Provide space info for present and future vessels in order to maximize
• Work with other offices/agents regarding additional cargo bookings to enhance overall revenue based on space.
• Close out vessel with actual space utilization report.
• Marine Technical Support: Investigate and report cargo handling capabilities within destination ports. Provide Sales and Trade teams info regarding general cargo characteristics and handling capabilities. This in conjunction with Area Managers in respective regions.
• Miscellaneous
• Any other stow and handling support as requested by Area Managers.
• Demonstrate effective "Intensity Value" by acting strategically and sharing the Company's vision with team or co-workers
• Apply "Innovation Value" by striving for continuous improvement

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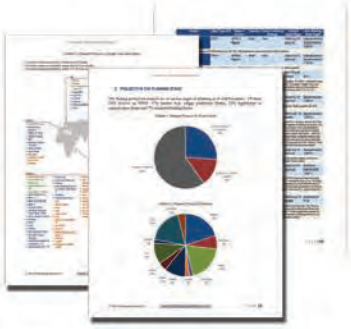

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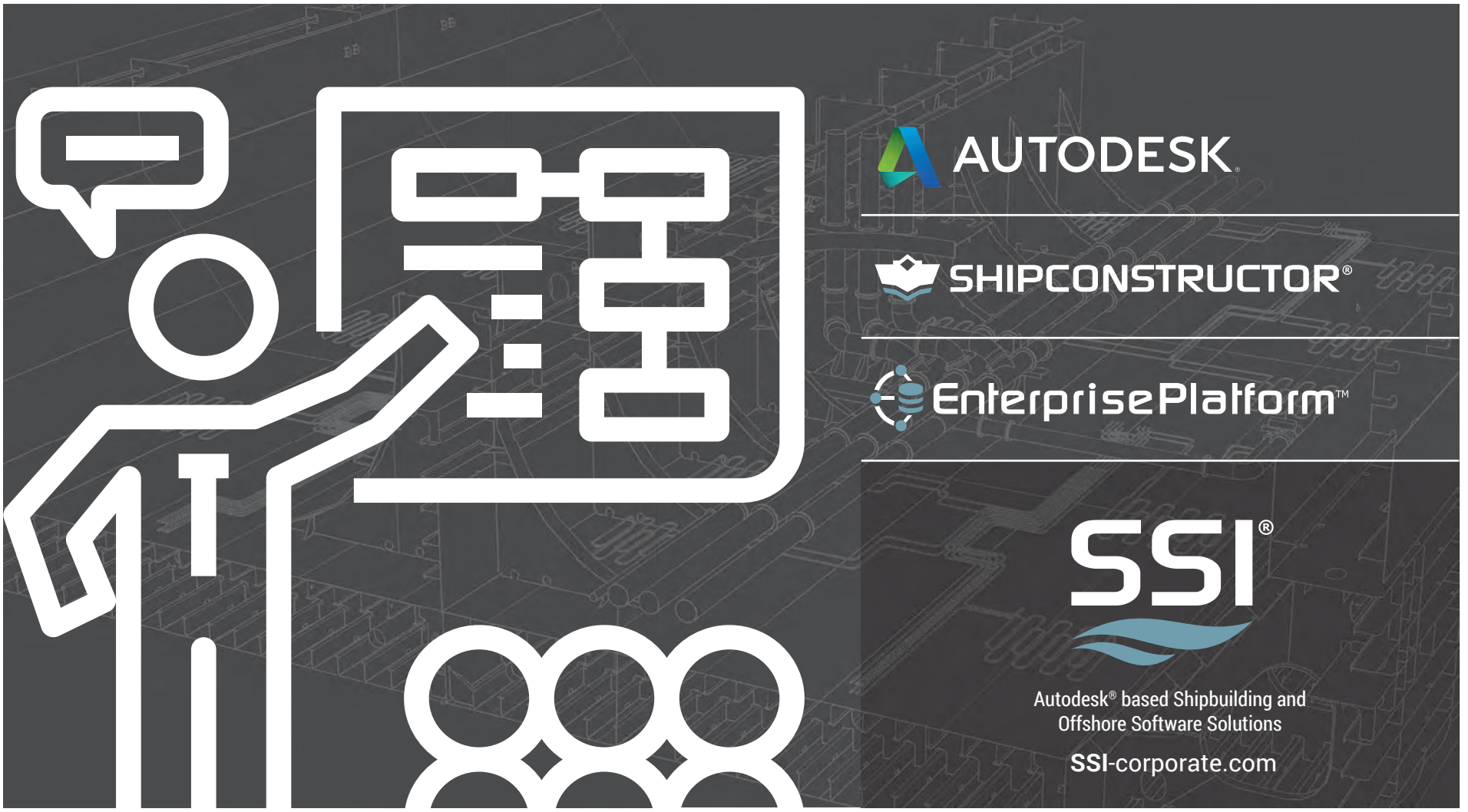

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