



SAFER WATERS IN A DIGITAL AGE

ISSUE 46



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CONTENTS

PAGE

04

SHIP'S LOG
news and happenings
at MPA



PAGE

12

FEATURE
safer waters in
a digital age

PAGE

18

PORT & STARBOARD
navigating with
AI and big data

PAGE

20

PERSONALITIES
sandra welch
abhishek chawla



PAGE

24

MARITIME SERVICES
insurance
for drones



PAGE

26

TECHNOLOGY
fuelling a new wave
of innovation

PAGE

30

COMPANY SPOTLIGHT
championing a
safety-first culture



PAGE

32

COMMENTARY
bridging gaps in
safety concerns

PAGE

34

COMMUNITY TALK
in the wake of
IMO 2020



PAGE

38

CAREERS
making a good
first impression

PAGE

40

THE BACK PAGE
international chemical
and oil pollution
conference and exhibition



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safety first

Personnel involved in the day-to-day implementation of safety systems must be thoroughly familiar with them

While we were putting together this safety-themed issue of *Singapore Nautilus*, the Coronavirus Disease 2019 (COVID-19) virus arrived on our shores. Since then, 'Safety First' has taken on an added dimension in the maritime sector, a vital part of Singapore's economy.

Maritime is big business, and one must not underestimate it. "The marine environment is one that is unpredictable, and can surprise even the most seasoned seafarer with its ferocity," warns Professor Richard Lim, then-Chairman of the National Maritime Safety at Sea Council. Not surprisingly, Singapore has invested heavily in ensuring the safety of its myriad maritime assets.

A new maritime traffic system that uses artificial intelligence to enhance safety and efficiency at sea is showcased in the Port & Starboard section (page 18).

However, it is important that staff and crew are familiar with a particular technology, no matter how advanced it is. The Feature article (page 12) describes an incident at sea that occurred largely because crew members were not thoroughly trained on a new steering and propulsion system installed on their vessel.

Pacific International Lines, a past winner of the Maritime and Port Authority of Singapore Safety@Sea award, shares in Company Spotlight (page 30) how it continues to keep safety top of mind among its staff.

Apart from a focus on safety, this issue of *Singapore Nautilus* also covers other aspects of the maritime industry. The Maritime Services section (page 24) introduces Acorn International, which offers insurance coverage for commercial drones. IMO 2020 continues to generate much interest — the Community Talk section (page 34) features a panel discussion at the 2019 Singapore Registry of Ships Forum on the impact that the new regulation has had on shipowners and charterers.

When COVID-19 struck, it caused a lot of market uncertainty in different industries around the world. However, with more than 80% of goods transported via seaborne trade, some countries such as Singapore kept their ports open so as not to disrupt the supply chain. Maritime Singapore's characteristics — Vital and Resilient — were never more apparent than during this challenging period. Still, I urge everyone to continue staying alert and be responsive to any change in the situation.

I hope that you will have an insightful and enjoyable time reading this issue.



CAITLIN FUA
EXECUTIVE EDITOR



SHIP'S LOG NEWS



SINGAPORE'S PRIME MINISTER VISITS TUAS PORT AND SULTAN SHOAL

When it is fully operational, Tuas Port will have 26km of deep-water berths capable of handling up to 65 million twenty-foot equivalent units annually. It has been designed to be future-proofed against the demands of the world's largest mega-vessels, mega-alliances, and mega-networks.

Tuas Port incorporates intelligent data-driven operations management systems, wharf and yard automation, full-electric automated guided vehicles, as well as smart engineering and power management platforms. It will be a key component in the wider Tuas ecosystem — comprising synergistic industries and supply chain nodes interlinked by physical and digital connections — acting as a hub and multiplier.

"By venturing beyond the physical port into complementary logistics capabilities and integrated digital systems, PSA will take the lead in transforming the industry to better deliver holistic cargo solutions for our customers and promote

greater supply chain efficiency," said Mr Peter Voser, Group Chairman of PSA International.

PSA was honoured on October 3, 2019, when Singapore's Prime Minister, Mr Lee Hsien Loong, accepted its invitation to place a torch on the grounds of Tuas Port, marking the start of a new chapter in the story of Maritime Singapore. "Generations of Singaporeans working at PSA, MPA (Maritime and Port Authority of Singapore), MOT (Ministry of Transport), and the maritime industry have contributed to this success," said PM Lee in an address to guests at the event.

PM Lee also took the opportunity to visit Sultan Shoal, which he described on his Facebook page as "an island smaller than a football pitch". On the island are the 124-year-old Sultan Shoal Lighthouse, a man-made lagoon, and former PSA chalets. During the journey on board the ferry, officers from MPA's Hydrographic Division briefed PM Lee on the significance of the lighthouse.



SINGAPORE ON IMO COUNCIL FOR 14TH CONSECUTIVE TERM

Singapore was re-elected into the International Maritime Organization (IMO) Council for the 14th consecutive term, during the 31st Session of the IMO Assembly on November 29, 2019, in London, UK. Each term lasts two years.

Since it was first elected to the Council in 1993, Singapore has played an active role in IMO. For example, it has served in various leadership positions, and made significant contributions towards advancing the efforts of the international maritime community in enhancing navigational



safety, promoting efficient and sustainable shipping, and protecting the marine environment.

Leading the Singapore delegation — comprising officials from the Ministry of Transport and the Maritime and

Port Authority of Singapore — was Mr Khaw Boon Wan, Coordinating Minister for Infrastructure and Minister for Transport. He said, "Singapore is honoured to be re-elected to the IMO Council, and is grateful for the support of our fellow IMO Member States. We will continue to contribute actively towards the IMO's goals."

Singapore also held the Singapore Reception on November 27, 2019, at the Royal Horticultural Halls' Lindley Hall in London. Hosted by Mr Khaw, the evening reception was attended by senior international delegates participating in the IMO Assembly.

SHIP'S LOG NEWS

DIGITALPORT@SG ANNOUNCED AT GLOBAL MARITIME FORUM ANNUAL SUMMIT

More than 200 high-level maritime industry leaders, experts, as well as policy and decision makers from 37 countries convened in Singapore on October 30 and 31, 2019, to discuss key opportunities and long-term challenges for the global maritime industry at the two-day Global Maritime Forum (GMF) Annual Summit.

During the opening plenary of the Summit, Singapore Deputy Prime Minister and Minister for Finance Heng Swee Keat outlined how the global maritime industry could take collective action for the future, including renewing the commitment to rules-based multilateralism, advocating maritime sustainability, and fostering greater digital connectivity within the maritime value chain. The GMF also saw the revelation of the winners of the Future Maritime Leaders essay competition, which sought to identify challenges that the next wave of maritime leaders will have to grapple with.

At the event, DPM Heng announced the launch of the Maritime and Port Authority of Singapore's (MPA) digitalPORT@SG, a digital Portal for One-stop Regulatory Transactions, Singapore's maritime single-window system that will serve as a one-stop portal for maritime regulatory and port services transactions.

DPM Heng was also Special Guest, joining Dr Lam Pin Min, Senior Minister of State for Transport and Health, to witness the signing of a Memorandum of Understanding (MOU) between Ms Quah Ley Hoon, Chief Executive of MPA, and Mr Remi Eriksen, Group President and CEO of DNV GL, a leading provider of classification services. The MOU maps out a three-year R&D collaboration in decarbonisation and digital transformation for sustainable and smart maritime ecosystems, including new maritime business and operation models utilising additive manufacturing, market and technical feasibility research of low- and zero-carbon ship fuels, autonomous and remote controlled ships as well as shore-based operation and control centres, and curated maritime-related thought leadership forums.

"MPA is happy to host the Global Maritime Forum Annual Summit this year and share Singapore's perspectives. We will continue to drive innovation to take Maritime Singapore forward by facilitating data-sharing, readying our maritime supply chain systems for the future, and pushing for closer partnerships with the industry and research communities," said Ms Quah.

30 October 2019, Singapore

**FERRY EMERGENCY EXERCISE**

To test the responsiveness of various agencies in the event of a ferry mishap, a ferry emergency exercise (FEREX 2019) was held on August 30, 2019, at the Regional Ferry Terminal at HarbourFront. The exercise involved around 250 personnel from 10 government agencies, including the Maritime and Port Authority of Singapore (MPA), three ferry operators, and Singapore Cruise Centre. In addition, 13 vessels and an RSAF helicopter were deployed. On hand to observe the exercise was Mr Khaw Boon Wan, Coordinating Minister for Infrastructure and Minister for Transport.

The exercise simulated the evacuation of 150 passengers from a ferry headed to Singapore from Batam. The ferry had struck a large underwater object near Kusu Island and was taking on water.

Besides stress-testing the coordination between agencies, the exercise saw the use of new technologies. One was remotely piloted water rescue lifebuoys that could be steered directly towards passengers in the water. Another was the live streaming of the incident site through camera-mounted drones, CCTVs installed on board the ferry, and SMART glasses worn by the On Scene Commander.

To test the activation and notification procedures, as well as the decision-making process in the handling of ferry mishaps, a table-top exercise was held a week earlier on August 21, 2019.

"It is important to conduct a ferry emergency exercise annually to test the coordination and operational readiness of our agencies. We have had the opportunity to deploy and test new technologies at FEREX 2019 to enhance rescue efforts. Through this exercise, MPA hopes that it enhances contingency preparedness of the participating agencies and, more importantly, that it will raise situational awareness of ferry passengers," said Captain Daknashamoorthy Ganasen, Senior Director of Operations & Marine Services at MPA.

SHIP'S LOG NEWS

NEW STANDARD IMPLEMENTED FOR BUNKER INDUSTRY

To enhance the operational aspects of Mass Flow Metering (MFM) bunkering and support the changing needs of the bunker industry as it operates under new International Maritime Organization (IMO) regulations that mandate the use of low-sulphur fuel oils from January 1, 2020, the Singapore Standards Council launched a new Singapore Standard, SS 648 – Code of Practice for Bunker MFM.

Launched on November 7, 2019, SS 648 is the first standard of its kind in the world. Developed under the auspices of the Technical Committee for Bunkering and managed by the Standards Development Organisation at Singapore Chemical Industry Council, it received inputs from stakeholders in the bunker supply chain. These stakeholders include bunker suppliers, tanker operators, bunker surveyors, ship owners, ship buyers, and the Maritime and Port Authority of Singapore (MPA).

Replacing TR 48, SS 648 supports the industry's shift towards environmental sustainability, and includes new requirements for multi-meter installation. This is achieved through the use of multi-meter systems that will reduce cross contamination with proper segregation. Bunker suppliers will now be able to better meet the needs of bunker buyers by



enabling the delivery of different grades of bunker fuels.

"To enhance integrity and transparency of bunker operations in the port of Singapore, MPA has mandated the use of mass flow meter for deliveries of marine fuel oil since January 1, 2017, and the deliveries of distillates since July 1, 2019. While we received positive feedback on quantity assurance, we continue to work closely with our stakeholders to prepare the bunkering industry for IMO 2020 and beyond. It is therefore important that the relevant standards, such as TR 48 and its upgraded version, SS 648, stay relevant and up to date," said Captain Daknashamoorthy Ganasen, Senior Director of Operations & Marine Services at MPA.

PARTNERING WORLD'S LARGEST MARINE PROFESSIONAL BODY

To upskill and retain maritime talent in Singapore, the Maritime and Port Authority of Singapore (MPA) has created another pathway for professional development and recognition.

On October 3, 2019, MPA signed a Memorandum of Understanding (MOU) with the Institute of Marine Engineering, Science and Technology (IMarEST). Ms Quah Ley Hoon, Chief Executive of MPA, and Mr David Loosley, Chief Executive of IMarEST, inked the MOU in a ceremony held in Singapore.

The IMarEST is an international organisation spanning 128 countries that brings marine engineers, marine scientists, and marine technologists together into one multidisciplinary professional body.

The MOU will benefit marine surveyors and marine

hydrographers in MPA, as well as offshore and shore-based maritime professionals. Former seafarers and those without seafaring experience can continue their professional development via two routes: an MSc/BSc jointly offered by IMarEST and the Plymouth University in the UK via distance and online learning, or a Chartered Status under the IMarEST banner.

"MPA recognises the importance of continued education and training of our maritime professionals. This partnership will enhance our manpower development efforts as mapped out in the Sea Transport Industry Transformation Map. We see continuing education as a necessary investment for individuals to upskill themselves to stay relevant in a maritime industry, which is transforming rapidly," said Ms Quah.



SHIP'S LOG NEWS

**BAZAAR BY THE PIER**

Held on November 9 and 10, 2019, at Marina South Pier, Bazaar by the Pier was organised by the Maritime and Port Authority of Singapore (MPA) to commemorate the Singapore Bicentennial. Free to all visitors, the event was themed "Past, Present and Future of Maritime Singapore". It highlighted Singapore's maritime heritage, particularly its transformation into a vital maritime hub.

"Maritime trade has always been at the heart of Singapore's economy. Following the opening of the Suez Canal in 1869, Singapore has played a vital role in trade between Europe and Asia, and became a key trading hub. We must possess the same forward-looking mindset our forefathers had, and continue to innovate so as to remain relevant and competitive," said Mr Baey Yam Keng, Senior Parliamentary Secretary, Ministry of Transport and Ministry of Culture, Community and Youth, who was also the Guest of Honour at the Bazaar.

A wide range of activities was available to entice visitors, including guided tours of the Singapore Maritime Gallery, an illustration class with Singaporean artist Mr Lee Xinli, as well as workshops in photography and social media content creation. Participants who had pre-registered for MPA's Sea Tour Learning Journey travelled along the Singapore Strait to observe port operations while learning about the navigational aids and vessels in our waters. Children at the event participated in craft activities and listened to storytellers at the Singapore Maritime Gallery.

Winning entries from the "My Defining Maritime Moment" social media photography contest were displayed at the Singapore Maritime Gallery. During the six-month-long contest, 1,137 photographs were posted on Facebook and Instagram, all of which depicted places of maritime heritage that held significant memories for the participants.

One of the winning entries, by Mr Nicholas Hiew Voon Keat, captured the grandeur of port cranes, while another winning entry, by Mr Wee Keng Hor, showed a ship laden with containers with the Singapore skyline in the background.



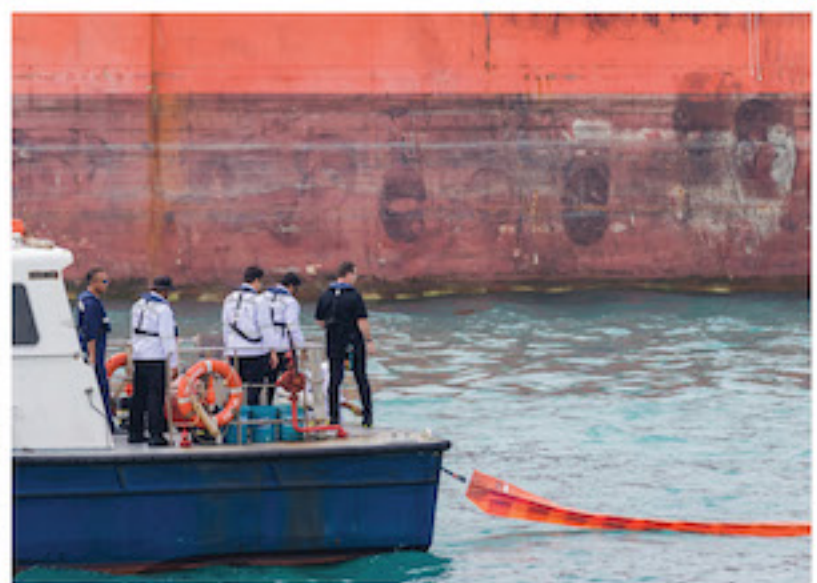
SHIP'S LOG HAPPENINGS

NEW INITIATIVES ANNOUNCED AT SRS FORUM



Themed "2020 & Beyond", the SRS Forum by the Maritime and Port Authority of Singapore on November 8, 2019, was attended by around 200 participants from Singapore-based shipping companies and other maritime entities. Announced at the forum were new initiatives to help shipowners and ship operators take steps that contribute to environmental sustainability, improve operational efficiency through digitalisation, and develop skilled maritime professionals.

MPA ORGANISES 11TH ICOPCE



The Maritime and Port Authority of Singapore (MPA) organised the 11th edition of the International Chemical and Oil Pollution Conference and Exhibition (ICOPCE) from October 21-24, 2019. More than 300 industry professionals from 36 countries attended the biennial event, of which the Guest of Honour was Mr Niam Chiang Meng, Chairman of MPA. ICOPCE comprised a workshop, a two-day conference, and a chemical spill exercise held on the last day. The exercise, involving 150 personnel from 20 agencies, simulated the collision of two tankers at Sinki Fairway that resulted in the spillage of 500 tonnes of xylene. It saw the deployment of chemical protective gear, gas detectors, and chemical containment booms.

SHIP'S LOG HAPPENINGS

VOLUNTEERS REMOVED CLOSE TO 240KG OF MARINE DEBRIS



Organised by the Maritime and Port Authority of Singapore (MPA), the Marine Clean-up Day on September 14, 2019, saw 120 volunteers — together with Mr Baey Yam Keng, Senior Parliamentary Secretary for Transport and Culture, Community and Youth — remove almost 240kg of marine trash from various locations around Singapore. Some people collected litter and microplastics at East Coast Beach, while stand-up paddlers and kayakers cleared floating marine debris from the coastal waters, and divers removed marine debris around Lazarus Island. Marine Clean-up Day complements MPA's existing efforts to protect the marine environment and ensure that our port waters are clean and safe.

MPA TAKES PART IN 5TH PORT AUTHORITIES ROUNDTABLE



At the 5th Port Authorities Roundtable, which took place from October 15–17, 2019, in Kobe, Japan, the Maritime and Port Authority of Singapore (MPA) tabled a proposal to form and lead a Port Authorities Chief Information Officer Cybersecurity Network (PACC-Net) to strengthen collaboration on cyber resilience and response among the 15 port authorities. "With increasing interconnectedness and digitalisation of the maritime sector, ports and shipping will also face greater vulnerabilities to cyber threats. We hope the establishment of PACC-Net will further enhance collaboration among leading ports to mitigate against such threats," said Ms Quah Ley Hoon, Chief Executive, MPA.

SHIP'S LOG HAPPENINGS

MPA ORGANISES PROGRAMME FOR SENIOR MARITIME ADMINISTRATORS



The Maritime and Port Authority of Singapore, together with the Nanyang Technological University, hosted 28 senior maritime administrators from across the globe during the 9th Maritime Public Leaders' Programme from October 21-25, 2019. The programme covered a comprehensive range of topics for participants, including shipping economics, maritime law, as well as port performance improvement and development.

NEW CENTRE OF EXCELLENCE ANNOUNCED AT FORUM



Dr Sanjay C Kuttan, Executive Director, Singapore Maritime Institute (SMI), announced the establishment of the Centre of Excellence for Autonomous & Remotely Operated Vessels (CEAOPS) at the 9th SMI Forum on October 9, 2019. CEAOPS is the first research initiative to be funded under the Maritime Transformation Programme. The Forum — graced by Dr Lam Pin Min, Senior Minister of State for Transport and Health — received more than 170 leaders in the maritime sector. They discussed how to sustain a strong and vibrant maritime ecosystem to enable the transformation of Maritime Singapore.

SHIP'S LOG HAPPENINGS

VALUING SEAFARERS



The Maritime and Port Authority (MPA)'s annual Appreciation Dinner for Seafarers and Partners in Seafarers' Welfare was held on December 3, 2019, at the Maritime House. Addressing the 40 visiting seafarers and 110 corporate guests in attendance was Mr Kam Soon Huat, the Guest of Honour. He is the Chairman of the Welfare Committee for Seafarers, President and Chief Operating Officer of Singapore Organisation of Seamen, and an MPA Board Member.

3RD MARITIME CAPITAL FORUM REINFORCES SINGAPORE'S ROLE AS A KEY INTERNATIONAL CAPITAL MARKETS CENTRE FOR SHIPPING



Photos: Singapore Shipping Association

Organised by the Singapore Shipping Association in conjunction with CLSA and Transport Capital, the Maritime Capital Forum was a by-invitation event held on November 18 and 19, 2019. The event connected key shipping companies with institutional investors, private equity and debt investors, family offices, and companies providing maritime financial solutions. This third edition drew participation from 21 global companies across the container, dry bulk, and chemical sectors. Delegates were also introduced to the Poseidon Principles framework, along with market outlook presentations from keynote speakers. The event was supported by the Maritime and Port Authority of Singapore and the Singapore Maritime Foundation.



safer waters in a digital age

Working in maritime can be immensely rewarding, but it also comes with some of the highest risks out there. Adeline Leow explores how technology can empower safety — if we let it

The maritime and shipping businesses are some of the most challenging — and dangerous — of international industries; which is why safety is of paramount importance, something that is gaining emphasis among an increasing number of maritime companies.

Naturally, a huge concern is the physical well-being of those working at sea and along shores.

In the words of Professor Richard Lim, then-Chairman of the National Maritime Safety at Sea Council, “The marine environment is one that is unpredictable, and can surprise even the most seasoned seafarer with its ferocity.” While maritime accidents are more often the result of a series of events rather than any single cause, there are several common attributions to most accidents.

FEATURE



For seafarers, inclement weather can pose a major threat. For example, fog that reduces visibility can make navigating a ship challenging, while strong wind and rain can increase the risk during vessel berthing. However, human error is the cause of 75–90% of all maritime accidents. These errors range from carelessness to negligence, especially with poor bridge resource management or a lack of attention, particularly while navigating busy waters.

Maritime safety is not confined to only the physical; just as important are the mental and emotional aspects of safety. Seafarers are often

isolated at sea for extended periods of time, away from their family and loved ones. Social isolation, long voyages, fatigue, harassment, and frequent port rotations can adversely affect a seafarer's mental health, which can lead to a higher risk of human error or worse, suicide.

This is a growing concern: a survey conducted by Yale University in 2017 showed that 26% of seafarers felt down, depressed, or hopeless, and almost half (45%) had not asked anyone for help. Suicide accounts for 6% of seafarer deaths — more if you include suspicious disappearances. These

FEATURE



A GROWING CONCERN: A SURVEY CONDUCTED BY YALE UNIVERSITY IN 2017 SHOWED THAT 26% OF SEAFARERS FELT DOWN, DEPRESSED, OR HOPELESS, AND ALMOST HALF (45%) HAD NOT ASKED ANYONE FOR HELP. SUICIDE ACCOUNTS FOR 6% OF SEAFARER DEATHS — MORE IF YOU INCLUDE SUSPICIOUS DISAPPEARANCES.

numbers are worrying, and indicate that more needs to be done to keep our seafarers safe in every aspect of the world.

EMBRACING TECHNOLOGY

With technology advancing faster than ever, it is hardly surprising that the maritime industry is looking towards technology to build a maritime community that is safer than ever. It is a hot topic in maritime circles, and was the focus at the International Safety@Sea Conference 2019, themed "Maritime Safety in a Digital Age".

There exists enormous potential to use technology to improve safety, but it is also important to make sure the technology is well implemented. Some developments have already been introduced, including the use of drones (turn to page 24 to learn more about insurance for companies that employ drones in a variety of scenarios, from search and rescue to maritime surveillance and sustainability). Technology that offers real-time reporting on any hiccups in vital parts of the ship, such as the engine, also allows for faster and more effective troubleshooting.

The use of Augmented Reality and Virtual Reality tools to increase maritime safety is another popular avenue for many maritime organisations. The ability to simulate an actual environment that seafarers

can gain practice in safety is key to helping workers familiarise themselves with a variety of situations so that they are better prepared to handle the rigours of being at sea. "Improving safety is not only about developing applied technology that you can transfer to the industry, but also about developing next-generation training systems that will enhance the competencies for our future-ready seafarers," shared Mr Daniel Zhang, Centre Director of the Centre of Excellence in Maritime Safety.

Another technological advancement that has the potential to reduce maritime accidents are autonomous vessels. As less human intervention is needed for autonomous vessels, the propensity for human error will correspondingly decrease. But picturing fully autonomous vessels raises an important question: how much is too much?

Captain Allan Gray, President of the International Harbour Masters' Association, cautioned the community not to be "blinded by the glamour of technology" during the first panel discussion of the International Safety@Sea Conference 2019. Acknowledging that it takes time to adapt to changes, Capt Gray emphasised the importance of training operators to deal with these technological advancements, as well as considering the consequences of implementing certain technologies.

FEATURE

MEASURED PROGRESS

Indeed, simply introducing the latest and greatest technology may not always be the answer. According to the Final Report issued by the Ministry of Transport's Transport Safety Investigation Bureau [see box story] on the deadly collision in 2017 between a US Navy destroyer, USS John S McCain (JSM), and an oil tanker, Alnic MC (AM), the accident occurred "because of a sudden turn to Port by JSM, which caused it to head into the path of AM. JSM's sudden turn to Port was due to a series of missteps that took place after a transfer of propulsion controls, which led to a confusion as to which station had steering control, and an unintentional reduction of the Port engine throttle, which increased the rate of JSM's turn to Port."

Notably, this should not be interpreted as proof of the evils of technology. Rather, this incident highlights the importance of strategic implementation: while the

design of the controls was a contributing factor, other factors, such as training competency or fatigue, could have exacerbated the situation.

When it comes to introducing technology that affects ship operation and procedures, it is important to consider the readiness of the crew and provide them with the training that is needed to use these upgrades correctly. "Make sure that they're not only given the initial training, because for two years when they're on board the ship, they're not going to encounter every scenario that they went through in the training room, so it's necessary to have refreshers. If we want to aspire to the aviation safety standards, training and retraining are crucial," Ms Caroline Yang, President of the Singapore Shipping Association, reminded the audience.

Without proper training, technology actually creates a higher risk to safety. It is also important to consider whether these technologies transfer



FEATURE



MAKE SURE THAT THEY'RE NOT ONLY GIVEN THE INITIAL TRAINING, BECAUSE FOR TWO YEARS WHEN THEY'RE ON BOARD THE SHIP, THEY'RE NOT GOING TO ENCOUNTER EVERY SCENARIO THAT THEY WENT THROUGH IN THE TRAINING ROOM, SO IT'S NECESSARY TO HAVE REFRESHERS.

the workload disproportionately to different crew members, and how assignments can be adapted to split this load. Another important consideration when it comes to introducing technology is how receptive the crew is to the changes — often, the natural response is to feel threatened and wonder whether automation and technology will take away jobs.

For shipowners and other maritime business leaders, getting the buy-in from their staff is key to successful implementation of new technology — it is all about creating awareness and educating the staff that technological advances bring about an evolution of roles, rather than an erosion.

Captain Nurur Rahman, Maritime Consultant of the Worldwide Ferry Safety Association, emphasised, "All stakeholders — for example, shipowners, government officials, commuters, and the local community — need to be consulted and convinced before any safety procedure or implementation of new equipment can be introduced. Safety at sea cannot be forced on consumers; rather, aspects of safety must be owned by the consumers to give it any success. A top-down approach tends to fail, and we

must be mindful of feedback by actual users."

Whatever the individual stances on automation and technology, it is undeniable that many of these advancements are already being explored and even tested. The technology is not new — already, autonomous vehicles have been employed in military and paramilitary applications, and have even been tested on Singapore roads. It is a matter of time before the technology is extended to the maritime industry. What is important, according to Ms Maja Markovic, Executive Director of the European Maritime Safety Agency and Keynote Speaker at the International Safety@Sea Conference, is to keep in mind that the existence of unmanned ships in maritime is not an indelible fact. "There will certainly be autonomous ships but not all ships will be autonomous. The hybrid environment is something that we need to concentrate on."

BEYOND THE PHYSICAL

Technology can also be used to improve the mental and emotional wellness of seafarers. One such example is the Ship Visitor app introduced by Sailors' Society.

FEATURE

"One of the things we realised very quickly in the last five years was that, if we're going to be providing a service that is relevant for seafarers, we need to ensure that we provide a service that's fit for the 21st century," said Ms Sandra Welch, the society's former Chief Operating Officer, about the motivation for the maritime charity to develop the app. The app allows maritime welfare organisations to provide chaplaincy for seafarers even when they're out at sea [turn to page 20 for a profile on Ms Welch].

Chaplains and ship visitors alike report their activities, and the information is then used to provide ongoing care and assistance as seafarers continue their voyage. This data is subject to confidentiality and data protection policies, ensuring that ship crew get the support they need without infringing on their right to privacy. The app then enables organisations to see the types of welfare cases being supported — from piracy to abandonment — and allows the provision of support to be tailored accordingly.

It is an example of how data and technology come together to make it easier to track all aspects of a seafarer's wellness: social, emotional, physical, intellectual, and spiritual.

A CULTURE OF SAFETY

While the emphasis is largely on technology, improving maritime safety goes beyond digital enhancements. High-tech solutions and alternatives must go hand in hand with a business and physical environment to forge a safety culture. The best in innovation will scarcely make a dent if an

organisation's unrealistic demands result in harried and overworked seafarers, who will naturally be more error-prone.

Strong regulations are also needed to pave the way to ensure that technology is developed for safety, and that implementation meets required safety standards.

Mr Denzal Hargreaves, Regional Production & QHSE Manager; Regional Chief Surveyor, Maritime – Region South East Asia, Pacific & India, DNV GL, recommends what he refers to as the HOT approach: Human, Organisation, and Technology. Typically used in DNV GL when it comes to their approach to investigations, it is also key to prevent incidents and accidents. It is about "when we are developing technology, how organisations are adopting it, and how we are integrating it and finding the right balance between human, organisation, and technology", he clarifies. He adds that we need to consider safety as the core of what we do to find the right balance when developing regulations, procedures, and best practices. Only then can we ensure that the adoption of technology does not hinder the intention to increase safety.

Digitalisation brings with it huge opportunities to modernise the maritime industry and improve safety standards. But the consensus of industry leaders is that the change is not one that will happen overnight. This evolution is a journey that we will need to continue slowly over time, and organisations need to make sure that their people are prepared for the changes that are to come.

TRANSPORT SAFETY INVESTIGATION BUREAU

Prevention is not the sole aspect of a culture of safety at sea. Just as important are the investigations to find out the causes of accidents.

The Transport Safety Investigation Bureau (TSIB) is the air and marine accidents and incidents investigation authority in Singapore. Through the conduct of independent and objective investigations into accidents and incidents, TSIB aims to prevent accidents and identify any lesson that can be learnt. Most importantly, shares Captain Kunal Nakra, Deputy Director of TSIB, the goal of these investigations is not to place blame.

As part of prevention, TSIB gathers, records, and analyses all available information on accidents and incidents, which are used to determine causes and contributing factors. The information is then used to identify possible safety issues and make safety recommendations to address these issues in the future. Finally, an investigation report is released and made accessible to the public on their website at <https://www.mot.gov.sg/about-mot/transport-safety-investigation-bureau>.





navigating with AI and big data

Maritime Singapore's aim to double its port capacity by 2030 has stirred interest in traffic management along the narrow Singapore Strait. Jon White learns how a multi-party industry collaboration keeps this dream afloat

From smart traffic lights to predictive flight paths, multi-agent technologies have been used extensively in coordinating the movements of unmanned vehicles in the air and on the ground. In 2015, transport researcher Professor Lau Hoong Chuin of the Singapore Management University (SMU) mooted

the idea of extending the use of artificial intelligence (AI) to enhance safety and efficiency on the seas.

Sharing his dream, Prof Lau reveals, "While optimisation models have been successfully deployed for coordinating land and air traffic, my wishful thinking was, in an age of maritime digitalisation and automation, wouldn't it be nice if similar models can be applied to coordinate maritime traffic to enhance safety and efficiency?"

Prof Lau's thought comes against the backdrop of a booming maritime scene. Singapore is one of the world's busiest ports, with about a thousand ships anchored in its waters at any one time and a ship arriving or departing every two to three minutes. Vessel traffic — comprising cruise ships, regional ferries, container ships, barges, and tugs — is only expected to grow, making narrow channels even more complex to manoeuvre and navigate. Ensuring navigation safety and efficiency in Singapore's waters is, thus, of utmost importance.

MAXIMISING PROGRESS

Building on his research on AI planning and scheduling, Prof Lau reached out to industry partners to build an AI solution. "It's almost obvious that no single party can claim that they have the full know-how and solutions," he ventures. "So I always advocate collaboration."

Under the Urban Computing and Engineering Centre of Excellence, a three party private-public partnership, three institutions — SMU, Fujitsu Laboratories Limited, and the Institute of High Performance Computing (IHPC) at the Agency for Science, Technology and Research (A*STAR) — collaborated to investigate and evaluate the use of maritime big data in traffic management technology. The collaboration saw each party bringing its unique capabilities to the table.

"A*STAR IHPC's interests are in prediction, while Fujitsu's interests are in big data analytics," says Prof Lau, describing each entity's specialty. This meant that IHPC could contribute with its probabilistic modelling and machine learning techniques, while Fujitsu leverages its high-performance computing and data analytics.

MAKING STRIDES

Within three years, the partnership's solution, which uses AI and big data, was built and validated using real-world data provided by the Maritime and Port Authority of Singapore (MPA). It aims to improve the forecasting of congestion and identification of potential collisions and risk hotspots, and provide timely recommendations on mitigating actions. In particular, the algorithm developed was benchmarked against Vessel Traffic Services (VTS) operators and demonstrated the possibility of quantifying risk in more detail in advance of detection by human operators. For example, based on benchmarking studies, the detection technology was able to flag potential risks approximately 10 minutes before the risk of collision became apparent; in doing so, it would provide approximately five minutes of additional lead time for VTS operators to alert shipmasters to take action against collision. The dynamic risk hotspot detection technology could detect risks up to 15 minutes in advance, enabling VTS operators to take specific measures to diffuse potential close-quarter situations.

Mr Tang Wey Lin, MPA's then-Deputy Director (Ops-Tech Special Projects), shares that MPA has always taken a keen interest in exploring innovative concepts and new technologies that can enhance operations and strengthen decision-making processes to enhance safety and security of navigation within Singapore waters. Such predictive and analytical tools are vital in augmenting the work of MPA's Vessel Traffic Management operators, enhancing their ability to better predict risks of

THE STRONGER OUR INDUSTRY AND ACADEMIC LINKAGES, THE MORE MINDS AND RESOURCES WE HAVE TO SOLVE COMPLEX CHALLENGES IN THE MARITIME DOMAIN.

collision — both in terms of accuracy and timeliness. "MPA's mission is to ensure that our port waters remain operational 24/7, and that there are no major incidents between vessels that can disrupt traffic flow and port operations, or damage the environment," he says.

Mr Tang elaborates, "The assurance that MPA provides to the maritime community — that Singapore will always safeguard safety and security despite the dense shipping lane — builds confidence, facilitates trade, and encourages maritime companies to invest in Singapore."

With his finger on the pulse of the maritime industry, Prof Lau has his sights set on shaping its future. He will continue research work at the lab to improve the algorithms in terms of scalability, robustness, and the ability to handle more complex real-world constraints. "To achieve success, project partners cannot work in silos," he reflects. "As the project progresses, university professors, students, and researchers should actively and constantly seek inputs from their industry and government partners, and find ways to meet the gaps."

SPURRING COLLABORATION

The Next Generation Vessel Traffic Management System (VTMS) innovation programme was spearheaded to ensure that MPA continues to provide the best Vessel Traffic Service, thereby ensuring the highest standards of safety, security, efficiency, and environmental protection.

In April 2019, supported by MPA's Maritime Innovation and Technology Fund under the MPA Living Lab initiative, ST Engineering and Kongsberg Norcontrol launched the first Next Generation VTMS Lab. The S\$9.9 million lab was set up to develop digital technologies and decision-making tools used by maritime operators, such as analysis of vessel routes, prediction of traffic hotspots, and detection of potential collision situations.

MPA welcomes industry players and institutes of higher learning to offer alternative solutions to complement and enrich key VTMS research areas so that MPA can build the most advanced VTMS within the next five years.

"We do not have a monopoly over ideas, so the best way is to work closely with industry and academia," stresses Mr Tang. "The stronger our industry and academic linkages, the more minds and resources we have to solve complex challenges in the maritime domain."





enhancing seafarers' well-being

Sailors' Society has been caring for the welfare of seafarers and their families through at-home, in-port, and at-sea assistance for more than 200 years. Its former Chief Operating Officer, Ms Sandra Welch, tells Adeline Leow how technology has helped it to stay relevant and effective

SAILORS' SOCIETY OFFERS AT-HOME, IN-PORT, AND AT-SEA ASSISTANCE TO SEAFARERS AND THEIR FAMILIES. TELL US MORE ABOUT SAILORS' SOCIETY'S AWARD-WINNING "WELLNESS AT SEA" PROGRAMME, AND SOME OF THE WAYS IT HAS HELPED MARITIME COMPANIES AND THEIR CREW.

Our innovative "Wellness at Sea" coaching programme, e-learning platform, and free app help seafarers stay physically and mentally fit for the daily pressures they face. The programme also helps maritime companies achieve the best performance from their crew by maintaining high levels of welfare. We provide training both in-class and online, working in partnership with companies and colleges. In class, seafarers can choose from five languages to learn — Hindi, Russian, Mandarin, Tagalog and English — and online, it is conducted in English. Since its launch in 2015, more than 8,000 seafarers have completed the training.

"Wellness at Sea" won two prestigious industry awards in 2018: "Best Crew Welfare Programme" at Seatrade Awards, and our e-learning programme was recognised at the Safety at Sea awards. The biggest reward, though, is seeing the difference it makes in preparing seafarers for a fulfilling career at sea.

WHAT ASSISTANCE DOES SAILORS' SOCIETY PROVIDE IN A CRISIS?

We offer free and confidential help to individuals, families, and companies. Our 24-7 Crisis Response Network of specially trained chaplains provides rapid-response trauma care and counselling service for survivors of incidents at sea, such as

PERSONALITY

Technology is a key factor in ensuring that issues of mental and physical well-being and, therefore, safety are addressed. But it must be part of a holistic, balanced solution, not forgetting the value of human interactions and support, such as that offered by our chaplains.

accident, ambush, or abandonment. Our chaplains and family support officers also care for seafarers' families when a crisis hits, offering emergency grants and helping them cope with the trauma of a loved one's injury, imprisonment, or death.

One case involved Indonesian fisherman, Mr Adi Manurung. He was held captive by Somali pirates for almost five years before being released in October 2016. Our chaplains supported him by accompanying him on visits to the psychiatrist, providing financial support, and counselling him and his family. His resilience and bravery in the face of adversity was quite incredible.

HOW HAS TECHNOLOGY CHANGED THE WAY SAILORS' SOCIETY WORKS?

Embracing digital technology has enabled us to provide high-quality and effective welfare advice and support for the 21st century.

Our Ship Visitor app allows chaplains and ship visitors to plan, deliver, and report in real-time, giving excellent insight into organisational services. The International Christian Maritime Association has licensed the app from us for its members and, last year, it was used to report on 700,000 seafarers. We've also used digital technology to enhance our communication and working relationships as a team; it has brought our global organisation much closer and made us even more productive.

WHAT DOES YOUR WORK AT SAILORS' SOCIETY ENTAIL?

I have the best job in the world! I am responsible for all of our programme activities. I manage 122 active chaplains and ship visitors, as well as our portfolio of community development projects. In practical terms, I develop our port activities, manage and train our staff, as well as develop and implement our strategic plan for our many community-based programmes within seafaring communities.

I find helping seafarers and highlighting the issues they face incredibly rewarding. Having joined in 2014, it was a new challenge to work with a workforce of people whom so many rely upon, but who are largely invisible.

HOW HAVE TECHNOLOGICAL AND INDUSTRY DEVELOPMENTS CHANGED SAFETY CONCERNS IN THE MARITIME INDUSTRY?

We recently heard of a drone that can assess the extent of corrosion underwater, which used to involve a seafarer using a winch. This and other developments help to protect people's mental and physical health. As a result, fewer incidents take place.

Studies, such as our *2018 Connectivity at Sea* report, produced with Inmarsat and Royal Holloway, University of London, indicate that Wi-Fi on board ship has an effect on seafarers' happiness, and is a key factor in choosing an employer. Yet, the increased connectivity can add to the stress and increase social isolation on board. Seafarers can now hear both good and bad news from home, with little they can do from thousands of miles away. They may also spend hours on social networks in their cabin rather than socialising with other crew. To the crew, automation also brings with it stresses and worries for them.

Technology is a key factor in ensuring that issues of mental and physical well-being and, therefore, safety are addressed. But it must be part of a holistic, balanced solution, not forgetting the value of human interactions and support, such as that offered by our chaplains.

WHAT SAFETY-RELATED CHALLENGES WOULD THE MARITIME INDUSTRY FACE IN THE FUTURE?

Mental health is a key issue for the industry at the moment, with more than 75% of accidents attributable to human error. Our *2018 Wellness Survey* revealed that more than a quarter of seafarers show signs of depression, and studies have shown that 6% of deaths at sea are attributable to suicide — significantly higher than onshore numbers.

That's why we introduced the "Not On My Watch" campaign, which calls for wellness training to be mandatory for seafarers in the Maritime Labour Convention. Awareness of these issues has increased dramatically, and there is a real appetite from the industry to take action.

A healthy, happy seafarer makes for a healthy ship and bottom line. There is a long way to go but, together, we can make a very real and positive change.

operational safety is our top priority

Mr Abhishek Chawla, Head of Operations, CMA CGM Asia & Chief Operations Officer, APL, has always been interested in the nexus between cost management and quality output. He discusses with Chua Kim Beng how the CMA CGM Group always places safety at the forefront of its priorities

WHAT ARE YOUR RESPONSIBILITIES AS HEAD OF OPERATIONS? HOW DO YOU ENSURE THAT THE GROUP'S FLEET OF MODERN VESSELS STAY SAFE, SECURE, EFFICIENT, AND GREEN ALL YEAR ROUND?

The CMA CGM Group has stringent operational standards. I am responsible for ensuring that our operated vessels are performing optimally in terms of operations, environmental impact, efficiency, and cost. The team from the operations department, which sees to the optimal movement of each container and vessel voyage, is involved in the day-to-day operations of the ships, including navigational safety, cargo, as well as ballast and tank cleaning and inspections. The team also maintains safety standards and procedures, handles environmental management, and monitors and analyses operational data to avert potential problems.

HOW DOES SAFETY, PARTICULARLY SAFETY AT SEA, FACTOR INTO YOUR VARIOUS JOB SCOPES?

Since joining the CMA CGM Group in 2014, I have observed that "safety first" is the mantra across all business functions and departments. I am thankful my seafaring experience has enabled me to view safety from both ship and shore perspectives.



PERSONALITY

In my first role with the Group, as Manager for Fleet Personnel Training and Crewing, the focus was on crew safety. I had to ensure that they were trained in the use of the numerous industry techniques to deal with any emergency. Auditing manning agencies for compliance in crew safety standards was another focus area. As a Maritime Resource Management facilitator, my top priority was to instil the mindset of “Safe Crew, Safe Seas, Safe Environment that will lead to Safe and Efficient Business”.

The safety scope broadened when I headed fleet control in Global Marine Operations, where I ensured that our fleet followed an optimally rostered plan to allow ships to run at optimum speeds and keep emissions in check. We also worked with special cargo teams to ensure the safe carriage of dangerous goods and out-of-gauge cargo.

My most recent role was Head of Fleet Operations for APL (a subsidiary of the CMA CGM Group), taking charge of liner operations for all APL services. The priority was to ensure safe and efficient stowage of the Group’s vessels, as well as developing and deploying optimal fuel strategies that will place us in a competitive position without compromising operational and emergency preparedness.

Operational safety is something I will continue to drive in my current role. With newer ships, such as the LNG-powered ones joining the CMA CGM fleet, we need to formulate strategies that will deliver greater efficiencies and engage various industry stakeholders, including the Maritime and Port Authority of Singapore, in simultaneous initiatives for safer port operation of the fleet.

AT APL AND THE CMA CGM GROUP, DO SAFETY AND COMMERCIAL CONSIDERATIONS CLASH?

Safety is a primary focus of our organisation, and there are processes in place to ensure that it is never compromised. We comply with the mandatory and regulatory requirements to ensure zero breach. We adopt the risk assessment approach before a decision is taken with all stakeholders’ interests in mind.

HOW DO YOU INCULCATE SAFETY IN YOUR TEAM?

The CMA CGM Group has very stringent safety protocols that seafarers and onshore teams must observe. At the same time, we recognise the need for continuous improvement. Clear and transparent communications between shore operations and the sea crew are crucial in

While technology is valuable for improving the safety and efficiency of ship operations, the optimal outcome usually comes about when technology is combined with the experience of captains and other experts.

preventing incidents. All near misses and incidents — be they big or small — should be reported so we can learn from them and avoid similar potential ones ahead.

Feedback from our sea crews is important to help eliminate unsafe and unwanted practices. Meanwhile, regular training and assessments are essential to ensure that our crews stay highly competent in safe vessel operations.

HOW HAS TECHNOLOGY BEEN A POSITIVE FACTOR WHEN IT COMES TO SAFETY ISSUES IN YOUR INDUSTRY?

While technology is valuable for improving the safety and efficiency of ship operations, the optimal outcome usually comes about when technology is combined with the experience of captains and other experts.

For instance, the CMA CGM Group’s Fleet Navigation and Port Operations Centre in Singapore ensures the safety of the Group’s seafarers, fleet, and customers’ cargo, as well as route optimisation. The state-of-the-art facility, which operates alongside two identical CMA CGM centres in Marseille and Miami, leverages the latest navigation assistance tools and technologies to track and examine wide-ranging nautical, meteorological, and geographic information in real-time, 24 hours a day, seven days a week.

Based on live analytics of the vessels’ operating speeds, ocean currents, weather forecasts, and high traffic areas, each centre’s team of experts is empowered to assess, anticipate, and mitigate any navigation-related risk to the Group’s vessel operations. Accurate guidance and alerts are provided to its deck officers on how vessel routes, speeds, and fuel consumption can be optimised across its fleet, while ensuring the safety of CMA CGM crews and vessels globally.

As the industry evolves and technology advances, sea and shore crews must be trained to drive the best safety and operational performance through technology.

insurance for drones

Acorn International Network's Coverflight platform is helping drone operators protect their flying assets more quickly and conveniently. Chua Kim Beng speaks to company founder Mr David Ong to find out how it has been performing since its launch in 2019

The drone that you have been dabbling with on weekends — to hone your piloting skills or to take stunning videos — is increasingly crossing into the commercial realm. Companies such as Wilhelmsen and Airbus already operate their own fleet of drones for shore-to-ship deliveries.

In order to protect their flying assets, these companies often purchase insurance for them. As an insurance buyer, Acorn International Network Pte Ltd helps these companies buy the relevant cover for their commercial and research drone operations and applications.

FULFILLING AN UNMET NEED

Acorn boasts about developing Singapore's first fully digital drone insurance platform, Coverflight, which was launched on February 22, 2019, after the company had conducted a study on the drone applications and users.

"We researched on whether there was any drone insurance in Singapore, and found that there were one or two, but the insurers needed to refer cases to specialists, who may be located elsewhere," shares Mr Ong. This is largely because insurance is based on risk sharing among a large number of parties — and the drone community in Singapore was much smaller then. "The study made us realise

that there was a small and energetic drone community that wanted to expand their services, but they needed to have their risk mitigated."

To meet this need, Acorn worked with a technology partner to develop Coverflight, an online solution that provides drone insurance for commercial drone operators underwritten by a specialist aviation underwriter. "We wanted to play our part in advancing the use of drones," states Mr Ong. Coverflight is a website that enables users who want drone insurance to go from 'quote to purchase' in minutes.

Prior to Coverflight, drone insurance application was done via the "traditional method". The client was required to submit a long proposal form, after which Acorn would forward it to insurers, who would usually take at least five to seven working days to send their quotations. For more complex cases where the underwriters require more information, it can take more than a month.

Coverflight is meant for commercial drone operators only, and the coverage is valid worldwide (except USA, Canada, as well as USA/UN-sanctioned countries). "We have had clients from other countries purchasing the cover online," says Mr Ong. As rules vary from country to country, the buyer should satisfy himself that he is compliant with the relevant regulations of his home country. "Acorn also services commercial drone operators who want to consider other quotations or require a more bespoke solution, as well as recreational drone users, but they will have to purchase the traditional way," he adds.

HULL VS THIRD-PARTY DAMAGES

On Coverflight, you can choose to insure 'hull only', 'third-party liability only', or 'hull and third-party liability'. "You can also insure other payloads and ground control units that will be used with your insured drone by adding them as separate items," advises Mr Ong.

He has noticed some buying patterns. Customers flying smaller standard models tend to be more concerned about legal liability arising from bodily injury and property damage caused to third parties, while others choose to insure the hull only.



Mr David Ong

[THE TREND TO INSURE ON A 'HULL AND THIRD-PARTY LIABILITY' BASIS] IS ENCOURAGING BECAUSE IT REFLECTS A BETTER UNDERSTANDING OF THE USE OF INSURANCE AS AN INSTRUMENT TO TRANSFER RISKS, WHICH ARE TOO SEVERE FOR AN INDIVIDUAL TO CARRY, TO INSURERS.

MARITIME SERVICES



Customers who fly bigger or customised drones, and those who have expensive payloads, tend to insure on a 'hull and third-party liability' basis. He is pleased that there is a trend to purchase this third option, saying, "This is encouraging because it reflects a better understanding of the use of insurance as an instrument to transfer risks, which are too severe for an individual to carry, to insurers."

Mr Ong advises potential clients to consider several points when selecting insurance options. Besides the quality of the drone itself, the ability of the pilot (Have they been trained properly? Do they know the rules and regulations of the land?), and the country/area of operation (Is it an advanced but litigious society, or a third-world country? Is it an urban or rural area?) should be factored in.

DRONES IN MARITIME INDUSTRY

As there are very few drone insurance specialists, Mr Ong sees opportunities for Coverflight. This is especially so now that large and established players in the maritime industry, such as Wilhelmsen, are already operating their own fleet of drones.

One challenge that he foresees for this shore-to-ship

delivery service is the fact that it is such a new idea. "This concerns underwriters as they have no historical data to rely on. Insurers are notoriously statistics-reliant!"

Another challenge for drone insurers is that goods carried are considered a Marine Cargo risk, and will have to be insured with marine underwriters under a Marine Cargo policy.

OTHER TYPES OF CUSTOMERS

Mr Ong reports that response to Coverflight has been encouraging, and the frequency of enquiries has been rising, with a good mix of individuals and companies signing on. "They provide an array of services, ranging from photography, videography and film to construction, surveillance and mapping to environmental and agricultural services, customised drone services and research," he reveals.

He has also received enquiries from emergency services, tertiary institutions, and companies from the logistics, warehousing, shipping, oil and gas, and security sectors — testament to the potential that drones present.

While Mr Ong admits that drone operators have limited choices currently when it comes to insurers, he assures that insurers specialising in drones have experience in safety practices that they can share with clients, thus helping drone operators to establish best practices.



fuelling a new wave of innovation

At Smart Port Challenge 2019, Jon White discovers how start-ups are surging ahead using deep tech for greater efficiency, safety, and sustainability in areas ranging from fuel monitoring to shared points of truth

FIRST PLACE: DRAVAM

Singapore is a key bunkering port. In 2019, it registered a bunker sale volume of 47.5 million tonnes. Whenever ships are re-fuelled in Singapore, shipowners would take a sample of the bunker fuel to an onshore laboratory for testing. Testing takes anywhere between one and seven days, by which time ships would have left the port.

"Though accurate, such traditional methods are slow, manual, and prone to dispute and malpractice, which can have expensive

PROVIDING THIS NEW DATA DIRECTLY TO CREW MEMBERS AND SHIPOWNERS FACILITATES QUICKER DECISION MAKING, POTENTIALLY REDUCING THE COST OF UNEXPECTED MAINTENANCE AND OPERATIONAL DELAYS.

Dr Vivek Premanadhan
Founder
Dravam



Dr Vivek Premanadhan

TECHNOLOGY

consequences, such as engine damage, regulatory fines, and damage to the environment," says Dr Vivek Premanadhan, founder of Dravam.

Dravam is addressing the robustness of bunker fuel inspection with a real-time fuel quality monitoring solution called dR-SCAN™. By mounting this system onto the fuel line, dR-SCAN™ scans the entire fuel transfer for contaminants, providing real-time information on fuel quality.

"Providing this new data directly to crew members and shipowners facilitates quicker decision making, potentially reducing the cost of unexpected maintenance and operational delays,"

Dr Premanadhan explains. "It also assures shipowners of fuel quality of the entire bunker, which is imperative now more than ever as compliant fuels are getting more costly."

Dr Premanadhan's team is well versed in dealing with flow assurance in pipelines. By tweaking their developed algorithms to suit different types of marine fuel oil, Dravam is able to predict the quality of the fuel as it is flowing in the pipeline.

The system has been proven to work on detecting parameters — including density, viscosity, water content, and sludge — under scaled laboratory conditions. The team is developing an updated test-skid to widen the detection envelope, testing with multiple fuel oils in smaller quantities, facilitating acquisition of larger databases, to benchmark against existing methods and for augmenting the accuracy of the detection algorithms. Dravam targets to pilot test their solution on board vessels in the last quarter of 2020.

For Dr Premanadhan, being able to plug into the maritime community at PIER71 was the biggest takeaway from participating in Smart Port Challenge (SPC) 2019. "The interactions with different parties involved in the shipping industry were tremendously useful, as they helped us to understand the intensity of the problem from various perspectives."

SECOND PLACE: KOIREADER TECHNOLOGIES

In the global maritime, logistics, trade, transportation, insurance, and supply chain industries, trillions of documents in varying formats and languages are exchanged. Manually capturing this information takes an average of 30 minutes per document, costing the global supply chain close to S\$685 billion annually.

KoiReader's contextual optical character recognition engine reduces processing time to less than a minute per document while bringing

down the cost from S\$3.40 to S\$0.06. Moreover, the technology can be applied to any document format or type, from pdf to jpg, and in multiple languages. The key advantage of KoiReader's proprietary technology is that it does not require training of a deep learning artificial intelligence (AI) model against a set of customer document templates. This innovation makes KoiReader's technology truly template-agnostic.

Besides cost and time savings, founder Mr Ashutosh Prasad shares how KoiReader's technology could be applied in numerous other cases. For instance, accurately and timely captured



The founders of KoiReader Technologies are Mr Ashutosh Prasad (left) and Mr Vivek Prasad, who is also the Chief Technology Officer

SINCE UNSTRUCTURED DATA CAN COME IN MANY FORMS, WE DIDN'T ACHIEVE MUCH SUCCESS INITIALLY. IT WAS THROUGH MONTHS OF INTERNAL R&D EFFORTS THAT WE WERE FINALLY ABLE TO ACHIEVE A MEANINGFUL BREAKTHROUGH.

Ashutosh Prasad
Co-founder
KoiReader Technologies

TECHNOLOGY

data from Shipper's Letter of Instruction could eliminate mis-declaration of dangerous goods by ocean shippers that leads to revenue loss in about 20% of international shipments.

"Since unstructured data can come in many forms, we didn't achieve much success initially," Mr Prasad recalls. "It was through months of internal R&D efforts that we were finally able to achieve a meaningful breakthrough."

He adds, "[Being part of SPC 2019] has opened up the maritime industry for us, and [obtaining] the runner-up recognition quickly took us to countries across the world."

THIRD PLACE: TEQPLAY

A port call requires the effective co-ordination of up to 25 stakeholders; without them, the call would lead to time wastage and sub-optimal use

of assets. Mr Léon Gommans, CEO and co-founder of Netherlands-headquartered Teqplay, estimates that the inefficiencies at port calls today result in a loss of S\$85 billion per year globally.

To equip port users with better decision-making capabilities, Teqplay has developed a cloud-based platform that collects and reads public data. By providing such information at the right place and time, Teqplay enables stakeholders to connect and collaborate in real time.

"Teqplay creates a shared point of truth for stakeholders and provides information and tools," Mr Gommans describes. "By working closely with the maritime industry, we have built the ultimate combination of deep context and technology knowledge. Artificial intelligence, machine learning, and the Internet of Things enable us to measure, detect, and predict what is happening or going to happen."

Highlighting that Teqplay's participation in SPC 2019 provided them with an insight into the port ecosystem in Singapore, Mr Gommans adds, "It allowed us to quickly validate our technology and maritime knowledge in the context of Singapore and Asia. We grew our network immensely and had a lot of good introductions. Winning the third prize is the icing on the cake; it puts Teqplay on the map in Asia."

PERFORMANCE ROTORS

At SPC 2019, Singapore's Performance Rotors showcased its smart drone systems, which have opened up new possibilities in the field of maritime inspection.

To reach confined and inaccessible spaces, inspectors currently require scaffolding and rope access. Mr Keith Ng, CEO and co-founder of Performance Rotors, views this as risky and costly. Existing drones in the market are also unsuitable for accessing dark, confined spaces, which deny drones of the GPS signals they need.

Hence, Performance Rotors came up with non-GPS-reliant aerial drones, which are the smallest in the market. They are also AI-equipped to make it easier for ship inspectors to pinpoint defects. A supporting cloud-based system allows all stakeholders to access on the go items such as inspection reports, recommendations, and updates.

"Without the use of manual access methods such as scaffolding, shipowners can eliminate up to two weeks' downtime and save up to S\$280,000 per inspection," Mr Ng notes. "Monetary savings for clients are a bonus; our aim is to keep inspectors safe."



Teqplay's founders are Mr Léon Gommans (Left) and Mr Richard van Klaveren, Chief Technology Officer

TEQPLAY CREATES A SHARED POINT OF TRUTH FOR STAKEHOLDERS AND PROVIDES INFORMATION AND TOOLS.

Léon Gommans
CEO & Co-founder
Teqplay

TECHNOLOGY

DID YOU KNOW?

SPC is an annual industry-wide initiative under Port Innovation Ecosystem Reimagined at BLOCK71 (PIER71), a collaboration between the Maritime and Port Authority of Singapore (MPA) and NUS Enterprise, the entrepreneurial arm of the National University of Singapore, to build a vibrant maritime entrepreneurial and innovation ecosystem in Singapore. Since 2018, tech start-ups with innovative ideas have stepped up to address key problems faced by maritime companies.

"As the world's busiest transshipment container port and a leading maritime hub, Singapore offers tremendous opportunities for start-ups in the maritime sector. In the two years since we started SPC, the number of quality proposals we have received has more than doubled. SPC brings fresh ideas to pressing challenges, such as digital disruption and tighter environmental regulations, and will inject life and vibrancy to the maritime innovation eco-system," said Dr Lam Pin Min, Senior Minister of State for Transport and Health at the Grand Finals of SPC 2019.

SPC 2019 IN NUMBERS

- ▶ **202**
proposals received
- ▶ **24**
teams
- ▶ **10**
finalists
- ▶ **300**
people (investors, corporate partners, venture capitalists, and maritime professionals) attended the Grand Finals
- ▶ **28**
innovation opportunities created
- ▶ **\$600,000**
disbursed by MPA for 12 projects

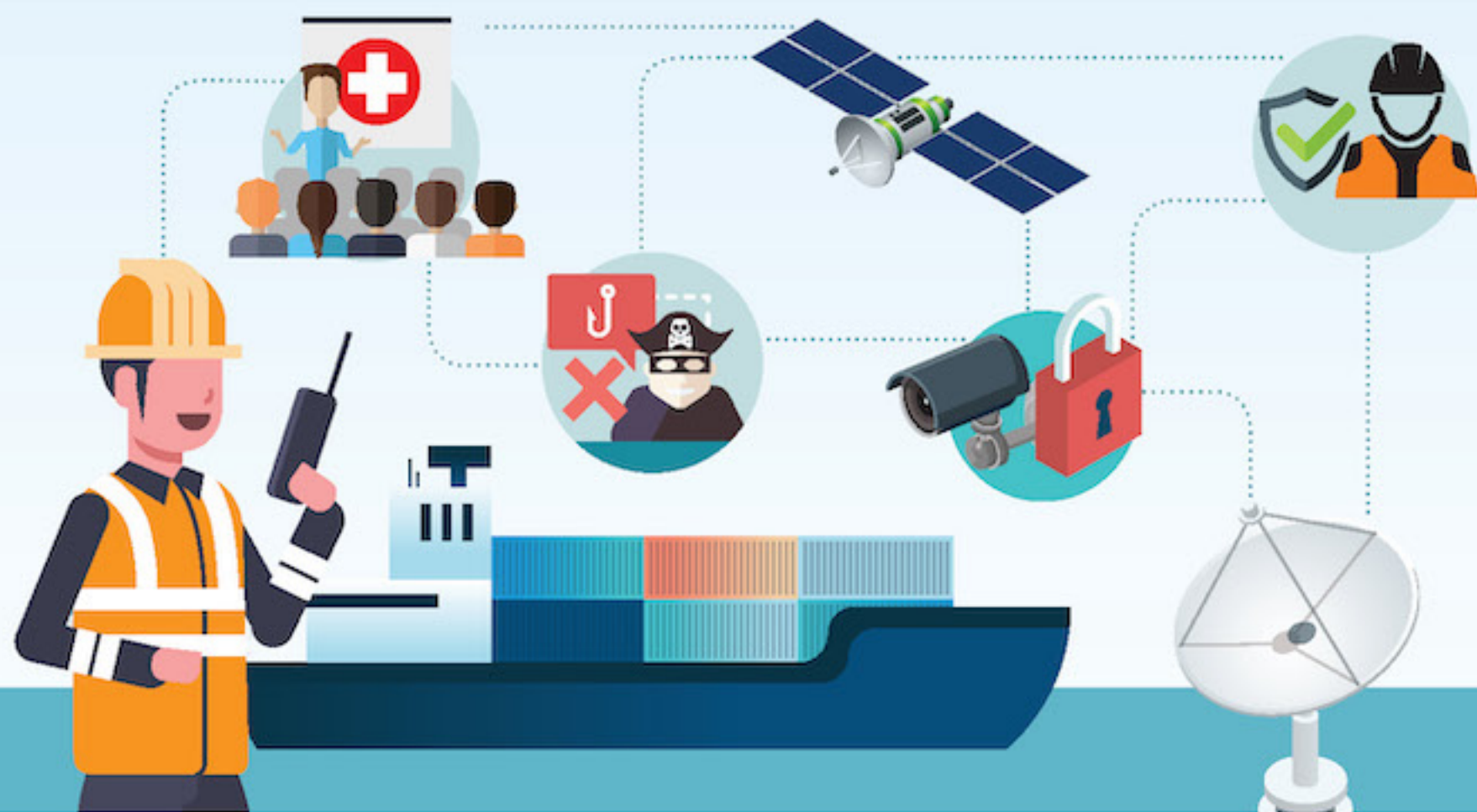


The founders of Performance Rotors are (from left): Mr Mervin Hoon (Chief Commercial Officer), Mr Keith Ng, and Mr Mark Toh (Chief Technology Officer)

WITHOUT THE USE OF MANUAL ACCESS METHODS SUCH AS SCAFFOLDING, SHIPOWNERS CAN ELIMINATE UP TO TWO WEEKS' DOWNTIME AND SAVE UP TO S\$280,000 PER INSPECTION.

Mr Keith Ng
CEO and Co-founder
Performance Rotors

COMPANY SPOTLIGHT



championing a safety-first culture

For more than 50 years, Pacific International Lines has upheld the principles of a positive safety culture. Jon White discovers how safety is kept top of mind at this enterprise

On August 23, 2019, the *Selatang Damai*, a fleet vessel, rescued 18 passengers from an abandoned ferry in the Java Sea. This was the latest of a string of rescue efforts by Pacific International Lines (PIL), a home-grown container liner and logistics services company.

"Despite conducting enhanced shipboard and shore training, as well as carrying out safety campaigns, accidents still occur on board merchant vessels — some of them leading to serious injuries," explains Captain Peng Chu Xing, Assistant General Manager, Quality, Safety & Security Department, Fleet Division, at PIL.

This is why PIL emphasises total visibility of safety issues on board its fleet vessels in order to foster a safer work environment.

SAFETY BY DESIGN

"At Pacific International Lines, we are fully committed to ensuring the safety of our crew and vessels," Capt Peng affirms. "At every stage of our operation, all PIL's vessels will be required to undergo maintenance. They are also regularly surveyed and audited to ensure that they meet the required international and national requirements, in addition to our own stringent standards."

For instance, before calling at the Gulf of Guinea, a particularly dangerous region for maritime piracy, PIL conducts rigorous security assessment for each vessel. Comprehensive security measures — such as shipboard hardenings, a security hotline, armed security escort, and subscribed security anchorages — are also put in place to mitigate security risks.

COMPANY SPOTLIGHT

AT PIL, WE NOT ONLY CONTINUOUSLY ENGAGE OUR SEAFARERS ON THEIR SKILL TRAINING, BUT ALSO ON THEIR EMOTIONAL HEALTH, BY ENCOURAGING A POSITIVE WORK ENVIRONMENT. WITH THE RIGHT ATTITUDE, ACCIDENTS AND INJURIES ON BOARD CAN BE GREATLY REDUCED.

Dispelling the notion that older vessels are less safe, Capt Peng stresses that safety issues are not directly related to the age of ships. "We have some older fleet vessels that possess excellent safety records through regular maintenance by the dedicated officers and crew on board," he shares.

The key to safety, Capt Peng believes, is open communication. "At PIL, we believe in fostering an open communication culture throughout our organisation to promote safety," he says. "Staff at all levels are encouraged to raise safety concerns, and communicate with those around them as well as directly to the Head Office, according to our established procedures and channels, ensuring that safety issues are addressed without any delay." To promote open and efficient communication on board and ashore, PIL has also introduced a range of safety initiatives, including regular seminars, pre-joining briefings, de-briefings, ship visits, internal audits, sailing inspections, as well as shipboard management meetings.

Capt Peng cautions that a lack of situational awareness, non-compliance of established procedures, or inadequate risk assessments may result in a lapse of judgement, adding that most accidents are preventable. "The complacent attitude by some seafarers remains a critical threat to safety at sea," he asserts. While skills can be taught through training, Capt Peng views the instilling of the right attitude as a bigger hurdle to surmount. Emotional and mental health is thus crucial as issues arising from emotional or mental health could lead to injuries and accidents. "We not only continuously engage our seafarers on their skill training, but also on their emotional health, by encouraging a positive work environment. With the right attitude, accidents and injuries on board can be greatly reduced."

INNOVATIONS IN SAFETY

By leveraging digitalisation, PIL is able to closely monitor voyages round the clock, as well as transform safety at sea. "Safety challenges can be mitigated to a certain extent by technology," Capt Peng suggests.

Among the new innovative technologies that PIL is actively exploring is a psychological and emotional health assessment tool co-piloted with Austin-based start-up Senseye.co. "The trial is run as part of Lloyd's Register Safety Accelerator, enabling Pacific International Lines to assess our crew's psychological and emotional health before commencing an important task or scheduled watch," Capt Peng says. The three-month trial will allow us to better manage seafarers' safety and fitness for duty, which could prevent injuries, death, or damage to property or the environment. PIL is also in close consultation with a third-party service provider for weather routing advice.

"I encourage all seafarers to remain vigilant and maintain a positive attitude towards safety as they continue to learn and upgrade their skills. How we perceive and manage safety is greatly dictated by our attitude," he urges. "We cannot be complacent."



DID YOU KNOW?

For its high safety standards and rescue efforts at sea, PIL was conferred the Maritime and Port Authority of Singapore Safety@Sea award in 2018. "We are greatly honoured to have received the award as it is a recognition of our seafarers' efforts in promoting safety at sea. We look forward to continuing to play our part as a responsible stakeholder of the international maritime community," says Capt Peng. In the photo above, he is on the right, accepting the award on behalf of PIL from Mr Michael Phoon, Executive Director, Singapore Shipping Association.



bridging gaps in safety concerns

Captain Allan Gray, President of the International Harbour Masters' Association, addresses disjointed safety concerns at the ship/shore interface

When ships arrive and depart from a port like a piece of beautifully orchestrated performance art, an observer is likely to assume that there is good communication between teams on the bridge and on shore, that the ship/shore interface is up to speed, and that there are good safety standards.

The reality is that we are not always communicating well with each other, leading to safety concerns and practices of one party being conveyed incompletely or insufficiently to other stakeholders. Safety concerns are disjointed and the gaps need to be bridged.

BREAK IN COMMUNICATIONS

Imagine that there is a new class of ship turning up at a port. The pilots did not get any information

about it until about a week ago, when it was put into the system. Now they have to deal with a ship that is bigger, wider, and heavier than anything they have ever dealt with before. The moment the pilots step on board that ship, they have just a few minutes to understand the vessel — to walk into a team and perform as part of that team, and for that team to welcome the pilots and engage with them.

In this scenario, something has gone wrong: a lack of communication between maritime businesses and ports. Despite the number of companies who talk about communicating more effectively with the ports, communication hardly gets going early enough. The industry is constantly changing ships without consulting anyone, forcing pilots and captains to deal with the situation on the fly.

COMMENTARY

We have the technology that allows us to communicate more easily, so why are we not using it? Detailed information, such as passage plans and past incidents, can all be sent for the Master Pilot Exchange before the vessel arrives.

DISCONNECTED SAFETY AND TRAINING STANDARDS

Another example of disjointed safety concerns involves Bridge Resource Management. We have two different training regimes: Bridge Resource Management, and Bridge Resource Management for Pilots.

How can we have the same team trying to utilise two different methods at the same time when trying to bring in a ship? It just does not make sense. We need to combine the two training regimes, and we can use technology to achieve this. Through technology, we can allow pilots to train with ships, captains, and teams on a regular basis, be it virtually or through simulation.

Now imagine that we have successfully navigated through the passage, and the vessel is now alongside us. Here is an interesting fact: Captain James Cook had the same mooring system as modern container ships, even though vessels now are so much bigger. The calculations for our mooring systems do not require ships to take beam wind speeds into consideration. Modern container ships will exceed safe working loads at 25 knots, yet the crane will run at 39 knots. Do I get ships to start leaving the ports at 25 knots when the stevedore wants to keep working up to 39 knots? This is another disjoint in safety concerns.

MANAGING RISK IN CHANGE

Out of all these, I would say that the biggest cause of disjointed safety concerns is change management.

Essentially, maritime companies like to bring on board new ships without consulting those who have

to handle them in the ports; neither do we consider the impact these vessels have on port infrastructure. These changes are introduced so quickly that pilots are faced with new challenges and higher risks, so it is hardly a surprise that pilots are resistant to these changes. The industry is very poor at change management, and this is something that we will be discussing in depth, along with digitalisation, during the upcoming 12th International Harbour Masters Congress in October 2020 at Hobart.

Be it pilot or port, our livelihood relies on ships coming in and leaving safely. At the ports, we have the added responsibility of managing port safety. It boils down to risk management, but we can only effectively manage risk once we have sorted out change management. To do this, regular consultation with shipping lines and port users is essential, and shipping lines need to understand the impact that the introduction of larger vessels or new classes of vessels will have. We need to bring everyone along on the journey to achieve good design and ongoing operational excellence in safety and efficiency. One example is the annual safe ships forum conducted by Pilbara Ports. This is an open forum involving both the port operator and ship handlers to jointly optimise safety in design.

Failure to consult or allowing adequate time for consultation inevitably results in pushback. When that happens, it is very difficult to make constructive progress forward with both parties taking strong opposing positions. Both parties should seek first to understand the issues from both sides — why shipping lines need to change to different vessels or technologies and why pilots have concerns; to agree on the outcome; and to inform all parties of the issues or difficulties and set a reasonable time frame to investigate the options. It is in everyone's interest to grow trade in a safe, efficient and sustainable way, but if we operate in silos, no one wins.

**ABOUT CAPTAIN ALLAN GRAY**

President and CEO of Halifax Port Authority, Capt Gray served as Harbour Master and General Manager Port Operations at Fremantle Ports for more than 11 years, where he gathered a wealth of experience in port operations. He was also elected President of the International Harbour Masters' Association at the Association's 11th Congress in London in June 2018.

Before coming ashore, he had a 20-year career at sea, which saw him trading on various vessels — from ro-ro to container and bulk — and spending time on LPG tankers with Bergesen of Norway. He has sailed to Japan, Europe, Africa, South America, and the United States.

Since coming ashore in 2011, he has worked with the Australian Maritime Safety Authority and Maritime Safety Queensland, where he was involved in managing marine incidents, as well as serving as Manager Vessel Traffic Management at VTS Mackay/Haypoint and Reefcentre. He also diversified into systems development and management, where he gained extensive experience in the operation of various systems, such as Dynamic Under Keel Clearance and Berth Warning Systems.

COMMUNITY TALK



in the wake of IMO 2020

With more than 90% of shipowners committed to making the switch to fuels that meet the International Maritime Organization's 2020 Fuel Oil Sulphur Limit, what are the potential challenges that may arise? Adaline Teo listens as a panel of experts fielded questions on fuel availability, cleaning, insurance, and blending at the Singapore Registry of Ships Forum held on November 8, 2019, at the Grand Copthorne Waterfront hotel

MODERATOR:

(1) Mr Mario Moretti, Council Member, Singapore Shipping Association; Marine & Energy Asia Senior Director, RINA

PANELLISTS:

(2) Mr Goh Chung Hun, Director (Shipping), Maritime and Port Authority of Singapore

(3) Ms Maite Bolivar Klarup, General Manager, BIMCO Singapore

(4) Mr Siddharth Mahajan, Loss Prevention Executive Asia, Gard Singapore Pte Ltd

(5) Mr Yeong Yew Wei, Senior Technical Manager, Ocean Tankers

ILLUSTRATION: THEBLACKKENVAS.COM

COMMUNITY TALK

MODERATOR: WILL COMPLIANT FUEL AVAILABILITY BE AN ISSUE?

MR GOH CHUNG HUN (GCH): Speaking on behalf of the Singapore Port, compliant fuel will be available. As you can see, bunker suppliers are already stocking up on compliant fuel, with some of the stock already being kept onboard offshore storage tankers.

MS MAITE BOLIVAR KLARUP (MBK): The seven or eight mega ports will have enough compliant fuels to cope with the new demand; with small ports, it really depends on whether the demand is for high-sulphur or low-sulphur fuel. The number of ports at which high-sulphur fuel oil is offered is reducing and could be limited for ships with scrubbers.

MODERATOR: ALTHOUGH THE CHARTERER IS SOMETIMES IN CHARGE OF PURCHASING THE FUEL OIL TO BE USED, THE SHIPOWNER IS RESPONSIBLE FOR COMPLIANCE. HOW SHOULD THE INDUSTRY RECONCILE THIS?

MBK: In a time charter party, the charterers provide fuel for the vessel. The owners place the responsibility of compliant fuel on the charterer, so the charterer has contractual obligations by the charter party to comply with low-sulphur fuel. However, the owner is still responsible for compliance with the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI. That's why it's very important to allocate responsibility for owners and charterers under the charter party, to ensure that the vessel is compliant with the fuel requirements. It is critical to understand that, even if the fuel is supplied by the same supplier and has the same grade, it needs to be segregated to avoid compatibility issues and contamination.

MODERATOR: ARE THERE ANY BACKUP PLANS IF THE CHANGEOVER FAILS?

MR YEONG YEW WEI (YYW): We have more than 10 vessels using compliant fuels. So far, the changeover has been successful; we did not get and do not foresee any abnormality reports. The ships also carry Low Sulphur Marine Gas Oil for both changeover maintenance as well as an operations backup plan in case there are problems.

MBK: There is a lack of clarity on some practical and commercial issues around bunkers. I recently spoke

to a ship operator who mentioned that we may see fuels coming with a "use before" or "best before" date — stability issues may arise when fuels are stored for a long time in the tanks.

Availability may not be the issue. The issue is, "How do I behave as an operator if I am in a port where there is compliant fuel, but it is not compatible with my operation?"

GCH: Compliant fuel can be low-sulphur fuel oil 0.5% or Marine Gas Oil (MGO). In most ports, MGO will be available. Still, if we come across a scenario where the port only has low-sulphur fuel oil 0.5%, and the owner can prove that it does not meet the engine manufacturers' specification, then it can be considered a Fuel Oil Non-availability Report (FONAR) case. If the ship can submit the justification, then — speaking on behalf of Singapore — we will honour the FONAR. I must stress that FONAR is not a get-out-of-jail card; you can only use that excuse once. If you submit a second one with a similar excuse, then it's clear that you didn't plan properly and it may then become an International Safety Management Code issue.

MBK: With FONAR, you need to account for — according to your Ship Implementation Plan —

Q & A

SPEAKING ON BEHALF OF THE SINGAPORE PORT, COMPLIANT FUEL WILL BE AVAILABLE. AS YOU CAN SEE, BUNKER SUPPLIERS ARE ALREADY STOCKING UP ON COMPLIANT FUEL, WITH SOME OF THE STOCK ALREADY BEING KEPT ONBOARD OFFSHORE STORAGE TANKERS.

MR GOH CHUNG HUN
DIRECTOR (SHIPPING)
MARITIME AND PORT AUTHORITY OF SINGAPORE

COMMUNITY TALK

AVAILABILITY MAY NOT BE THE ISSUE. THE ISSUE IS, "HOW DO I BEHAVE AS AN OPERATOR IF I AM IN A PORT WHERE THERE IS COMPLIANT FUEL, BUT IT IS NOT COMPATIBLE WITH MY OPERATION?"

MS MAITE BOLIVAR KLARUP
GENERAL MANAGER
BIMCO SINGAPORE

why you are going into the port to get bunkers, knowing that compliant fuels are not available. Even if a ship, against all efforts, ends up in a situation where the only solution is to bunker non-compliant fuel, the ship is deemed non-compliant according to regulation 18.2 of MARPOL Annex VI, and the FONAR will not get you out of the situation. If your explanation is convincing, it does not mean the port state control will not impose a fine. It is not enough just to fill out the FONAR. You actually need to be able to provide evidence that you did all you could to be compliant, but your efforts were in vain. FONAR, while meant as a useful last resort for a ship arriving with non-compliant fuel at a port, could come with an expensive price tag.

MR SIDDHARTH MAHAJAN (SM): Speaking of FONAR, I would like to mention International Maritime Organization's (IMO) Global Integrated Shipping Information System (GISIS) platform. Some states are using it to upload a variety of information relating to Annex VI, and evidence of non-availability of compliant fuel oil is one of them. If all states make judicious use of the GISIS platform, then owners, managers, and charterers can benefit from it, such as when planning bunkers.

MODERATOR: FROM THE INSURANCE PERSPECTIVE, DO YOU FORESEE AN INCREASE OF CLAIMS FROM FAILURE OF MACHINERY DUE TO THE USE OF COMPLIANT BUT INCOMPATIBLE FUEL?

SM: The general feeling is that there is an increased

risk. We are seeing some claims already with regard to fuel being off-specification marginally but which could have been consumed with better fuel management onboard.

MODERATOR: ARE THERE ANY SAFETY OR OPERATIONAL CHALLENGES WHEN CLEANING THE BUNKER TANKS IN PREPARATION FOR IMO 2020? HOW MUCH RESOURCES WERE USED?

YYW: For our fleet of 14 vessels, cleaning took about five days — one day for testing and doing risk assessment before entering the tank, and three to four days to clean the tank manually. In terms of resources, six to eight crewmembers worked on a rotational basis to clean it. So far, it has been successful.

MODERATOR: FOR SHIPS CHOOSING TO USE HIGH-SULPHUR FUEL OIL (HSFO) WITH OPEN-LOOP SCRUBBERS, ARE THERE CONCERNS ABOUT WASTEWATER DISCHARGE RESTRICTIONS AT CERTAIN PORTS? DOES THE SHIP NEED TO FLAG THAT THERE IS NO LOW-SULPHUR FUEL OIL (LSFO) ONBOARD?

GCH: That's a good question. The ports that are prohibiting the discharge of wash water from open-loop scrubbers are listed on many sites online. Ship operators should check the requirements of their destination port if the vessel is fitted with open-loop scrubbers. If you know in advance that LSFO may not be available at the port, then your ship should be prepared to have LSFO onboard. If you go to a port without low-sulphur fuel onboard, you cannot use your open-loop scrubber. Then you'll have to report to the flag and to the port, whereby the port will have certain instructions. For example, if it is our Port of Singapore, we will say that you can come in but please use bunker-compliant fuel thereafter, and stop your scrubber.

MBK: Will the ship then be in a non-compliant situation if it doesn't have LSFO while calling at Singapore port with a scrubber?

GCH: The ship will be non-compliant in terms of that port's regulation, because the prohibition of discharge of open-loop scrubber is a port's regulation. So if you inform the port in advance and the port agrees to let you come in, you can go into port and take on compliant fuel.

COMMUNITY TALK

Q & A

MODERATOR: IF COMPLIANT FUEL IS NOT AVAILABLE AT THIS PORT, HOW MUCH OIL CAN I BUNKER? WHAT IS THE PROCEDURE TO ALLOW AN OPERATOR TO BUNKER THE RIGHT QUANTITY OF FUEL AND TO AVOID ANY PROBLEM AT THE NEXT PORT OF CALL? WHAT IF THE PORT HAS NO FACILITIES FOR DEBUNKERING IF THERE IS A NEED TO DISCHARGE?

GCH: Some due diligence will have to be exercised by the ship operator. When a ship enters a particular port, the ship will have some leftover fuel. Let's say this is compliant fuel but it is not enough for the next voyage. She needs to bunker, but the port does not have compliant fuel. What she can do is to take onboard only a sufficient amount of the non-compliant fuel to make up the difference, submit the FONAR to the flag, and finish off this amount of non-compliant fuel while at sea, then change over to the remaining compliant fuel onboard before arriving at the next destination. This will minimise debunkering and save a lot of headache with the destination port.

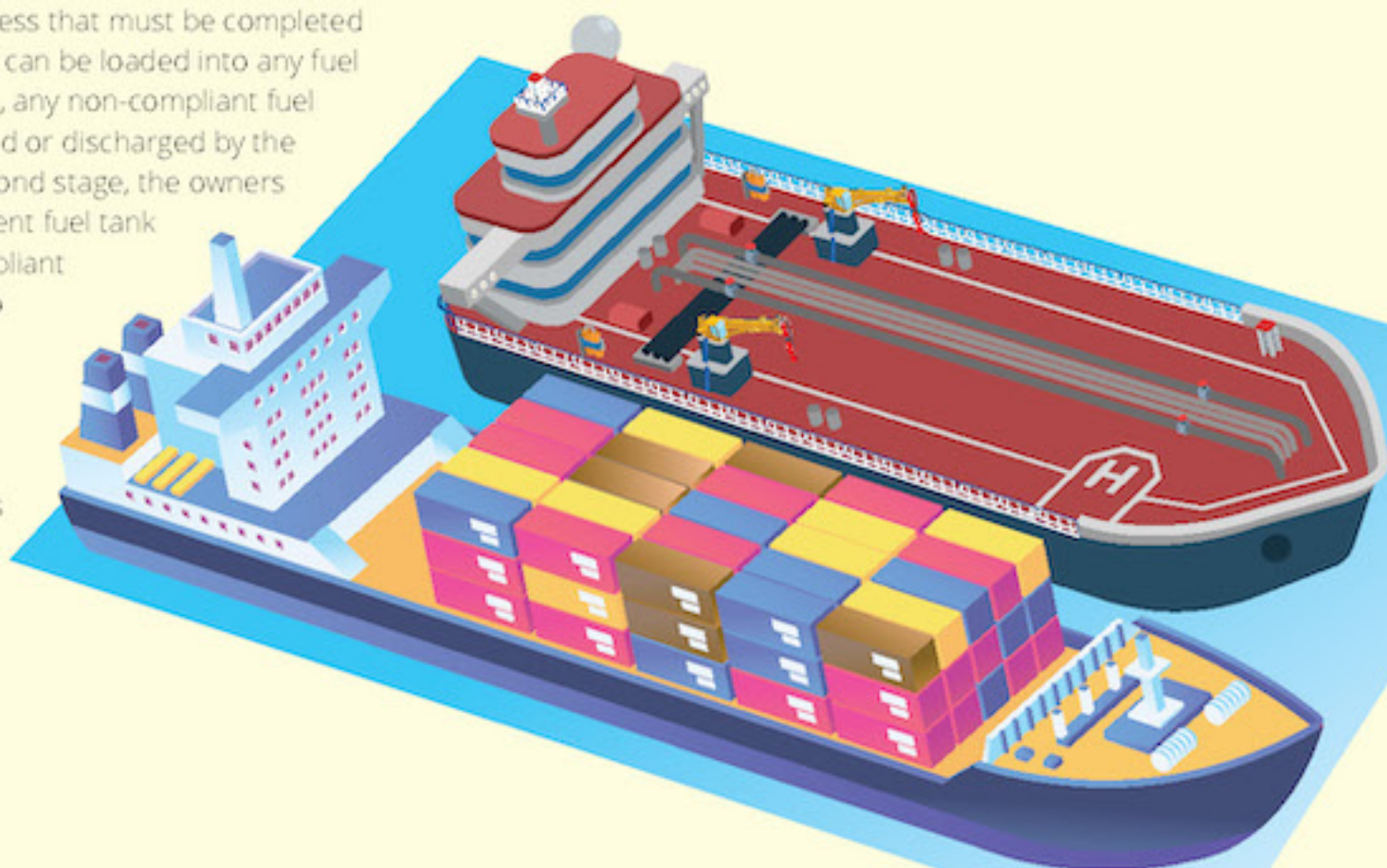
MODERATOR: WHAT FEEDBACK HAS BIMCO RECEIVED REGARDING THE FUEL TRANSITION CLAUSE, ESPECIALLY ON THE TIMELINE TO SWITCH OVER?

MBK: The BIMCO 2020 Fuel Transition Clause deals with a two-stage process that must be completed before compliant fuel can be loaded into any fuel tank. In the first stage, any non-compliant fuel needs to be consumed or discharged by the charterers. In the second stage, the owners must make the recipient fuel tank fit to receive the compliant fuel. I was speaking to a shipowner who felt charterers are not playing that role as they are pushing that responsibility towards shipowners. As it is not stated in the

agreement, it is up to shipowners and charterers to find a way to agree on the consumption of non-compliant fuel. The switch is a process that requires the owners and charterers to cooperate to ensure a smooth transition.

MODERATOR: IS BLENDING OF FUELS ALLOWED UNDER IMO 2020? WHAT ARE THE POTENTIAL PROBLEMS?

GCH: There are shipowners who are concerned that their ships will have leftover non-compliant fuel come January 1, 2020, and they do not intend to spend time and money to clean the tanks. They have asked if they can dilute and mix compliant fuels for use. We advised them not to do it. In MARPOL, when it comes to bunker fuel, there is no specific regulation, unlike liquid bulk cargo, but there are issues mixing fuels onboard. This is because, if you blend, the Bunker Delivery Note (BDN) becomes invalid. Thus you will not have a BDN for the blended product you have created. Furthermore, there is no guarantee that this blended product will meet the 0.5% specification or any other parameters set out in ISO 8217, so we strongly discourage this practice.



making a good first impression

Mr Alex Lee, Senior Manager in PSA Marine's Pilotage Services Department, believes that pilots have to be well trained as a pilot is the first person in Singapore that ships entering our port will meet. The Master Pilot shares with Patricia Ang what his job entails

A self-confessed "meticulous and quiet person", Mr Alex Lee says that his hobby of fixing and collecting navy ship models during his younger days developed his interest in the maritime industry and led to a Diploma in Nautical Studies.

After a stint as a ship planner, Mr Lee joined PSA Marine in 1996 as a trainee harbour pilot. In 2004, he became the youngest A1 pilot serving in the Port of Singapore when he attained the highest class of Pilotage Licence (Class A1) in March that year. To date, he has piloted more than 13,000 vessels calling at the Port of Singapore.

"I feel a sense of achievement. I'm proud to be the youngest A1 pilot serving in the Port of Singapore at that time," says Mr Lee. "As a harbour pilot, I am the ambassador for the Port of Singapore. Harbour pilots are the first group of people to greet a Captain after a long voyage; they create the first impression of Singapore."


TRAINING & DEVELOPMENT

Mr Lee oversees the training and development needs of all pilot trainees and licenced pilots in PSA Marine. He develops the content of the courses, and ensures that their professionalism is above the standard set by the various authorities and international organisations. He has instructed more than 140 trainee harbour pilots in Singapore.

Harbour pilots are required to attend a crisis management and emergency procedure course on



CAREERS



handling crises on ships. "It is important to prepare and renew the skills and knowledge of the harbour pilots on standard operating procedures (SOPs). The emergency drills during the simulation training better prepare the harbour pilot to handle a real-life crisis in terms of professionalism and composure," he shares.

SAFETY & SECURITY

Having been in the maritime industry for more than two decades, Mr Lee acknowledges that there is now more advanced technology in use.

For example, harbour pilots can now refer to modern radar equipment that contains the Electronic Chart Display and Information System. This is a geographic information system used for nautical navigation that superimposes the position and name of vessels in the vicinity. In the past, vessels had to be piloted through the congested anchorage using radar with a cathode-ray display, where the vessel's radar echo would appear for only about one to two seconds before disappearing; this worked better in the dark. During the day, a curtain would be draped over the radar to facilitate viewing. The pilot would thus need to get used to moving frequently from a dark to bright environment while manoeuvring the vessel. Another big challenge was that the plotting of targets had to be done manually with a china graph on the display. "Ships are manned with more competent crew and more reliable machines these days," he comments.

Mr Lee also notes that port security has become more stringent, while the general awareness of safety issues has improved considerably through training and constant reminders. With the International Maritime Organization A.960 (23) for training of marine pilots and International Convention for the Safety of Life at Sea, 1974, Chapter V Safety of Navigation, Regulation 23, which covers pilot transfer arrangement, pilots and crew now possess better knowledge. "Hence, working conditions have improved," he affirms.

Thanks to the implementation of the International Ship and Port Facility Security Code, which lists security arrangements for ships, ports, and government agencies, there is greater security awareness on board ships and at the terminals. For instance, personnel moving in and out of the terminals have to display proper identification, which are subject to stringent checks. In addition, the perimeters have been fenced up, a watchtower was constructed on Jurong Island, and more sea patrols are being conducted by the Police Coast Guard.

SIMULATOR INSTRUCTOR

Mr Lee is also a simulator instructor who designs training exercises and facilitates training sessions for harbour pilots. He designed and created the simulation training scenarios and modules for new facilities and key maritime projects in Singapore, including Marina Cruise Centre, Singapore's first liquefied natural gas terminal, and Sembcorp Marine Tuas Boulevard Yard.

"Simulation training requires the identification of the training needs of learners and the use of resources to improve training scenarios, which are taken into consideration for the development of future SOPs. Training pilots in the simulator on a new maritime facility can mentally prepare them for the actual crisis," he explains.

As the maritime industry is "as deep as the ocean and way beyond the horizon", Mr Lee has this piece of advice for people aspiring to join the industry: "Be humble, adopt a positive attitude towards new knowledge, and do not be selective about what you want to know or learn." He stresses the importance of harbour pilots being self-motivated and fully committed. Harbour pilots have to be prepared to work on weekends and public holidays, and Mr Lee is grateful to his family for putting up with this aspect of his work.



Those who wish to be a certified simulator instructor must undergo on-the-job training on the system with another instructor and be assessed by the system owner. The minimum entry qualification of a harbour pilot is the Certificate of Competency Class 3 Deck Officer. Obtaining certification as an A1 master pilot will require a minimum of 10 years' piloting experience and the passing of several tests.

international chemical and oil pollution conference and exhibition

Held from October 21–24, 2019, the MPA-organised 11th edition of the International Chemical and Oil Pollution Conference and Exhibition (ICOPCE) turned the spotlight on strategic, operational, and tactical aspects of response strategies for chemical and oil cargoes.

AT A GLANCE: ICOPCE (CONFERENCE) 2019 NUMBERS

10	314	36
EXHIBITORS	ATTENDEES	COUNTRIES FROM WHICH ATTENDEES HAILED

AT A GLANCE: ICOPCE (EXERCISE) 2019 NUMBERS



As part of ICOPCE 2019, a multi-agency Chemical Spill Exercise was held. It simulated the collision of two tankers, resulting in the spillage of 500 tonnes of xylene into the sea. The exercise involved:

10	100	20
CRAFTS including: • Mass Rescue Vessel (SCDF) • Mata Ikan (MPA) • Patrol craft (MPA) • Patrol craft (PCG) • Rapid Fire Vessel (SCDF)	OBSERVERS AT SEA	GOVERNMENT AGENCIES including: • JTC • MINDEF • MPA • PCG • SCDF • SDC • SPF
150 EXERCISE PARTICIPANTS		



SINGAPORE MARITIME TRAIL



OUR LEGACY

Do you know that Singapore was not a sleepy fishing village before the British arrived, despite popular lore? In fact, Singapore has a maritime landscape that evolved from a British trading post in the mid-1800s to a premier global hub port and international maritime centre!

Launched in March 2019, SMT 3 will bring you on a journey to discover the links that connect Singapore's rich maritime trade activities with the country's colourful culture, specifically how it influenced and shaped our identity as a nation today.

Are you ready to put on your walking shoes and comfortable attire whilst we take you on a journey to discover more about Singapore's rich maritime stories through the different Singapore Maritime Trails?



Find out more about
'Our Heritage' and
'Our Progress' through
Singapore Maritime
Trail 1 and 2 too!



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