



02/2015 no.31



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# SMART PORT SOLUTIONS



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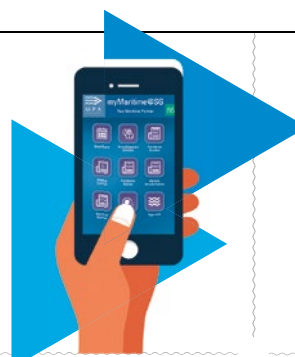
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# DISCOVER SG 50 SINGAPORE'S RICH MARITIME STORIES

Sign up now for complimentary guided tours of the **Singapore Maritime Trails 1 and 2** in August!

As part of Singapore's SG50 celebrations this year, MPA will be running additional guided tours for our Singapore Maritime Trails 1 and 2 in August 2015. Choose your preferred timings on the weekends listed below. Spaces for each tour are limited, call +65 6836 6466 (Mon-Fri, 9am-6.30pm) or email [fang\\_jiayun@mpa.gov.sg](mailto:fang_jiayun@mpa.gov.sg) to register now!



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DATES	Singapore Maritime <i>Trails 1</i>	Singapore Maritime <i>Trails 2</i>
1 and 2 August	9 AM - 11.30 AM or 3PM - 5.30PM	9 AM - 11.30 AM or 3PM - 5.30PM
15 and 16 August		
22 and 23 August		
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The Singapore Maritime Trails is an initiative by  
The Maritime and Port Authority of Singapore  
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# forging ahead

*The maritime industry has undergone significant transformation in recent years, bearing witness to the emergence of bigger, smarter and greener ships, the proliferation of real-time response systems, and the building of more efficient and intelligent ports.*



For Maritime Singapore, the future is here and now. Despite its humble beginning, Singapore has been able to establish itself as a global hub port and leading international maritime centre through a combination of factors, from geographic position to strategic vision. Key among these is its ability to respond quickly to emerging global trends and successfully invest in these areas. With the shift in the economic and maritime centre of gravity to Asia, technology will be important in keeping Singapore ahead of the competition.

In anticipation of future growth, the Maritime and Port Authority of Singapore (MPA) has embarked on a series of initiatives and programmes that bank on innovative application of the latest technology to turn the Port of Singapore into a smarter, safer and more productive port. Read more about these efforts in this issue's main feature.

With safety a priority in Singapore's port waters, MPA and research and consulting group DHI Water and Environment jointly undertook a Real-Time Under Keel Clearance project, which will improve navigational safety for vessels transiting the Singapore Strait or navigating in our port by

providing real-time monitoring of the vessels' under keel clearance. Find out more about this project in the Technology section.

In this issue, we feature two prominent individuals from the maritime industry in the Personality section. The first is Mr Andrew Winbow, Assistant Secretary-General of the International Maritime Organization, who talks about some of the pertinent issues his organisation is working on. We also speak to Mr Tung Chee Chen, Chairman of Orient Overseas (International) Limited, who shares his keen observations on some of the future trends in the container shipping sector.

In the Community Talk section, the heads of four regional port authorities share their vision of a future-ready port.

Through this issue, we hope to share with you some of the exciting developments that are underway in the dynamic maritime industry.

**AU KHENG SHENG**  
EXECUTIVE EDITOR



## REAFFIRMING SINO-SINGAPORE MARITIME TIES

An eight-member Singapore delegation, led by Mr Andrew Tan, Chief Executive of the Maritime and Port Authority of Singapore (MPA), attended the ninth China-Singapore Senior Officials' Committee Meeting in Shanghai from April 7 to 10.

The annual meeting between MPA and the People's Republic of China's Ministry of Transport provides senior maritime officials from both countries with an opportunity to exchange views on maritime matters of common interest and to further bilateral cooperation.

Topics discussed at the meeting included the Co-operative Mechanism On Safety Of Navigation And Environmental Protection In The Straits Of Malacca and Singapore, ongoing International Maritime Organization issues such as the Ballast Water Management Convention, piracy and armed robbery, as well as China's initiative of the 21st Century Maritime Silk Road.

As part of the visit, the MPA delegation also visited Yangshan Port and Yangshan Vessel Traffic Service Centre to learn about the Shanghai port's operations.

## IMPROVING MARITIME TRAINING

To enhance realism and boost the quality and efficiency of maritime training in Singapore, the Maritime and Port Authority of Singapore (MPA) has set up a Vessel Traffic Service Simulator at the Port Operations Control Centre Vista. It was unveiled at a commissioning ceremony on March 27 by MPA Chief Executive Mr Andrew Tan.

Comprising five consoles, the simulator provides the full functionality of a Vessel Traffic System operator workplace while allowing Vessel Traffic Management Officers to be trained in varied and realistic scenarios in a risk-free environment. It achieves this by using the latest Vessel Traffic Information System, equipped with simulated configurations from other monitoring systems. The system can also closely imitate real-life ship movements and environmental conditions in a simulated waterway.

These functions allow instructors to create areas with different navigational situations, control target ships, and generate various training scenarios and tasks.

## SINGAPORE IS BEST SEAPORT IN ASIA FOR 27TH TIME



The Port of Singapore has beaten Hong Kong and Shanghai to be named the Best Seaport in Asia for the 27th time, at the 2015 Asian Freight, Logistics and Supply Chain Awards.

The award ceremony, held in Hong Kong on June 24, honoured organisations for demonstrating leadership as well as consistency in service quality, innovation, customer relationship management and reliability. It was organised by freight and logistics publication *Asia Cargo News*, with the winners determined by votes from its readers.

The Port of Singapore stood out for its leading performance on a range of criteria, including cost competitiveness, timely and adequate investment in new infrastructure to meet future demand, and the facilitation of ancillary services.

Mr Andrew Tan, Chief Executive of the Maritime and Port Authority of Singapore said: "We will continue to work closely with all our stakeholders to strengthen our competitiveness as a premier global hub port and

international maritime centre.

"Singapore will also continue to plan and invest ahead; our commissioning of Pasir Panjang Terminal Phases 3 and 4, for example, will increase the overall capacity of Singapore's port to 50 million TEUs (twenty-foot equivalent units) when they are fully operational."

Prime Minister Lee Hsien Loong officially opened the terminals on June 23. They will be fully operational by the end of 2017.

Last year, the Port of Singapore continued to achieve good growth. Annual vessel arrival tonnage reached 2.37 billion gross tonnes (GT), container throughput hit 33.9 million TEUs, and total cargo tonnage handled reached 580.8 million tonnes.

The total volume of bunkers sold in the Port of Singapore remained the highest in the world, at 42.4 million tonnes. And the total tonnage of ships under the Singapore Registry of Ships was 82.2 million GT, putting Singapore among the top 10 ship registries in the world.



## LAUNCH OF SMART PORT INITIATIVES

At the Building A Smarter Port Of Singapore launch event on March 23, the Maritime and Port Authority of Singapore (MPA) announced new initiatives that harness the use of mobile technology and wireless connectivity to enhance communications, productivity and crew welfare in the Port of Singapore.

These include collaborating with local telco M1 to improve broadband coverage in Singapore's port waters by providing high-speed wireless 4G broadband access up to 15km from the coast, extending free Wi-Fi services to the public at MPA-managed terminals such as at Changi Point Ferry Terminal from July 1, and launching a new mobile app, myMaritime@SG, for the maritime community and the public to access maritime information and services on their mobile phones.

MPA and the Singapore Shipping Association have also issued a joint call for proposals to invite the maritime community and solution providers to develop apps for the industry.

A Memorandum of Understanding (MOU) was also signed between MPA and M1 with the aim of leveraging mobile technology to enhance productivity and crew welfare. They will also work together on research and projects to test-bed new technologies to benefit the maritime industry.



## 30 AWARDED THE MPA GLOBAL INTERNSHIP AWARD



The Maritime and Port Authority of Singapore (MPA) has awarded 30 undergraduates from varying fields (Maritime Studies, Business Management, Economics, Accountancy and Law) with the MPA Global Internship Award (GIA). This year, 21 maritime companies from different sectors including shipping, shipbroking, ship finance, marine insurance, and offshore and maritime law are participating in the programme. This is the largest number of award recipients and participating companies since the GIA programme started in 2013.

The GIA award allows high-achieving local undergraduates from the National University of Singapore, Nanyang Technological University

and Singapore Management University to gain a deeper appreciation of the global nature of the maritime industry through a 10-week internship programme. GIA recipients will experience hands-on learning in both the local and overseas offices of participating maritime companies as the programme includes overseas stints of up to four weeks in Australasia, the Middle East, South Africa, Europe and the United States.

MPA Chief Executive Mr Andrew Tan said: "We are heartened by the encouraging response to the MPA GIA 2015, as the increased number of applications, recipients and participating companies indicate the value of the programme and commitment in developing manpower for Maritime Singapore."

**TOP** Some of the GIA recipients with Mr Andrew Tan, MPA's Chief Executive, and representatives of participating maritime companies.

**LEFT, TOP** Mr Andrew Tan (left), and Mrs Josephine Teo, Senior Minister of State for Finance and Transport, launching the myMaritime@SG mobile app. **BOTTOM** Ms Karen Kooi (extreme left), M1's Chief Executive Officer, with Mrs Teo and Mr Tan at the signing of the MOU.

**OPPOSITE** MPA's Director of Port Policy, Mr Tan Cheng Peng (left), received the award on behalf of the Port of Singapore.

SHIP'S LOG HAPPENINGS

## MAERSK PROJECT SUPPORTED UNDER GREEN TECHNOLOGY PROGRAMME



Maersk received a S\$2 million grant from the Maritime and Port Authority of Singapore's (MPA's) Green Technology Programme to retrofit four vessels.

## LAUNCH OF MARITIME YOUTH CLUB AND SINGAPORE MARITIME TRAIL 2



The Maritime Youth Club, an outreach initiative by MPA to raise awareness of Maritime Singapore among youth, was launched at the former Tanjong Pagar Railway Station on May 19. At the same event, MPA also launched Singapore Maritime Trail 2, which maps the development of Maritime Singapore.

## INTERNATIONAL BOWLING TOURNAMENT FOR SEAFARERS 2015



The Maritime and Port Authority of Singapore (MPA) hosted a Lunar New Year lunch at Customs House on Feb 25 for its friends in the media to express its appreciation for their strong support over the years. Mr Lucien Wong, MPA Chairman, outlined key highlights for MPA this year during his welcome remarks.



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SHIP'S LOG HAPPENINGS

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### VISIT BY SEYCHELLES MINISTER



Mr Jean-Paul Adam, the Seychellois Minister for Finance, Trade and the Blue Economy, visited MPA on March 13.

### VISIT BY PANAMA MINISTER



MPA hosted Mr Jorge Barakat Pitty, Minister of Maritime Affairs and Administrator of the Panama Maritime Authority, under its Distinguished Visitors Programme from April 19 to 24. During his visit, he also called on Mr Lui Tuck Yew, Minister for Transport and Second Minister for Defence.

### VISIT BY IMO ASSISTANT SECRETARY-GENERAL



Mr Andrew Winbow, Assistant Secretary-General and Director of the Maritime Safety Division at the International Maritime Organization, visited MPA on April 24.

# SMW 2015

The 10th edition of Singapore Maritime Week (SMW) saw over 50,000 public participants and members of the international maritime community gathering here for 30 diverse and exciting events organised around the theme of People, Ideas And Opportunities. *Singapore Nautilus* takes a look at some of the highlights of the annual flagship event driven by the Maritime and Port Authority of Singapore (MPA).

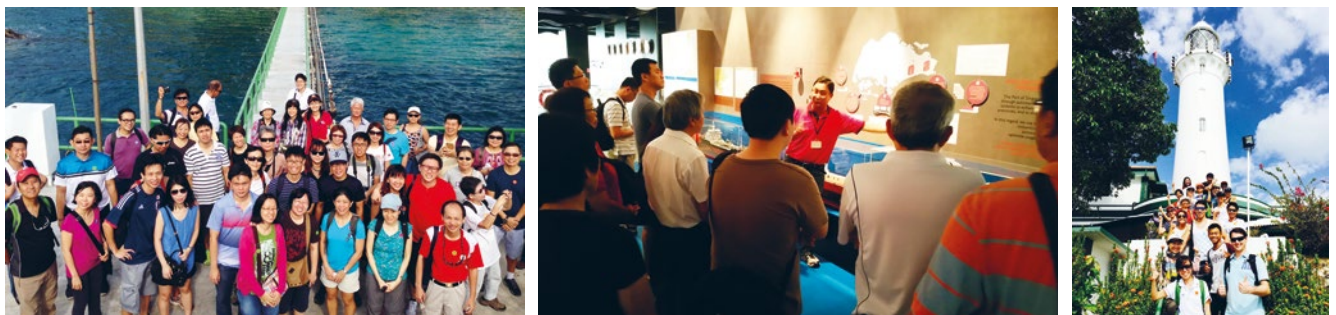
## PEOPLE

### LAUNCH OF SMW 2015 AND MARITIME HERITAGE EXHIBITION



Mr Lui Tuck Yew, Minister for Transport and Second Minister for Defence, officiated at the launch of SMW 2015, as well as the opening of the first ever Maritime Heritage Exhibition at the Marina Bay Sands Event Plaza on April 19. The public exhibition tells the story of how the past and present are shaping the future of Maritime Singapore through artefacts, interactive presentations and multimedia displays.

### MARITIME LEARNING JOURNEYS



More than 1,100 participants participated in this year's Maritime Learning Journeys, which brought them on trips out to sea as well as visits to Raffles Lighthouse and the Singapore Maritime Gallery.



SHIP'S LOG HAPPENINGS

**2ND CERTIFICATE OF COMPETENCY (COC) (SPECIAL LIMITS) GRADUATION CEREMONY**



Associate Professor Muhammad Faishal Ibrahim, Parliamentary Secretary for Health and Transport, presented insignias to cadets from the second batch of graduates of the CoC (Special Limits) training programmes for Deck Officers and Marine Engineers. To date, more than 250 Singaporeans have enrolled in these two programmes.

**IDEAS**

**9TH SINGAPORE MARITIME LECTURE (SML)**



About 400 high-level delegates and decision-makers in the maritime industry attended this year's SML, which was delivered by Mr Tung Chee Chen, Chairman of Orient Overseas (International) Limited. He also engaged the audience in a dialogue chaired by BW Group's Chairman, Mr Andreas Sohlen-Pao.

**SEA ASIA 2015**



A record 16,185 participants from 85 different countries took part in the fifth edition of Sea Asia 2015. Mr Lui Tuck Yew, Minister for Transport and Second Minister for Defence, officiated at the opening of the conference.



## SHIP'S LOG HAPPENINGS

## PORT AUTHORITIES ROUNDTABLE

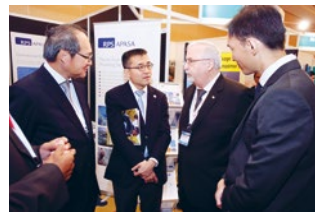


This closed-door roundtable event brought 10 port authorities from major ports around the world together to network, share insights on pertinent issues and best practices, and explore areas of collaboration. During the event, the Ports of Singapore and Rotterdam also signed a Memorandum of Understanding to exchange information on marine services and jointly collaborate on research and development in the areas of service efficiency and optimisation, and new developments in the maritime and port sectors.

## SINGAPORE MARITIME TECHNOLOGY CONFERENCE (SMTC)



## INTERNATIONAL CHEMICAL AND OIL POLLUTION CONFERENCE AND EXHIBITION 2015



The inaugural SMTC saw more than 60 eminent experts from around the world gathering to speak on a wide range of topics, from e-navigation to the use of automated and autonomous technologies, to about 300 participants from more than 10 countries.

Around 300 international maritime experts and participants from major oil and chemical companies, emergency response companies, shipowners and operators, as well as port authorities, attended this year's event. A chemical spill exercise, organised by the MPA, was also conducted during the event.

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SHIP'S LOG HAPPENINGS

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## ADVANCED MARITIME LEADERS PROGRAMME (AMLP)



The inaugural AMLP saw 13 senior maritime officials from Africa, Asia, the Caribbean, Europe, the Middle East and Oceania engaging in sharing sessions, panel discussions, case studies and crisis communication exercises over a five-day period.

## 14TH MPA BUNKER FORUM



The forum gathered bunker suppliers, craft operators, testing laboratories, surveyors and shipping companies and engaged and updated them on actions taken to improve bunkering services in the Port of Singapore.

## OPPORTUNITIES

### SINGAPORE INTERNATIONAL MARITIME AWARDS 2015



This year's awards ceremony honoured 11 industry partners for their outstanding contributions towards the growth of Maritime Singapore. Mr Lui Tuck Yew, Minister for Transport and Second Minister for Defence, also presented 38 maritime companies with the Maritime Sector Incentive Awards, which aim to facilitate the growth and expansion of shipowners and operators and maritime service providers locally.





Rahita Elias looks at how Maritime Singapore is harnessing the potential of

# the way

The past several years have been a challenging period for the global maritime industry, but there is quiet confidence in its long-term prospects.

In its latest *The World In 2050* report, professional services firm PricewaterhouseCoopers projected that the world economy would double in size by 2037 and almost triple by 2050. It also predicted a shift in global economic power away from advanced economies in North America and Western Europe, towards Asia and faster-growing emerging economies over the next 35 years. Against this backdrop, shipping remains the primary and most efficient mode of transport for goods across countries.

Evolving trends have seen the centre of maritime activities shifting towards Asia in recent years. Regional port authorities have responded to this by building new ports and expanding or upgrading existing ones.

With limited land and manpower, Singapore cannot compete on scale alone. For Maritime Singapore to be well positioned to capture the upcoming growth and new opportunities, it has to find ways to do things more efficiently, cleverly or differently to stay







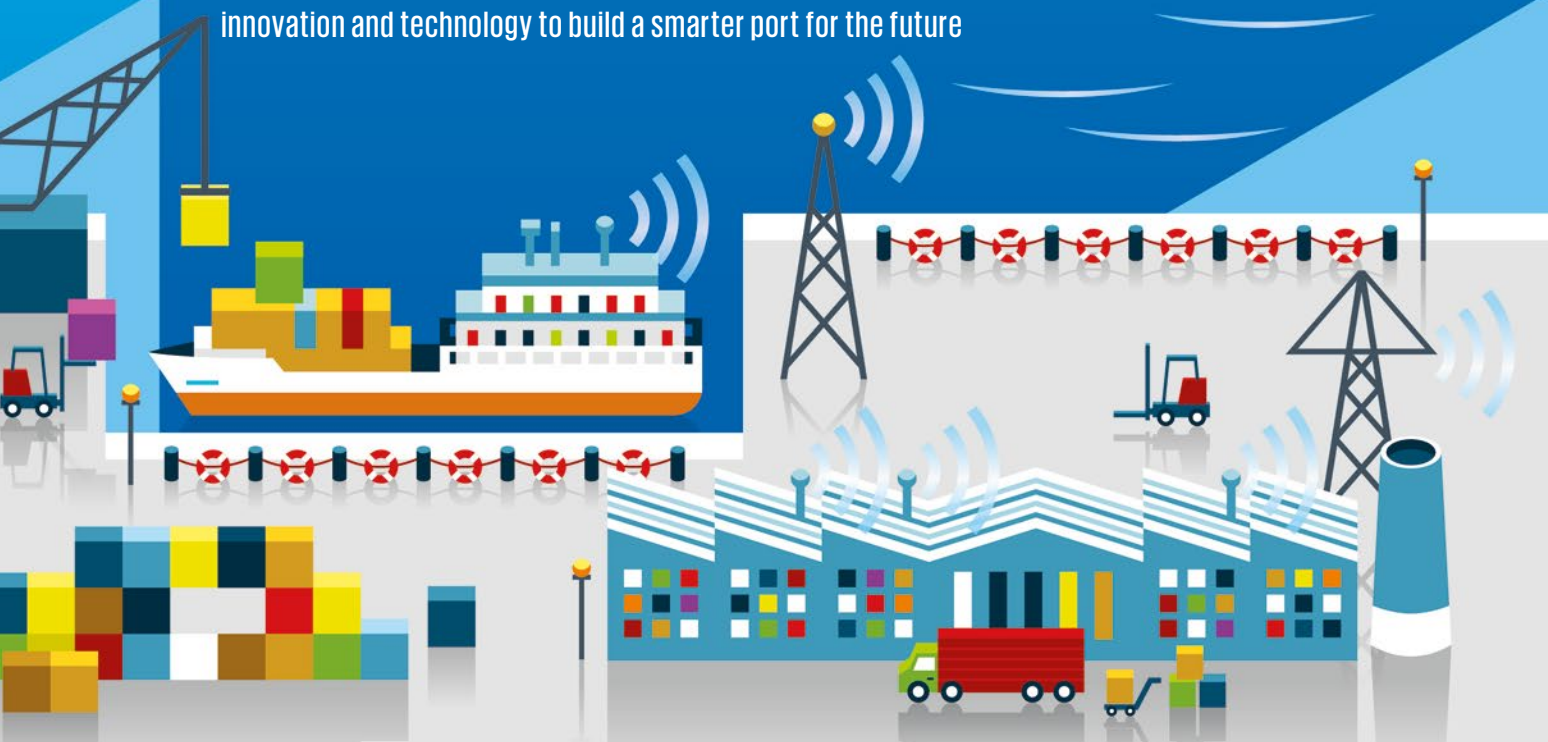
ahead of the competition.

With the launch of the S\$3.5 billion expansion of Pasir Panjang Terminal Phases 3 and 4, and the construction of the mega port at Tuas underway, the Port of Singapore has also embarked on a plan to build a smarter, more efficient and safer port. Recently, it introduced a slew of initiatives and programmes that will leverage the latest technological advancements to benefit all users.

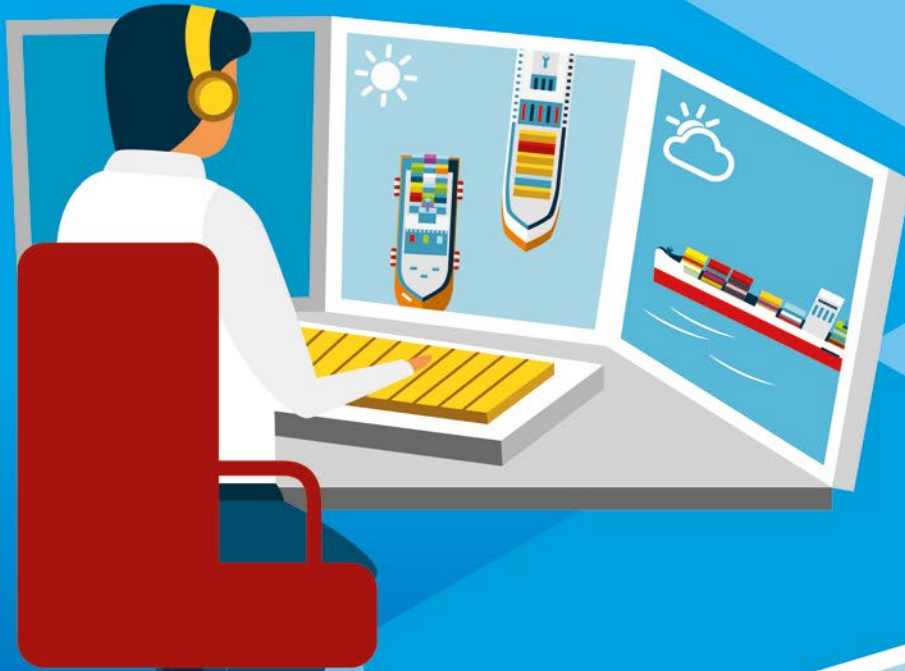
At the Building A Smarter Port Of Singapore event on March 23, Senior Minister of State for Finance and Transport Josephine Teo said that the Republic is adopting a multi-pronged approach in its endeavour to realise a Smarter Port of Singapore. This involves improving mobile and wireless connectivity in our port waters and facilitating the development and test-bedding of smart technologies locally. Data analytics will be used to strengthen enforcement, and a next-generation Vessel Traffic Management System

# forward

innovation and technology to build a smarter port for the future



FEATURE



## FEATURE

will be developed to include capabilities such as early detection of congestion hotspots. The port community will ride on these initiatives to build new port applications.

At the event, Maritime and Port Authority of Singapore (MPA) Chief Executive Andrew Tan highlighted the importance of a smart port for Singapore. He said: "We envision a more interconnected port with high-speed Internet access, wider use of data analytics, and innovative mobile solutions to enhance our port's overall competitiveness. This will benefit all users of the Port of Singapore."

### ENHANCING REALISM

A new Vessel Traffic Service (VTS) Simulator has been commissioned at the Port Operations Control Centre Vista to enhance the quality and effectiveness of the training of Singapore's Vessel Traffic Management Officers.

Providing varied and realistic scenarios to train these officers in a risk-free environment, the simulator has the full functionality of a Vessel Traffic System operator workplace. It uses the latest Vessel Traffic Information System and closely imitates real ship movements and actual environmental conditions in a waterway. This allows instructors to create areas with different navigational situations, control target ships, and generate various training scenarios and tasks.

### EXTENDING WIRELESS CONNECTIVITY

As part of the smart port strategy, MPA is harnessing mobile technology and wireless connectivity to enhance communications, productivity and crew welfare in the port through various collaborations with M1.

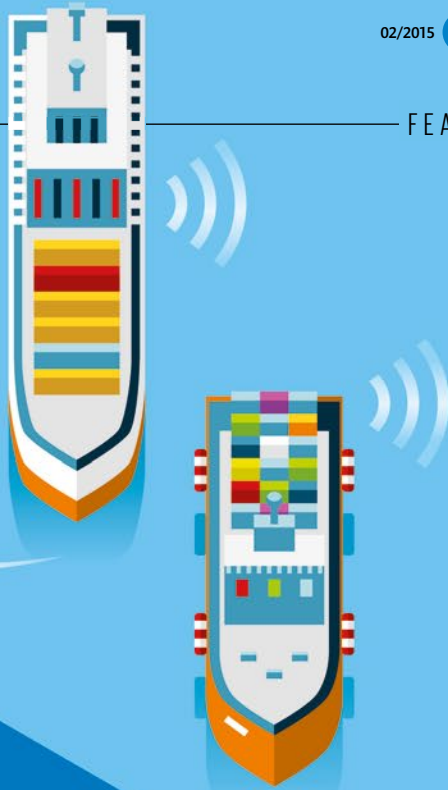
MPA and M1 have joined forces to address the current limitations of high-speed broadband coverage in Singapore's port waters. The maritime community now has access to a high-bandwidth, low-cost, secure and wireless 4G broadband network up to 15km from Singapore's coastline.

To this end, MPA and M1 have inked a Memorandum of Understanding (MOU) to promote the adoption of 4G broadband coverage for vessels operating within Singapore's port waters. They





## FEATURE



will also work together on research and projects to test-bed new technologies that enhance the network coverage in our port waters.

This will open up new possibilities in the way port users use and access information. For instance, regardless of where a port user is, he will be able to access near real-time information, make decisions, and even place an order for services and monitor the status of their delivery anytime and nearly anywhere. The rich information gathered by service providers can also be further analysed to optimise operations and services in the future.

Access to the Internet can also help attract and retain talent in the maritime industry; the welfare of crews on visiting ships and harbour craft would be enhanced by the availability of ready, low-cost broadband services that make it easier for them to keep in touch with their loved ones.

Additionally, the Wireless@SG programme has been extended to Marina South Pier, Changi Point Ferry Terminal, and West Coast Pier. Members of the public now enjoy access to free basic Wi-Fi at these terminals.

MPA has also launched a free mobile app, myMaritime@SG. With this app, the first of its kind in the region, port users can obtain the latest information (e.g. ship arrivals and departures, and tidal data) with which to plan their shipping routes and carry out transactions, while the public can provide real-time feedback to MPA.

The current emphasis on mobility means that mobile apps are a potential game changer for the port community. For instance, work patterns could become more mobile and flexible as more transactions and services are performed through mobile devices.

To grow this potential, MPA and the Singapore Shipping Association have jointly invited companies to submit proposals to develop innovative business-to-business mobile apps that will offer value-added services in areas such as maritime logistics operations, ship-to-shore communications, and remote shore monitoring of marine operations. For this, MPA has set aside S\$2 million from its Maritime Innovation and Technology (MINT) Fund to co-fund projects approved under this initiative.

#### FOSTERING PARTNERSHIPS

During this year's Singapore Maritime Week, maritime technology took centre stage at the inaugural Singapore Maritime Technology Conference (SMTC). Local and overseas maritime companies, organisations, institutes of higher learning, research institutes and international partners



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congregated at the conference in April.

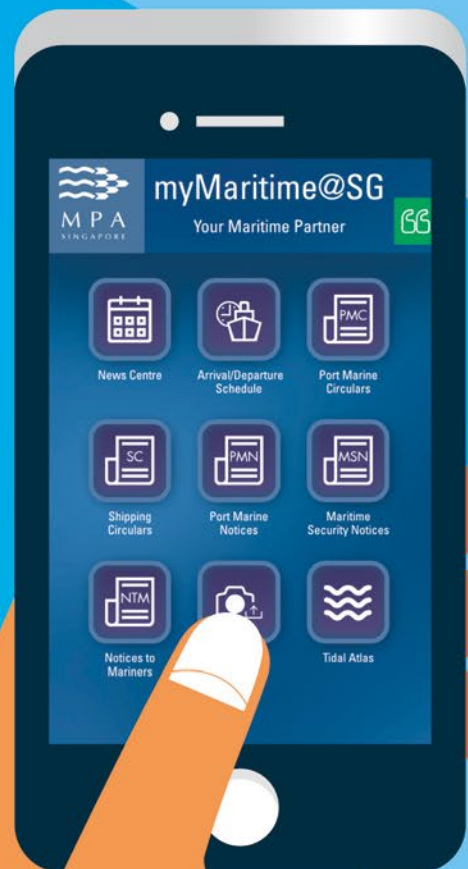
Senior Minister of State Josephine Teo, who officiated at the opening of the conference, announced that MPA is launching a series of call-for-proposals to cover new areas of potential research and test-bedding of technology solutions under its MINT Fund. It is also extending the Green Technology Programme by another five years until 2021 and committing another S\$25 million to the programme, bringing the total funding to S\$50 million. To encourage companies to adopt green technologies that are developed or test-bedded locally, MPA is increasing the co-funding level for such projects from 50 per cent to 70 per cent, capped at S\$2 million per project.

During the conference, MPA also signed MOUs with two research agencies to ensure that Singapore stays ahead of maritime technology development. The first was with the Agency for Science, Technology and Research (A\*STAR) to collaborate on research and development (R&D) in maritime technology. Some areas of R&D covered under the MOU include next-generation maritime communications technology, robotic capability for the marine industry, as well as the application of modelling and simulation to bolster the competitive edge of Maritime Singapore. At the signing, Dr Raj Thampuran, Managing Director of A\*STAR, said: "This MOU...serves as a framework to bring our partnership to a new level by delivering even more ideas and innovative technologies to the Maritime and Offshore industry."

The other MOU, with the Research Council of Norway, renewed the two organisations' bilateral agreement on maritime education, training and R&D for another three years till 2018. The current MOU framework has been expanded to include collaboration in the first international joint call-for-proposals in maritime



DOWNLOAD APP



## FEATURE

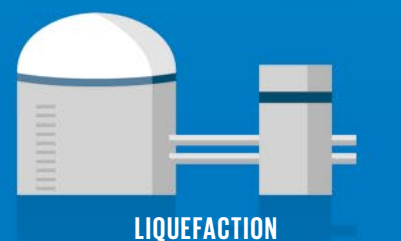
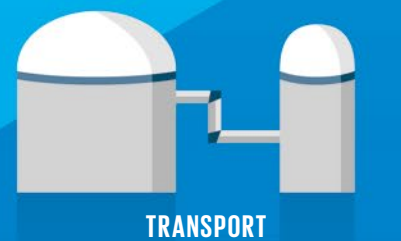
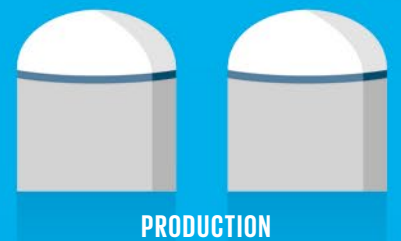
research, where S\$6 million will be channelled into technological development in navigational safety, ship operations and safety, ship-port operations, green shipping and maritime arctic research. This will help promote maritime research collaboration and knowledge exchange between Singapore and Norway through joint R&D projects among their research institutions.

Arvid Hallen, Director-General of the Research Council of Norway, said: "Both Singapore and Norway put great emphasis on improving the environmental footprint of shipping, and when scientists from two of the world's leading maritime nations work together, the results will be of major significance for both parties as well as for the environment."

**SPOTLIGHT ON TECHNOLOGY**

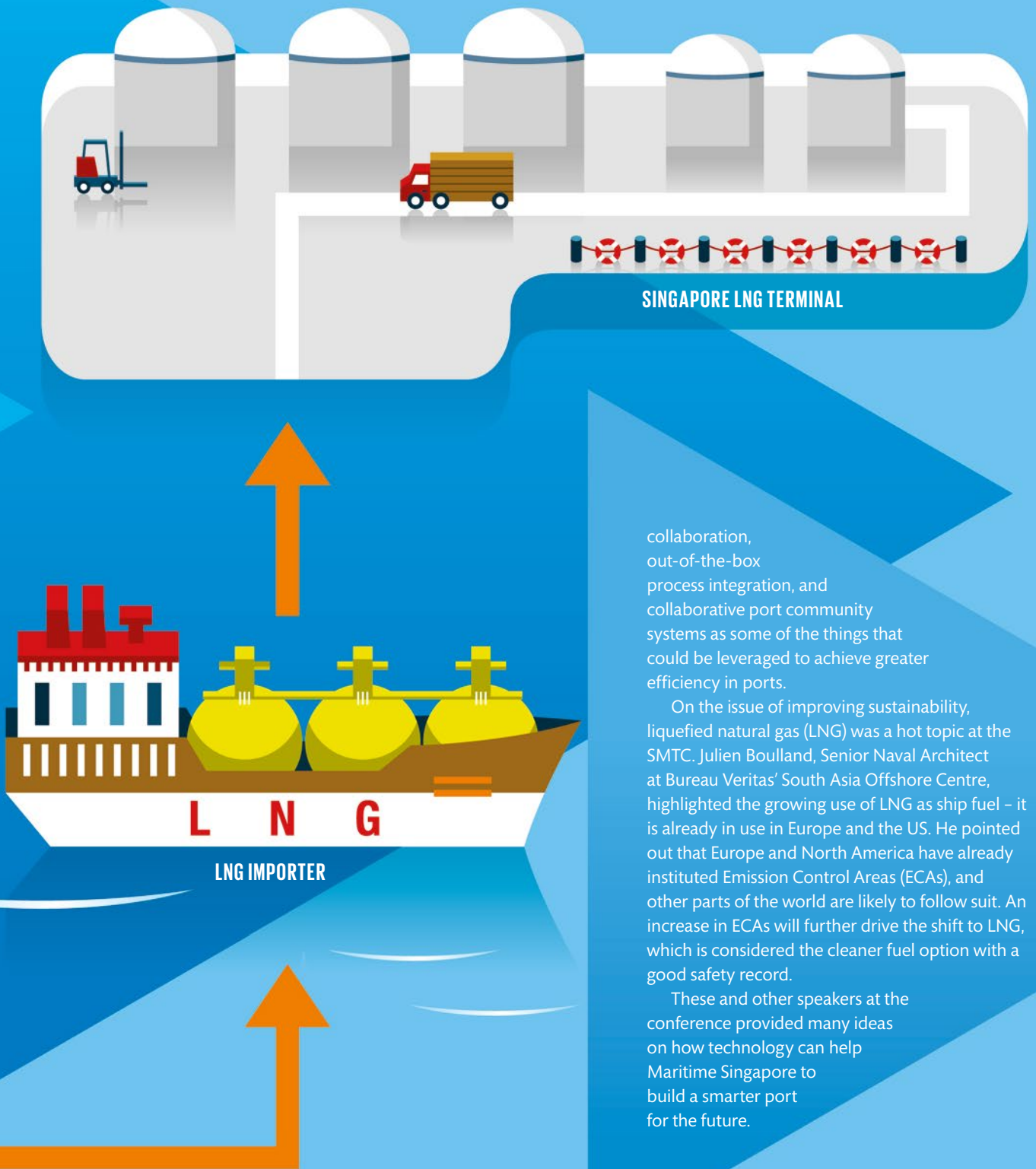
The opening session of the conference saw International Maritime Organization (IMO) Assistant Secretary-General Andrew Winbow speaking on e-navigation and the IMO's priorities in the field of maritime safety. He pointed out that in using e-navigation tools to support navigators, the important thing is not the mere presence of more data, but the delivery of timely, relevant and accurate data. He also drew attention to human limitations as a critical factor that impacts the effective use of e-navigation systems.

Another speaker at the SMTC was Oh Bee Lock, Chief Operating Officer of PSA Singapore Terminals, who talked about the importance of deploying smart technologies in ports. He said that the Tuas port will be equipped with smart technologies, such as automated handling systems, while staying committed to environmental sustainability. He also touched on the potential of man-machine





FEATURE



collaboration, out-of-the-box process integration, and collaborative port community systems as some of the things that could be leveraged to achieve greater efficiency in ports.

On the issue of improving sustainability, liquefied natural gas (LNG) was a hot topic at the SMT. Julien Boulland, Senior Naval Architect at Bureau Veritas' South Asia Offshore Centre, highlighted the growing use of LNG as ship fuel – it is already in use in Europe and the US. He pointed out that Europe and North America have already instituted Emission Control Areas (ECAs), and other parts of the world are likely to follow suit. An increase in ECAs will further drive the shift to LNG, which is considered the cleaner fuel option with a good safety record.

These and other speakers at the conference provided many ideas on how technology can help Maritime Singapore to build a smarter port for the future.

## CAN YOU SHARE ON THE MAIN FOCUS OF YOUR KEYNOTE SPEECH FOR THE RECAAP CONFERENCE?

The ReCAAP Information Sharing Centre (ReCAAP ISC) was set up as a centre for reporting and sharing information on piracy and armed robbery at sea. It has been very effective and its membership has increased.

Information is powerful these days and the sharing of information has done a lot to help combat piracy. There is now a relatively new issue faced by small tankers – generally 1,000 DWT to 2,000 DWT tankers – of hijackings for the theft of their cargo and bunker fuel. It is focused on South-east Asia at the moment, but similar incidents have occurred in West Africa. There has been some indication that some of these may be “inside jobs”.

If that is the case, effective response measures leveraging ReCAAP ISC’s membership resources and utilising its cooperative arrangements can be put in place to inform, educate and advise shipping companies on how to tackle this and future problems.

The recent success of the Malaysian Maritime Enforcement



# towards greater safety and security

Andrew Winbow, Assistant Secretary-General of the International Maritime Organization (IMO), speaks to AJ Leow on the work of the IMO and his seafaring experience

*Andrew Winbow, Assistant Secretary-General and Director of the Maritime Safety Division at the International Maritime Organization (IMO), was a regular visitor to Singapore in the 1970s when he worked for multinational oil and gas company Shell on board an 18,000 deadweight tonnage (DWT) tanker that also made frequent calls at ports in Hong Kong and Vietnam. He was back in Singapore for Singapore Maritime Week 2015, where he delivered two keynote addresses, one at the Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP) conference, and the other at the Singapore Maritime Technology Conference.*

Agency in arresting pirates that hijacked a Malaysian coastal tanker is welcome, and more successes of this type would be a very positive message to the industry and a deterrent to pirates.

### WHAT ARE THE MOST PERTINENT ISSUES FACING THE IMO NOW?

At the moment, it is migrants in European waters. Distress situations at sea are covered under the International Convention for the Safety of Life at Sea (SOLAS) and the International Convention on Maritime Search and Rescue, both of which require shipmasters to rescue other ships in distress. Of course, this requirement is also a well-enshrined tradition that dates back to the early days of sailing.

About 40,000 of the 200,000 people rescued in the Mediterranean last year were rescued by merchant ships. That in itself is a problem because ships these days normally have crews of about 20 people. Rescuing people at sea is difficult, and space and resources like water, food and medical facilities are limited.

This leads to the next problem – where to take them – because

some countries are reluctant to accept migrants for a number of both practical and political reasons. This gets the IMO involved in discussions with United Nations agencies dealing with refugees, human rights and human trafficking to address this. From the IMO's perspective, it is not a matter of dealing with ships in distress anymore – the issue becomes more wide-ranging.

During last year's Ebola outbreak, some countries took drastic actions with ships that sailed to Africa, and even ships that had not visited any Ebola-stricken country. As the incubation period for Ebola is 21 days, ships were quarantined for three weeks at sea. This affected trade as well as seafarers leaving or joining ships, so the IMO had to come up with guidelines to manage the situation.

More recently, a fire broke out on the car deck of a roll-on/roll-off Italian-flagged ferry off Greece. The fire spread quickly and there was a lot of smoke, which made evacuation difficult as it hampered the use of life-saving equipment. Many of the passengers had to be airlifted, some one at a time, by helicopter, which

slowed the whole evacuation process. The case is currently being investigated and may result in the IMO having to look into improving firefighting and life-saving measures for such vessels.

### YOUNG PEOPLE TODAY SEEM LESS DRAWN TO SEAFARING CAREERS THAN IN THE PAST. HOW CAN ONE PERSUADE THEM OTHERWISE?

Share with them the perspective that the only way to really see the world is to join a merchant ship.

The trouble with the shipping industry is that it's almost invisible. Unlike in Singapore, in most parts of the world ports are far away from where people live. In London, ships used to go past Tower Bridge, and during World War II, ships were a lifeline.

There have been many campaigns in the UK, such as stickers on bananas asking questions like, "Where do they come from?" It raises some awareness but that soon dissipates. I read (an article) about the most sought-after degree courses. It says that there has been an increase in interest in psychology due to TV programmes like *CSI: Crime Scene*

"INFORMATION IS POWERFUL THESE DAYS AND THE SHARING OF INFORMATION HAS DONE A LOT TO HELP COMBAT PIRACY."

ANDREW WINBOW, IMO'S ASSISTANT SECRETARY-GENERAL

*Investigation.* Maybe we should have something like that for the industry.

### HOW WILL THE IMO SAFEGUARD EARTH'S LAST PRISTINE FRONTIERS FROM ECO-TOURISM AND DEEP-SEA EXPLORATION?

We recently adopted the IMO Polar Code, which states that if you enter the polar regions, you should do so with a bit more care because of the extreme weather; the facts are that search and rescue facilities are virtually non-existent there, that it is a pristine environment, and that navigators who can navigate through ice are needed. These are practically additional requirements – a prescriptive bolt-on to existing requirements under SOLAS and MARPOL (International Convention for the Prevention of Pollution from Ships) conventions. Having said that, in the last summer season, only a handful of ships took the polar routes.





# seeing beyond the horizon

**Orient Overseas (International) Limited Chairman Tung Chee Chen gives Rahita Elias his take on how the container shipping industry has fared so far and what lies ahead for the sector**

*Tung Chee Chen, Chairman of Hong Kong-based shipping group Orient Overseas (International) Limited (OOIL) – the parent company of Orient Overseas Container Line – was in Singapore in April to deliver the Singapore Maritime Lecture during Singapore Maritime Week 2015, where he gave unique insights on *The Changing Dynamics Of The Container Shipping Industry*. He tells Singapore Nautilus what he thinks will be the major forces shaping the industry in the coming years.*

## **HOW HAS THE CONTAINER SHIPPING INDUSTRY FARED OVER THE PAST FEW YEARS?**

For the longest time, the container shipping industry has had healthy growth averaging 8 per cent to 8.5 per cent a year. China's accession to the World Trade Organization in 2001 and the growth in outsourcing later pushed growth rates to rise to about 10 per cent to 11 per cent annually.

With the global financial crisis in 2008,

everything came to a halt. The market became very volatile, with more downs than ups.

On average, growth was zero to 2 per cent for a couple of years, gradually stabilising to what it is today. Our estimate is about 5 per cent growth during this period. It has stabilised but is substantially less robust compared to the pre-crisis years.

## **WHAT ARE THE FUNDAMENTAL FACTORS THAT HAVE BEEN DRIVING THE CONTAINER SHIPPING INDUSTRY? HOW WILL THEY AFFECT THE INDUSTRY?**

In recent years, the correlation between trade and GDP growth has dropped. Prior to 2000, the multiple was about 2.6 times. This reduced to 2.4 times in the boom years. Today, it is about 1.3 times.

This means that global growth is less dependent on trade, which is bad for our industry. The question is whether we are seeing a structural change: are consumers spending less because of a change in their behaviour or their psychology? We really don't know.

If we look at the corporate results, we are still lacking very much in consumer

demand growth. But that is really talking about 50 per cent of our business – the demand side. We also have to look at the supply side.

## **SO WHAT HAS BEEN HAPPENING ON THE SUPPLY SIDE OF THE EQUATION, AND WHAT IS LIKELY TO HAPPEN IN THE FUTURE?**

Throughout the years of growth, most of the companies had been planning ahead of their capacity needs and expecting this to continue.

Companies tend to order ships ahead of time and much more aggressively because they are optimistic. When the financial crisis came, businesses came to a halt even as these mega container ships continued to be delivered.

The deployment of these big ships allows companies to reduce their unit costs either on their own or by working closer together through alliances. Those who did not order the mega ships found it very difficult to compete. So, many have ordered or are contemplating ordering similar-sized ships without actually seeing a recovery on the horizon. This means that the already excess capacity will be extended over a longer period of time.

## **HOW ELSE CAN CARRIERS MANAGE COSTS FOR GREATER EFFICIENCY AND BETTER RESULTS?**

Big ships give you a more efficient cost structure on the sea side. However, there are a lot of shore side operations that you also need to manage. In fact, shore side expenditure is a fair bit higher than sea side, so you will really need to consider that when managing your business so that you can create operating margins.

## **WHAT IS OOIL DOING TO MANAGE ITS BUSINESS EFFICIENTLY AND CREATE OPERATING MARGINS?**

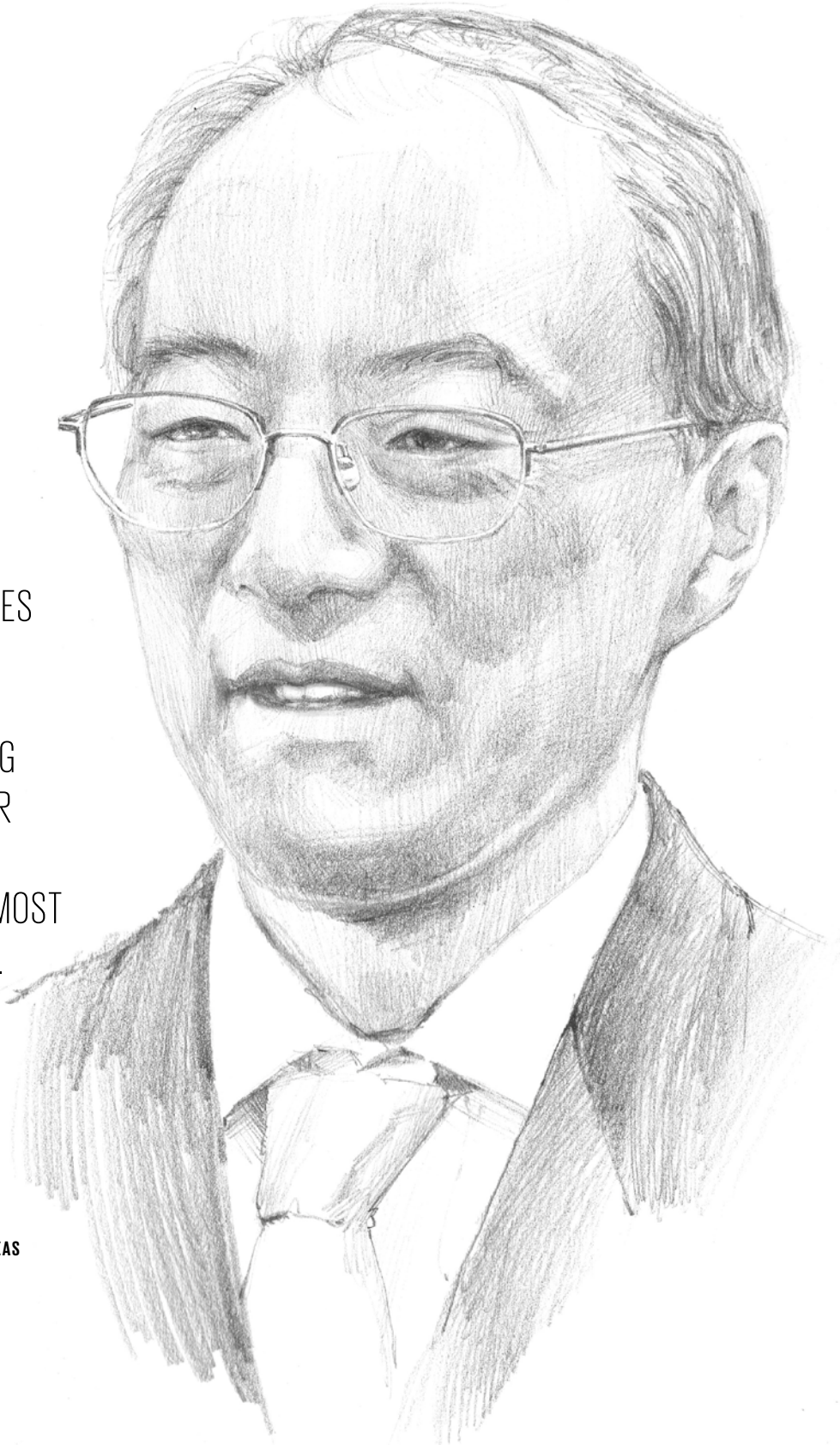
Apart from working with alliances to capture cost synergies by pooling our ships, we are continuously building our operating system to manage our business better. The system allows us almost real-time information.

We hope to move to a stage where we can anticipate cost changes and manage our business better. Because business dynamics are changing all the time, knowing our cost structure is important. It's a live system so changes can be reflected immediately, allowing us to price our products better.

## PERSONALITY

"APART FROM WORKING WITH ALLIANCES TO CAPTURE COST SYNERGIES BY POOLING OUR SHIPS, WE ARE CONTINUOUSLY BUILDING OUR OPERATING SYSTEM TO MANAGE OUR BUSINESS BETTER. THE SYSTEM ALLOWS US ALMOST REAL-TIME INFORMATION. WE HOPE TO MOVE TO A STAGE WHERE WE CAN ANTICIPATE COST CHANGES AND MANAGE OUR BUSINESS BETTER."

**TUNG CHEE CHEN, CHAIRMAN OF ORIENT OVERSEAS (INTERNATIONAL) LIMITED**



# empowering minds

Alywin Chew finds out how the DNV GL Maritime Academy is responding to the needs of the maritime community

As one of the world's most reputable classification societies, and having helped improve numerous aspects of the shipping ecosystem, it was no surprise when DNV GL founded a training arm, the DNV GL Maritime Academy, to share its expertise in enhancing the global maritime industry.

Centred on the core themes of Developing People, Operating Ships and Building Ships, training courses at the DNV GL Maritime Academy have been well received since it opened its doors in Singapore in 2009. Overall, the academy now operates in over 100 countries and has 19 academy managers in 17 key locations worldwide.

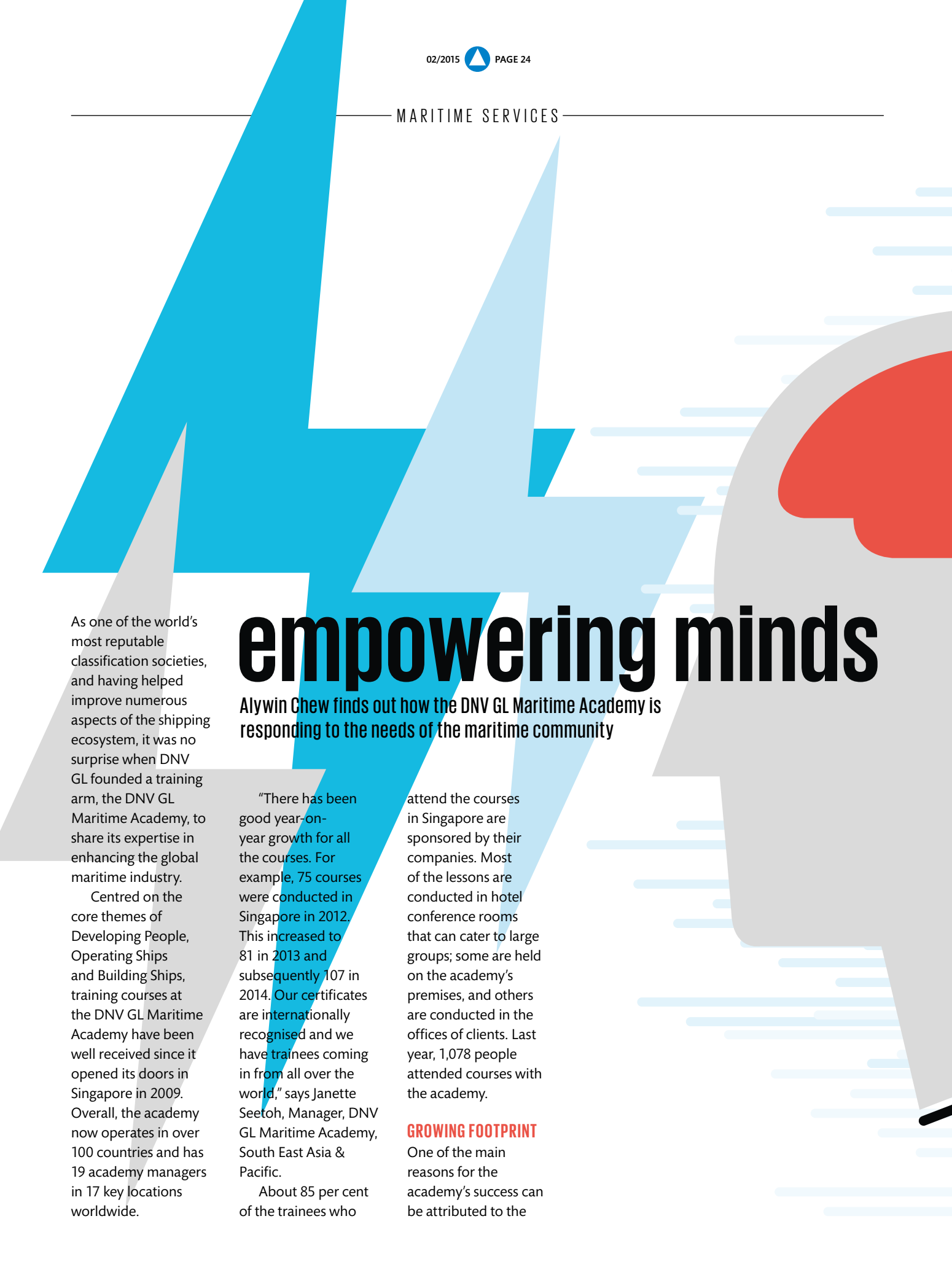
"There has been good year-on-year growth for all the courses. For example, 75 courses were conducted in Singapore in 2012. This increased to 81 in 2013 and subsequently 107 in 2014. Our certificates are internationally recognised and we have trainees coming in from all over the world," says Janette Seetoh, Manager, DNV GL Maritime Academy, South East Asia & Pacific.

About 85 per cent of the trainees who

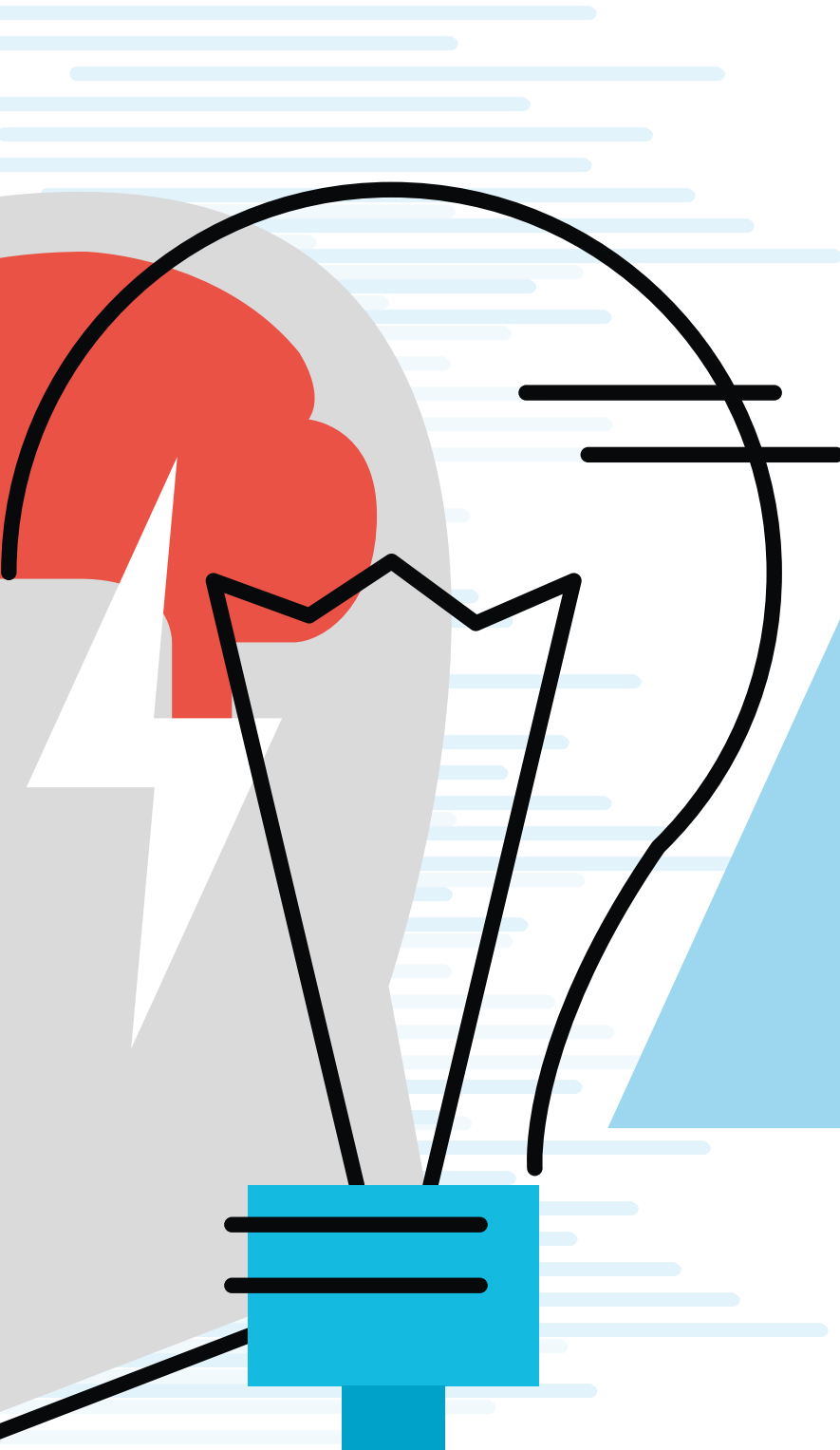
attend the courses in Singapore are sponsored by their companies. Most of the lessons are conducted in hotel conference rooms that can cater to large groups; some are held on the academy's premises, and others are conducted in the offices of clients. Last year, 1,078 people attended courses with the academy.

## GROWING FOOTPRINT

One of the main reasons for the academy's success can be attributed to the







strategic partnerships that it has forged with both local and foreign maritime agencies.

In February this year, the academy signed a Memorandum of Understanding with Singapore Polytechnic's Singapore Maritime Academy. Apart from facilitating an exchange of lecturers and trainers between the two institutes, this partnership also opened new doors for joint research and development projects, and practical training opportunities for students at DNV GL.

Part of Seetoh's job at the academy involves working on business development plans with the academy's team in Hamburg, and

understanding what types of courses offer the most value to the local clientele.

She foresees that courses such as those related to the use of gas as ship fuel will experience greater local demand in the near future because of the Maritime and Port Authority of Singapore's (MPA) push towards using liquefied natural gas as marine fuel. On the global stage, where energy efficiency is reaching paramount importance, two-day courses such as Energy Efficient Operation Of Ships - Masterclass are expected to enjoy good reception.

The Singapore arm of the academy also boasts an impressive roster of highly qualified trainers

## MARITIME SERVICES



CENTRED ON THE CORE THEMES OF DEVELOPING PEOPLE, OPERATING SHIPS AND BUILDING SHIPS...THE ACADEMY NOW OPERATES IN OVER 100 COUNTRIES AND HAS 19 ACADEMY MANAGERS IN 17 KEY LOCATIONS WORLDWIDE.

from all walks of life. Aside from its full-time lecturers, the academy has external trainers such as former navy commanders, Master Mariners, maritime journalists, and leaders of top shipping firms coming in to offer invaluable real-world insights that complement the syllabus.

Seetoh and her team are also quick to react to client needs by providing customised courses – an option that is proving to be highly popular with local businesses. For example, the academy

offers a course called Media Handling for Shipping Companies that is only available in Singapore. It was developed locally by modifying existing global course materials to ensure relevancy to domestic regulations and the needs of clients here.

On current maritime education trends, Seetoh sees an increasing number of clients seeking interactive and skills-specific courses that align with the International Maritime Organization's requirements as well as classification requirements.

She adds: "More and more people these days are looking at interactive learning sessions facilitated by trainers who get discussions going among the trainees. Trainers are starting to minimise the use of PowerPoint slides and instead use questions to foster interaction among course attendees. Getting people to share their real life experiences makes for a more effective learning environment."

### GOING DIGITAL

There are also clients who require non-interactive courses that can be done remotely. To meet this demand, DNV GL

Maritime Academy Singapore offers short courses whose materials are available via USB drive, making them ideal for people like ship captains and engineers who are often away at sea. To receive a certificate of completion for such courses, participants need to pass a test accessible via the USB device, save the results, and have the academy verify said results.

In this digital age, the academy is also exploring the feasibility of paperless learning, such as having participants use tablets to access USB devices containing course materials. The academy in Manila is the first to have done so, and the pilot programme has received favourable reviews so far.

Seetoh says that the adoption of such environmentally friendly training methods boosts efficiency and reduces waste as trainers can now make last minute edits to course materials without having to reprint dozens of pages.

### MEETING CHALLENGES

A constant challenge for Seetoh and the 18 other academy managers around the world is responding to requests for

courses that are currently unavailable in their educational portfolio. To meet this increasing demand for customised learning content, academy managers tap the organisation's extensive global network, boasting more than 300 trainers from all sectors of the industry, to source for training materials and the ideal subject-matter experts.

Another challenge is getting companies to sign up. Many companies are hesitant to invest in training due to the current economic climate. The academy tackles this by working closely with MPA to secure subsidies. For example, companies that send their employees to attend courses under the Maritime Cluster Fund-Manpower Development training grant receive co-funding of 70 per cent for three years.

Other initiatives such as the Singapore Government's Productivity and Innovation Credit scheme, which offers financial incentives – tax deductions or cash payouts – to companies that invest in six qualifying activities including staff training, means that financial outlays on such investments can be greatly offset.

## COMPANY SPOTLIGHT

Since Singapore's foray into rig building in the late 1960s, the country has maintained its competitive edge through continuing investment in technology and research and development (R&D) to come up with innovative solutions for the industry.

Thus, it is by no accident that Singapore is today the top player in the global marine and offshore engineering industry, and is home to some of the world's largest offshore rig builders, including rig and shipbuilding company Keppel Offshore & Marine (Keppel O&M).

Keppel O&M is a market leader in the design, construction and repair of offshore rigs, as well as the repair and conversion of ships and specialised shipbuilding. It builds on its strong technological and engineering capabilities, honed through the years, to give it the versatility to respond promptly to rapidly changing market needs.

**KEEPING PAGE WITH TECHNOLOGY**

One of the ways in which it advances its technological capacity is through its R&D and technology arm Keppel Offshore & Marine Technology Centre (KOMtech).

Set up in 2007, KOMtech supplements the work of Keppel O&M and helps it access new markets and opportunities. KOMtech's key focus lies in conducting R&D for solutions and products that are commercially viable and responsive to the needs of the industry.

It does so by keeping up to speed with technological developments, conceptualising next-generation solutions, and conducting R&D to create prototypes before handing over the designs to the business units of Keppel O&M for commercialisation.

KOMtech comprises two key arms: Deep

*Audrina Gan finds out how Keppel Offshore & Marine Technology Centre engages in research and*

# ahead of the curve

*development to seek innovative solutions for oil and gas exploration*





## COMPANY SPOTLIGHT

**PREVIOUS PAGE:** The KFELS N Class jack-up rig is designed for one of the world's harshest environments.

**BELOW:** Mr Merchant (left) receiving the Outstanding Maritime R&D and Technology Award on behalf of KOMtech from Minister for Transport and Second Minister for Defence Lui Tuck Yew at the Singapore International Maritime Awards in April this year.

**OPPOSITE:** The innovative and cost-effective KFELS B Class jack-up rig is known as the reliable workhorse of the industry.



Water Technology and Shallow Water Technology, headed by Mr Aziz Amirali Merchant, Executive Director (Deep Water Technology), and Dr Foo Kok Seng, Executive Director (Shallow Water Technology).

The Deep Water Technology unit looks into areas such as deepwater and ultra-deepwater drillships, ultra-harsh environment drilling semi-submersibles, as well as innovative ship designs and shipyard technology to improve processes and productivity. The Shallow Water Technology department is involved in areas such as arctic jack-up design, offshore wind solutions, liquefied natural gas applications, and environmental and drilling solutions.

Despite concerns over the falling price of oil and expected lower capital expenditures for oil and gas exploration and production (E&P) projects this year, KOMtech remains committed to R&D to maintain its technological lead.

"In difficult times such as this, it is all the more important that investments continue to be made in R&D so that more robust and cost-effective oil production solutions can be developed for the oil and gas industry," Mr Merchant says.

"Whether in shallow water or deepwater, it is important to ensure the safe, reliable and efficient implementation of offshore E&P activities. In this declining oil price environment, it is also important for the industry to seek solutions that are also cost-effective."

### CUSTOMISING SOLUTIONS

The centre's R&D team constantly innovates and develops new rig designs that are responsive to the needs of its customers. For instance, the Deepwater Horizon oil spill in the Gulf of Mexico in 2010 significantly sharpened the industry's focus on newer drilling units with superior technical and safety capabilities.

Responding to customers' enquiries for newbuild rigs equipped with new safety technology, Dr Foo says that all of Keppel's rig designs now provide maximum operational duration and drilling efficiency while incorporating a high level of safety and updated environmental features. The designs also ensure optimum working conditions for crew to operate efficiently.

"With our proprietary rig designs, which can be customised, we have been able to offer drilling contractors the flexibility to incorporate unique features to reduce environmental impact, while

addressing technological changes in drilling equipment and processes," he explains.

### NEW FRONTIERS

KOMtech is also planning ahead in anticipation of mid- to long-term trends, including moving into deeper waters and harsher environments, such as the Arctic region, in the search for oil and gas as more shallow water fields mature, says Dr Foo.

Aside from keeping an eye on trends and technological advancement, KOMtech has stepped up R&D efforts over the years by engaging oil companies and drilling operators so as to understand industry needs and develop E&P solutions for the Arctic region. This will ensure that it is prepared for a future when arctic drilling becomes a reality.

Says Dr Foo: "For instance, we have implemented more automation and increased the number of safety features on our rigs. We recognise the trend of E&P moving into harsher, deeper and colder environments, and our research efforts are invested accordingly in the design and construction of more complex and robust rigs."

Apart from new solutions responsive to this trend, the centre has also enhanced its existing jack-up designs to increase their efficiency and capabilities. For instance, the KFELS N Class rig is designed for harsh weather conditions, and meets the exacting requirements for operation in the Norwegian sector of the North Sea, one of the world's harshest operating environments for offshore E&P.

Aside from this, the KFELS Super B Class was conceived to facilitate drilling works at deeper depths and at higher temperatures and pressures, while the KFELS Super A Class jack-up is designed to operate in harsh and cold climate environments, such as the British, Danish and Dutch sectors of the North Sea.

Proprietary designs such as these have helped Keppel O&M retain its premier spot as a leading designer and builder of jack-up rigs. Earlier this year, it reached a milestone by delivering its 100th jack-up rig, the PV Drilling VI – a KFELS B Class jack-up rig – to PetroVietnam Drilling & Well Services Corporation.

### OVERCOMING CHALLENGES

To continue making breakthroughs in its R&D efforts, KOMtech has forged industry partnerships and tie-ups with both local and international institutions such as the National University of

KEPPEL O&M BUILDS ON ITS STRONG TECHNOLOGICAL AND ENGINEERING CAPABILITIES... TO GIVE IT THE VERSATILITY TO RESPOND PROMPTLY TO RAPIDLY CHANGING MARKET NEEDS.

Singapore (NUS) and the American Bureau of Shipping (ABS). For instance, it collaborated with ABS on a joint development project using specialised and fast-growing application tools to further improve a drillship's design in order to achieve higher fuel efficiency and operation over longer periods.

Further afield, KOMtech, NUS and FloaTEC, a joint venture company between engineering and construction company McDermott and Keppel FELS (the rig design and building arm of Keppel O&M), have also signed a Memorandum of Understanding to form a consortium named fKN that will meet the challenges of deepwater developments in Brazil. It will explore collaborations with Brazilian universities, research institutions, and offshore and marine industry partners to develop new technology and training opportunities.

As E&P activities move into deeper waters, such projects typically face technical and financial challenges. This makes it crucial for operators to effectively control drilling costs and minimise downtime, while ensuring that their operations remain safe in harsh environments. "These issues get increasingly significant for operators and contractors as E&P moves into ever deeper water," Mr Merchant says.

To overcome such challenges, KOMtech is working on a range of solutions from drilling in deep water to the maintenance of production units. The CAN DO drillship currently under construction is one such example. In close consultation with customers, major oil companies and vendors, it was developed as a differentiated drillship, able to undertake exploration,



development and completion operations. When completed, it is expected to be a state-of-the-art drillship that meets the industry's requirements of high functionality, safety and cost effectiveness.

KOMtech has also come up with innovative deepwater rig designs such as the KFELS 5000HE, a semi-submersible with features that enable it to operate to a depth of 457m in the harsh environment of the British sector of the North Sea.

Despite tough times in recent months for the marine and offshore industry, Mr Merchant believes that its long-term fundamentals remain sound as developing countries will need more energy as they grow and develop their industries, and the low oil prices today are not sustainable in the long run. He says: "As over 50 per cent of jack-ups and semis are 25 years and older, the rig replacement cycle will eventually resume as oil companies will have to invest in replenishing their reserves at some point."

Moving forward, Mr Merchant adds that KOMtech will continue to work with its customers to develop high-specification rigs and offshore solutions that are more productive and cost-effective, and have better safety features.

Forward-looking companies these days concern themselves not only with bottom lines, but also with how they can remain profitable while integrating sustainability principles into their business in a way that can add value to their company in the long run.

In keeping with the times, the Singapore Exchange (SGX) plans to implement a “comply or explain” approach to sustainability reporting by 2017. This will require Singapore-listed companies to follow sustainability reporting guidelines or explain why they are not doing so.

Many other stock exchanges around the world are taking the same approach in response to requests from investors for greater disclosure from companies on their environmental and social risks and opportunities.

Sustainability reporting is about communicating to wider stakeholders, such as investors, business partners, clients, employees and non-governmental organisations, the sustainability measures that companies have introduced and their performance in areas such as energy efficiency, fuel emissions and safety standards.

Because shipping is one of the most efficient forms of cargo transportation available, a majority of world trade is moved by sea. This heavy reliance on shipping, coupled with rising concerns over the environment in general, has resulted in increasingly intensive scrutiny of the maritime industry's efforts to improve its environmental track record.

Nowadays, stakeholders are increasingly demanding greater transparency from shipping and marine companies on the measures they are taking to reduce their environmental and social impact, be it cutting carbon and sulphur dioxide emissions or improving safety standards in shipyards.



# the business of sustainability

Carrie Johnson of sustainability consultancy firm Paia Consulting explains why companies, especially those in the maritime sector, should adopt sustainability reporting, and lists what to look out for when implementing it



## COMMENTARY

**GAINING PACE**

Globally, many companies have already adopted sustainability reporting as part of their development strategy.

In Singapore, sustainability reporting has increased rapidly in recent years as more and more companies realise its business benefits. Based on reports from the leading organisation in the sustainability field, Global Reporting Initiative (GRI), and reports compiled by our consultancy, 20 of the top 30 companies in Singapore today produce sustainability reports, and 15 report to GRI.

Within the shipping and marine industry here, organisations and businesses such as the Maritime and Port Authority of Singapore, Keppel Corporation, Sembcorp Marine, China Navigation Company, Swire Pacific Offshore and Neptune Orient Lines all produce sustainability reports that meet the GRI standard, and many have been doing so for a number of years now.

We expect this trend to gain greater momentum in the future.

**FINDING KEY FOCUS**

Sustainability is a broad topic encompassing everything from carbon emissions, waste generation and water pollution to safety performance, employee development and training, and employee welfare. The first step towards sustainability reporting is to define what issues are material to the company and its stakeholders.

Depending on the type and scope of a company's operations, the issues that will be the most relevant will differ from company to company. Hence, it is important to define what is really significant.

For some companies, this may just be a handful of issues, such as energy efficiency, health and safety, and employee welfare. For others, it may be a more extensive list.

The key challenge for both groups is to focus the reporting. It is far better to achieve meaningful results around a few key issues than to report on a host of sustainability issues and spread one's resources too thinly.

It is also important to take into account key stakeholders' considerations when formulating a company's focus on sustainability, because some of them may have clarity on which environmental or social issues they see as being most significant to a company's long-term performance.

Many experienced companies that are engaged in sustainability reporting are integrating their key environmental and social risks into their enterprise risk management (a process that identifies potential events that may affect the organisation, manages associated risks, and provides reasonable assurance that its objectives will be met), such that these risks and opportunities are managed alongside other key risks.

This is in line with SGX's recommendation to integrate

environmental and social risks into general risk management.

Once the key issues have been identified, the company's performance against each issue needs to be assessed.

To do this, we need to find out whether there are relevant key performance indicators already in place or if such indicators need to be established to measure and drive performance improvements. Reporting is then about communicating the company's strategies and performance with regards to these key issues.

Some companies find it a major challenge to avoid focusing just on the end product of adopting sustainability reporting – the report. Sustainability is about implementing improved practices and driving change that will help build the company over the long term.

The reporting process can be invaluable to companies as it allows them to look at the wider issues that are important to their longevity and discuss internally how best to address and integrate any measures taken into day-to-day operations.

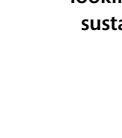
**STAYING THE COURSE**

Once sustainability reporting has been adopted, companies have to ensure that they continue to comply with the requirements. The global standard for sustainability reporting, GRI, sets out clear requirements for companies producing sustainability reports. We recommend that companies first do a gap analysis so they can benchmark where they are on sustainability policies, procedures and performance against international reporting requirements and against their peers.

As this is a rapidly evolving area in which we see more and more Singaporean companies take up sustainability reporting year-on-year, it is important to stay abreast of the latest developments.

**ABOUT CARRIE**

Carrie Johnson is Founding Director of Paia Consulting, a sustainability consultancy that provides specialist advice to companies looking to manage their sustainability risks and opportunities.



# safety in the shallows

Audrina Gan finds out how a real-time under keel clearance monitoring system can provide safer passage for vessels in our port waters

*Vessels transiting the Singapore Strait are getting bigger and have deeper draughts, particularly those bound for our Very Large Crude Carrier (VLCC) berths, container terminals and the future Tuas Port. Ensuring that these vessels navigate safely in our port is a priority for the Maritime and Port Authority of Singapore (MPA). To address this concern, a Real-Time Under Keel Clearance (RUKC) project covering the Singapore Strait and the Port of Singapore was launched last year under MPA's Maritime Innovation and Technology (MINT) Fund. It is undertaken jointly by MPA and research and consulting group DHI Water and Environment.*

## VESSELS MORE THAN 3,000 GT

The minimum UKC requirement is 1m for vessels operating in our port waters if they have more than 3,000 gross tonnage (GT). This is reduced to 0.9m for vessels bound for the container terminals.

## VESSELS 3,000 GT OR LESS

Vessels of 3,000 GT or less need to have a minimum UKC of 0.6m.

## WHAT IS UNDER KEEL CLEARANCE (UKC)?

It is defined as the vertical distance between a vessel's keel and the seabed. It is mainly influenced by a vessel's draught (depth of the submerged part of a vessel), which varies according to the vessel's load condition, speed, and other environmental factors.

### HOW WILL AN RUKC SYSTEM ENHANCE SAFETY?

An RUKC system will help to check and monitor the UKCs of vessels transiting the Singapore Strait and ensure UKC compliance for vessels navigating in our port waters. The system's users will be alerted when there is insufficient UKC or non-compliance of UKC is detected based on the projected tracks of vessels in the water. When implemented, the system will help to identify vessels that potentially risk running aground while transiting the Singapore Strait or navigating in our port waters.

Currently, before a vessel arrives in port, its shipmaster will find out the depth alongside the berth his vessel is bound for, as well as the depth of the channel that his vessel will be transiting. The shipmaster will then calculate his vessel's UKC using tidal prediction data.

According to Captain Charles De Souza, Assistant Director (Operations Planning) and Deputy Port Master of the MPA, who is overseeing the project, an RUKC system will give early warning to duty officers at the Port Operations Control Centre (POCC), who can relay pertinent information or warn vessels of potential breaches of minimum UKC requirements. Shipmasters or harbour pilots can then take appropriate action to avoid grounding, especially of larger and laden vessels for which minimum UKCs are expected.

An RUKC system will benefit both the port authority and shipmasters. Knowing that MPA is monitoring the deep draught vessels transiting the Singapore Strait and its port waters will give shipmasters added confidence. In addition, duty officers at the POCC who are monitoring the vessels' UKCs will be able to advise shipmasters on their passages in port, alert them to tidal restrictions, and advise them to defer berthing when there is insufficient UKC.

### HOW WILL THE SYSTEM WORK?

The planned RUKC system will build on information extracted from either MPA's Port

Traffic Management System (PTMS) or vessels' Automatic Identification Systems (AIS), both of which track all the vessels operating in the Singapore Strait and its port waters.

The PTMS captures vessel activities in real time through the use of POCC's vessel traffic radars and mandatory Very High Frequency radio reports from vessels. Each vessel's AIS transmits information such as its position and particulars to the POCC and other vessels in the vicinity.

### WHY IS IT IMPORTANT TO HAVE THIS SYSTEM?

Capt De Souza says that the project is about checks and balances. As the port authority, MPA's primary role is in ensuring the navigational safety of vessels plying the Singapore Strait and our port waters. However, responsibility cannot fall entirely on one party, such as a shipmaster or a harbour pilot, as they each have to handle multiple tasks and human error can creep in.

Fortunately, there have been no grounding incidents in Singapore's waters involving laden vessels. However, MPA continues to remain vigilant and will take necessary measures to prevent any such incidents.

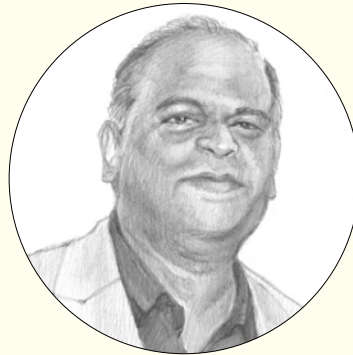
### WHAT'S NEXT?

Today, mega-container vessels can be up to 400m long with draughts of up to 16m. A typical loaded VLCC may have a draught of up to 21.6m. On average, the minimum depth of water required to support the movement of such vessels ranges from 16.9m to 22.6m. Our waters have sufficient depth to support the safe movement of mega-container vessels and VLCCs, but seabed depth varies, so such vessels have to ensure that they avoid the areas along their passages that cannot support their UKC requirements.

Eventually, MPA hopes to integrate the RUKC system with the iTracks system, which is being developed to track vessel movement. Together, they will ensure a high degree of navigational safety in Singapore's waters, says Capt De Souza.



## COMMUNITY TALK



# hubs of the future

Participants of the inaugural Port Authorities Roundtable held during Singapore Maritime Week 2015 share their perspectives on challenges and opportunities ahead for the port community

#### CLOCKWISE FROM TOP

**LEFT** Eddy Bruyninckx, CEO, Antwerp Port Authority; Grant Gilfillan, Chief Executive Officer and Director, Port Authority of New South Wales; Dato' Captain David Padman, General Manager, Port Klang Authority; Lim Ki-Tack, President, Busan Port Authority.

### **SINGAPORE NAUTILUS (SN):** WHAT ARE SOME OF THE FUTURE CHALLENGES AND OPPORTUNITIES THAT YOUR PORT IS LIKELY TO FACE?

**EDDY BRUYNINCKX (EB):** Changes in economic structures, patterns of consumption and demographics; shifts in production centres resulting in increased globalisation; deregulation of trade; new company strategies; opportunities in shipping caused by scale increases, as well as increasing concern about the environment – these are all key considerations that will determine the prospects of ports and their success and importance in the 21st century.

Ports will continue to play a crucial role in the global value chain. Therefore, the impact of the sustainable aspects of a port's policies will go far beyond its spatial territory. A global vision on the sustainable role of ports or a port-wide overview of the different sustainable activities within the global value chain may give direction on how to deal with the major challenges and opportunities.

**GRANT GILFILLAN (GG):** The role of each port in the global network is changing over time as the move to ever-larger ships more clearly defines which ports are mega hubs, and brings up the issue of how remaining ports can justify the infrastructure necessary to also receive larger ships as they cascade down the networks. With ports increasing their focus on sustainability and the potential for greater peaks in activity and congestion associated with mega ships, there needs to be greater collaboration between shipping lines and ports in planning processes.

**LIM KI-TACK (LKT):** The regional economy in North-east Asia has shown constant growth and the container trade in the region is expected to make up more than 40 per cent of the world's share. Because of this, lots of ports in this region have expanded their investment into port infrastructures, intensifying competition between ports to attract more cargo. Another challenge for us is the integration of the old and new ports in Busan for more efficient logistics flow to reduce overcapacity issues.

Also, as alliances and partnerships between the container carriers increase, their greater bargaining power can present another challenge. However, the Busan Port Authority (BPA) and the port community, as well as terminal operators and labour unions have worked together to maintain and strengthen their competitiveness in recognition of these challenges.

**DAVID PADMAN (DP):** One of the challenges that

## COMMUNITY TALK

ports will face is stiff competition from both local and regional ports. For example, besides existing competition from Malaysian ports such as Tanjung Pelepas and Penang, Port Klang also needs to compete with regional ports, especially Singapore, the current hub port, and emerging ports in Indonesia, Thailand, Vietnam and Sri Lanka.

There is also the challenge of upgrading port facilities and staff training to accommodate the growing size of container vessels. With shipping lines now venturing into port operations by buying equity in such operations, the result is a preference for shipping lines to call at their own ports and terminals over others.

To overcome these challenges, Port Klang is positioning itself as the preferred logistics hub in Asia. Some of our initiatives include minimising leakages of indigenous containers through neighbouring ports by encouraging more feeder ships to Malaysian ports, setting up and promoting port-related and ancillary services to support the local ports and shipping industry, and minimising bureaucratic bottlenecks by streamlining the functions of various agencies involved in port-related activities to reduce waiting time.

### **SN: HOW WILL THE INCREASING EMPHASIS ON ENVIRONMENTAL SUSTAINABILITY IMPACT THE WORK OF PORT AUTHORITIES?**

**EB:** Port authorities and port communities face lots of pressure in their use of natural resources. Sustainability reporting on relevant environmental indicators, such as energy and water consumption, enables port communities to adequately address their environmental policy as an integrated part of their overall management strategy.

An environmental policy should focus on a proactive, responsible and critical approach in which adequate measures beyond legal compliance are encouraged. Instruments that can be used by ports include rewarding best practices, such as the provision of incentives based on the Environmental Ship Index (ESI) for seagoing ships that are better at reducing greenhouse gas emissions than required by the International Maritime Organization (IMO), concessions for innovative environmental improvements, and financial support for proposals that are big on environmental benefits.

**GG:** Ports need to develop new skill sets to manage the complexities associated with sustainability. It is not just about being green, as sustainability is a broad term that can be equally addressed through

efficiency and the best use of infrastructure. We must also be prepared to engage proactively with local communities to ensure that ports and communities continue to grow next to each other. We must actively seek and retain a “social licence” to operate, as community standards continue to evolve and become more demanding of low impact port operations.

**LKT:** The Korean government leads the green policy on a national level by enacting laws aimed at cutting carbon dioxide emission by 30 per cent by 2020. To support this, the BPA set up its own Green Port Policy in 2011. The policy has three aims: achieving low carbon emission but high energy efficiency, improving the maritime environment, and enhancing the port landscape.

Busan Port was the first in North-east Asia to provide a 15 per cent exemption of port dues to vessels that score more than 31 points in the ESI. The BPA also plans to give incentives to vessels with reduced nitrogen oxide emissions and to give out awards to environmentally friendly vessels that call at Busan Port. There are also plans to bring forward the timeline for installing LED light bulbs in the port area and to build a liquefied natural gas (LNG) bunkering facility at Busan New Port by 2018.

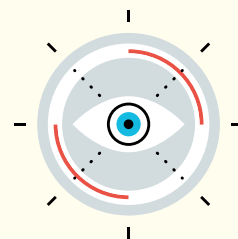
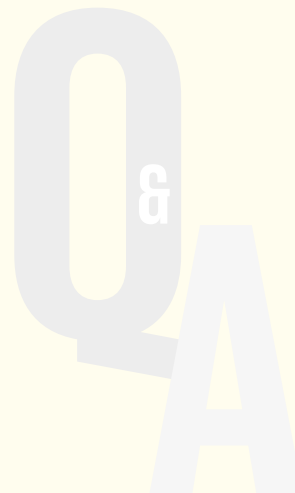
**DP:** To build a greener environment, dynamic changes to upgrade and enhance shipping technology are taking place. Some of these include replacing or upgrading vessel engines to improve fuel efficiency, employing hybrid tugboats that reduce fuel consumption, emissions and noise, and adopting automated mooring technology, which allows ships to reduce their speed when approaching the port, resulting in fuel savings and emissions reduction.

International ports around the world are also embarking on green port initiatives and adopting greener technology. Some of these include using hybrid port handling equipment such as forklifts and cranes, using cleaner fuels such as ultra-low-sulfur diesel and LNG for on-dock vehicles, and adopting solar energy in port areas.

Besides these strategies, Malaysia has adopted and put into practice international laws, codes and conventions in embracing a greener environment. Its ports and terminals have initiated strategies and actions to adopt green port initiatives.

### **SN: WHAT ARE SOME OF THE BEST PRACTICES IN ENHANCING PORT SAFETY AND SECURITY?**

**EB:** The Antwerp Port Authority has a comprehensive system to support its port facilities



and ensure that they comply with security regulations. More importantly, we have a security system that actually works. Recently, we set up a Port Information Network, which is a public-private partnership using a security platform to exchange information, send real-time messages, and communicate preventive tips. The Port of Antwerp is in fact a participant in the Regional EU-ASEAN Dialogue Instrument, which is a four-year initiative of the European Union to share experience and best practices with ASEAN.

**GG:** Best practice is difficult to define when it comes to port safety and security. Recently in Sydney, we experienced almost unprecedented weather with 130kmh winds, torrential rain and 13m swells off the entrances to our ports. Due to lessons learned from previous weather events, we managed to keep all ships secured at berth and acted quickly to send other vessels to sea where there was less risk of a ship being blown ashore as happened with the bulk carrier *Pasha Bulker* in Newcastle in 2007. These actions required confidence on the part of our harbourmaster to act quickly and not wait until a problem has unfolded. This is what best practice is about.

**LKT:** Global safety regulation set by the IMO has already reached a high standard, but 80 per cent to 90 per cent of port and marine accidents still occur due to human factors, as a result of not following safety regulations. The Port of Busan endeavours to establish a Safe, Global Busan Port through organising safety workshops, conducting regular safety checks, and eliminating potential dangers in advance by working closely with the port community, including port-related companies and port workers.

**DP:** One important aspect of any major international seaport these days is to ensure that it is a safe haven for all ships that call at the port. At Port Klang, it is our mission to provide the highest standards of cargo safety and security. We are proactive in taking initiatives to ensure we comply with the International Ship and Port Facility Security Code.

Port Klang has introduced the Container Security Initiative and the Megaports Initiative to enhance the safety and security of its terminals. The port is also compliant with all international maritime conventions in which Malaysia is a signatory, such as the International Convention for the Safety of Life at Sea (SOLAS) and the International Convention for the Prevention of Pollution from Ships (MARPOL).

## **SN: WHAT ARE SOME AREAS FOR COLLABORATION AND COOPERATION BETWEEN PORT AUTHORITIES?**

**EB:** Port authorities in today's world play a more active role than that of a traditional landlord. This results in many opportunities for collaboration.

For instance, one potential area is in stimulating sustainable development. We see sustainability reporting as an important tool to enhance sustainable development, and are working out guidelines for ports on this through an International Association of Ports and Harbors and The World Association for Waterborne Transport Infrastructure working group.

Another example, linked to environmental and safety practices, is the Memorandum of Understanding signed between the Antwerp Port Authority, the Maritime and Port Authority of Singapore, Zeebrugge Port Authority and the Port of Rotterdam. It aims to harmonise and standardise LNG bunkering procedures and facilitate the exchange of information to further stimulate the use of LNG as a fuel for shipping.

Collaboration between port authorities could and should result in level playing fields in the regulation and application of the legal framework.

Other areas for cooperation include the exchange of data between different port systems, and the joint development of hinterland connectivity for goods using environmentally friendly transport modes like rail and barge.

**GG:** The land transport activities associated with ports are an area where the sharing of ideas can assist in making ports more efficient. Most ports have well-developed terminal technologies and a strong focus on servicing ships, but there is often less interest in how containers are moved to and from the port.

Ports can be active facilitators of supply chain efficiencies, and there are many ideas and initiatives to be shared between ports. Often, the costs associated with land transport activities exceed shipping transport costs.

**LKT:** Collaboration and cooperation between port authorities can be achieved through discussing and sharing the ideas or lessons learnt from trials and errors they have been through. They can also put their heads together to think of solutions to overcome challenges faced by port authorities.

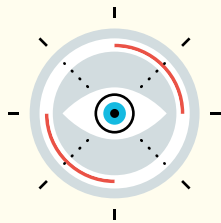
The BPA hopes to achieve useful results from annual or biannual meetings with sister ports, rather than letting them be a formality. We look forward to the second sister port exchange workshop this year between the Hamburg Port





“A FUTURE-READY PORT TAKES INTO ACCOUNT MAJOR DEVELOPMENTS IN SHIPPING AND TERMINAL HANDLING... IT NEEDS TO ENSURE THAT ITS INFRASTRUCTURE IS IN LINE WITH THE LATEST DEVELOPMENTS IN THE SHIPPING AND PORT SECTORS.”

**EDDY BRUYNINCKX, CEO, ANTWERP PORT AUTHORITY**



Authority and the BPA on the development of port performance indicators beyond counters for twenty-foot equivalent units (TEUs) and tonnage. I believe that these opportunities contribute to better understanding and cooperation between port authorities.

**DP:** The Port Klang Authority initiated collaboration and cooperation with other ports through establishing sister port agreements, opening up opportunities for cooperation in a wide variety of fields such as port studies, staff training, and information exchange. More importantly, the agreements help participating countries find ways to develop mutually beneficial cargo and cargo traffic services between ports. Encouraging seminars and dialogues between port authorities, as was recently done in Singapore, is another positive step for such collaboration.

**SN: WHAT DO YOU CONSIDER IMPORTANT IN BUILDING A FUTURE-READY PORT?**

**EB:** A future-ready port takes into account major developments in shipping and terminal

handling. This includes looking into the trend of ships growing larger and larger in size and how that would impact port infrastructure in terms of design draught, gantry crane outreach, air draught and terminal length. It needs to ensure that its infrastructure is in line with the latest developments in the shipping and port sectors. It also needs to anticipate future developments as history has proven that these can move faster and further than expected.

Ports must also take into account the long lifespan of maritime infrastructure and incorporate flexibility and adaptability features into their designs, such as in the phasing of infrastructure investments. It is also essential to introduce technology to increase port performance.

**GG:** There is little doubt that automation is the way of the future. Yard automation including automated receipt and delivery at the land transport interface is now a reality.

The next step is for terminals and shipping lines to work together on the next challenge of automating ship work. The reliability and predictability that an automated process delivers will become very desirable for mega ships for which schedule integrity tends to be paramount.

Automation is also desirable from a workplace health and safety perspective. For instance, a machine operator might be moved to an office to work in a technology-based role rather than having to strain his back working on the machine.

**LKT:** The BPA fully recognises the importance of implementing the inter-terminal transfer (ITT) platform at Busan New Port to attract more vessels and cargoes to Busan.

In light of this, the BPA has developed long-term and short-term strategies to reduce transportation costs of ITT in Busan New Port. I believe the ITT platform will significantly reduce the delivery cost between terminals in Busan New Port and eventually result in enhanced cost competitiveness for Busan Port.

**DP:** As the world's economies become more intertwined, ports play increasingly important roles in assisting their customers in competing for a share of the global market. With technology in the port and shipping sector changing at a rapid rate, there is also a need for major financial commitment to stay ahead of technology. Ports need to leverage port engineering capabilities and new technology to respond to growing environmental awareness and their increasing obligation to ensure a greener environment.



DR GUILLAUME DRILLET

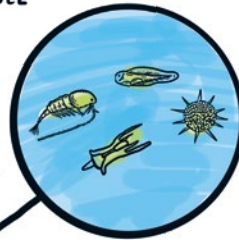
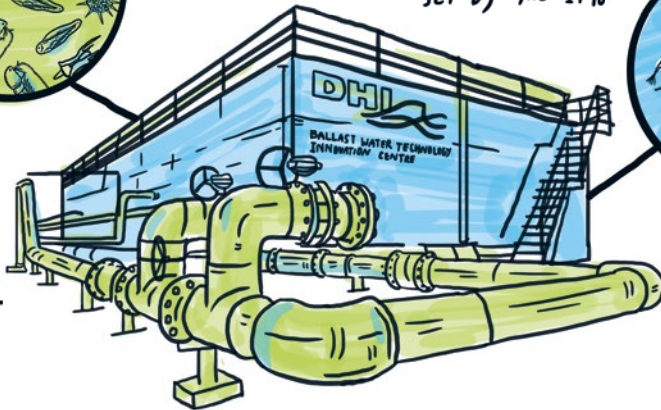
# JOB SCOPE

## 1 AT THE DHI BALLAST WATER CENTRE

A BWMS PASSES THE TEST WHEN THE NUMBER OF AQUATIC ORGANISMS AND PATHOGENS IN THE WATER IT TREATS IS REDUCED TO A LEVEL SET BY THE IMO.



SET UP TEST FACILITY FOR BALLAST WATER MANAGEMENT SYSTEMS (BWMS)



## 2 IN THE LAB

- MONITOR PLANKTON COMMUNITIES & SEE HOW THEY EVOLVE
- LOOK OUT FOR VITAL SIGNS, SUCH AS GROWTH RATES, REPRODUCTION RATES AND RESPIRATION

# a study in blue

Dr Guillaume Drillet, who is Head of Ecological Processes and Aquaculture at DHI Water & Environment, shares what his role as a marine biologist entails

Growing up by the coast of Brittany in north-west France, Dr Guillaume Drillet, Head of Ecological Processes and Aquaculture at water and environmental consultancy and research firm DHI Water & Environment, dreamed of being a marine biologist. "I was born next to the sea," he says, "and my dad loved to sail. He would take me sailing in the Channel and around the south of England every so often."

His affinity with the sea spurred an interest in understanding the effect human

beings have on the ecosystem. He worked on a farm under France's Ministry of Agriculture for his high school diploma before pursuing a degree in biology at university.

In between his master's degree in the management of coastal resources and his doctorate in aquaculture, he worked on various research projects dealing with copepods (tiny aquatic crustaceans that are key components of marine food chains) and aquaculture in Europe and the United States (US) before

moving here in 2010 to work for DHI.

### TESTING SYSTEMS

At DHI, Dr Drillet was involved in setting up a ballast water test facility at the DHI Ballast Water Centre in Singapore and putting testing procedures in place. Ballast water is carried in ships' ballast tanks to improve stability but the presence of non-native marine species

in the water can have a negative impact on the marine environment. The International Maritime Organization (IMO) requires all ships to install systems to treat this water before releasing it into the environment.

The test facility, the first of its kind in a tropical climate, tests and verifies technologies developed to reduce the amount of harmful

CAREERS

aquatic organisms and pathogens in ballast water. Dr Drillet was tasked to produce plankton (microscopic organisms that float in water) for the required tests. When his team finally got a valid test result a few months after setting up the facility from scratch, they were ecstatic.

Recognised by the US Coast Guard as an independent laboratory, the centre can independently evaluate the performance of ballast water management systems to see if they meet industry quality standards and comply with international

guidelines. Comprising three tanks with a combined volume of 1,050 cubic m, the test facility is designed to mimic real ballast tanks in ships to minimise the potential gap between land-based and shipboard testing.

**STUDYING PLANKTON**

Dr Drillet is also involved in laboratory-based research and development projects in which microscopic studies are done to understand the ecology of phytoplankton (plant plankton) and zooplankton (animal plankton). He applies

his knowledge and findings to business contexts, such as ballast water treatment technology tests and cases where growing better quality plankton is essential to feed fish larvae and support a healthy aquatic environment. These studies also help in developing early warning systems to predict toxic plankton blooms, which have caused mass fish deaths in fish farms off Singapore's coast in recent years.

Another important aspect of Dr Drillet's work involves communicating with people, notably his

colleagues. He ensures that they feel good and happy at work, and helps them arrive at solutions when they encounter problems at work. He says: "I love communicating and taking care of people. I want to be the guy who helps. Normally, people come to me when they have a problem. I like to help them find solutions. My objective is to improve things."

Aside from these, Dr Drillet provides technical advice on ballast water management to the Maritime and Port Authority of Singapore at IMO meetings. He

also spends about 50 hours a year teaching evening classes on aquaculture at Temasek Polytechnic, and occasionally gives talks on aquatic ecology and aquaculture at other institutes.

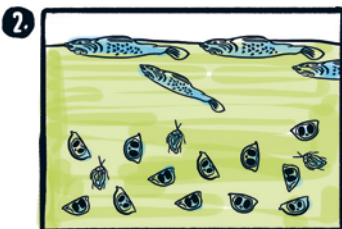
In February 2011, he won acclaim as a marine biologist when he received one of the most prestigious Danish awards, the Sapere Aude Young Elite Scientist Award, for his research on copepods. It was a dream come true.

He says: "All my life, I've been fighting, and I'm still fighting, to realise my dreams."

# GAINING RECOGNITION AS A SCIENTIST



1 I FOUND OUT WHY COPEPODS GET STRESSED & HOW TO GROW THEM ON A LARGE SCALE.



2 WHEN THEY ARE STRESSED, THEY LAY EGGS THAT DO NOT HATCH PROPERLY. THIS AFFECTS FISH FARMERS' LIVESTOCK AS COPEPODS ARE THE MAIN SOURCE OF FOOD FOR SEVERAL FISH SPECIES.



3 I WAS AWARDED THE SAPERE AUDE YOUNG ELITE SCIENTIST AWARD FOR MY RESEARCH IN FEBRUARY 2011.

## TO BE A MARINE BIOLOGIST:



1 HAVE PASSION FOR THE SUBJECT.



2 LIKE TRAVELLING & MEETING NEW PEOPLE.



3 BE ABLE TO PERSEVERE DESPITE MULTIPLE FAILURES

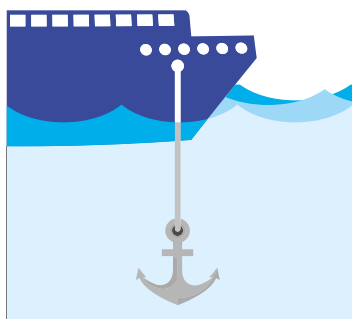


4 PUT IN HARD WORK



THE BACK PAGE

**BUILT TO REPLACE CLIFFORD PIER, MARINA SOUTH PIER IS USED BY PASSENGERS VISITING THE SOUTHERN ISLANDS, AND TO ACCESS SHIPS ANCHORED IN THE EASTERN ANCHORAGES.**



## retracing history

The Singapore Maritime Trail is an outreach programme by the Maritime and Port Authority of Singapore. The second edition of the trail, launched in May, takes participants on a journey that tracks the progress and development of our port. These are some of the interesting places it covers.

**MAXWELL CHAMBERS**  
WAS FORMERLY KNOWN AS CUSTOM HOUSE.

*Custom House was the headquarters of the Department of Customs and Excise (now Singapore Customs) for almost*

# 1900

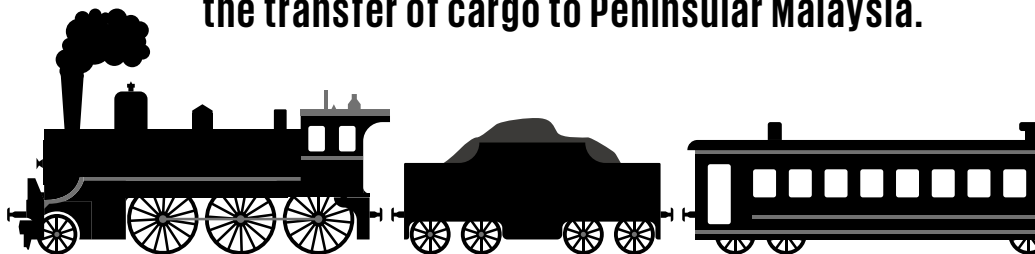
saw New Harbour renamed as Keppel Harbour, after Sir Henry Keppel, a Royal Navy officer who was sent to fight piracy in the region.



CUSTOMS POLICE KEPT WATCH ON THE SINGAPORE HARBOUR FROM ITS 23M-TALL LOOKOUT TOWER AT CLIFFORD PIER.

# 60 years.

**Opened in 1932, the former Tanjong Pagar Railway Station opposite the Tanjong Pagar docks facilitated the transfer of cargo to Peninsular Malaysia.**





The Maritime Youth Club programme is an outreach initiative targeting schools and institutes of higher learning to raise the awareness of Maritime Singapore and to introduce the varied career opportunities that the industry offers. Schools can use the funding to organise maritime-related activities that are of interest to the students and to create platforms for the youths to experience the various aspects of the maritime industry.



We would like to invite all interested schools and students to be a part of this outreach initiative. Successful applicants will receive funding support ranging from SGD1,000 to SGD12,000\*.

To find out more about how to apply for Maritime Youth Club support, please contact Ms Fang Jiayun from MPA's Community Engagement Department at [fang\\_jiayun@mpa.gov.sg](mailto:fang_jiayun@mpa.gov.sg).

\*Terms and conditions apply.



The Maritime Youth Club is an initiative of the Maritime and Port Authority of Singapore





## Singapore's Gateway for General & Bulk Cargo

Innovative ■ Dynamic ■ Sustainable

### Main Port

Asia Pacific Multi-Purpose Terminal Operator  
of the Year (2010 – 2014) by Frost & Sullivan

### Administration Building

Awarded Green Mark Platinum by Building  
and Construction Authority

### "Green" Berths

Awarded Green Mark Gold by Building  
and Construction Authority

Received ABC Waters Certification  
by Public Utilities Board