

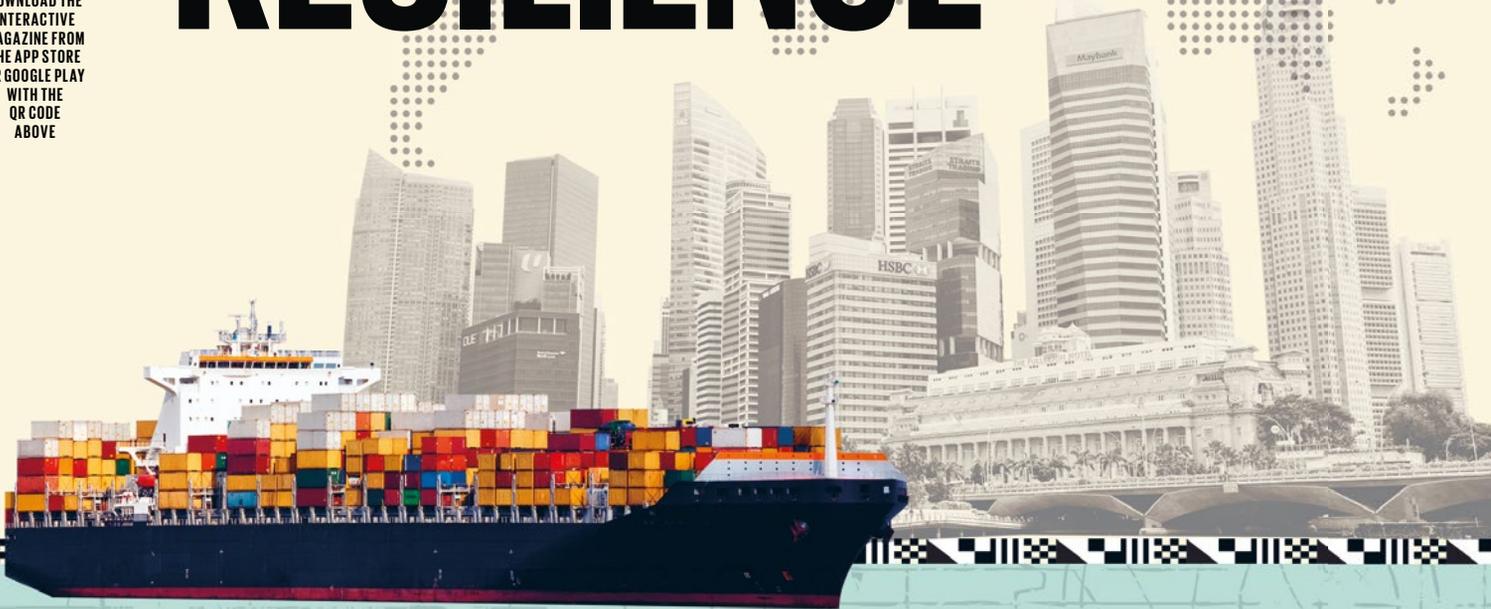
ROUTE TO RESILIENCE



02/2016 no.35



DOWNLOAD THE INTERACTIVE MAGAZINE FROM THE APP STORE OR GOOGLE PLAY WITH THE QR CODE ABOVE



▶ committed to innovation

▶ greening the bottom line

▶ eye on asia



25 - 27 April 2017

Marina Bay Sands®
Singapore

www.sea-asia.com

Organisers



Held in conjunction with



Recognised as



Book now and stay ahead of the competition

Asia's shipping sector has come a long way and has gained global recognition as an important maritime crossroad. If you are in the maritime industry and aim to grow your business, do not miss riding on Asia's wave!

Be part of Sea Asia, the anchor maritime and offshore event, as an exhibitor or sponsor.



Over **400** exhibiting companies



High-powered conference and seminars



International pavilions



More than **16,000** participants in **3** days

Contact us

Sea Asia Singapore Pte Ltd

T: +65 6592 0888 | F: +65 6221 2282 | E: sales-seatrade@ubm.com



Sponsors



CONTENTS

PAGE
04

SHIP'S LOG
**news and happenings
at MPA**

PAGE
12

FEATURE
**strength in
adversity**

PAGE
18

PORT & STARBOARD
smart revolution

PAGE
20

MARITIME SERVICES
nord to asia

PAGE
22

PERSONALITY
**rallying the
industry**

PAGE
24

PERSONALITY
**eyeing a
turnaround**

PAGE
26

TECHNOLOGY
minted for success

PAGE
30



COMPANY SPOTLIGHT
**for a greener
tomorrow**

PAGE
32

COMMUNITY TALK
**changes for
the better**

PAGE
36

COMMENTARY
**going green
makes cents**

PAGE
38

CAREERS
**maintaining good
order at sea**

PAGE
40

THE BACK PAGE
maritime milestones

publisher



MPA
SINGAPORE

**MARITIME AND
PORT AUTHORITY OF
SINGAPORE**

460 Alexandra Road
#19-00 PSA Building
Singapore 119963
Tel: +65 6375 1600
Fax: +65 6275 9247
www.mpa.gov.sg

executive editor

Au Kheng Sheng

advisory committee

Andrew Tan
Tan Beng Tee
M Segar Abdullah
Khong Shen Ping
Toh Ah Cheong
Ong Seok Bin
Parry Oei
Tan Cheng Peng
Angela Png
Tan Suan Jow
Bernice Yeoh
Yvonne Chan
Alan Lim

managing editor

Kate Tan

publishing agent

SPHmagazines

Caroline Ngui
GROUP EDITOR-IN-CHIEF

Joanna Lee-Miller
GROUP EDITOR

editorial & creative

Dora Tay
SENIOR EDITOR
Lediati Tan
EDITOR

Annabelle Bok
SUB-EDITOR
Jayson Ong
ASSOCIATE CREATIVE DIRECTOR
Stephanie Teo
ART DIRECTOR

Geoff Tan
MANAGING DIRECTOR

Christopher Chan
GENERAL MANAGER

**sales & client
management**

Kaz Lim
ASSOCIATE ACCOUNT DIRECTOR
Charmaine Soh
GROUP ACCOUNT MANAGER
Christine Chionh
**ASSISTANT MANAGER CLIENT
MANAGEMENT**



publishing services
Matthew Joseph Nah
EXECUTIVE

Singapore Nautilus is published quarterly by SPH Magazines Pte Ltd (Registration No: 196900476M) for the Maritime and Port Authority of Singapore (MPA). Copyright of the materials contained in this magazine belongs to MPA. Views expressed may not necessarily be those of MPA or SPH Magazines Pte Ltd. All rights reserved. Enquiries should be directed to the Editor, Maritime and Port Authority of Singapore, 460 Alexandra Road, #19-00, PSA Building, Singapore 119963. Tel: +65 6375 1600, Fax: +65 6275 9247, E-mail: SN_feedback@mpa.gov.sg. All information is correct at time of printing. Printed in Singapore by KHL Printing Co. Pte Ltd (Registration No: 197801823M), ISSN 2010-1120. For advertising enquiries, please e-mail jrani@sph.com.sg



Vital. Versatile. Resilient. Leading.

Do you know that there are more than 170,000 people who are currently employed in over 5,000 maritime establishments in Singapore?

Maritime Singapore opens the door to a whole new world of opportunities within this vibrant industry. Find your true ambition with this leading industry.

www.maritimesingapore.sg

building resilience

The global maritime industry is a cyclical business, with booms and busts par for the course.

In good times, it is important for businesses to build up their strengths and capabilities in order to be able to weather the storms during a downturn.

This is something that the maritime industry in Singapore has been doing for years. Together, the industry, the Government and the unions have built up a maritime ecosystem that is resilient and adaptable to challenges.

That is why, despite the global economic slowdown which has adversely impacted the maritime industry around the world, we remain confident in Maritime Singapore's ability to weather the current headwinds.

In this issue's main feature, read about how the Maritime and Port Authority

of Singapore (MPA) is helping the maritime sector to remain robust in tough market conditions.

To meet the challenges ahead, we need to think in both the short and long term to ensure that Maritime Singapore emerges stronger from this cycle. One way to do so is to invest in cutting-edge maritime technology that helps businesses gain a competitive edge. In the Technology section, we share the experiences of two local companies that have developed innovative solutions for the maritime industry with support from MPA's Maritime Innovation & Technology Fund.

In the Personality section, Mr Kristian Siem, founder and Chairman of industrial holding group Siem Industries, and Mr Jarand Rystad, Managing Partner of oil and gas consultancy Rystad Energy, share their perspectives on strategies to cope with the current downturn.

With the combined wisdom of our industry stakeholders, I'm optimistic about the medium- to longer-term outlook for Singapore's position as a global hub port and an International Maritime Centre.



AU KHENG SHENG
EXECUTIVE EDITOR



LLOYD'S REGISTER AND KEPPEL JOIN HANDS IN RESEARCH AND DEVELOPMENT

Lloyd's Register's Global Technology Centre in Singapore and Keppel Offshore & Marine Technology Centre (KOMtech) are working on a joint research and development project, co-funded by the Maritime and Port Authority of Singapore under the Maritime Innovation & Technology Fund.

To improve the safety and performance of new semi-submersible designs, they will develop advanced numerical simulation capabilities to predict semi-submersible behaviour in extreme waves through the development of the Numerical Wave Basin.

For the project, Lloyd's Register will adapt its NewWave simulation tool, which has been applied on fixed offshore structures to simulate wave-in-deck loading, with KOMtech's deepwater know-how, while leveraging both parties' strength in Computational Fluid Dynamics. KOMtech will use its deepwater know-how and extensive in-house data from model tests on semi-submersibles to benchmark and validate this new technology.

SINGAPORE IS BEST SEAPORT IN ASIA FOR 28TH TIME

At this year's Asian Freight, Logistics and Supply Chain Awards held in Shanghai, China on June 14, the Port of Singapore was once again named the Best Seaport in Asia, making it the 28th time it has won the honour. The awards, organised by freight and logistics publication *Asia Cargo News*, honour organisations that demonstrate leadership and consistency in service quality, innovation, customer relationship management and reliability.

In votes cast by readers of *Asia Cargo News*, Singapore was recognised for its leading performance in areas including cost competitiveness, provision of suitable container shipping-related infrastructure, timely and adequate investment in new infrastructure, and the facilitation of ancillary services.

Home-grown global container group PSA also clinched two awards. PSA International was named Best Global Container Terminal Operating Company, while PSA Singapore Terminals was Asia's Best Container Terminal in the over four million twenty-foot equivalent units category.

PHASE 1 OF TUAS TERMINAL DEVELOPMENT BEGINS



Singapore's next-generation container terminal development has clocked a major milestone with the Tuas Terminal development entering Phase 1 of its construction.

Coordinating Minister for Infrastructure and Minister for Transport Khaw Boon Wan marked the occasion on April 29 by launching the first caisson, a watertight retaining structure that will be part of the wharf of Phase 1 of the Tuas Terminal. A total of 222 such caissons will form the permanent 8.6km-long wharf structure. Each caisson is 28m tall, equivalent to the height of a 10-storey HDB block; this makes them some of the largest in the world.

When completed, the 20 deepwater berths in Phase 1 of Tuas Terminal's development will be able to handle about 20 million twenty-foot equivalent units (TEUs) per annum. The entire mega-terminal will be able to handle up to 65 million TEUs.

Tuas Terminal, a major

component of Singapore's Next Generation Port vision, will be developed in four phases over the span of some 30 years, with Phase 1 reclamation works scheduled to be completed by the early 2020s. Said MPA Chief Executive Mr Andrew Tan: "The Tuas Terminal is a centrepiece of Singapore's Next Generation Port vision and demonstrates our strong commitment to strengthening and sustaining our leadership position as a global hub port and International Maritime Centre. Additionally, we hope that complex projects of this scale can inspire the next generation of engineers to join the profession and help shape our future."

ABOVE Coordinating Minister for Infrastructure and Minister for Transport Khaw Boon Wan (fifth from left) marked the start of construction by launching the first caisson.



TAP FOR VIDEO

RECORD 34 UNDERGRADUATES RECEIVE THE MPA GLOBAL INTERNSHIP AWARD

A total of 34 undergraduates were awarded the MPA Global Internship Award (GIA) on May 12.

Launched in 2013, the MPA GIA programme provides opportunities for outstanding undergraduates from Nanyang Technological University, National University of Singapore, and Singapore Management University to gain insights into the diverse and global nature of the maritime industry through a 10-week internship, which includes an overseas stint of up to four weeks across Australasia,

Europe, the Middle East and South America.

The recipients were selected from over 250 applications, double that of last year, from both maritime and non-maritime-related disciplines. They will take up internships in 23 companies from diverse maritime sectors, including shipping, finance, insurance and legal. To date, 88 students have benefitted from the MPA GIA programme.

BELOW A record number of 34 undergraduates received the MPA Global Internship Award this year.



9TH SEATRADER MARITIME AWARDS ASIA

Organised by Seatrade, the 9th Seatrade Maritime Awards Asia honoured individuals and companies for their outstanding contributions to the region's maritime industry on July 15 at the Shangri-La Hotel, Singapore.

Widely regarded as one of Asia's most prestigious industry awards, the gala dinner was attended by over 400 leading industry professionals and guests. Of the 15 awards given out, 11 were in competitive categories, with winners chosen by an independent panel of senior industry figures. The remaining four special awards, presented to individuals for exemplary contributions to the shipping industry, were decided by the Seatrade Senior Editorial Board.

To recognise the work of the Sailors' Society and The Mission to Seafarers in supporting seafarers and their families, Seatrade donated 10 per cent of the event's table sales proceeds to both charities.

FROST & SULLIVAN

PROUDLY CONGRATULATES



2016 FROST & SULLIVAN MALAYSIA
NICHE LOGISTICS
 SERVICE PROVIDER OF THE YEAR



GIGA Shipping Sdn Bhd

SHIP'S LOG HAPPENINGS

FERRY EVACUATION EXERCISE



On May 6, more than 150 personnel from eight agencies and companies took part in a half-day ferry evacuation exercise organised by the Maritime and Port Authority of Singapore (MPA), to test their readiness in responding to potential ferry mishaps in the Port of Singapore.

ICBC 2ND RMB INTERNATIONALISATION SUMMIT



The 2nd RMB Internationalisation Summit hosted by the Industrial and Commercial Bank of China (ICBC) Singapore on June 7 saw the inauguration of ICBC Shipping Finance Centre (Asia Pacific), as well as the signing of formal Memorandums of Understanding and Cooperation Agreements with local organisations.

CIL-MPA OCEANS GOVERNANCE RESEARCH PROGRAMME



The Centre for International Law (CIL) at the National University of Singapore has received a three-year research grant of S\$1.56 million from the Singapore Maritime Institute, which is supported by MPA, to establish the CIL-MPA Oceans Governance Research Programme.

SHIP'S LOG HAPPENINGS

VISIT BY PANAMA PRESIDENT



Panama President Juan Carlos Varela Rodriguez, who was in Singapore on a one-day State Visit, visited the Port Operations Control Centre (POCC) at PSA Vista and held discussions with MPA officials on April 22.

VISIT BY SUEZ CANAL AUTHORITY



MPA hosted Dr Ahmed M Darwish, Chairman of the General Authority for the Suez Canal Economic Zone of the Arab Republic of Egypt, under its Distinguished Visitors Programme from May 31 to June 4. As part of his visit, he was given an overview of Maritime Singapore, including the development of the future Tuas Port.

MPA ATTACHMENT PROGRAMME



Mr Masatoyo Ishihara, Director for Designated Port Management Company Supervision, Port Management and Operation Division, Ports and Harbours Bureau, Japan's Ministry of Land, Infrastructure, Transport and Tourism, took part in a 10-day attachment programme with MPA in March.

VISIT BY THAILAND'S MARINE DEPARTMENT



A delegation from Thailand's Marine Department, led by Mr Somchai Sumanuskajonkul, Deputy Director General (Maritime Transportation) of the Marine Department, visited MPA on May 13. Aside from visiting the POCC at PSA Vista, they also called on MPA Chief Executive Mr Andrew Tan.

SMW 2016

Driven by the Maritime and Port Authority of Singapore (MPA), the 11th edition of Singapore Maritime Week (SMW), held from April 17 to 22, saw over 43,000 public participants and members of the international maritime community attending the region's biggest maritime event. Themed "Positioning for Future Growth" and organised around the focus areas of People, Ideas and Opportunities, this year's line-up of 31 events ranged from exhibitions and conferences to social activities and outreach initiatives. *Singapore Nautilus* looks at some of the highlights.

PEOPLE

LAUNCH OF SMW 2016



Mr Khaw Boon Wan, Coordinating Minister for Infrastructure and Minister for Transport, officially opened SMW 2016, MPA's annual flagship event, on April 17. The launch was held at Marina Square, the site of the week-long SMW 2016 Exhibition, Our Maritime Singapore Stories. Open to the public, the exhibition aimed to enable the general public to develop a deeper understanding of Maritime Singapore and its achievements.

3RD CERTIFICATE OF COMPETENCY (COC) GRADUATION CEREMONY



On April 21, a total of 57 cadets who graduated from the CoC (Special Limit) Deck Officer and Marine Engineer training programmes received their certificates from Mr Gilbert Tan, Chief Executive Officer of e2i (Employment and Employability Institute).

SHIP'S LOG HAPPENINGS

SMW MPA LEARNING JOURNEYS



This year, SMW MPA Learning Journeys participants were brought on a journey that told the story of Singapore's progress in the maritime industry via a guided tour of historical landmarks and modern maritime facilities that are usually not accessible to the public.

AMAZING MARITIME CHALLENGE 2016



This year's Amazing Maritime Challenge, held on April 17, saw teams racing around Singapore in a series of mental and physical games designed to help them discover more about Maritime Singapore. The winning teams for both the Open and Corporate categories each walked away with cash prizes ranging from S\$1,000 to S\$3,000.



INTERNATIONAL SPORTSWEK FOR SEAFARERS



To promote goodwill and sportsmanship among seafarers of different nationalities, cultures and backgrounds, seafarers from across the shipping community came together to participate in various fun sporting events from April 19 to 22.

SHIP'S LOG HAPPENINGS

IDEAS

10TH SINGAPORE MARITIME LECTURE



Close to 400 senior maritime professionals attended the 10th Singapore Maritime Lecture, which included a keynote speech by Mr Kristian Siem, Chairman of Siem Industries, as well as a high-level panel discussion moderated by BW Group's Chairman, Mr Andreas Sohlen-Pao.

INAUGURAL MARITIME ADMINISTRATORS' FORUM



The inaugural Maritime Administrators' Forum, organised by MPA Academy, supported the International Maritime Organization's 2016 World Maritime Day theme - Shipping: Indispensable to the World - to highlight shipping's importance and raise awareness of how it supports and sustains today's global society.

SHIP'S LOG HAPPENINGS

MPA BUNKER FORUM



The MPA Bunker Forum, held on April 22, gathered feedback and suggestions from industry stakeholders with a view to improving bunkering services in the Port of Singapore.

OPPORTUNITIES

INAUGURAL SGX-MPA CAPITAL MARKETS ROUNDTABLE



Close to 20 companies representing various sectors of the maritime industry, including liner, bulk, tanker and offshore services, participated in a Capital Markets Roundtable jointly organised by Singapore Exchange (SGX) and MPA to discuss ship financing opportunities in Singapore's capital markets.

LAUNCH OF SEA ASIA 2017

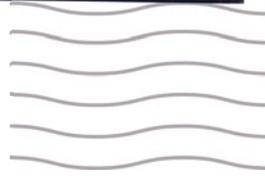


Over 250 guests attended the launch reception for Sea Asia 2017, the premier maritime and offshore conference and exhibition in Asia, on April 19 at Marina Bay Sands, Singapore. Sea Asia 2017, co-organised by Seatrade and Singapore Maritime Foundation, and supported by MPA, will be held next year from April 25 to 27.

Rahita Elias finds out how the Maritime and Port Authority of Singapore helps Maritime Singapore to remain robust as the industry eyes a recovery on the horizon



strength in adversity





In the 20 years since the Maritime and Port Authority of Singapore (MPA) was established in February 1996, it has weathered many ups and downs with the maritime industry in Singapore, supporting the industry through various initiatives and programmes.

Over the years, concerted efforts by MPA, in partnership with the maritime industry, have helped to establish a multi-faceted and dynamic maritime ecosystem in Singapore that is resilient and adaptable to challenges. The country hosts over 5,000 maritime establishments offering a diversity of products and services, and is home to about 130 of the world's top shipping companies. Employment levels in the maritime sector have also remained stable at around 170,000 jobs.

Singapore is also a regional hub for maritime law and arbitration, and the venue of choice for international maritime organisations and associations such as the Baltic Exchange, the Asian Shipowner's Forum and the International Association of Independent Tanker Owners to set up their headquarters and representative offices.

In her speech at the Committee of Supply Debate 2016 in April, Josephine Teo, Senior Minister of State in the Prime Minister's Office, the Ministry of Transport and the Ministry of Foreign Affairs, said that while the shipping industry has been sailing through rough waters, the medium- to long-term outlook is positive.

She noted how, despite the downturn, Singapore has clinched the top spot in the International Shipping Centre Development Index, which ranks the performance of major ports around the world, for two consecutive years.

In June, the Port of Singapore was also named the Best Seaport in Asia for the 28th time at the Asian Freight, Logistics and Supply Chain Awards, held in Shanghai, China.



FEATURE

GROWING FUTURE CAPABILITIES

Amid the tough conditions, MPA has lent a helping hand to the shipping industry. On top of enhancing the port dues concession to offshore support vessels in November last year, MPA has granted a 10 per cent concession on port dues to bulk carriers carrying out cargo works and staying not more than five days from April 15 this year. The concession will be available for one year. In January, MPA also announced an additional 10 per cent concession on port dues for container vessels calling at Singapore.

These concessions are on top of existing port dues concessions such as the Green Port Programme incentives and the 20 per cent concession first introduced in 1996. Taken together with the existing concessions, the full slate of concessions is expected to yield S\$18 million in annual savings for shipping companies.

Singapore also continues to build long-term capacity in several different aspects. Through developing Pasir Panjang Terminal and the new Tuas Terminal, it continues to invest in building port capacity to meet the industry's long-term needs. It is also investing in smart technology to boost productivity and transform current jobs into higher value-added jobs.

The use of smart technologies, such as the use of driverless vehicles to ferry container boxes around the Tuas Terminal, opens up new job opportunities in engineering and software development, while the deployment of a next-generation Vessel Traffic Management System at Tuas will require skilled data analysts and data scientists to predict congestion hotspots and avoid potential collisions.

To encourage research and development and innovation in the maritime cluster, a total of S\$200 million has been set aside to support numerous research organisations and projects through MPA's Maritime Innovation & Technology Fund.

PEOPLE DEVELOPMENT

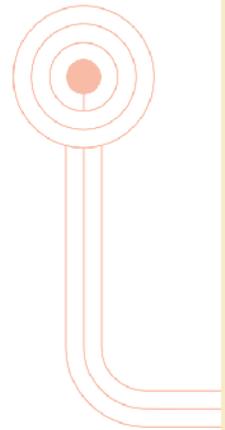
Developing manpower capabilities for the maritime sector in Singapore remains a top priority. In total, MPA has set aside S\$12 million for various manpower initiatives, which are expected to benefit some 5,000 Singaporeans.

Besides organising the inaugural Maritime Youth Festival later this year to promote the maritime sector among the young, the Singapore Maritime Foundation's Maritime Singapore Connect Office is also intensifying its outreach efforts to link the industry with schools to promote internship and job opportunities. The office will also run an online portal that allows the public to access information on maritime careers and training opportunities.

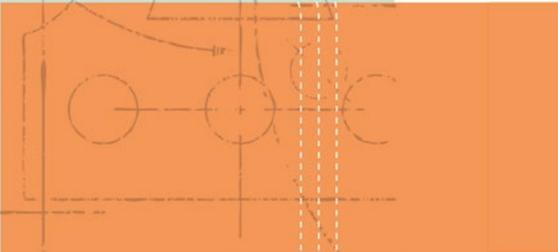
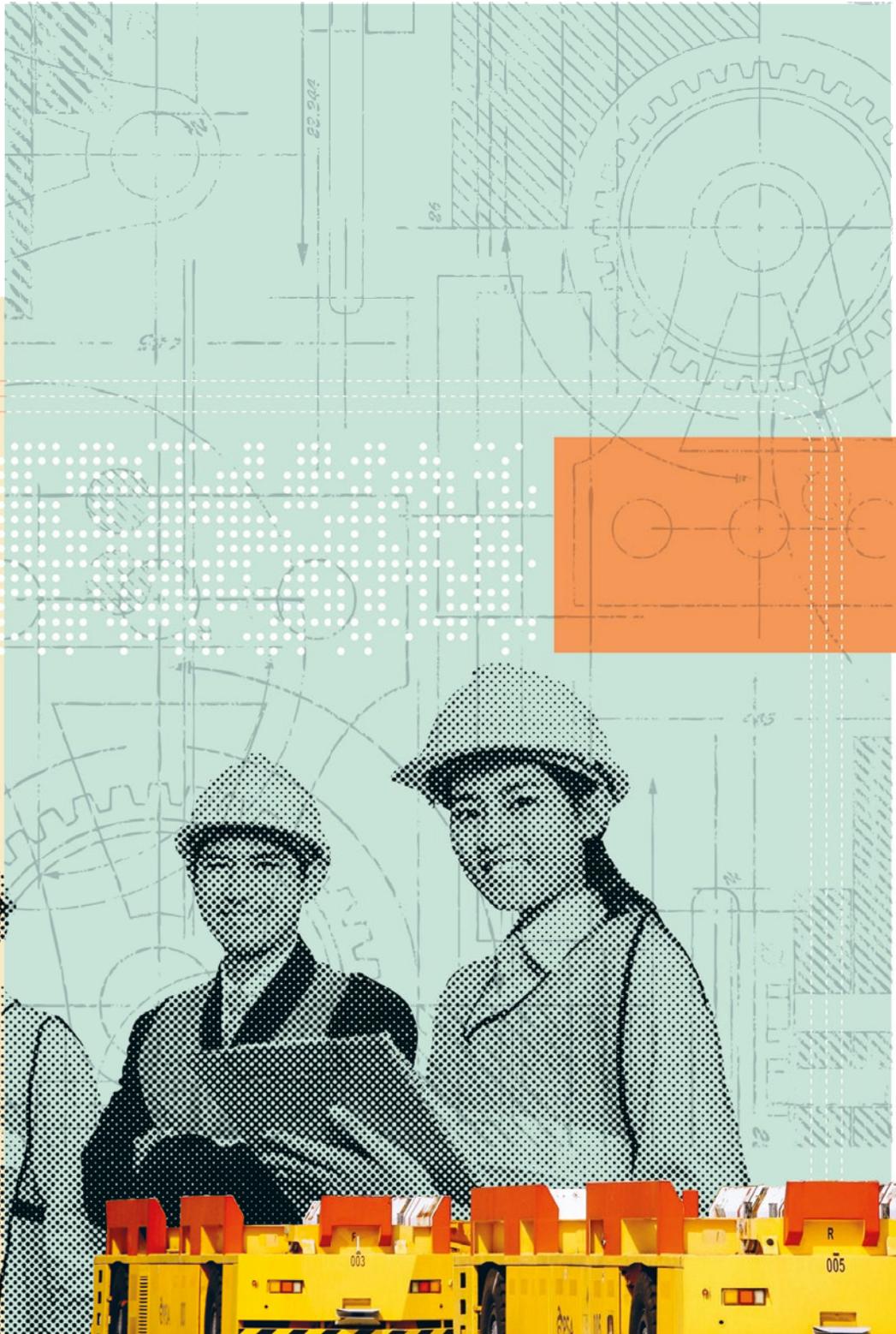
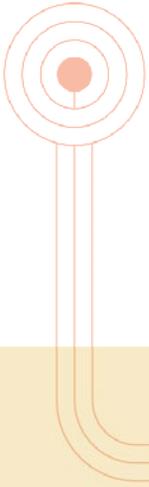
MPA has introduced the Internship Reimbursement Scheme to help students gain relevant work experience and reintroduced the Graduates Attachment Programme to help university, polytechnic and Institute of Technical Education graduates gain industry experience in participating maritime companies. Under the new Maritime Career Conversion Scheme, MPA will help Singaporeans wanting to make a career switch into the maritime sector by subsidising training costs and providing wage support.

To ensure that the skills and knowledge of current employees remain relevant to the changing needs of the industry, MPA has also increased co-funding support for maritime companies for selected maritime training courses to encourage them to continue sending their local employees for training.

Said Andrew Tan, Chief Executive of MPA: "MPA will continue to commit resources to attract, develop and retain local talents in the maritime sector. The introduction of our various manpower schemes to provide support to maritime companies and a wide spectrum of our local talent pool reaffirms MPA's commitment to developing a quality maritime workforce and ensuring that Singapore remains well-positioned when we emerge from the shipping downturn."



FEATURE



FEATURE

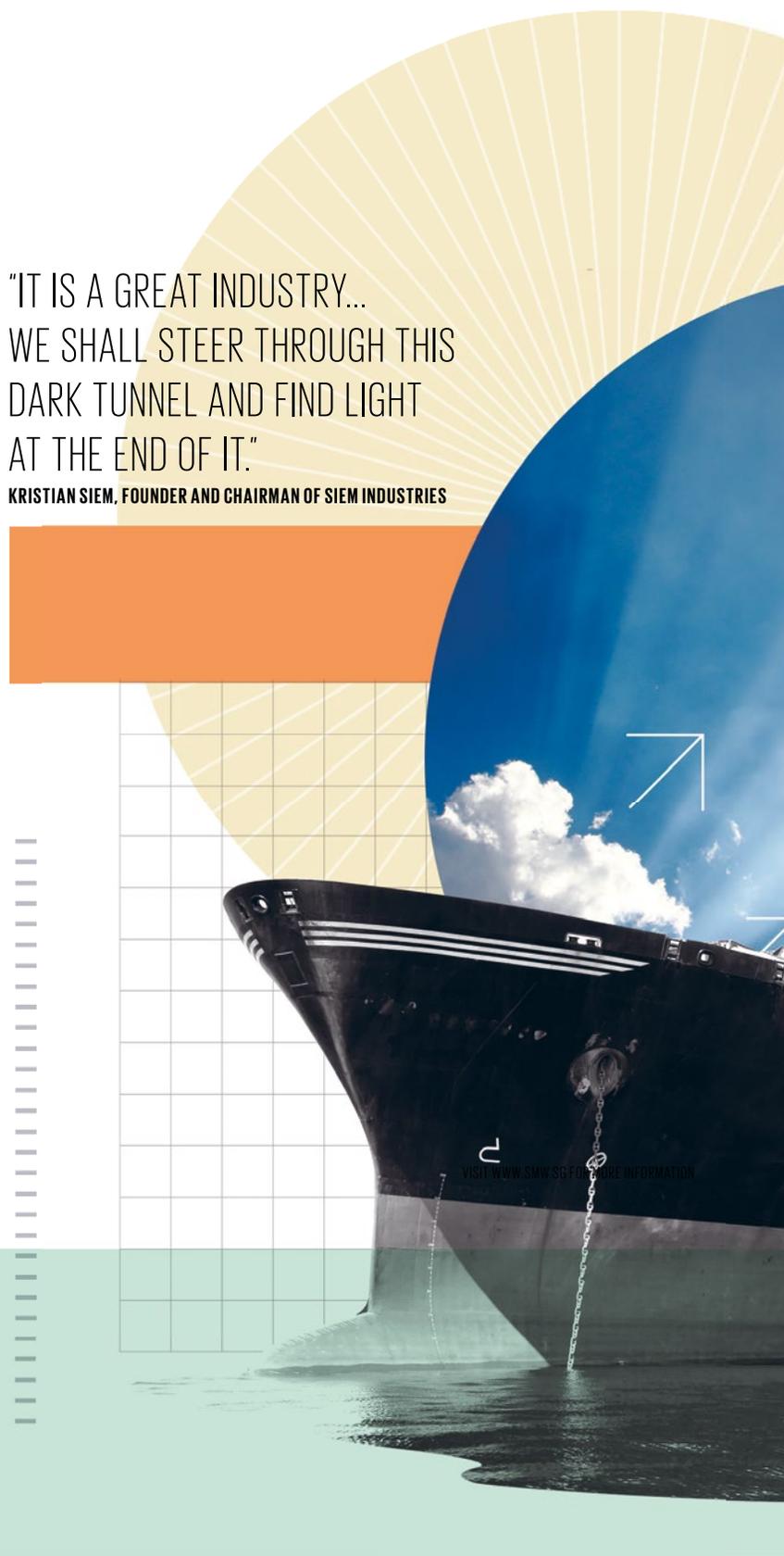
RECOVERY ON THE HORIZON

Globally, the resilience of the maritime industry was also a key theme that emerged from the recently concluded Singapore Maritime Lecture – the anchor event of the annual Singapore Maritime Week. The event's keynote speaker was Kristian Siem, who is Chairman of Siem Industries. The talk by the 44-year veteran of the oil service industry was followed by a lively discussion involving him, Teo Siong Seng, Managing Director of Pacific International Lines (PIL), and David Carbon, Managing Director of Economic and Currency Research for DBS Bank. The discussion was skilfully helmed by Singapore Maritime Foundation and BW Group Chairman Andreas Sohmen-Pao.

During the event, Siem said that the oil industry is going through a difficult period; after an extended period in which oil prices were seemingly on an unstoppable uptrend, the industry is now feeling the bite of falling oil prices. But he believes that the offshore oil service market is set to recover next year, or by 2018 at the latest. Lower development costs coupled with the need for operators to replenish oil reserves will drive this growth, he said, pointing out that the reserves' replenishment ratios in 2015 were the lowest they have been since 2000.

"(The oil companies) will begin to look at the reality that they need to replenish reserves. They will see that the cost of field developments has come down in such a way that they can start developing economically. It's only my guess; a shift in the thinking in the boardrooms will lead to more activity in 2018," he added.

Despite the challenging conditions, Siem believes in the industry's ability to face its difficulties. He said: "It is a great industry... We shall steer through this dark tunnel and find light at the end of it."

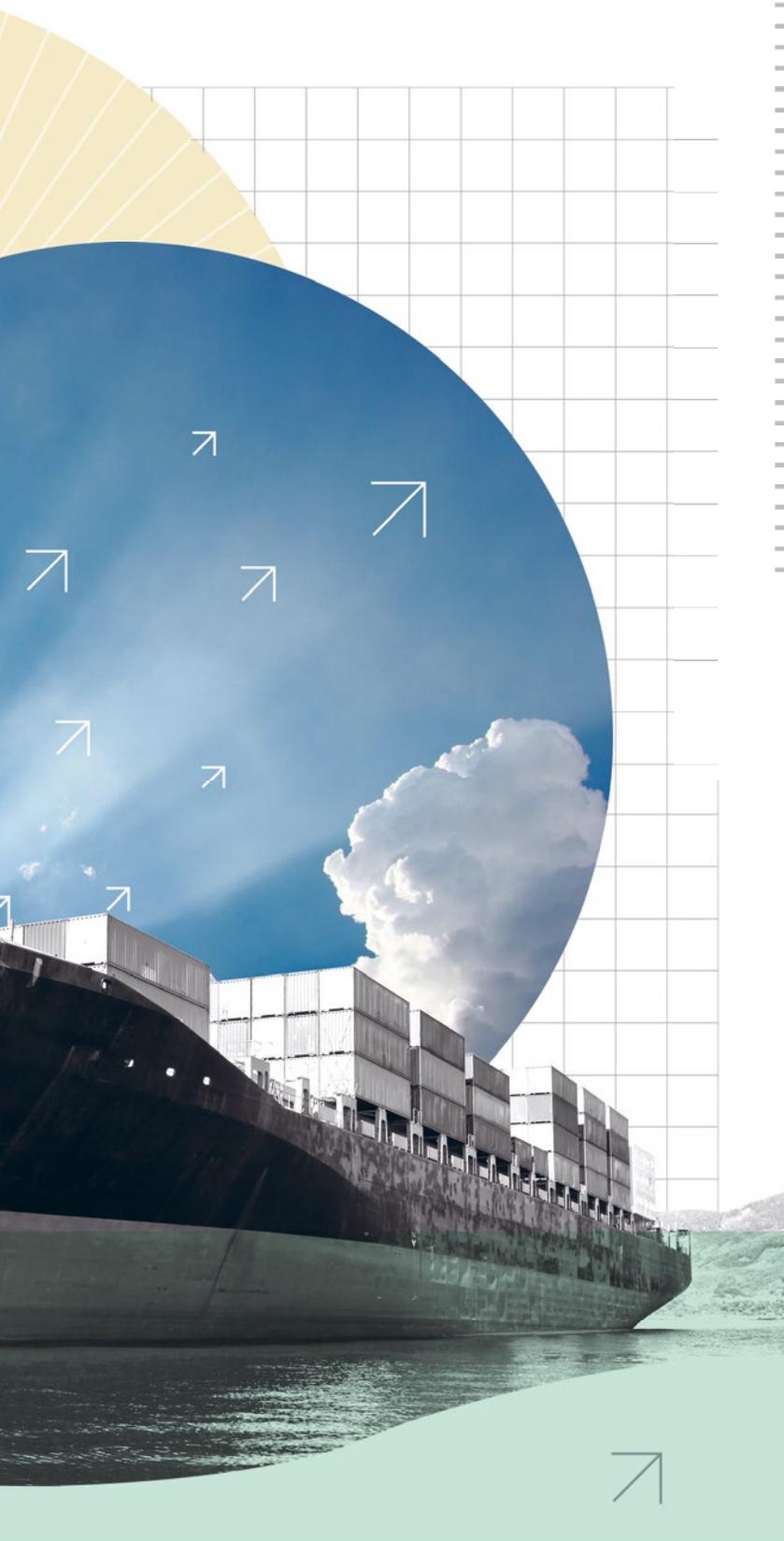


"IT IS A GREAT INDUSTRY...
WE SHALL STEER THROUGH THIS
DARK TUNNEL AND FIND LIGHT
AT THE END OF IT."

KRISTIAN SIEM, FOUNDER AND CHAIRMAN OF SIEM INDUSTRIES

VISIT WWW.SMW.SG FOR MORE INFORMATION

FEATURE



CRISIS AND OPPORTUNITY

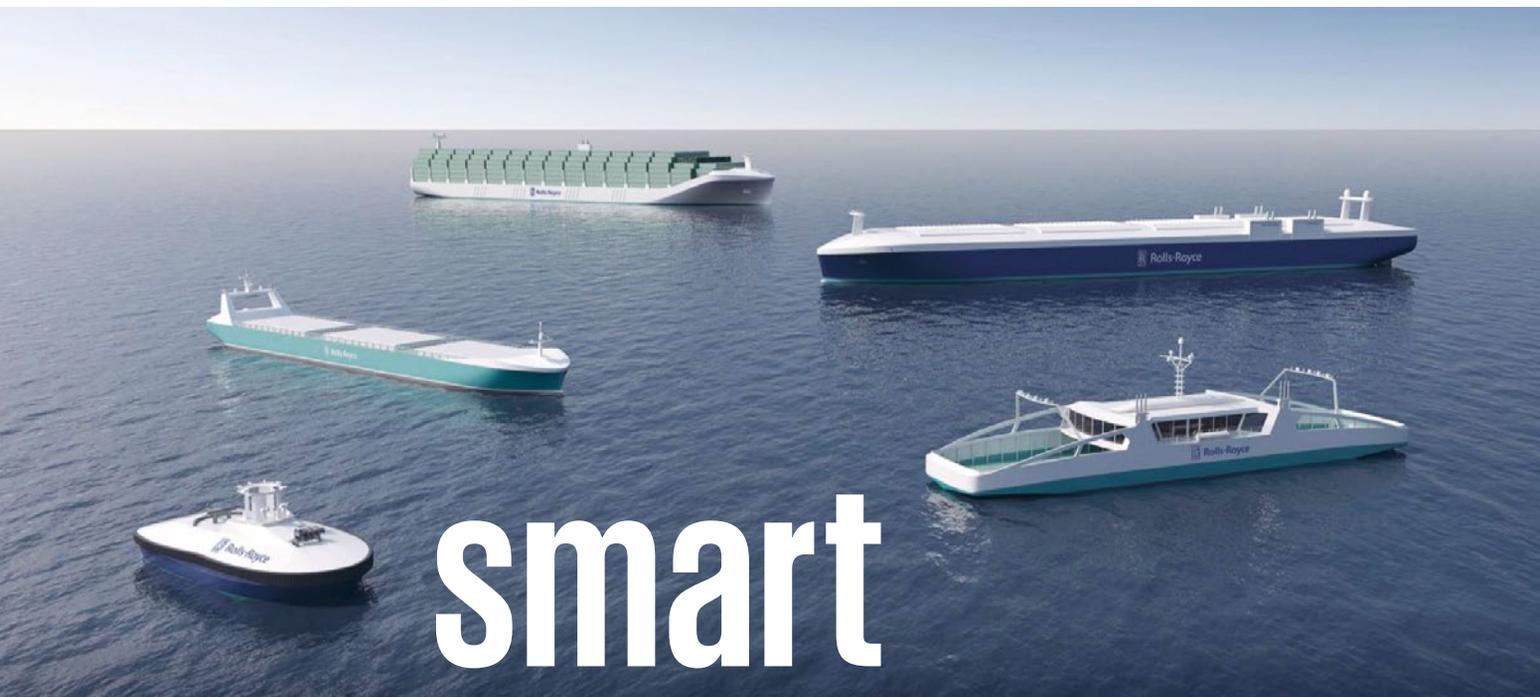
During the panel discussion, PIL's Teo remained upbeat about the long-term prospects for the industry. He pointed to the Chinese phrase for "crisis" - *weiji* - composed of the words "danger" and "opportunity", and raised the concept of *weiji*, in which crisis and opportunity are intertwined.

Teo noted that the industry will have to adapt to the new norm of slower economic growth, but he also pointed out: "Shipping and offshore marine are necessary parts of our livelihood. While there is a storm going on, there should be sunshine coming. The going will be tough, but there will still be opportunities in Asia, including Singapore. We can continue to attract the young into the industry, and we have a good chance of grooming winners."

DBS' Carbon also talked about the slowdown in terms of growth, saying: "You will have to get used to (the slower growth). Growth is slowing because incomes have gone up, and populations are growing slower as they age."

On the bright side, he said that Asia is speeding up in some ways. "Even with slower growth, there is still a lot of dollar growth here," he said.





smart revolution

The Singapore Maritime Institute Seminar on Smart Ships puts the spotlight on the important role of smart shipping in transforming the maritime industry

The advent of containerisation in 1956 when uniform metal boxes were first used to move cargo by sea led to a shipping revolution that reshaped global trade.

Today, smart shipping could well turn out to be the shipping revolution of our time.

Speaking at the Singapore Maritime Institute (SMI) Seminar on Smart Ships, Esben Poulsen, President of the Singapore Shipping Association, called for a game-changing approach for a new era of shipping and sustainability. He said: "With enabling digital competencies such as data analytics and robotics, smart ship technologies present an emerging opportunity to change the way ships operate."

ABOVE Artist's impressions of autonomous ships under the Rolls-Royce-led joint industry-academia research project known as the Advanced Autonomous Waterborne Applications Initiative in Finland.

Held on April 19 in conjunction with Singapore Maritime Week 2016, the SMI Seminar on Smart Ships explored cutting-edge maritime research and technology that will help to build a new era of shipping and sustainability for a future-ready Maritime Singapore. Participants comprised senior shipping executives and members of the maritime research and development community.

Poulsen's sentiments were echoed by other panellists at the seminar, including Markus Laurinen, Project Manager of the Advanced Autonomous Waterborne Applications Initiative (AAWA) at the Machine Technology Centre Turku in Finland, who said: "We believe that ship intelligence will be the big revolution that we will see (in our time)."

Smart ships, added Laurinen, will help address two key issues in the maritime industry, namely improvement in operational safety and greater efficiency through optimised use of resources.

Laurinen's compatriot, Antti Saurama, who is Director of the Centre for Collaborative Research in the Turku School of Economics based in Finland's University of Turku, also stressed the transformational aspect of smart shipping.

The change, Saurama said, will not just be technological, but societal as well, involving the whole industry, transport networks and technologies, as well as the human side of things.

PORT & STARBOARD

Noting that the world is currently experiencing megatrends such as digitalisation, robotisation and the Internet of Things, which the maritime ecosystem is not isolated from, Saurama said that the development of such technologies will result in the formation of a new ecosystem around autonomous capabilities.

This will lead to new technology, new actors, new models of doing things and new types of business networks, he added, which is why the impact of such a change will extend to all parts of the maritime sector.

He also noted that as with previous changes like containerisation, which took quite a long time to materialise as a commercial solution and become part of the global main trade, smart shipping will also need time.

Another panellist, Brijesh Tewari, Principal Specialist and Marine Consultancy Services Manager at engineering, technical and business services organisation Lloyd's Register Asia, predicted that in the short to medium term, the maritime industry will see the trend of digital ships move to that of intelligent ships, while in the medium to long term, it will see movement from intelligent ships to autonomous ships.

Thong Sew Kait, another panellist at the SMI Seminar as well as the Department Head of Technical Services (Projects) at container shipping firm APL, said that in such transformations, data analytics will provide building blocks for the maritime industry's move to autonomous ships.

SHOWCASING EXCELLENCE

To raise the profile of maritime and offshore research and technology in Singapore, the biannual Singapore Maritime Institute (SMI) Research Showcase April 2016 was also launched during the SMI Seminar on Smart Ships.

The showcase featured shortlisted maritime and offshore research projects supported by SMI. Aside from engineering research projects, for the first time, it also featured two policy

research projects from the Singapore University of Technology and Design and Singapore Management University (SMU).

As a nod to maritime research excellence, visitors to the showcase were invited to vote for their favourite research project. Of the nine projects, two projects – one on the numerical modelling of strong wave impact on deep-sea semi-submersibles from the Agency for Science, Technology and Research's Institute of High Performance Computing, and the

other on biocide-free antifouling coatings for maritime and harbour applications from Singapore Polytechnic – were named the top projects. Each received a cash award of S\$3,000.

Receiving special mention was an SMU project that looked at a framework for evaluating energy sustainability efforts in maritime terminal operations in Singapore and selected international ports.

The next SMI Research Showcase will be held in the last quarter of this year.

BELOW (From left) SMI Executive Director Heng Chiang Gnee moderated the panel discussion, which featured Lloyd's Register Asia's Brijesh Tewari, APL's Thong Sew Kait, Machine Technology Centre Turku's Markus Laurinen, University of Turku's Antti Saurama, and the Institute for Infocomm Research's Dr Peng Xiaoming.

REDEFINING HUMAN ROLES

Despite the unfolding changes, panellists at the seminar also agreed that the human element will remain important to the maritime industry. Said Poulsson: "We should view this situation as a driver for automation and autonomy in the form of intelligent and smart ships. With the removal of people from tasks that are of lower value and dangerous in nature, we can better optimise manpower resource while enhancing productivity and safety.

"Our vision for autonomous smart ships should not be one that is fully mechanised but one with a human heart. The human element should never be removed entirely from the equation. Instead, it must remain at the core of smart ship technologies and operations."

Tewari also touched on the new human role in shipping. He said: "Machines should do what machines do better than humans. Humans should do what humans do better than machines. And finally, machines should support humans.

"Humans will be trained to only deal with failure modes and to master the emergency operations. Day-to-day operations will be run by the machines. Emergency preparedness, understanding the ship's software language and logic, and how the ship will tend to behave on failure modes will become key training points for the new human element on board the ships."



With a banking pedigree that dates back more than 250 years, NORD/LB is a German *landesbank* (public regional bank) that set up shop in Singapore in 1994, to cater to German companies seeking to establish a presence in Asia.

While it covers the gamut of retail and corporate banking on its home turf, it has since carved a niche in Singapore in asset-based structural finance with a focus on three pillars in its international banking tack: shipping, aviation and renewable energy. This has been so especially in the last three years, with NORD/LB's enhanced Asia strategy that has raised its headcount here to 70 employees, three quarters of whom are local hires.

Its ship finance team, which has doubled its staff strength from five to 11, handles portfolio and risk management, derivative solutions – mainly in interest rates and foreign exchange – as well as payment for clients in the Asia-Pacific, including Australia and the Middle East. It oversees a regional portfolio size of about one billion euros (\$\$1.54 billion).

The group's overall strength has always stemmed from its focus on having a clear competitive advantage due to its specialist expertise in niche market segments, says NORD/LB's Head of Ship Finance for the Asia-Pacific region, Aaron Sen.

He adds: "The Asian shipping business here in Singapore currently accounts for 10 per cent of the bank's overall global shipping portfolio. We are confident of doubling that share to 20 per cent over the next few years with the stringent diversification strategy we have put in place.

"NORD/LB can finance all sorts of ships including very large bulk carriers and tankers, cruise ships and ferries, tugs and offshore vessels, as well as specialised ships like asphalt carriers. From time to time, we shift our focus between asset classes in order to follow, or in anticipation of, market developments, and adopt our strategy to the different market cycles.

"We stay away from speculation and tend to support owners with a long-term vision rather than short-term players hoping to buy cheap during distressed periods and benefit from recovery in prices."

To weather the current weakness in the

Germany-based NORD/LB tells AJ Leow why Singapore is such an important hub for their shipping business

nord to asia

business cycle, shipowners will need to be prepared to inject more equity into their shipping transactions, says Sen. This will make their projects more bankable to ship financiers, or enable them to work out some flexibility in payment solutions when operating margins are being squeezed.

For the offshore support vessel segment, Sen says that there is currently an imbalance in supply and demand as too many vessels have been ordered. He adds: "We see oil prices stabilising above US\$40 (\$\$54) and possibly even testing US\$50. If further stabilising takes place, we can expect oil majors to resume some of their shelved offshore energy projects as oil reserves are generally being depleted."

Moreover, Sen notes that the oil majors have been able to cut their cost bases and lower their break-even rates, which should help revitalise certain offshore oil and gas projects.

CHOICE DESTINATION

Despite the current slump in shipping markets, particularly in dry bulk, and to a lesser extent the tanker segment, Sen notes that demand for ship



finance in Asia has continued to grow apace, with Asian owners from Singapore, Hong Kong, Taiwan, South Korea and China, among others, making up about 35 per cent of the world's shipowners.

"Singapore has overtaken Hong Kong in weightage and strengthened its position as a ship finance hub in Asia over the last 10 years. All the relevant banks are here and there is a robust network to tap into. It is also a favoured location when it comes to ship registration and flagging as well as an arbitration hub for Asian shipowners. It is only the broader access to capital markets that is still lacking behind places like London and Hong Kong," says Sen.

On NORD/LB's set-up here, Sen says: "We are generally happy with the progress in our Singapore office. It is NORD/LB's Asian headquarters with an eye on a growth trajectory in Asia. Our strategic focus has just been underlined with the move to our new office in CapitaGreen that has space to cater for further growth.

"We have good working relationships with the Maritime and Port Authority of Singapore and the Monetary Authority of Singapore, as well as tie-ups with institutions in maritime studies, finance and business administration, in which we offer internships for students – two of whom we recently hired after their graduations.

"There is a good talent pool and critical mass here. Manpower-wise, Singapore is a fantastic place – even on an international basis – for new hires and replacements when it comes to the shipping business. What makes it interesting are the different and diverse markets we get to cover from here while staying true to our business principles."



HOW WOULD YOU DESCRIBE YOUR TIME HERE DURING SINGAPORE MARITIME WEEK?

It has been a stimulating time. It is important for us in the West to spend time in the East in order to keep abreast of developments here, and also to have a feel for what is important here. We live by the quality of our decisions: The deeper our understanding of this region, the better the base for our decisions.

For instance, decision makers worldwide understand the importance of China, and in Singapore there are a lot of ethnic Chinese people who speak the language. They are more likely to pick up nuances, have a more complete picture of the situation, and have a better understanding of the information coming out of China.

THE OIL SERVICE INDUSTRY IS UNDERGOING A CHALLENGING TIME. HOW DID THIS SITUATION EMERGE?

The oil industry has had an exceptionally long period of upturn. During an upturn, costs and waste creep in. As a result, the cost base was so high that the oil companies' margins were being squeezed. Since the oil companies were so focused on giving dividends, they were cutting back on some capital expenditures.

This dramatic shift in oil companies' behaviour was subsequently exacerbated by the fall in oil price. The activity level dried up almost completely. There are now hardly any new projects for the oil service industry.

HOW WILL THE OIL SERVICE INDUSTRY COPE WITH THE CURRENT CHALLENGES?

Tailor-made solutions are being replaced by standardisation. Cooperation between clients and suppliers is becoming more effective. These have helped to erode the cost base. Many projects that were previously deemed uneconomical have suddenly become viable.

The question in our minds is when these new projects will begin. My guess is that maybe by next year, certainly by 2018, the operators will start sanctioning some of these projects, which should lead to more activity for us.

If I were an oil company, given the low cost base now, I would start some of the commercially viable projects. In doing so, I would be able to enjoy lower development costs while replenishing my oil reserves. I would also be able to preserve the best of the supply chain, preventing them from losing their capabilities.

rallying the industry

Amid the downturn, Kristian Siem of Siem Industries shares with Rahita Elias on what to expect in the offshore industry ahead

Despite the challenging economic environment facing the offshore industry, Kristian Siem, who is the founder and Chairman of industrial holding group Siem Industries, remains upbeat about its prospects. This is a sentiment he shared during his keynote address on "The State and Future of the Offshore Industry" at the 10th Singapore Maritime Lecture during Singapore Maritime Week 2016. He shares with Singapore Nautilus his thoughts on the current global economic climate, and ways to overcome the associated challenges.

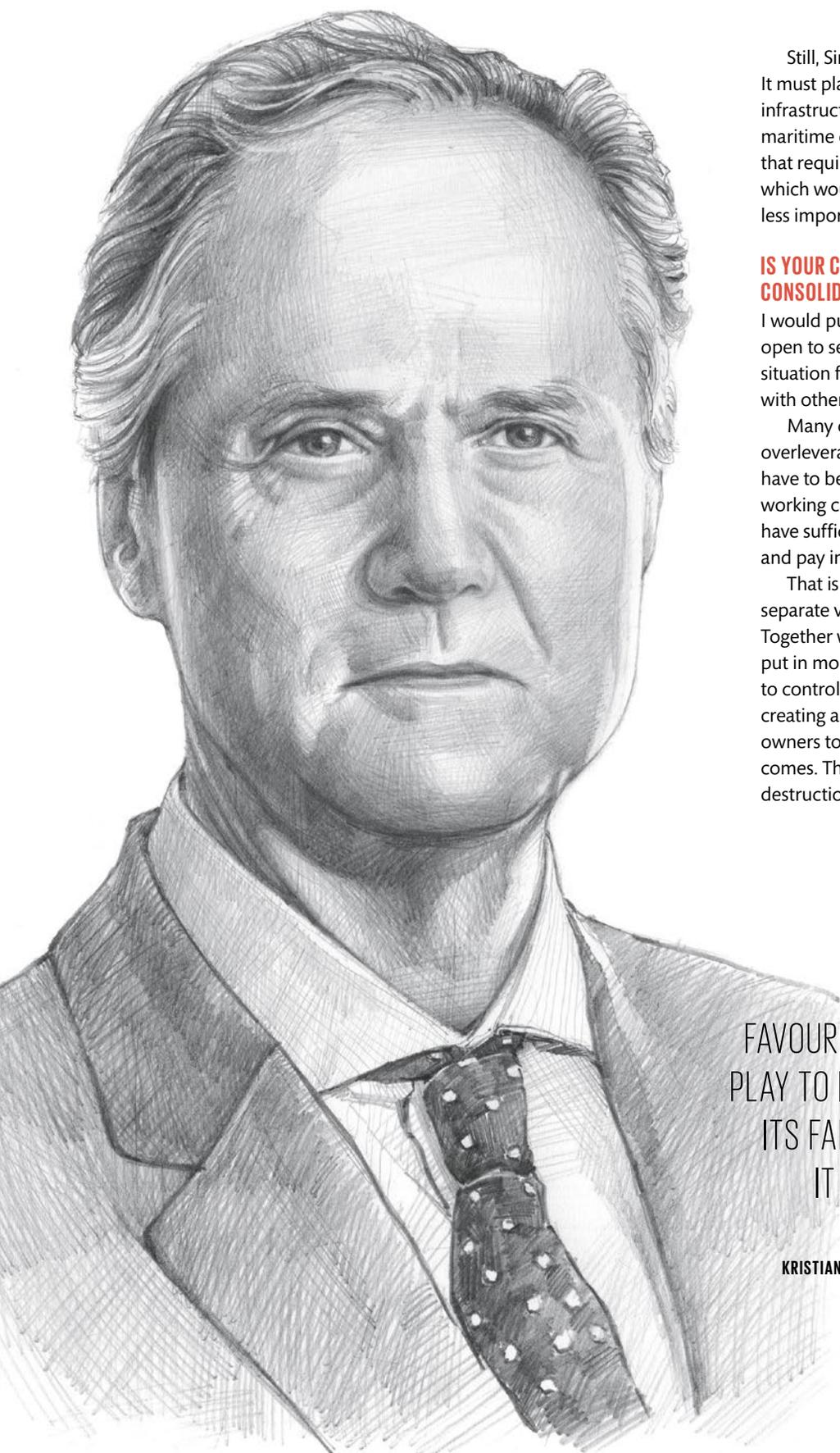
GIVEN THAT THE NEW PROJECTS ARE ONLY LIKELY TO EMERGE NEXT YEAR AT THE EARLIEST, WHAT CHANGES DO YOU EXPECT TO SEE IN THE OIL SERVICE INDUSTRY?

We are entering a downturn with the added problem of too much supply. That has to work itself out, which is going to take some time. In the meantime, the name of the game is to preserve cash and reduce cost.

One way to reduce costs is to merge, so I see a lot of sense in consolidating. Most sectors of the oil service industry are greatly fragmented, so the industry lends itself to consolidation. Now is a great opportunity to merge.

WHAT IMPACT HAS THE DOWNTURN HAD ON YOUR COMPANIES?

When the activity level dropped, like all the other contractors, we had to downsize our operations. We had to look at our costs. We had offices in Singapore and Malaysia. For now, we have decided to put our operations in a cheaper location – Malaysia.



Still, Singapore has many favourable attributes. It must play to its strengths, including its fantastic infrastructure. It remains well placed as a maritime centre. It could focus more on activities that require fewer people and less office space, which would make these particular cost elements less important.

IS YOUR COMPANY LOOKING TO MERGE OR CONSOLIDATE YOUR OPERATIONS?

I would put it a little differently: We are always open to seeing ways forward that will improve the situation for our industry, including combining with other companies.

Many offshore support vessel companies are overleveraged nowadays. Their balance sheets have to be restructured. They will need additional working capital to assure their lenders that they have sufficient cash to keep their operations going and pay interest. All these things need new cash.

That is why we have established a fund in a separate vehicle that will provide the new cash. Together with existing owners who are willing to put in more cash or show flexibility with regard to control, we can preserve these companies by creating a better cost base and enable the existing owners to participate in the upturn when it comes. Through this process, we also avoid further destruction of value in our industry.

“SINGAPORE HAS MANY FAVOURABLE ATTRIBUTES. IT MUST PLAY TO ITS STRENGTHS, INCLUDING ITS FANTASTIC INFRASTRUCTURE. IT REMAINS WELL PLACED AS A MARITIME CENTRE.”

KRISTIAN SIEM, FOUNDER AND CHAIRMAN OF SIEM INDUSTRIES

eyeing a turnaround

Jarand Rystad, Managing Partner of Rystad Energy, shares with Audrina Gan his insights on manoeuvring through tough times

YOU SEEM UPBEAT ABOUT THE OIL MARKET AND HAVE PREDICTED THAT PRICES WILL AGAIN INCREASE TO OVER US\$100 (S\$136) PER BARREL BY 2020. WHY IS THIS SO?

Instead of being optimistic in my predictions, I try to be as realistic and analytical as possible in my projections. This particular projection is based on our bottom-up database, which is based on oil field profiles. During my presentation at the Offshore Marine Forum in Singapore, I showed a graph illustrating the decline in existing oil fields as well as the number of new fields available. So the market is beginning to balance itself and we predict demand to surpass supply.

The other issue is that the oil service industry is cutting back on capacity these days and we will have too little capacity when the market rebounds. When that happens, we will see a cost inflation in crude oil prices in the industry. We have already seen a cost inflation in 2014 and there will likely be another cost inflation next year.

We're also predicting a new downturn in the oil market in 2023. Before the new downturn occurs, oil prices will pick up. The fluctuation in oil prices is a constant phenomenon in the industry.

YOU HAVE WARNED THE INDUSTRY AGAINST MAKING TOO MANY CUTS IN BOTH INVESTMENT AND STAFFING. WHY DO YOU HOLD THIS VIEW? HOW SHOULD THE INDUSTRY RESPOND INSTEAD?

When you want to lose weight, you want to take away the fat but not the muscles. Staffing is one of the key competencies for oil exploration companies so they may not have enough talent to help them boost their capacity when the market

With extensive experience in oil and gas strategy advisory work, Jarand Rystad, the founder and Managing Partner of oil and gas consultancy firm Rystad Energy, is among the most cited petroleum analysts in the industry. He has led projects for international oil and gas companies and oilfield service companies, and provided his expertise to governments, international organisations and investors globally. In Singapore to deliver the keynote address at the Offshore Marine Forum during Singapore Maritime Week 2016, he shares with Singapore Nautilus his thoughts on how the offshore and marine sector should respond to the current challenging conditions and prepare for the coming upturn.





TAP FOR MORE

rebounds. The industry is laying off 500,000 to 600,000 people worldwide and these are very educated people. In order to attract talent back to the industry when the market rebounds, we will need to increase salaries across the value chain.

Meanwhile, oil companies should also approve more projects for development so that their staff can be deployed to these projects without having to retrench them.

We also need to refurbish oil exploration equipment but companies are not buying new equipment now. Instead, they are replacing old equipment from their existing inventory and that's a short-sighted approach because they will pay a higher price when they need to make replacements in the longer term.

WHAT ARE THE PROSPECTS FOR THE LIQUEFIED NATURAL GAS (LNG) MARKET IN ASIA?

I think the bulk of the LNG projects and capacity over the next five years will come from Australia and the United States. These new capacities will generate a low gas price. The gas price will be lower and more depressed than the oil price.

To build up long-term demand and consumption for gas, companies will have to build gas infrastructure. Hopefully, more countries in Asia will replace coal with gas, which has higher efficiency. That will help to generate higher demand for gas in the future. The good thing is that LNG is increasingly being used in the shipping industry. This is a positive factor for long-term gas growth.

WHAT IS YOUR OUTLOOK ON THE FUTURE PROSPECTS OF THE OFFSHORE AND MARINE SECTOR IN ASIA?

In terms of shipyards, it is a sad picture because there will be very few new rig constructions. Some of the newly constructed rigs are being deferred for later delivery. The equipment on these rigs would have suffered corrosion by the time they are eventually delivered over the next two to three years.

There is also an oversupply of vessels at the moment. In the platform supply vessels sector, there are 1,000 ships being laid off. Faced with this overcapacity situation, there are very few companies that would want to build new vessels.

But demand will increase from 2019 to 2022, so companies should start investing in new projects and build vessels that are scheduled for delivery from 2019 onwards.

A computerised system provides shipowners with real-time information on fuel efficiency, while another technology brings a traditionally paper-based maritime process into the digital era.

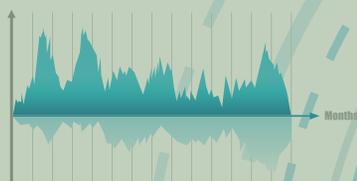
These are among the latest of almost 300 research and development innovations facilitated by the Maritime Innovation & Technology (MINT) Fund to help developers of maritime technologies create, validate and enhance their products and services.

The Maritime and Port Authority of Singapore set up the MINT Fund with the aim of

developing Singapore as a Centre of Excellence for maritime research and development and technology solutions. Through the fund, it hopes to encourage maritime companies to innovate for greater competitive advantage, to create collaborative opportunities for the industry to tap the capabilities of local universities and research institutes, as well as to provide the necessary infrastructure and facilities for the test-bedding of novel ideas and concepts.

The MINT Fund provides grants of up to 50 per cent of project costs and is available to companies

So E Solomon finds out how the Maritime Innovation & Technology Fund continues to ensure Singapore's maritime sector gets the right innovative technology to stay ahead of the curve



MINTed for success



incorporated in Singapore and engaged in either research and development or test-bedding in Singapore of new or better products, processes and applications relevant to the maritime industry.

REAL-TIME DATA

Ascenz Solutions is a home-grown maritime technology player specialising in ship data acquisition and analytics. With support from the MINT Fund, Ascenz created the Shipulse Data Acquisition System (DAS) to collate data from shipboard sensors. The DAS is able to transmit the

data back to shore in real time and customers can access relevant information on the Shipulse portal for better decision making.

This innovation measures a vessel's fuel efficiency by monitoring its propulsion and fuel consumption against various factors such as weather and engine load. The data is sent automatically via satellite into the cloud-based system and provides the shipowner with performance indicators like fuel consumption and vessel speed so that it is able to determine how efficiently the vessel is performing.

In the past, information was collected in a static manner and communicated to shore only periodically, says Gary Ong, Director (Corporate) at Ascenz.

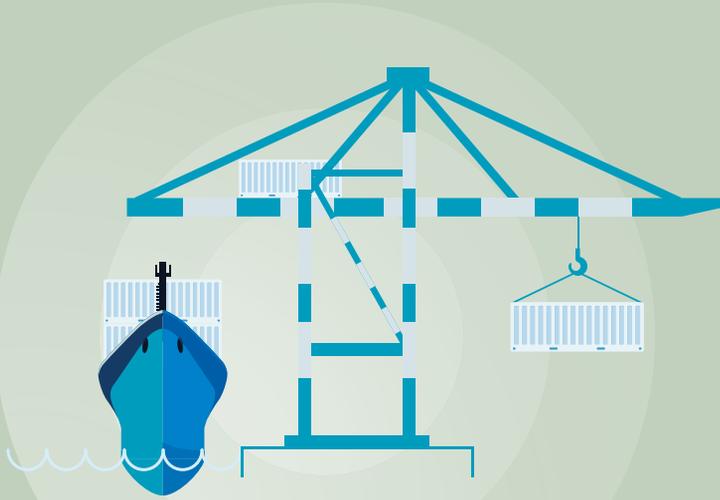
But now, with more accurate data collected in a comprehensive manner, shipowners can take better optimisation measures such as condition-based maintenance to improve fuel efficiency.

Ascenz also plans to make such information available to the captain and chief engineer on board a vessel so that they too can make better decisions while at sea.

"In the past few years, fuel could account for more than 50 per cent of expenses for companies in the shipping industry," says Ong. "By improving the efficiency in this area, the company will be able to increase its profitability."

Ascenz started testing Shipulse on a tanker in the second quarter of this year, and will extend the trial to two container ships in the latter half of the year.





REFRESHING MINT

The Maritime and Port Authority of Singapore (MPA) established the Maritime Innovation & Technology (MINT) Fund in 2003, with S\$100 million, to support the research and development (R&D) and test-bedding of maritime technologies in Singapore over 10 years.

In 2013, it was topped up with S\$50 million and extended to 2018. This year, the MPA committed a further S\$50 million, bringing the total amount allocated to the fund to S\$200 million, and extended its term to 2021.

Another new enhancement to the fund is the introduction of the MINT-Product Development scheme to promote local development of products and solutions for the maritime industry. To encourage higher-quality projects, the funding policies and guidelines for the MINT Fund were also enhanced.

The fund's focus areas have also been expanded to include sub-focus areas such as data analytics, modelling and simulation, and autonomous technologies and sensors.

Since its inception, the MINT Fund has supported over 290 R&D projects in a number of different focus areas. These have resulted in innovations such as a real-time under keel clearance monitoring system to prevent the grounding of ships and improve navigational safety in our port waters. In the area of maritime operations and logistics, a project to automate container yard operations has enabled an operator to remotely control multiple yard cranes and increase our port's operational efficiency.

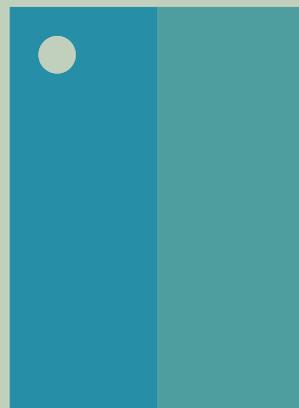
Visit www.mpa.gov.sg for more information.

AUTOMATED PROCESS

Another MINT Fund recipient is Slikstream.Net, a company that specialises in providing productivity tools. It is currently developing and trialling an automated workboat workflow system for the booking of launches, working with a workboat operator to do so.

Slikstream.Net aims to reduce paperwork by digitising the booking process for the operator, whose workboats include small boats like passenger launches, tug boats and supply vessels. The trial also involves the workboat operator's customer, a hirer of shipping agents, charterers and chandlers.

Traditionally, workboat orders are taken manually over the phone by someone who writes them down on paper, says Aaron Gong, Founder of Slikstream.Net.



This sometimes contributes to missed calls, wrong order entries and lost orders. The retrieving and processing of data is slow, so a lot of time gets wasted. Furthermore, the process of assigning boats may also be inefficient, whereby boats that are currently further away are assigned jobs instead of those nearby.

The tool moves away from paper processes and captures everything digitally via smartphone. Once a boat is assigned, a notification is sent wirelessly to the person who placed the workboat order, as well as to the workboat operator, whose staff can then retrieve the information via tablet. The tool also allows both parties to keep track of any changes to the order.

The workflow tool includes GPS tracking, which helps reduce customer waiting time at piers by providing real-time updates to launch

operators who can monitor asset movements and availabilities using a 4G network.

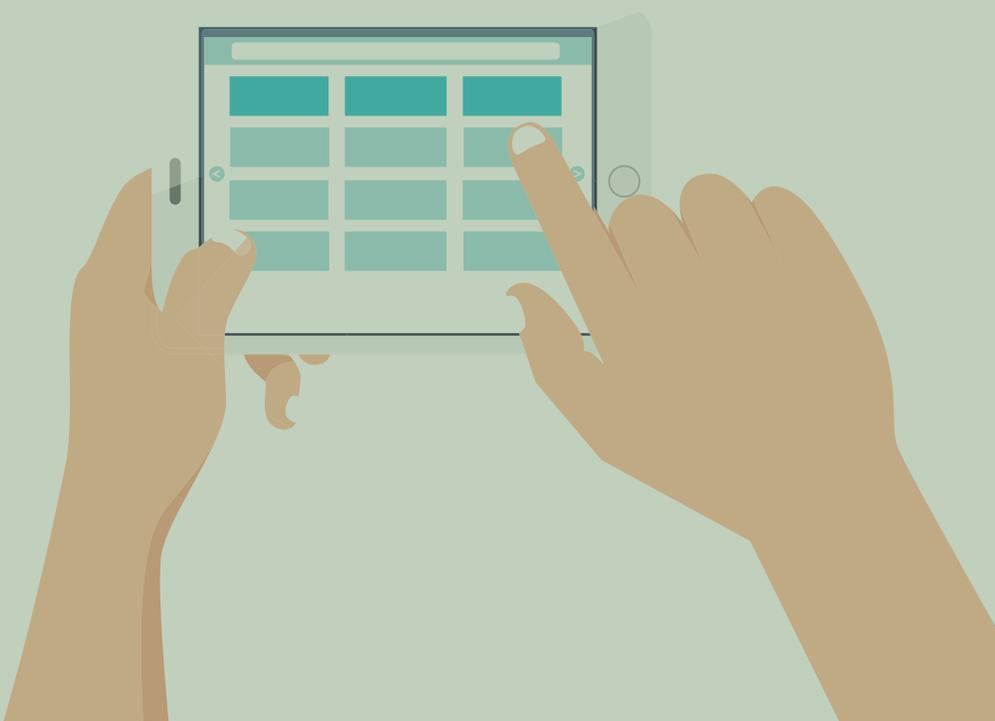
The tool also has a fail-safe measure; if the mobile network is down, the operator can go back to pen and paper, and key the information into a spreadsheet and import it later, says Gong.

Development of the tool started in February and trials with the workboat operator commenced in April. The workboat operator's customer also joined in the trial in the middle of this year.

Ascenz and Slikstream.Net, who both had their MINT Fund applications approved within six months, praised its application process. "It is very simple," says Ascenz's Ong.

Concurring, Slikstream's Gong adds: "It is quite straightforward. Everything – all the requirements and what you need to submit – is on the website. There were not many additional queries required."

THROUGH THE MINT FUND, MPA HOPES TO ENCOURAGE MARITIME COMPANIES TO INNOVATE FOR GREATER COMPETITIVE ADVANTAGE, TO CREATE COLLABORATIVE OPPORTUNITIES FOR THE INDUSTRY TO TAP THE CAPABILITIES OF LOCAL UNIVERSITIES AND RESEARCH INSTITUTES, AS WELL AS TO PROVIDE THE NECESSARY INFRASTRUCTURE AND FACILITIES FOR THE TEST-BEDDING OF NOVEL IDEAS AND CONCEPTS.



COMPANY SPOTLIGHT

In January this year, the *Maersk Venturer* set sail from Singapore, with its bow pointed towards Uruguay to work on a project there for oil giant Total. It would have been a normal sea journey except that only two of its six engines were on, and its speed was set at eight knots instead of 12.

That voyage of the 228m-long drillship was part of the Energy Efficiency Management Programme by Maersk Drilling, which owns the vessel, to reduce its and its clients' environmental footprint from carbon dioxide (CO₂) and other greenhouse gas emissions.

The decrease in speed translated into significant outcomes. Says Jan Holm, Managing Director of Maersk Drilling Holdings Singapore: "The trip took 47 days instead of 36, but we saw a 40 per cent reduction in CO₂ emissions, and a two-third reduction in fuel consumption. We are now looking at how to make this a company standard."

According to a study by the International Maritime Organization published in 2014, maritime transport contributes to approximately 2.2 per cent of global greenhouse gas emissions – this includes around one billion tonnes of CO₂. And depending on future economic and energy development, shipping emissions are predicted to increase by between 50 and 250 per cent by 2050.

These stark truths put environmental sustainability high on the Danish rig company's agenda. "We acknowledge that the industries we

operate in are among the elements that contribute toward the global warming challenge. We are not oblivious to it. We are doing everything we can to minimise our CO₂ footprint," says Holm.

SUSTAINABILITY EFFORTS

One of the ways it has done so was by signing the Maritime Singapore Green Pledge in November last year, as part of the Maritime Singapore Green Initiative (MSGI) by the Maritime and Port Authority of Singapore (MPA). This involves companies committing to promote and support clean and green shipping in Singapore. To date, 100 companies have come on board.

The MSGI was started in 2011, when MPA pledged a maximum of S\$100 million over the next five years to the initiative. Holm says that Maersk Drilling is completely aligned with what MPA wants to achieve. He adds: "The MSGI presents an opportunity for all stakeholders to join forces and share knowledge on how to reduce our impact on the environment. I hope to promote it in the community and encourage others to follow in our footsteps. We stand stronger united."

BELOW The *Maersk Venturer* can work at water depths of up to 3,600m.



Another example of sustainability by Maersk Drilling is Team Zero, a programme to achieve zero incidents on all its drilling platforms by 2018. In offshore drilling, the safety of both people and the environment is dependent on the constant management of risk. "When you work on one of our units, you have the right and obligation to stop any job that you deem unsafe. Only then will offshore drilling be safe," explains Holm. "By striving towards zero incidents, we hope to make human injuries and spills a thing of the past."

Last year, Maersk Drilling reported its best year to date in safety performance, registering only three incidents in its Lost Time Incidents Frequency (LTIF). "However, three LTIFs are still three too many," says Holm. "We hope that by collaborating closely with our stakeholders, we can establish an industry-wide zero-incident safety culture, where neither our people nor Mother Nature will experience any incidents."

A third effort by Maersk Drilling involves

responsible recycling. Last year, its oldest jack-up rig, *Maersk Endurer*, was decommissioned at the ripe age of 31. To ensure this was done safely and with minimal environmental impact, Zhoushan Changhong International Ship Recycling was enlisted to do the job. The Chinese company, a state-of-the-art rig recycling facility, complies with the European Union Ship Recycling Regulation. Maersk Drilling also hired Sea2Cradle, a global expert in green ship recycling, to supervise the process, which saw 98 per cent of the rig recycled.

Back on board the *Maersk Venturer*, the drillship made headlines when it broke the record for drilling into a potential oil and gas well sitting in water depths of 3,400m off the coast of Uruguay, beating the 2013 record of 3,174m off India.

It is a double pat on the back for the crew, given its achievements. Whether this trajectory will continue remains to be seen, but at the very least, it can proudly say it has made a step towards environmental sustainability.



for a greener tomorrow

Low Shi Ping finds out the laudable initiatives undertaken by Maersk Drilling to minimise its impact on the environment



changes for the better

The inaugural Maritime Administrators' Forum, held during Singapore Maritime Week, brought together maritime leaders from around the world to highlight the vital role shipping plays globally. Forum speakers share with Abigail Chia their insights on developing maritime initiatives and meeting regulatory requirements

CLOCKWISE FROM TOP LEFT

Jeon Ki-Jeong, Commissioner and Deputy Minister, Korea Maritime Safety Tribunal; Dakuku Peterside, Director-General, Nigerian Maritime Administration and Safety Agency; Janis Krastins, Chairman of the Board, Maritime Administration of Latvia; Rear Admiral Peter Brady, Director General, Maritime Authority of Jamaica.

SINGAPORE NAUTILUS (SN): CAN YOU SHARE SOME OF THE KEY INITIATIVES THAT YOUR COUNTRY HAS UNDERTAKEN TO HIGHLIGHT SHIPPING'S CRITICAL ROLE IN THE GLOBAL ARENA?

JANIS KRASTINS (JK): One priority is maintaining the number of seafarers. We have to attract youngsters to study at the maritime academy, and we aim to adjust and improve the educational system in accordance with international legislation. To ensure that seafarers can find work all over the world, we are also looking at working with shipping companies.

We also aim to increase the number of vessels under the Latvian flag. To attract shipowners, we have no restrictions on nationalities and we have created one of the best taxation systems for seafarers, which was a large expense for shipowners and management companies. We consider the Latvian flag competitive within Europe and aim to provide the best service to shipowners and management companies.

The other initiative we are undertaking is maritime spatial planning. A lot of activities take place in the sea, like shipping, tourism and fishing. Therefore, specific areas should be designated for different activities to avoid conflicts over territories, routes and licensed areas.

JEON KI-JEONG (JKJ): One key initiative is strengthening the competitiveness of Korea's shipping industry by extracting support from the financial sector, as some key shipping companies are struggling with financial problems.

Another initiative is convincing young people to join the shipping sector and to attend the Korea Maritime and Ocean University. We try to attract talent through school talks, seminars, public relations and the media.

PETER BRADY (PB): During World Maritime Week, we communicate the importance of shipping to the commercial shipping sector in Jamaica. We also pitch the message to schools and lower commercial maritime communities, like the fishing sector, stressing the need to observe safety rules and get formal training in this global arena.

We try to educate the ministry staff in charge of policy direction on the importance of safety training and skills development for shipping sector workers. We also communicate closely with legislation drafters, and try to give them a good insight into shipping.

DAKUKU PETERSIDE (DP): Our maritime industry has a strategic position in Nigeria and we have to build capabilities with respect to personnel,

COMMUNITY TALK

acquisition of assets and infrastructure. We've initiated the National Seafarers Development Programme (NSDP), in which we send our young school-leavers to the best institutions around the world to be trained and certified. We've also established our own maritime university, which is reviewed by the government, and it already has a number of scholars.

In terms of asset acquisition, we passed the Coastal and Inland Shipping (Cabotage) Act to empower domestic shipowners; 90 per cent of vessels in Nigeria which are in international trade are owned by foreigners, and Nigerians have little or no share in the international shipping business. We are working to achieve better results.

Regarding infrastructure, there have been some improvements in the past 10 years. However, we are not where we are supposed to be yet. There is much to be done in the automation of processes.

SN: WHAT ARE SOME OF THE DIFFICULTIES THAT YOUR COUNTRY OR ORGANISATION HAS FACED IN TRYING TO RAISE THE PROFILE OF THE SHIPPING SECTOR? HOW WERE THESE RESOLVED?

JK: One difficulty is in attracting more vessels to register under the flag. There are many complex issues, such as the legislation for ownership and the taxation regime, and building the reputation of the flag state. We hope to resolve these by attending exhibitions where shipowners gather, addressing issues directly with shipowners' associations, and working with our specifications team on this.

Another is the size of our flag state. Although we are a small flag state, we always put in our best effort to work with shipowners and management companies to resolve all of their issues.

JKJ: It is very difficult to extract support and cooperation from the financial sector. We make efforts to communicate international shipping industry information to them so that they understand the impact of shipping on the national economy. We have to change their perspective of the shipping sector as a traditional industry.

PB: For the last three years, Jamaica has been under the International Monetary Fund programme, which requires new legislation for the control of spending. Due to the legislative priorities associated with this, the maritime legislative programme has been displaced.

With proper legislation, we will be able to implement all of the international rules that govern shipping and the commercial aspects of shipping.

We are going to pitch legislation that focuses on maritime safety, security and pollution prevention, and we hope that the government will look upon these as a high priority.

DP: Piracy is a common issue faced by developing countries. To address that, we are presenting an anti-piracy bill to the National Assembly to enforce serious penalties for crimes at sea. Also, we are collaborating with the Nigerian navy and air force for more vigilant patrols of the sea and for air surveillance. We are working closely with our neighbours in the Gulf of Guinea and the United Nations Office on Drugs and Crime to ensure that we achieve zero piracy activities in our water territories in the next year.

We also face challenges in upgrading our technology as a number of processes are still done manually. We aim to achieve 100 per cent automation on all our maritime processes. Another challenge we are facing is ageing manpower. We need to replace them with younger seafarers being trained under the NSDP, but they do not have the opportunity as yet to acquire sea time experience. We are working with private shipowners to get a national shipping line to provide sea time experience for our cadets and seafarers.

SN: WHAT ARE SOME KEY MEASURES THAT YOUR COUNTRY HAS ADOPTED TO MEET REGULATORY REQUIREMENTS IN THE MARITIME SECTOR? WHAT CHALLENGES DID YOU HAVE TO OVERCOME TO IMPLEMENT THESE MEASURES?

JK: We have adopted almost every measure possible to meet international regulatory requirements such as controlling the sulphur emission level of vessels to reduce pollution, except on a couple of conventions and Ballast Water Management, but that's in progress. The challenge of implementing measures is getting all the stakeholders to agree on these sensitive issues. Although adapting to international legislation is part of our daily routine, negotiating with the different parties involved is not a simple matter.

JKJ: We are trying to meet international regulatory requirements in the maritime sector such as with regards to safety, security and environment issues, and want to merge all the international conventions into our national legislation. For example, we have to prepare for upcoming international regulations, such as the Ballast Water Management Convention and other environment-related regulations of the International Maritime Organization (IMO).



COMMUNITY TALK

The challenge is in getting shipping companies, particularly from the private shipbuilding sector, to meet IMO regulations that have not been enforced in South Korea. They have to be prepared for environment-related regulations, such as the need to manage pollution emission levels from vessels, before they are enforced.

To advocate the Ballast Water Management Convention, we are organising ballast water-related activities around the world. Hopefully, we are going to make a difference since Korean ballast water processing companies currently own 50 per cent of the market share for ballast water treatment systems.

PB: We put emphasis on education and training and have shared our thoughts about the urgency for maritime legislation with our legal draughtsmen whom we included in the IMO's first Regional Legal Draughters workshop, held in Jamaica recently. Before they attended the workshop, it was not easy to get their support for and recognition of the importance of enshrining the international maritime instruments in our domestic legislation. However once they started in the training programme, they realised that they had been lacking in this type of tuition. They were able to share their problems with their counterparts in the rest of the Caribbean region, which is of benefit to us.

Another key measure is hiring surveyors to meet the workload required to comply with regulatory requirements. Local surveyors tend to move overseas because their salary in Jamaica is not competitive compared to global salaries. To resolve the shortage of manpower, we hire surveyors from India and Egypt.

DP: The most important measure taken is in making local laws adhere to IMO regulations. In our country, we are not allowed to enforce IMO regulations automatically. We still need to make them part of our law. They have to pass through local legal processes before they can be enforced. In trying to enforce IMO instruments, we also need to engage stakeholders. Convincing them is always challenging. It is critical that we get their support for new regulations as we need new facilities and technology.

Another challenge is in getting our government to understand how important the enforcement of these regulations is. We always aim to overcome this challenge by communicating with them effectively on our research and providing information that we have gathered from around

the world. We also have the challenge of not having adequately qualified personnel. We bridge it by working with the classification society and training staff to ensure that they are in tune with current regulatory developments.

SN: ARE THERE ANY SPECIFIC AREAS IN WHICH YOU THINK THE REGULATORY REGIME CAN BE IMPROVED FOR THE MARITIME SECTOR? IF SO, WHAT IMPROVEMENTS WOULD YOU LIKE TO SEE?

JK: In terms of environmental protection regulations, we would like to see a common global effort to control the sulphur content in fuel, for vessels to reduce air pollution. We are in the sulphur emission control area, which is different from the rest of the world because the sulphur content in the fuel for vessels is much lower in our area than in other countries. Other countries will have to cut down their ships' sulphur content to a maximum of 0.5 per cent after 2020. We were already at 0.1 per cent last year. In that aspect, all countries should do the same.

As regards the efficient execution of regulations, we hope that there will be more resources to facilitate the processes for seafarers, who now have more responsibilities with paperwork in order to meet new legislations.

JKJ: Technological measures, including the Energy Efficiency Design Index, to achieve the 2013 reduction target of greenhouse gas emissions are being implemented under Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL). In addition, regarding the greenhouse gas emissions of vessels, the data collection system for fuel consumption was approved at the 69th session of the IMO's Marine Environment Protection Committee earlier this year and scheduled to be adopted at its 70th session in October. It will then be implemented in 2019. The shipping industry needs to implement the MARPOL Annex VI regulation to participate in resolving global warming.

Also, in fulfilling the international maritime regulatory requirement, private sector companies have to pay extra for emission control facilities and thus need more time to meet this regulation. The key issue is how to resolve financial burdens on shipping companies while trying to meet the international maritime regulatory requirement.

PB: One of our greatest weaknesses is that our government lacks tools for the implementation of some of the international rules. Ideally, the Office of the Parliamentary Counsel at the Ministry



"I LOOK FORWARD TO MORE COLLABORATION BETWEEN ADVANCED MARITIME NATIONS AND EMERGING MARITIME NATIONS IN THE NEAR FUTURE... FOR THE ENVIRONMENT, I WOULD LIKE TO SEE A SAFER AND CLEANER OCEAN. ALL OF US HAVE TO WORK TOGETHER TO ACHIEVE THIS GOAL."

DAKUKU PETERSIDE, DIRECTOR-GENERAL, NIGERIAN MARITIME ADMINISTRATION AND SAFETY AGENCY



of Justice should have dedicated personnel for developing laws for the aviation and maritime sectors. These are laws from the International Civil Aviation Organization and the IMO, and we need personnel to observe and plan our national legislation to adhere to the international regulatory regime.

DP: One of the areas for improvement is the global standardisation of rules and regulations. Currently, rules and regulations vary by country and region and this can be quite challenging. I also hope the IMO will give greater support to emerging economies, such as the small islands of South America and Asia. I look forward to more collaboration between advanced maritime nations and emerging maritime nations in the near future. I also expect to see technology play a greater role in shipping globally.

For the environment, I would like to see a safer and cleaner ocean. All of us have to work together to achieve this goal.

SN: WHAT IS YOUR MAIN TAKEAWAY FROM THE MARITIME ADMINISTRATORS' FORUM?

JK: It was very interesting. Staying in the area or the European region, we don't see the reality and the hot issues outside Europe. We can read about them, but it is always different from seeing the real thing. Living only in your region, it's hard to understand the reasoning behind other regions' actions. Talking to people from different regions helps me to understand what measures they use and what their priorities are. The important issues for Asia and for Africa might be different from Europe. It was also valuable interaction for the exchange of interesting ideas and information.

JKJ: I want to express special thanks to the Maritime and Port Authority of Singapore for this forum. It is a good opportunity to share views with other countries on the shipping sector and on international regulatory requirements. It was also a good opportunity to build relationships with key countries for future cooperation. The important thing to note is how to cooperate with each other to create win-win situations, especially as Singapore and Korea are developed countries that play a bridging role between developed and developing countries.

PB: Seeing a developed system in place and understanding its evolution and development is an eye-opener. It is the standard that we would like to get to. Also, recognising that the maritime potential of a country can be realised if you place means to tap into it properly. We would like to reach a stage like Singapore's where the entire population understands the importance of being an island state dependent on the sea, and that we need to protect and preserve it.

Interaction with the delegates was priceless. We are not alone. Sharing ideas and exchanging knowledge enable us to see how other countries deal with issues. I made lots of new contacts to exchange thoughts with. I recommend that Singapore do this every year.

DP: The forum was well organised and informative and hopefully it can be sustained on a more regular basis. Meeting delegates and sharing our experiences with other countries was valuable. The most prominent takeaway is to maximise resources from the ocean. Other than shipping and fishing, there are other things that the ocean can do for us. On improving shipping technology globally, I am impressed by how Singapore's 4th Generation Vessel Traffic Information System can handle up to 10,000 vessel tracks at any one time.

going green makes cents

Alisdair Pettigrew, James Mitchell and Phoebe Lewis, three members of the Carbon War Room's Shipping Efficiency operation, share their perspectives on the profitable measures and strategies that will reduce both fuel consumption and greenhouse gas emissions across the shipping industry



Undergoing retrofitting

ABOVE The Carbon War Room helps the maritime industry explore opportunities to cut cost and reduce emissions through initiatives such as retrofitting vessels with efficiency technologies.

The Carbon War Room (CWR) is a non-profit organisation founded by Sir Richard Branson in 2009 that seeks to drive profitable low-carbon solutions across different industries, including shipping, trucking and aviation. CWR sees climate change as an opportunity for businesses to reduce costs and emissions at the same time, with many solutions available today.

Reducing carbon emissions from industries such as aviation and shipping is a key goal for CWR, and we are constantly looking for ways in which businesses can lower their carbon emissions cost-effectively. However, several challenges stand in the way of the huge savings potential.

Firstly, the shipping industry is a very cyclical one, where the booms are much shorter than the busts. It is also very fragmented, with the average shipowner owning fewer than five ships. This makes it difficult to scale new initiatives quickly. Next, the charterer, not the owner, pays for the fuel. There is little financial incentive for owners to invest in ships that generate lower emissions.

Finally, market barriers are exacerbated by a lack of access to capital by those seeking to improve their efficiency.

In a global downturn, even with lower bunker prices and reduced access to finance, the industry can still continue to reduce carbon emissions and increase fuel and energy efficiency profitably. We believe that reducing carbon emissions and making a profit are not mutually exclusive events. There is economic opportunity in preserving our planet's resources. Under CWR's Shipping Efficiency operation, we aim to reduce carbon emissions by bridging gaps in market information related to fuel efficiency, embedding demand for efficiency into decision-making, and unlocking capital for technology retrofits.

GREEN THUMBS UP

We have made significant strides in these areas.

CWR partnered with RightShip, a maritime risk-management specialist, to provide the world's first free-to-access vessel efficiency index for the



Retrofitted

ABOUT THE CONTRIBUTORS

Alisdair Pettigrew

is a Senior Advisor at Operation Shipping Efficiency. He has over 12 years' experience in the marine and allied fuel and commodities markets.

James Mitchell

is a Senior Associate at Operation Shipping Efficiency. He leads engagement with maritime financial institutions, and identifies financing for the industry's efficiency solutions.

Phoebe Lewis

is an Associate at Operation Shipping Efficiency.

industry (available at www.shippingefficiency.org). The GHG (Greenhouse Gas) Emissions Rating, launched in December 2010, rates vessels from A to G based on their design efficiency to enable charterers and shippers to select the most energy efficient vessels, with A being the most efficient and G the least.

To date, 39 charterers including Cargill, Rio Tinto and BHP Billiton, representing over 2 billion tonnes of cargo, use the Rating as a basis for policies in which they refuse to charter F and G-rated vessels. In this way, charterers save money on their fuel bills by leasing more efficient ships. Two Canadian ports, the Port of Prince Rupert and the Port of Vancouver, also use the Rating in their eco-incentive schemes. Such initiatives have also incentivised activity in shipping banks. Several leading banks, including HSH Nordbank AG and KfW IPEX-Bank use energy efficiency data in their investment and financing decisions.

Twenty per cent of the world's cargo is now transported on these more efficient ships and this

number is rising. We are working to recalibrate the behaviour of shipping stakeholders in this area. The shipping industry is already showing a willingness to get involved. For instance, in February this year, six leaders and influencers from across the shipping industry joined our Shipping Efficiency advisory board. With backgrounds that span the shipowning, chartering, finance and academic worlds, these board members lend insight and support our mission to profitably decarbonise the international shipping industry.

In March, CWR announced a collaboration between German-based shipowner Hammonia Reederei and US-based charterer Intermarine, which led to the retrofit of three sister vessels with multiple efficiency technologies, such as an optimised bulbous bow and rudder optimisation.

Under anticipated operating conditions, each vessel is expected to achieve 25 per cent fuel savings, which will be shared between Hammonia and Intermarine. CWR awarded Hammonia a US\$120,000 (S\$163,500) grant to do this.

SINGAPORE'S EFFORTS

As the world's largest ship retrofit centre, Singapore can play a big part in multi-technology retrofits that maximise energy efficiency. There is real potential for the two big shipyard groups here, Sembawang and Keppel, to look at the Hammonia deal as an example of fuel and energy savings by way of a retrofit bundle. The shipyards here already have the ability to understand how these technologies combine and work together.

Overall, Singapore has done much to encourage technological innovation in the industry. The Maritime and Port Authority of Singapore is to be commended for its eco-friendly initiatives under its Maritime Singapore Green Initiative, which aims to reduce the environmental impact of shipping and related activities, and promote clean and green shipping in Singapore.

Globally, the shipping industry can capitalise further. In the aviation industry, the two major plane manufacturers, Airbus and Boeing, are in a race to come up with the most technologically advanced aeroplanes. Shipbuilders, conversely, are competing on the basis of who can build vessels faster and at a lower cost. There is therefore a need to recalibrate both thinking and overall strategy within the shipping industry. CWR will continue to work with industry stakeholders to facilitate this and shine light on the solutions that work best and are the most profitable.

CAREERS

**Maritime lawyer
Derek Tan tells
Desmond Ng what
the draw of the
industry is and
what keeps his
work interesting**

The unpredictable nature of shipping makes it a challenging industry to work in. But for Singaporean maritime lawyer Derek Tan, who relishes dealing with what he describes as “mind-boggling” situations, that is also the most wonderful aspect of working in the industry.

As a maritime lawyer, he represents clients in cases relating to the seas, and this covers a range of issues including disputes, the sale of ships, fund-raising, and even insolvency and restructuring. He has also been involved when incidents happen on board. One of the more extreme cases he has dealt with was when a crew member died after a ship that was being refuelled exploded.

Says Tan, a partner with local law firm WongPartnership: “At the end of the day, ships

provide services. They service trade by moving things from point A to point B. When ships are involved, you have weather problems and scheduling problems. When accidents happen, we deal with the insurance companies. The work covers different practice areas but it’s all commercial in nature and the flavour is maritime.”

For Tan, who has more than 15 years’ experience in the maritime industry, his job is anything but dull. Rather than being confined behind a desk all the time, working under the hot sun, getting dirty and climbing on board ships to take statements is de rigueur for him. He says: “It’s almost always fun but you have to like that part of it. Sometimes we go on board a ship, find out how things work and what happened. There’s

maintaining good order at sea



TO BE A GOOD MARITIME LAWYER YOU MUST:



1.
HAVE A LAW
DEGREE.



3.
BE PREPARED
TO GIVE CLIENTS
ADVICE 24/7.

2.
Be well
versed in the
commercial aspects
of the business.



4.
BE OPEN TO
WORKING
OUTDOORS
AND LEARNING
NEW THINGS.

an element of investigative work, knowing what questions to ask and how the operations work.”

His interest in the maritime industry led him to take subjects that were of relevance to the industry such as shipping law, insurance, Chinese commercial law and civil procedure while at the National University of Singapore’s Faculty of Law. But his decision to work in maritime law, after he graduated in 1998, surprised his law friends.

He says: “When I was in law school, many of my friends wanted to be in corporate finance where the big money was. People were wondering why I wanted to do shipping. Shipping is a very old industry. Many of the old cases, which are quite interesting, are shipping cases. In the past, when a dispute occurred, people would go to court if it involved a big sum of money. This often happened when the dispute involved a ship full of cargo. Our commercial law developed from there.”

GROWTH POTENTIAL

Maritime lawyers, says Tan, play a pivotal role in providing essential services to support the maritime industry in Singapore. He explains: “When you have shipowners, charterers and traders, there will be disputes. They want the assurance of getting good advice. We are here to advise and help them, and to counsel them.

“Things may go wrong but if these parties don’t have a good way to resolve it, why would they come here? They need to be sure that they can get back the money they put in. That’s the strength of Singapore. People trust Singapore because they know we are fair and honest, hence they do business here.”

On the industry’s future development, Tan says that the “One Belt, One Road” initiative proposed by Chinese President Xi Jinping in 2013, if successful, could increase trade along those routes. The initiative aims to strengthen connectivity both on the westward land route from China through Central Asia to Europe and on the southerly maritime routes from China through South-east Asia, South Asia and Africa to Europe. He adds: “It could be good for business and good for the economy. We should see an uptick in clients and money coming in. But now, it’s all about port development. Hopefully, it will be an impetus for trade to go up.”

Tan reasons that with Singapore being a port, shipping will be an evergreen business here, which means his skills will always be required. He says: “It (maritime law) is not a very big industry here and that’s part of the reason why I was attracted to this industry. We see the same small group of people. That breeds familiarity, cooperation and fairness. For instance, today I need a favour; tomorrow you may need a favour. So we help each other out. Apart from the fact that it is made up of good lawyers, I like the collegiate feel of the shipping bar.”

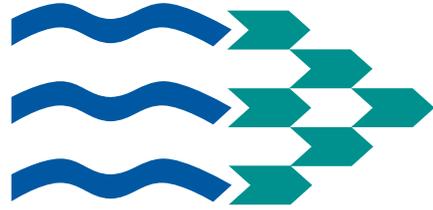
A good maritime lawyer, Tan says, must be well versed in and aware of the commercial aspects of the business as they are dealing with affairs that happen in real time. The maritime industry is a fast-moving one and is operational 24/7 as clients are international by nature, which means that one needs to be prepared to give immediate advice at a moment’s notice, he adds. The global reach of shipping also gives him opportunities to travel to countries like Japan, the United States, Finland, and even exotic locales like Iran for work.

But the long hours and being on call 24/7 can be disruptive to one’s life, says Tan, who adds: “That’s the nature of the trade. I always go home; it’s just a question of what time I go home.

“But it’s cyclical. We are essentially a service industry. If there are a lot of transactions, naturally there will be more disputes and our hours will be long. But if there are less transactions, there will be less disputes, then our hours will be shorter.”

FEB 2, 1996

MPA was established through the merger of the Marine Department in the then Ministry of Communications, the National Maritime Board, and the Port of Singapore Authority's regulatory departments.



M P A

S I N G A P O R E

10,000

The number of vessel tracks MPA's 4th Generation Vessel Traffic Information System can handle at any one time.

maritime milestones

The Maritime and Port Authority of Singapore (MPA), the driving force behind the country's port and maritime development, turned 20 this year. We highlight some interesting facts about and achievements by the organisation.



The Port of Singapore has been named the **Best Seaport in Asia** at the Asian Freight, Logistics and Supply Chain Awards 2016 for the 28th time.

MPA HAS REGISTERED SOME

4700 SHIPS

TOTALLING OVER 87 MILLION GROSS TONS, INTO THE SINGAPORE REGISTRY OF SHIPS, MAKING IT ONE OF THE WORLD'S TOP FIVE REGISTRIES.

Singapore tops the overall **Xinhua-Baltic International Shipping Centre Development Index** for its combined port and maritime services offerings.

singaporenautilus



APP STORE & GOOGLE PLAY

Singapore Nautilus is the quarterly corporate publication of the Maritime and Port Authority of Singapore. The magazine is now available for download on both the App Store and Google Play! Simply search for "Singapore Nautilus" or scan the QR code above. [Download the app now!](#)



M P A
SINGAPORE

Today's Maritime
Singapore delivers

SkillsFuture Study Award for Maritime Sector

Enrich yourself for
career growth



SkillsFuture

<http://www.skillsfuture.sg/studyawards/maritime>