



# SHAPING THE FUTURE

04/2016 no.37



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



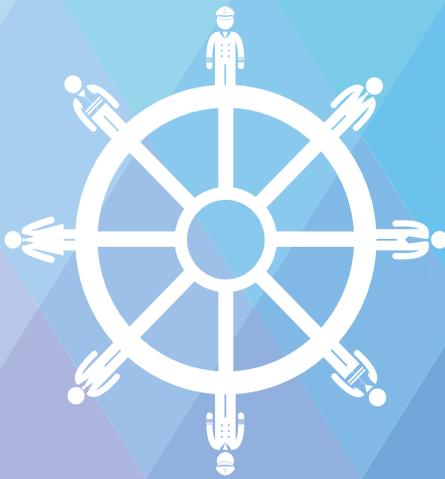
▶ poised for change

▶ exchanging expertise

▶ port of tomorrow

SINGAPORE  
maritimeweek®  
2017

22 - 28 April 2017



▶ PEOPLE ◀



▶ IDEAS ◀



▶ OPPORTUNITIES ◀

# NAVIGATING THROUGH CHALLENGING TIMES

Visit [www.smw.sg](http://www.smw.sg) for more details!

# CONTENTS

PAGE  
**04**

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



PAGE  
**08**  
FEATURE  
**staying ahead  
of the curve**

PAGE  
**14**  
PORT & STARBOARD  
**in good stead**

PAGE  
**18**  
MARITIME SERVICES  
**powering  
forward**

PAGE  
**22**

PERSONALITY  
**forward together**

PAGE  
**24**

PERSONALITY  
**eye on maritime  
safety**

PAGE  
**26**

COMPANY SPOTLIGHT  
**rising up to new  
industry standards**

PAGE  
**28**

TECHNOLOGY  
**smart port**



PAGE  
**32**

COMMENTARY  
**embracing change**

PAGE  
**34**

COMMUNITY TALK  
**platform for  
growth**

PAGE  
**38**

CAREERS  
**grow with the flow**

PAGE  
**40**

THE BACK PAGE  
**safety first**

**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**

Vicki Loh

**advisory committee**

Andrew Tan  
Tan Beng Tee  
M Segar Abdullah  
Khong Shen Ping  
Tham Wai Wah  
Ong Seok Bin  
Parry Oei  
Tan Cheng Peng  
Angela Png  
Daknashamoorthy  
Ganasen  
Tan Suan Jow  
Bernice Yeoh  
Yvonne Chan

**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  
**CREATIVE DIRECTOR**  
Stephanie Teo  
**ART DIRECTOR**  
Fish Chan  
**ASSOCIATE ART DIRECTOR**

Geoff Tan  
**MANAGING DIRECTOR**

Chua Soon Tzer  
**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



25 - 27 April 2017

6th Edition

Marina Bay Sands®  
Singapore

[www.sea-asia.com](http://www.sea-asia.com)

Organisers



Held in conjunction with



Part of



Recognised as



**Book Now and Save!**  
Register and pay before **10 March 2017**  
to enjoy Early Bird Rates.

# The Asian Voice in a Global Industry

## Over 30 Speakers | 8 Sessions | 3 Days

Delivered by some of the industry's most articulate speakers covering a wide range of topics impacting the maritime and offshore industry.

- Top level speakers** include **Andy Tung**, Orient Overseas Container Line • **Filippos Lemos**, N.S. Lemos & Company Ltd  
 • **Ian Taylor**, Vitol Group • **Kenneth Hvid**, Teekay Offshore Group Ltd • **Philippe Louis-Dreyfus**, Louis Dreyfus Armateurs S.A.S.  
 • **Piyush Gupta**, DBS Group • **Randy Chen**, Wan Hai Lines and many more...



### GLOBAL FORUM

High level panel discussing future of the shipping industry



### TECHNOLOGY FORUM

The Fourth Industrial Revolution: Threat or Opportunity?



### PARLIAMENTARY DEBATE

"This House believes that the best days of the private independent shipowner are over"

Purchase your conference passes today at [www.sea-asia.com](http://www.sea-asia.com)

Sponsors



# ahead of the pack

*As the world's top bunkering port, Singapore has constantly sought to ensure that the quality of supplies and services to all parties within the bunker supply chain is of the highest standards.*

At the Maritime and Port Authority of Singapore (MPA), we have implemented stringent bunkering standards over the years to ensure the effectiveness, safety and security of bunker delivery operations in Singapore. These are reviewed regularly to make certain that they keep pace with developments within the industry.

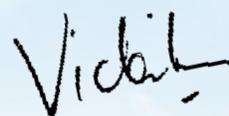
In line with this, we have made it mandatory to use mass flow metering (MFM) systems for the delivery of marine fuel oil in Singapore since Jan 1, 2017. When this was first announced in 2014, it seemed like an ambitious undertaking. However, with support from stakeholders within the industry, we have successfully met the timeline. As of Jan 1, 2017, 136 bunker tankers have been installed with MPA-approved MFM systems and are ready to perform marine fuel oil deliveries in the Port of Singapore. Read more about this in the Feature section.

We also highlight the perspectives of different stakeholders in the adoption of the MFM systems in the Commentary and Careers sections.

In August 2016, we hosted Mr Kitack Lim, Secretary-General of the International Maritime Organization (IMO), on his first visit to Singapore since he assumed office on Jan 1, 2016. In the Personality section, we had the honour of speaking to Mr Lim about his views on the industry as a whole as well as his vision for the IMO.

In addition, we take a look at the cutting-edge solutions that help to keep our ports at the top of their game in the Technology section.

We hope you will gain greater insight into the maritime industry through reading this issue.



**VICKI LOH**  
EXECUTIVE EDITOR



## SINGAPORE STRENGTHENS MARITIME COLLABORATION WITH NORWAY



During a state visit by Singapore's President, Dr Tony Tan Keng Yam, to Norway, the Maritime and Port Authority of Singapore (MPA) signed a joint statement with the Norwegian Ministry of Trade, Industry and Fisheries on Oct 10, 2016. Mr Andrew Tan, Chief Executive of MPA, represented MPA while Norway's signatory was Ms Dilek Ayhan, State Secretary of the Norwegian Ministry of Trade, Industry and Fisheries. It was witnessed by Dr Tan and King Harald V of Norway.

The two countries have developed strong maritime relations through commercial and industrial cooperation between its maritime clusters, as well as collaboration in research and development in areas such as the maritime environment, and offshore and marine engineering. In education, the Maritime Studies programmes offered at Singapore's Nanyang Technological University (NTU) are jointly conducted by BI Norwegian School of Management and NTU.

These close maritime links were why MPA was part of the delegation for Dr Tan's visit to Norway. During the visit, MPA's Mr Tan also spoke about the two countries' cooperation in maritime research and education at a seminar organised by the Research Council of Norway. It was attended by industry leaders, academia and government delegates from both countries.

**ABOVE** Mr Andrew Tan with Ms Dilek Ayhan, State Secretary of the Norwegian Ministry of Trade, Industry and Fisheries.

**RIGHT** Members of the IMC 2030 Advisory Committee with Mrs Josephine Teo, Senior Minister of State, Prime Minister's Office, Ministry of Foreign Affairs and Ministry of Transport.

## SINGAPORE'S 2016 MARITIME PERFORMANCE

The Port of Singapore sustained its performance in 2016 amid weaker-than-expected global economic conditions and significant structural changes in the maritime industry.

Container throughput held steady at 30.9 million twenty-foot equivalent units (TEUs) in 2016, same as in 2015. Singapore remained the world's top bunkering port, with the total volume of bunkers sold in 2016 growing by 7.7 per cent to 48.6 million tonnes, compared to 45.2 million tonnes in 2015.

Annual vessel arrival tonnage increased by 6.3 per cent in 2016 compared to 2015, reaching 2.66 billion gross tonnes (GT). Total cargo tonnage handled in 2016 also grew by 3 per cent over 2015 to reach 593.3 million tonnes.

The Singapore Registry of Ships maintained its growth momentum, consolidating its position as one of the world's top 10 ship registries. Compared to 2015, the total tonnage of ships under the Singapore flag grew by 2 per cent, or 1.7 million GT, to 88 million GT in 2016.

The United Nations Conference on Trade and Development has ranked Singapore as the second most connected country in the world for two years in a row, while the World Economic Forum Port Infrastructure Rankings put Singapore as having the world's second best port infrastructure.

## IMC 2030 ADVISORY COMMITTEE FORMED



On Sept 14, 2016, the Maritime and Port Authority of Singapore announced the establishment of the International Maritime Centre 2030 (IMC 2030) Advisory Committee to chart the future directions of Singapore as an IMC. The committee will review Singapore's IMC development

strategy and identify new growth areas to enhance its long-term competitiveness and value proposition as an IMC.

Mr Andreas Sohmen-Pao, Chairman of BW Group, is Chairman of the committee. Its members include global business leaders and experts in maritime and related sectors.

## NEW MEASURES TO SHAPE THE FUTURE OF BUNKERING



The 19th instalment of the Singapore International Bunkering Conference and Exhibition (SIBCON), the world's largest bunkering conference, was held from Oct 4-7, 2016. Organised by the Maritime and Port Authority of Singapore (MPA), SIBCON 2016 drew more than 1,600 participants from 69 countries. The conference offered a unique platform for participants to hear from key international speakers on the present and future directions of the bunkering industry.

To enhance bunkering processes and prepare the industry to meet future demands, MPA announced several new initiatives during SIBCON 2016. These included leveraging technology to enhance transparency and improve efficiency in bunkering operations. Aside from funding the test bedding of the use of mass flow meters for the delivery of distillates, MPA is also conducting tests on electronic Bunker Delivery Notes to improve productivity.

To prepare for liquefied natural gas (LNG) bunkering, MPA and the Singapore LNG Corporation are collaborating

on an interim truck loading facility, which will be used to service LNG bunkering as well as a variety of other industries that may require small volumes of LNG to be transported over land. MPA will contribute about S\$2 million towards the development of this facility.

MPA is also working with SPRING Singapore and industry players to develop the Technical Reference for LNG bunkering standards, which will provide a reliable and transparent framework for LNG bunkering operations.

MPA has also awarded S\$8 million of the S\$12 million co-funding programme for LNG-fuelled vessels to Harley Marine Asia, Keppel Smit Towage and Maju Maritime.

To encourage the uptake of LNG bunker by the local harbour craft community, MPA will waive five years of port dues for new LNG-fuelled harbour craft that register with MPA between Oct 1, 2017 and Dec 31, 2019. It will grant an extra 10 per cent port dues concession for qualifying vessels that engage LNG-fuelled harbour craft under the Green Port Programme.

## FORMING A NETWORK OF LNG BUNKER-READY PORTS

An international focus group comprising the ports of Singapore, Rotterdam, Antwerp and Zeebrugge was formed in 2014 to deepen cooperation and information sharing in liquefied natural gas (LNG) bunkering from a global perspective. The group was then expanded to include the Port of Jacksonville and the Norwegian Maritime Authority. Together, the group is working to develop the world's first set of harmonised LNG bunkering standards, which will ensure that key areas of the LNG bunkering process are aligned across ports carrying out the operations. This can serve as a guide for ports seeking to be LNG bunker-ready.

To develop a network of LNG bunker-ready ports across the East, West and Trans-Pacific trade routes, the Maritime and Port Authority of Singapore drove the expansion of the group to include Japan's Ministry of Land, Infrastructure, Transport and Tourism, and South Korea's Ulsan Port Authority. This was formalised through a Memorandum of Understanding signed at SIBCON 2016.



**ABOVE** The signing of the Memorandum of Understanding to facilitate the future uptake of LNG, during SIBCON 2016.

**TOP LEFT** SIBCON 2016 attracted more than 1,600 participants, comprising leading bunkering professionals, academic experts and high-level industry executives from 69 countries.

SHIP'S LOG HAPPENINGS

**4TH FORUM OF SMALL STATES (FOSS) FELLOWSHIP VISIT**



The Maritime and Port Authority of Singapore (MPA) hosted 11 Permanent Representatives to the United Nations (UN) under the 4th FOSS Fellowship programme, organised by the Ministry of Foreign Affairs, on Jan 10, 2017. The FOSS is an informal platform for small states to exchange views on issues of common interest.

**BUSINESS EXCELLENCE AWARDS 2016 CEREMONY AND GALA DINNER**



At the Business Excellence Awards held on Oct 27, 2016, MPA was one of the two winners of the Singapore Quality Award. MPA was commended for leveraging technology to boost the development of Singapore's port and maritime industry, such as in enhancing transparency and efficiency in the bunkering process.

**2016 PRO-ENTERPRISE PANEL-SINGAPORE BUSINESS FEDERATION (PEP-SBF) AWARDS**



MPA was ranked the top government agency for the fifth consecutive year in the annual Pro-Enterprise Ranking Survey for its efforts in enhancing Singapore's pro-enterprise environment. It received the honour at the 2016 PEP-SBF Awards held on Nov 10, 2016.

SHIP'S LOG HAPPENINGS

**SINGAPORE REGISTRY OF SHIPS (SRS) 50TH ANNIVERSARY DINNER**



SRS marked its 50th anniversary milestone with a celebratory dinner on Nov 30, 2016. SRS took the opportunity to thank industry partners for helping Singapore become the world's fifth largest registry and for their support of initiatives to grow Singapore as a leading International Maritime Centre.

**NEW ZEALAND MINISTER VISITS MPA**



MPA hosted Mr Paul Goldsmith, New Zealand Minister for Commerce and Consumer Affairs and Associate Minister for Accident Compensation Corporation, during his visit under the Singapore Ministry of Foreign Affairs' Distinguished Visitors' Programme on Nov 25, 2016.

**MEETING WITH DR CLEOPATRA DOUMBIA-HENRY**



Mr Andrew Tan, MPA's Chief Executive, met Dr Cleopatra Doumbia-Henry, President of the World Maritime University, during her visit to Singapore on Nov 24, 2016. During the meeting, the two discussed opportunities for working together to promote global maritime leadership training.



Francis Kan finds out how Singapore is taking concrete steps to reinforce its position as the world's leading bunkering port amid a wave of change

# staying ahead of the

# CUR

**MOVING TOWARDS 2020  
GLOBAL SULPHUR CAP****0.5%**

# VG

Whether due to tighter global limits on emissions or customer demands for higher quality service, the bunker industry is in the midst of a major transition that will impact many of its players. As the world's top bunkering port, Singapore is taking the lead in addressing many of these challenges.

Chief among them is the industry-wide move towards the use of cleaner fuels that are less harmful to the environment. The shipping industry is one of the world's biggest emitters of sulphur, which is harmful to both human health and the environment.

To curb maritime pollution, the International Maritime Organization (IMO) is set to impose a 0.5 per cent global cap on sulphur emissions from marine fuels come Jan 1, 2020. This is a significant cut from the current 3.5 per cent global limit, and will have knock-on effects worldwide for the shipping, bunkering and energy sectors. It will force shippers to seek out cleaner alternative fuels such as liquefied natural gas (LNG).

Up till recently, the maritime industry has relied heavily on highly polluting fuel oil – a residual distillate of the crude oil refining process – to power its vessels. Container ships of between 15,000 twenty-foot equivalent units (TEUs) and 18,000 TEUs are estimated to consume up to 300 tonnes of high-sulphur fuel a day while at sea. Meanwhile, a 300,000-deadweight tonne supertanker can use up to 100 tonnes per day.

"One large vessel in one day can emit more sulphur dioxide than all the new cars that come onto the world's roads in a year. That is reason enough to cap emissions," said Thomas Koniordos, Head of Business Line Environmental Solutions at Norwegian chemical company Yara International, on the sidelines of the 19th Singapore International Bunkering Conference and Exhibition (SIBCON) in October 2016. Yara International makes systems known as "scrubbers" that are used to remove sulphur oxides from ships' engine and boiler exhaust gases.



## TAKING THE LEAD

Singapore, which maintained its position as the world's leading bunker port in 2016, is taking the lead in going green by promoting the use of LNG as a marine fuel. Bunker sales here reached a record 48.6 million tonnes in 2016.

"We are also gearing Singapore up for a future of cleaner marine fuels," said Ng Chee Meng, who is Singapore's Minister for Education (Schools) as well as Second Minister for Transport, in his keynote address at SIBCON 2016.

The Maritime and Port Authority of Singapore (MPA) has announced a raft of measures to make Singapore ready to supply LNG bunker by 2017. For instance, it announced a grant of up to S\$2 million for each newly built LNG-fuelled vessel to encourage the switch to LNG. It has set aside S\$12 million for this purpose. Some players are already biting. MPA will be disbursing a total of S\$8 million to Keppel Smit Towage, Maju Maritime and Harley Marine Asia to co-fund the construction of their new LNG-fuelled vessels. Newly registered LNG-fuelled harbour crafts in Singapore will also enjoy a five-year waiver of port dues.

Meanwhile, MPA and the Singapore LNG Corporation signed a Memorandum of Understanding (MOU) at SIBCON 2016 to develop a truck loading facility, which will be used to service LNG bunkering. MPA has committed S\$2 million to co-fund this facility, which has been commissioned.

Outside of Singapore, the use of LNG as a marine fuel is starting to gain traction too. In October 2016, Shell inked an agreement with cruise liner Carnival to supply LNG fuel to two of the world's largest passenger cruise ships. This is the first time LNG will be used in dual-fuel engines to power cruise ships.

On its part, MPA is working with other ports to develop a set of harmonised LNG bunkering procedures through an international focus group comprising the ports of Singapore, Rotterdam, Antwerp, Zeebrugge and Jacksonville, as well as the Norwegian Maritime Authority. The procedures will serve as good reference to ports seeking to be LNG bunker-ready. To deepen cooperation and information sharing in LNG bunkering, and to develop a network of LNG bunker-ready ports across the East, West and Trans-Pacific trade routes, the group was expanded to include Japan's Ministry of Land, Infrastructure, Transport and Tourism, and South Korea's Ulsan Port Authority. This was formalised through a new MOU signed during SIBCON 2016.



FEATURE



2015

2016

## IMPROVING BUNKER DELIVERY

In another step to raise the quality of its bunkering services, Singapore introduced the mass flow metering (MFM) procedure for the delivery of all marine fuel oil here in January 2017. As of Jan 1, 2017, 136 bunker tankers were installed with MPA-approved MFM systems and ready to perform marine fuel oil deliveries in the Port of Singapore.

Among other benefits, the use of MFM will provide greater assurance to both suppliers and customers on the quantity of bunker delivered. Bunker delivery will also be sped up by as much as 15 per cent.

"This means faster and more accurate deliveries, a win-win for everyone," said Ng. Furthermore, MPA will be extending the use of MFM to distillate fuel deliveries, and is setting aside S\$500,000 to fund its test-bedding.

To further improve productivity, MPA will be rolling out electronic bunker delivery notes, or e-BDN, in 2018. This will replace the current paper-based system. The e-BDN will enable immediate information transmission between the supplier and customer, greatly improving efficiency for all parties.

Summarising the various initiatives to improve the bunker industry here, Ng said: "(MPA's) efforts to continually improve and reinvent bunkering services have borne fruit."





## THE MASS FLOW METER ADVANTAGE

While the mass flow metering (MFM) system for bunkering is already in use at certain ports abroad, Singapore is the first country to mandate the use of this system, which measures the transfer of bunker fuel between the supplier and buyer.

The MFM system replaces the traditional tank gauging method, which requires human intervention. This is expected to improve transparency and efficiency in bunker operations.

In February 2016, the world's first National Technical Reference (TR) for MFM was launched. Known as TR48, the document was developed by a Technical Committee for Bunkering comprising representatives from the Maritime and Port Authority of Singapore

(MPA), enterprise development agency SPRING Singapore, the Agency for Science, Technology and Research (A\*Star) and stakeholders from the marine, shipping and oil and gas industry.

As of Jan 1, 2017, MPA had approved 136 bunker tankers for MFM delivery. These vessels had been delivering more than 1 million tonnes of bunkers each month.

Time savings of up to three hours were observed during trials of MFM delivery compared to traditional methods. According to international oil and gas company ExxonMobil, this translated to cost savings of as much as US\$5,000 (S\$7,119) per refuelling operation for marine vessel operators.

With more than 69,000 bunkering operations conducted in Singapore in 2016, the cost savings from MFM will be significant.

Desmond Ng finds out how the Tripartite Engineering Training Award helps aspiring engineers like Mohd Reza Suhaidi prepare for a career in the maritime industry



# in good



Mohd Reza Suhaidi (opposite page, inset) set his heart on working in the maritime industry after watching a Singaporean TV show about 10 years ago.

The Chinese drama, called *The Peak*, revolved around characters working in the offshore and marine and maritime industry in Singapore. Intrigued by the inner workings of the maritime industry, Reza, 27, decided that he wanted to become a marine engineer.

Reza, who is half-Chinese and can speak some Mandarin, says: "I was introduced to the offshore construction sector through the show, through which I also gained an initial understanding about the maritime industry. That inspired me to find out more about it."

As one of eight cadets awarded the Tripartite Engineering Training Award (TETA) in 2016, Reza is well on his way to fulfilling his ambition.

TETA is a 31-month training programme that enables Singaporeans to receive training to join the maritime industry, beginning as engine cadets and graduating as Certificate of Competency (Class 5) marine engineers. It was launched in 2016 to address the shortage of marine engineers within the maritime industry.

The S\$1.2m programme is a joint initiative by Workforce Singapore, the Singapore Maritime Officers' Union (SMOU) and the Employment and Employability Institute (e2i), and is supported by the Singapore Shipping Association, the Maritime and Port Authority of Singapore and various shipping companies.

To pursue his dream, Reza took up a two-year Higher Nitec course in Offshore and Marine

# stead

"WE HAVE RECEIVED IMMENSE SUPPORT AND GUIDANCE FROM MANY EXPERIENCED SEAFARERS, SUCH AS CAPTAIN ROBIN FOO, PRESIDENT OF SMOU, AND OUR MENTOR MR KALYAN CHATTERJEA, WHO IS THE TETA COURSE COMMANDER. THEY HAVE INSPIRED ME TO CONTINUE CONFRONTING ANY CHALLENGES THAT COME MY WAY AS I WORK TOWARDS MY GOAL."

MOHD REZA SUHAIDI, TETA RECIPIENT

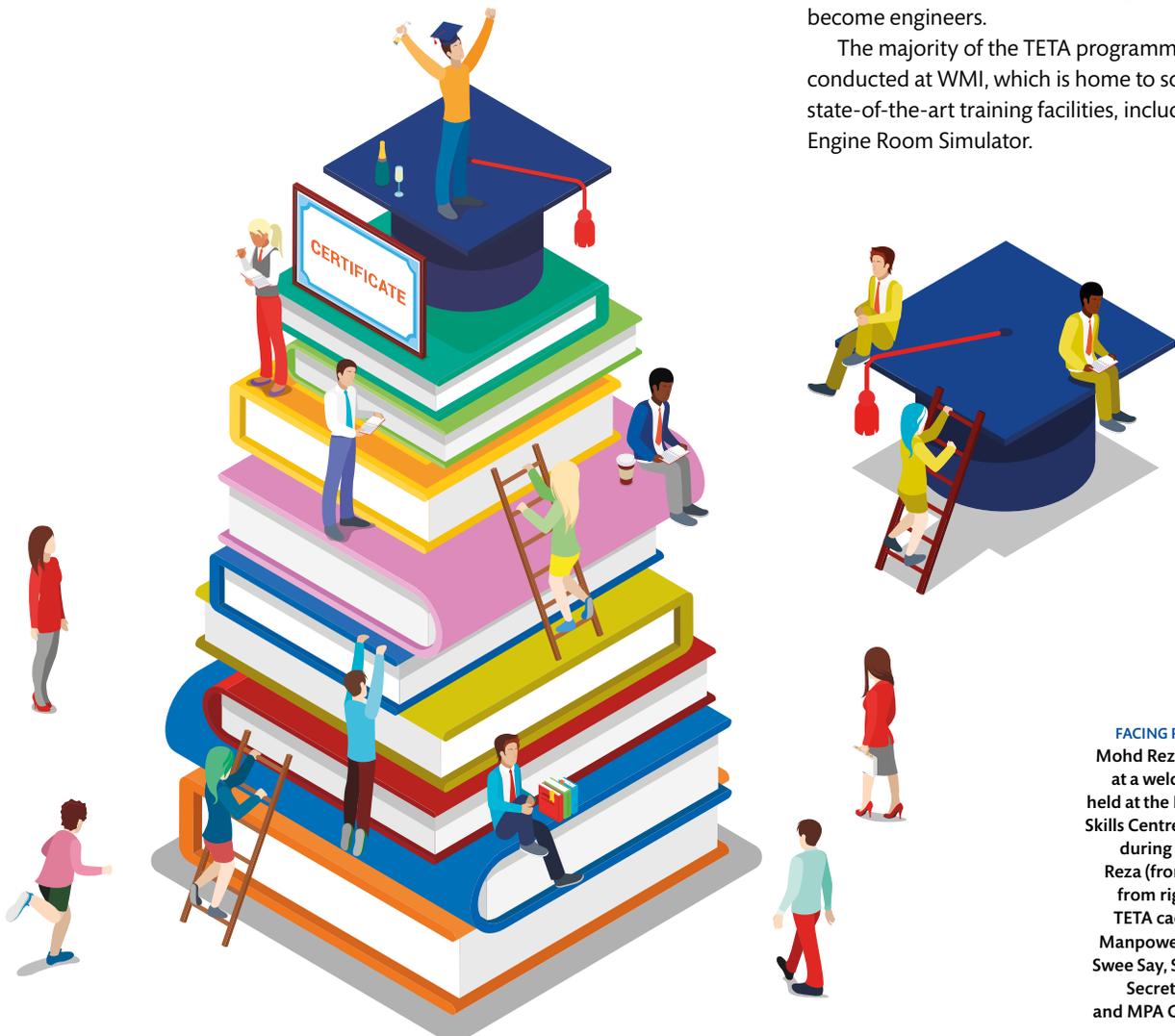
Engineering Design at the Institute of Technical Education (ITE) College Central. He graduated in April 2016 as the top student in his Higher Nitec course. He was also among the top 3 per cent of the school's graduating engineering cohort.

Reza found out about the TETA programme while at ITE College Central and applied to it. He was selected, and started the TETA programme soon after graduation.

### ALL-ROUND TRAINING

The programme is divided into three training phases, comprising eight months of pre-sea classroom training at Wavelink Maritime Institute (WMI), the training arm of SMOU, followed by 15 months of on-the-job training on board a commercial vessel, and then eight months of preparatory courses and examinations. Cadets who pass the course then graduate to become engineers.

The majority of the TETA programme is conducted at WMI, which is home to some truly state-of-the-art training facilities, including an Engine Room Simulator.



FACING PAGE, FROM TOP  
Mohd Reza Suhaidi (left)  
at a welding workshop  
held at the LHUB Industry  
Skills Centre@Benoi; Reza  
during a TETA course;  
Reza (front row, second  
from right) with other  
TETA cadets, as well as  
Manpower Minister Lim  
Swee Say, SMOU General  
Secretary Mary Liew  
and MPA Chief Executive  
Andrew Tan.



## TO QUALIFY FOR TETA, YOU MUST:

- Be Singaporean
- Have completed National Service (applicable to males)
- Have earned a diploma or Higher Nitec qualification from a local institution, preferably in Marine Engineering, Offshore & Marine Engineering Design, or Marine & Offshore Technology
- Be physically and medically fit
- Not have night and/or colour blindness
- Commit to 31 months of training, including 15 months on board vessels
- Be disciplined and motivated

Visit [www.e2i.com.sg](http://www.e2i.com.sg) to find out more.

Under the programme, cadets pay only 10 per cent of the course fees. e2i pays 80 per cent while SMOU pays the remaining 10 per cent. In addition, cadets receive a training allowance of between S\$1,200 and S\$1,400 per month during the programme.

A key feature of TETA is that its cadets are required to be given training berths and employment opportunities by shipping firms before the programme commences. This is something that Reza, who is employed by shipping firm AP Moller-Maersk, especially appreciates.

He says: "It's a good experience, especially if you are looking for something adventurous and unique to learn.

"At the same time, we are given the opportunity to learn in a conducive environment in which we are able to learn from mistakes and understand why they happen, and are taught the proper measures to take before accidents happen."

Reza, who has completed one third of the programme as of January 2017, says that he finds the TETA course subjects interesting. Among the subjects he has studied are the strength of metals, the viscosity and chemical properties of residual and lubricating oils, and applied mechanics and thermodynamics, as well as welding.

He adds: "We'll also be training on board a vessel, so we will have to learn about the workings of that vessel. Once we start work in the future,

we'll have to do a lot of maintenance work and keep track of all the system maintenance, upgrades and watchkeeping on board a vessel."

Reza points out that the TETA programme does not just get down to the nuts and bolts of marine engineering; it also allows cadets to pick up soft skills such as managing interpersonal relations, gain actual work experience, and learn from experts and veterans in the maritime industry.

He says: "We have received immense support and guidance from many experienced seafarers, such as Captain Robin Foo, President of SMOU, and our mentor Mr Kalyan Chatterjea, who is the TETA Course Commander. They have inspired me to continue confronting any challenges that come my way as I work towards my goal."

He believes that the well-rounded exposure provided by TETA will put him on good footing when he starts work as a marine engineer after graduating from the programme in 2019.

He says: "I will be out there (on a vessel) alone with a multinational crew. I will have to work as a team and learn how to communicate with them. We will have to depend on each other to survive.

"Because of my previous work experience, I am confident I can learn how to do this, how to interact with different people."

Beyond the TETA programme, Reza looks forward to forging an exciting career path within the maritime industry. Marine engineers can expect a starting pay of around US\$3,000 (S\$4,326) a month when they graduate, and more than US\$7,000 a month as they work their way up to the position of a chief engineer.





# powering forw

Low Shi Ping finds out why Chemoil, Singapore's No. 1 supplier of bunker fuel in 2015 and 2016, is optimistic



# ard

about its future despite changes afoot in the bunkering industry

If you own a ship and it stopped in Singapore in the last two years to refuel, chances are that Chemoil may have served it. The energy company was the top supplier of bunker fuel by volume here for two consecutive years in 2015 and 2016, moving up from 16th place in 2014.

Ng Koh Sheng, Global Account Manager of Chemoil, says that the turning point came after the company was fully acquired by commodity producer and trader Glencore in 2014, which integrated it into one of the world's largest natural resource commodity firms. He adds: "Chemoil went from becoming an independent supplier of bunker fuel, to being part of Glencore, which is very supportive of this arm of its business. We underwent a restructuring process, and increased our marketing activities in the second half of 2014."

This led to new customers for Chemoil, as well as an increase in demand from existing customers, pushing it to the top spot. "We never had the aspiration to be No. 1. It's more about prestige than anything else," admits Ng.

Aside from supplying fuel, Chemoil is also championing the use of mass flow metering (MFM) systems, which measure precisely how much fuel is transferred during bunkering. As of November 2016, almost 80 per cent of its bunker fleet had been fitted out with MFM systems. This move is in line with Singapore's shift to the mandatory use of MFM for bunkering, which came into effect on Jan 1, 2017.

Expressing his support for MFM, Ng says: "It is very good because you can accurately control the amount of marine fuel oil needed, and you know exactly how much has been supplied. It also prevents inventory losses, and increases the transparency of the supply process."

Chemoil adopted MFM systems on its time-chartered and owned barges in Fujairah, the United Arab Emirates, in November 2016.

Ng hopes that one day, data analytics will be built into the system to enable real-time updates. The technology is available at present, but is not yet stable; Ng says it is merely a matter of time before improvements are made to bring it up to speed.

### FACING UP TO CHALLENGES

As with any new technology, implementing MFM has not been without its challenges. Ng says that Chemoil faced resistance from its customers when it first introduced the MFM system. Many were concerned that their costs would increase significantly. However, once they saw the accuracy of MFM in ensuring that they would not be short-changed during bunkering, the system gradually gained acceptance.

Ng says Chemoil welcomes the levelling of the playing field for the industry in 2017, as it means everyone will have the same cost base, and will have to be more efficient to grow their slice of the pie.

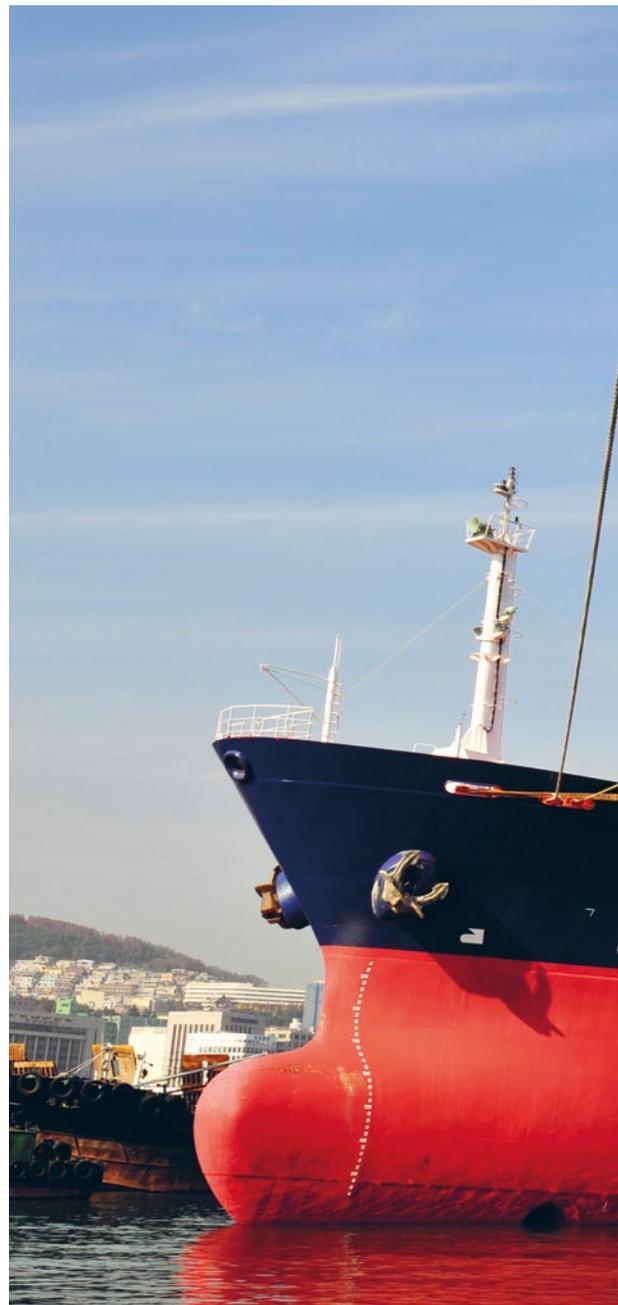
Despite the Oct 27, 2016 announcement during the 70th session of the International Maritime Organization's Marine Environment Protection Committee, that a 0.5 per cent global sulphur cap on marine fuels will be implemented from 2020 instead of 2025, Ng remains optimistic about Chemoil's opportunities.

The company is well positioned to face the

challenges brought about by the announcement, Ng says. He points out that Chemoil not only offers a broad range of marine fuels that comply with internationally set standards as well as localised emission control areas such as in the European Union, it is also conducting research and development into more cost-effective, low-sulphur fuel oil alternatives.

As the world's largest bunkering port, Singapore has long made provisions for a low-sulphur future by embracing liquefied natural gas as an alternative marine fuel, Ng says. He believes that Singapore's ability to look ahead will ensure its position as a bunkering hub in the Asia-Pacific.

**PREVIOUS PAGE** Chemoil has been the top choice for bunker fuel in Singapore since 2015.  
**RIGHT** Singapore's use of a low-sulphur fuel option solidifies its position as a bunkering hub.



“CHEMOIL NEVER HAD THE ASPIRATION TO BE NO. 1. IT’S MORE ABOUT PRESTIGE THAN ANYTHING ELSE.”

**CHEMOIL’S GLOBAL ACCOUNT MANAGER, NG KOH SHENG**

One area of concern, says Ng, is whether US President Donald Trump lives up to his campaign promise of increased protectionism and deglobalisation. This may affect trade, which shipping is almost entirely dependent on.

“Globalisation drives shipping. It is why you see bigger vessels and more of them; this allows the bunkering business in Singapore to maintain its growth,” explains Ng.

“If our Government keeps an open mind, we should be OK. We have good weather all year round, and the capability to service all types of ships. As long as we remain effective and efficient, we have hope for our future.”



*From Aug 29 to Sept 1, 2016, the Maritime and Port Authority of Singapore (MPA) hosted Kitack Lim, Secretary-General of the International Maritime Organization (IMO), on his first visit to Singapore since he assumed his post on Jan 1, 2016. Lim was here to deliver the keynote address at the inaugural International Safety@Sea Conference, held from Aug 30-31. He spoke on key priorities and policies in the area of maritime safety, highlighting the importance of inculcating a safety-first culture throughout the global shipping community. He also shared his vision for the IMO with some 200 maritime industry leaders, government officials and academics as part of the MPA Academy's Distinguished Speaker Series. During his visit, Lim called on Khaw Boon Wan, Singapore's Coordinating Minister for Infrastructure and Minister for Transport, and also met with senior maritime officials from MPA to exchange views on issues such as safety of navigation, maritime security, and the protection of the marine environment.*

# forward together

International Maritime Organization Secretary-General Kitack Lim shares with Rahita Elias the tasks and challenges ahead for the organisation and the shipping industry



"IMO'S CORE GOALS CAN ONLY BE ACHIEVED WHEN ALL MEMBER STATES JOIN TOGETHER TO IMPLEMENT IMO STANDARDS PROPERLY."

KITACK LIM,  
IMO SECRETARY-GENERAL

#### HOW HAVE THINGS SHAPED UP SINCE YOU TOOK UP YOUR POST AS SECRETARY-GENERAL OF IMO?

I am truly impressed with the dedication and expert work that goes on in the plenary, working and drafting groups to develop technical regulations and guidance for the maritime sector.

I have also had the privilege to travel extensively and meet officials and representatives from governments, the maritime industry, environmental organisations and more, to engage in debates, listen to the concerns of IMO's many and varied stakeholders, and open up new lines of communication with so many people who are vital to the continued success of the organisation.

As Secretary-General, I find myself at the helm of a great ship, but this is not a voyage I undertake alone. I am supported by the excellent staff of the IMO Secretariat as well as Member States and the wider maritime and shipping community.

#### WHAT WILL BE IMO'S KEY INITIATIVES UNDER YOUR LEADERSHIP? HOW WILL IMO IMPLEMENT THEM?

As Secretary-General, my role is to develop strategies and a vision that support Member States' decision-making processes. Therefore, the ongoing work on the development of a new strategic framework is relevant.

I would like to focus on data management. IMO receives data from Member States, intergovernmental organisations, non-governmental organisations, and other sources. We need to analyse and utilise that data better and more systematically so that we can evaluate IMO's performance. I am particularly interested in looking more closely into our casualty information and ensuring that we conduct proper analysis of accident causes, particularly the human element, to create effective regulations, and possibly predict areas where action needs to be taken.

#### YOU HAVE MENTIONED THREE STRONG IMO PRIORITIES - IMPLEMENTATION, CAPACITY BUILDING, AND COMMUNICATION. HOW WILL IMO ACHIEVE THESE? HOW CAN MEMBER STATES HELP?

Communication is one of our most valuable tools. By sharing our thoughts, experiences, problems and successes, we can make progress. I would like to increase IMO's visibility, and raise its awareness among officials, ministers and decision makers outside our regular community.

IMO's core goals can only be achieved when all Member States join together to implement IMO standards properly. We need to enhance

our capacity building, including exploring ways to secure funding from a wider range of donors by building relationships with international bodies and industries.

Member States can contribute through active participation. The now-mandatory IMO Member State Audit Scheme (which assesses Member States' performances in meeting their obligations and responsibilities contained in a number of IMO treaty instruments) is already proving to be a powerful tool in supporting capacity building and implementation, and in increasing communication.

#### HOW WOULD YOU DESCRIBE THE IMO-SINGAPORE RELATIONSHIP?

It is important that Member States work together on regional matters and stand ready to support IMO's work. Singapore is a valued Member State in this respect. MPA is a strategic partner in the Global Maritime Energy Efficiency Partnerships (GloMEEP) project, which supports the uptake and implementation of energy-efficiency measures for shipping. As part of this partnership, MPA and IMO co-organised the inaugural Future-Ready Shipping conference in 2015. I certainly look forward to working further with Singapore, and specifically MPA, on this and other projects.

#### WHAT ARE SHIPPING'S MAIN CHALLENGES?

Uncertainty in the global economy creates a challenge for the maritime industry but there will always be an underlying need for shipping. Maritime transportation will continue to play a key role in supporting global trade. The main challenge is to ensure shipping's sustainability.

Shipping needs to keep up to date with the latest requirements such as those entering into force on Jan 1, 2017, including the Polar Code for ships operating in Arctic and Antarctic waters. Broader challenges include embracing a green and sustainable culture, implementing the Ballast Water Management Convention which enters into force in September 2017, and maintaining preparedness to deal with maritime security threats.

#### HOW DO YOU BALANCE YOUR FAMILY AND WORK COMMITMENTS? WHAT ARE YOUR HOBBIES?

I always try to make time for my very supportive family. I enjoy spending time in London visiting art galleries with my wife and going to the theatre. I also enjoy golf. I would like to take up horse-riding, study languages, and donate my time to charities that support child-related causes.

*As Director of Maritime Safety and Standards at the United Kingdom's (UK) Maritime and Coastguard Agency, Katy Ware is responsible for ensuring the safety of ships under the Red Ensign, the UK's safety, environmental and navigational regulatory regimes, as well as the country's survey and Port State Control inspection regime. She is also the Permanent Representative of the UK to the International Maritime Organization (IMO). She visited Singapore from Aug 29 to Sept 1, 2016 under the Maritime and Port Authority of Singapore's Maritime Visitors Programme, which facilitates the exchange of views and ideas on important maritime issues with influential maritime personalities.*

# eye on maritime safety



Katy Ware, Director of Maritime Safety and Standards at the UK's Maritime and Coastguard Agency, tells Rahita Elias about the UK's chief maritime concerns and strategies, as well as how she got into the exciting world of shipping

### WHAT ARE THE UK'S GREATEST CONCERNS IN INTERNATIONAL MARITIME SAFETY?

The safety regime for international shipping is in a reasonably steady state. The key for the UK is now the implementation of international legislation, so that we provide a level playing field for shipowners and ensure that the legislation is enforced fairly across the world.

The other issue is the human factor, and how we can improve safety by understanding how humans react to different situations. We see this as an issue to be addressed across the industry.

Statistically, 80 per cent of incidents are due to the human element. That makes you think automatically that humans are the weak link. It is very simple to point the finger at the seafarer. But if a person fails, it may not be his or her fault. One may be a perfectly capable human being who is well rested and functioning normally but may be working in an incompatible system. So we need to look at the man-machine interface.

### HOW IS THE UK ADDRESSING THESE ISSUES?

In the UK, we want to turn the view around from humans as our biggest hazard to humans as our greatest asset. After all, these people are the ones we rely on to drive ships; not just those on board but also the builders, the commercial people, and so on. We are working under the banner of setting up people to succeed.

Meanwhile, the shipping industry has matured hugely since I was a Port State Control officer from 1999 to 2007. There has been a substantial decrease in the number of sub-standard ships. There has also been a cultural change within the industry. You see some very good companies, and their numbers are increasing, which realise that running their ships safely and in an environmentally friendly manner is commercially sensible. Because owners have become more responsible, rather than us imposing regulations, we are now in an era where we can work collaboratively with the industry.

### HOW WILL BREXIT IMPACT THE UK'S MARITIME SAFETY CONCERNS AND HOW IT ADDRESSES THEM?

The UK has always believed in the importance of addressing maritime safety concerns on an international basis, led by the IMO, to give us both a robust safety regime and a level playing field – and Brexit does not change that.

### HOW CAN SINGAPORE AND THE UK WORK MORE CLOSELY TOGETHER?

There are lessons to be learnt from each other. We are very impressed with the collaborative relationship Singapore has with shipowners – this is an area in which the UK can improve on. In particular, we were impressed with how Singapore has gotten ship captains to observe port operation controls so that they have a better understanding of what happens in that area.

Conversely, the UK's focus on research of the human element in shipping is something that we can share with Singapore. There is certainly scope for greater technical cooperation between Singapore and the UK.

### WHAT MADE YOU DECIDE ON A MARITIME CAREER?

I must admit maritime was a bit of a default career. As a family, we spent holidays in the south coast of the UK. There was a naval base there, and I thought joining the navy would be a great way to see the world. I initially wanted to be a Royal Navy nurse but it became quite apparent that I wasn't very good with blood and bodily fluids.

My idea then was that I would serve as a Royal Navy engineer. I would first train at the Britannia Royal Naval College at Dartmouth and then study engineering at the University of Newcastle upon Tyne.

Just as I was about to join the Royal Navy, there was a public uproar over women being deployed on warships. I thought to myself, "Crikey, I just want to do my job, not be part of some controversy." So I called the university and asked if I could enrol a year earlier than planned. I was lucky enough to receive a scholarship from maritime classification society Lloyd's Register while at university. By then, I had fallen in love with commercial ship repair; I have never looked back.

### WHAT IS YOUR ADVICE TO WOMEN WHO WANT TO JOIN THE MARITIME INDUSTRY?

I would say, "Go for it." I've learnt that passion, professionalism and enthusiasm go a long way. Definitely don't be ashamed about being a woman, and don't waste your time trying to be one of the boys.

Take the time to develop yourself professionally and personally. Also, surround yourself with good confidants and counsel because no one can do it on their own.



Despite the challenging outlook for Singapore's offshore and marine sector in 2017, marine services company Global Energy Group continues to steer a steady ship. Established in 1992, Global Energy Group, which is headquartered in Singapore, runs a key bunker fuel trading business that revolves around the ownership, management and deployment of small tankers.

Since its inception, Global Energy Group has grown to become one of the leading marine services companies in the region. Major oil companies such as ExxonMobil, Shell and BP, and shipowners like Maersk, Hapag-Lloyd, Mitsui OSK Lines and Nippon Yusen Kabushiki Kaisha (NYK) Line, are its key clients and business partners.

The group currently owns 14 tankers and operates more than 18 tankers regionally. In all, it employs more than 60 staff and 280 ship crew for its bunker supply operations in Singapore and Fujairah in the United Arab Emirates, and for its tanker freight business in key ports in Asia-Pacific.

Having experienced several downturns in the industry over the years, Global Energy credits its ability to weather the storms to its position as a physical supplier that believes firmly in the direct sales to client concept, and in having full control over its operations. Says a spokesman: "This philosophy has successfully enabled the group's business units to provide efficient and reliable services to the oil and marine industry."

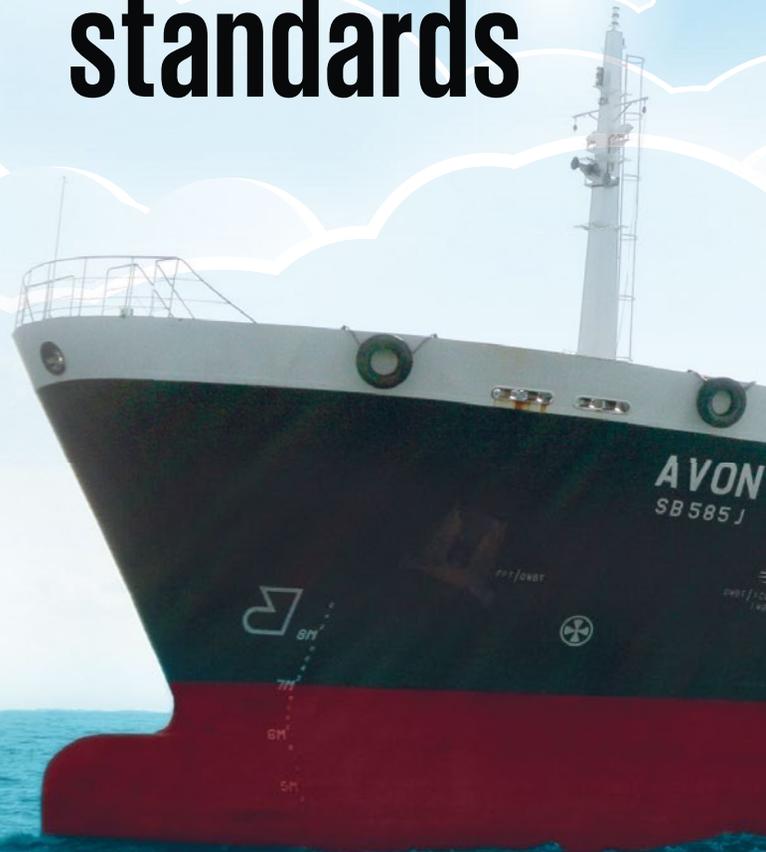
Another pillar of its success is its well-equipped and well-maintained vessels. The group has an impeccable safety record – its vessels are maintained to classification societies' standards and operate to the highest standards of major oil companies. "This ensures our vessels have a high rate of employability, and the smooth operation of our business builds customers' and suppliers' confidence in the group," says its spokesman.

The group's commitment to a high level of service standards, both locally and overseas, has also been pivotal in its ability to stay afloat. Says the spokesman: "Our customers and associates often refer our services to their overseas counterparts in the ports that we operate in."

These achievements have not gone unnoticed. The group has received several accolades,

Audrina Gan finds out how the Global Energy Group taps its management expertise and long-standing business relationships to provide efficient marine services worldwide

# rising up to new industry standards



## COMPANY SPOTLIGHT

**BELOW** The Global Energy Group owns 14 double-hulled tankers, including the Avon.

including the prestigious Bunker Award at the International Maritime Awards in 2009 – a first for a home-grown company – for its contributions to Singapore’s development as a major global hub port and International Maritime Centre.

### LOOKING AHEAD

Global Energy remains cautiously optimistic on the industry outlook in the medium term. Says its spokesman: “While Singapore bunker demand is still strong and robust, we are sure that most of our peers would agree with us that 2017 will be another tough year. We are a service provider to a lot of shipping companies as well as oil companies, so when the macro environment faces strong headwinds, like what we are seeing now, the margins that we can derive from providing services to these companies will be compromised.”

At the same time, costs are going up due to upgrading works to meet new regulations on several fronts, including the Ship Inspection Report Programme, a tanker risk assessment tool to ensure ships’ safety, mandatory mass flow meter installation for bunkering in Singapore, and the entry into force of the International Maritime Organization’s Ballast Water Management Convention. “The bunker business is also facing the daunting task of managing the financial risks of delivering products on open credit terms to shipping companies,” adds the spokesman.

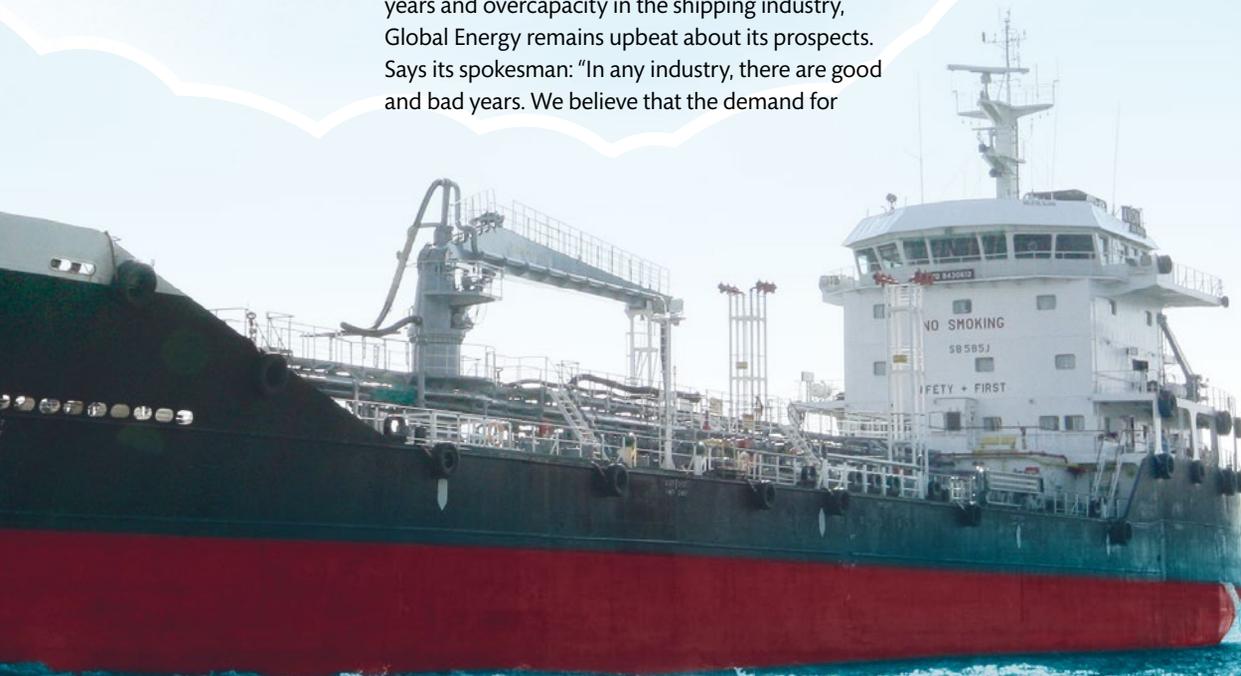
Despite slower economic growth in recent years and overcapacity in the shipping industry, Global Energy remains upbeat about its prospects. Says its spokesman: “In any industry, there are good and bad years. We believe that the demand for

marine services remains sustainable. It is merely experiencing a downtime before the market corrects the supply and demand imbalances.”

Global Energy is confident that it can ride out the tough times while it looks for fresh opportunities to expand its operations. Says its spokesman: “We have a team of dedicated staff, and our directors and key management have, among them, more than 80 years’ experience in the industry, including seafaring experience. They have strong backgrounds in bunker fuel trading, ship chartering and ship management. They also possess in-depth knowledge of local and regional markets which include Malaysia, Thailand, Indonesia, Japan, China and the Middle East.”

For the future, Global Energy plans to leverage its strengths to grow its presence in the Asia-Pacific and in regions east of the Suez Canal, so as to link up its key markets and provide more comprehensive and efficient service to its clients. Meanwhile, it will invest in renewing its fleet to meet new industry emission standards, including the 0.5 per cent global sulphur cap set for 2020, to ensure its ability to service its clients in the future.

Singapore will continue to be an important hub for its operations, says the company’s spokesman, as it moves into a new era of mass flow meter bunkering and alternative fuels. He adds: “Singapore, being our headquarters and the biggest bunkering port in the world, shall remain the core and focus of our business.”



---

TECHNOLOGY

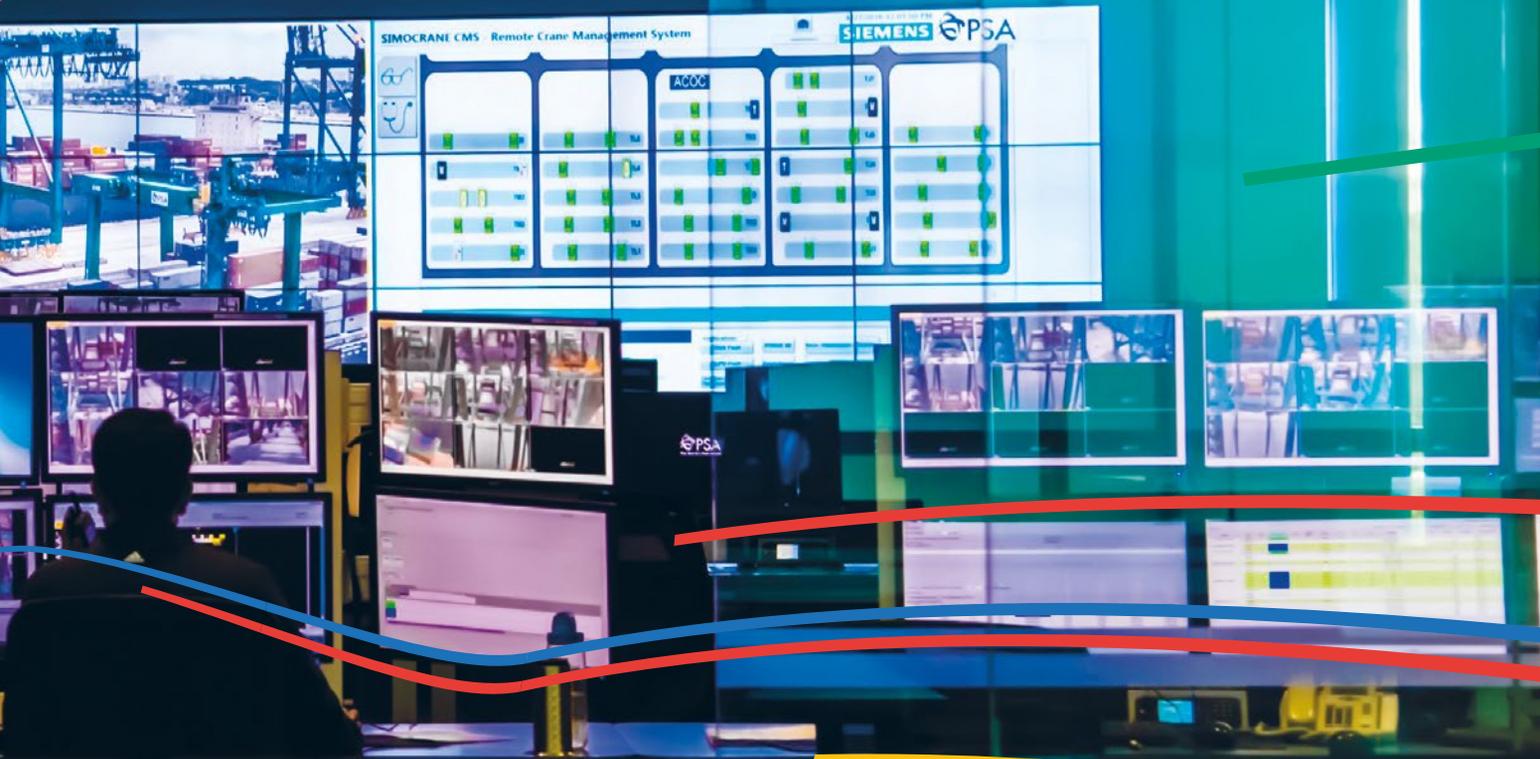
---



**THIS PAGE** Technology boosts productivity by enabling crane operators to operate multiple cranes remotely at the same time.

# smart port

Find out how PSA leverages innovative systems and technology to manage its terminals in Singapore



PSA Singapore operates the world's largest container transshipment hub in Singapore. Here, its operations take place across seven terminals at Tanjong Pagar, Keppel, Brani and Pasir Panjang. To ensure the efficiency and seamless integration of the countless complex operations taking place in its facilities around the clock, PSA relies on state-of-the-art equipment and cutting-edge technology to manage and move cargo within its terminals. A big part of its operations

is dependent on highly-skilled engineering and IT staff to manage its innovative systems. It also continually invests in port infrastructure, equipment and technology to ensure it continues to provide excellent, reliable and quality service to vessels calling at its terminals. Singapore Nautilus looks at some of the key systems and technology deployed at these terminals in Singapore which have enabled PSA to be at the forefront of port terminal operations globally.

# MANAGING THE FLOW OF CONTAINERS



**ABOVE** Both remote-controlled and automated crane systems are in use at Pasir Panjang Terminal.

- The Computer Integrated Terminal Operations System (CITOS), developed in 1988, coordinates and integrates every aspect of port operations, from containers, prime movers, quay cranes and yard cranes to crane specialists and drivers, across PSA Singapore's terminals.
- Before a vessel or container truck arrives at the port, a shipping company submits a manifest of the cargo through Portnet. **Portnet is PSA's flagship online application. It simplifies, synchronises and integrates complex operational processes across Singapore's port and shipping community. It is used by over 10,000 users, and facilitates more than 220 million transactions, annually.**

## FROM TERMINAL GATE TO SHIP

- 1 At the entry gate, PSA's fully automated Flow-Through Gate system checks both a driver's and truck's identities, as well as container weights and numbers against the manifest, and clears a truck for entry within 25 seconds. Drivers are directed to the exact positions where containers will be stacked in the yard. **The Flow-Through Gate, introduced in 1997, handles an average traffic flow of 700 trucks per peak hour, and 9,000 trucks per day.**
- 2 Containers are unloaded and stacked in the yard by various types of yard cranes, including automated systems, at Pasir Panjang Terminal. Automated Rail Mounted Gantry (aRMG) cranes are in use at Pasir Panjang Terminal



## TECHNOLOGY

Phases 3 and 4. When fully operational by end 2017, the phases will have a total of 186 operational aRMGs.

*The aRMGs utilise state-of-the-art laser technology for precise and safe handling, as well as proprietary job scheduling systems for higher asset productivity. Currently, the aRMGs at Pasir Panjang Terminal 5 are capable of handling almost 90 per cent of all container moves without human intervention.*

**3** When a container is ready to be shipped, it is moved by a prime mover to where its assigned vessel is berthed. PSA is currently developing and investing in driverless Automated Guided Vehicles (AGVs), which are unmanned transportation platforms for shuttling containers between quay and yard.

*Eight AGVs are now being tested at Pasir Panjang Terminal. The fleet will be enlarged to 30 units by Q2 2017. At the future Tuas Terminals, AGVs will replace prime movers.*

**4** At the quay, the container is loaded by quay cranes onto the vessel. New cranes with optical imaging and image processing technology, together with other systems in place, allow a wharf operations supervisor to supervise two quay cranes at a time instead of the usual one.

## IN PURSUIT OF INNOVATION

### PSA UNBOXED

Announced in May 2016, PSA unboxed is the corporate venture capital arm of PSA. It runs an incubator programme for start-ups to develop innovative solutions that will revolutionise container terminal operations, streamline global supply chain logistics, and enhance the efficiency of international trade and finance ecosystems.

### PSA LIVING LAB

The PSA Living Lab, inaugurated in June 2016, enables start-ups and technology solution providers to collaborate with PSA to develop ideas and test-bed solutions at two operational berths at Pasir Panjang Terminal. Operationally ready solutions have the potential to be deployed not just in Singapore, but also at PSA Group terminals worldwide. The PSA Living Lab complements the PSA unboxed incubator programme.

### AUTONOMOUS TRUCK PLATOONING TECHNOLOGY

In January 2017, Singapore's Ministry of Transport signed agreements with two automotive companies to design, develop and test-bed an autonomous truck platooning system for use on Singapore's public roads. The technology involves a single manned truck leading one or more driverless container trucks to transport containers between PSA terminals.



## DURING TRANSSHIPMENT

**1** Berth planning begins 72 hours before a vessel arrives, when a shipping company applies for a berth and sends ship stowage and connection information to PSA via Portnet.

**2** Once berthed, quay cranes unload boxes bound for other ports onto prime movers and load boxes brought in by other vessels. The prime movers are tracked individually via a Global Positioning System and are distributed dynamically among vessels.

**3** Prime movers transport the containers to a holding area in the yard. Yard cranes lift containers from prime movers and stack them in the yard. The sequence is reversed for delivery out of the yard to connecting vessels.

**4** In both the yard and on board vessels, containers are systematically stacked. *When information on a container is obtained, CITOS automatically generates ship stowage plans and yard layout plans based on factors such as ship stability and stowage, container weight, and destination. This allows PSA to maximise land use and optimise container retrieval, track container location, and maximise resource productivity.*

**TOP** A remote-controlled bridge crane in operation.

**LEFT** The fully automated Flow-Through Gate system clears each incoming truck within 25 seconds.



Singapore has just opened a new chapter in bunkering. Since Jan 1, 2017, all bunker tankers that refuel ships in the Port of Singapore have had to be fitted with mass flow metering (MFM) systems that are approved by the Maritime and Port Authority of Singapore (MPA). This new bunkering process, which promises to be accurate, fast and efficient, will bring greater transparency to the bunkering industry, and eliminate possible malpractices and disputes between buyers and sellers.

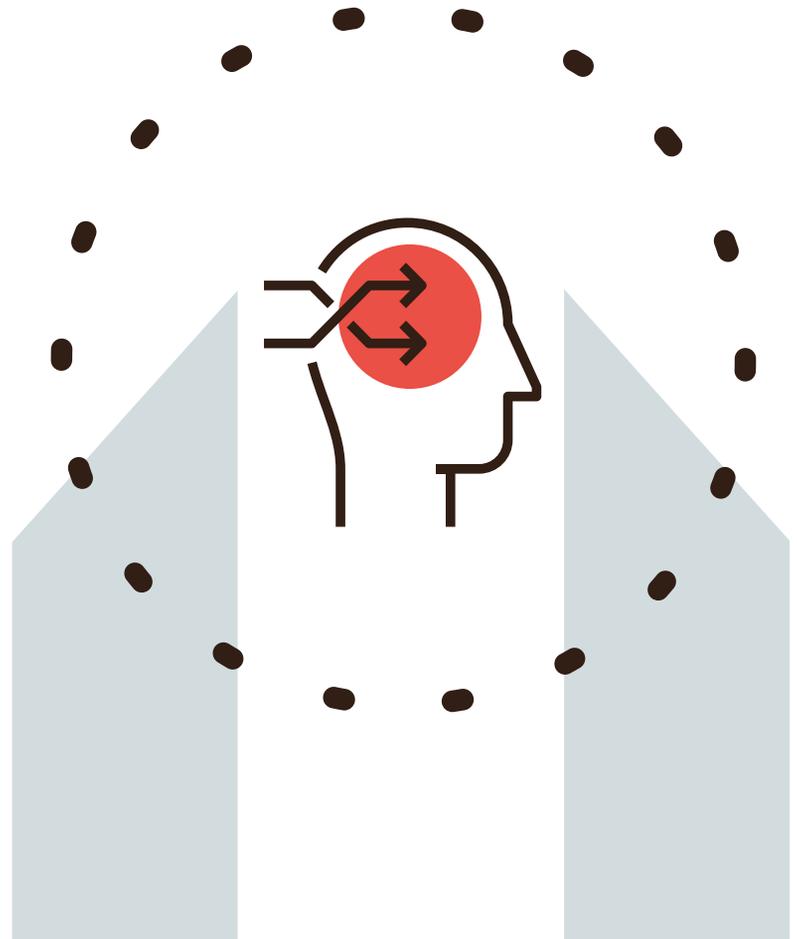
The MFM system is a marked change from the traditional process in which a bunker surveyor physically measures bunker quantities in fuel tanks using tank gauging or sounding. The manual process is prone to human errors in measurement and calculation, and gives rise to opportunities for malpractice, which may result in buyers being short-changed by bunker suppliers in the actual quantity of bunker delivered. It is also time consuming, taking 30 minutes to two hours depending on the number of fuel tanks and quantities to be delivered.

The use of MFM prevents errors in conversion from volume to mass by making fluid measurements based on mass, and so helps prevent unethical practices from taking place during bunkering. It also shortens each bunkering process by up to three hours, resulting in cost

savings of a few thousand dollars per delivery. With more than 69,000 bunkering operations conducted in Singapore in 2016, or 188 bunkering operations per day, the collective cost and time savings with mandatory MFM are expected to be significant.

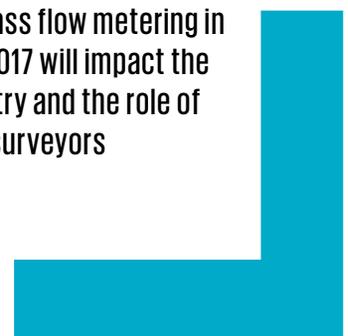
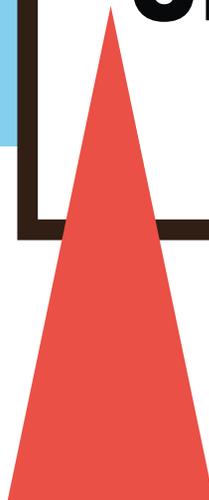
If we look at the bigger context, MFM is necessary for Singapore. The volume of bunkers sold in Singapore has been hovering at around 42 million tonnes in recent years; it was more than 48 million tonnes in 2016. MFM may potentially

GRAPHICS: 123RF



# embracing change

Darajit Daud shares his views on how mandatory mass flow metering in Singapore from 2017 will impact the bunkering industry and the role of bunker surveyors



result in more bunkers being sold in Singapore as the time required to refuel each vessel is shorter, and thus more ships can be served. If you look at the macro view, this benefits everyone.

With the Port of Singapore receiving 130,000 vessel calls annually, and Singapore's status as the world's top bunkering port, the implementation of MFM in Singapore is something that foreign ports will be watching closely, and it will have an impact globally.

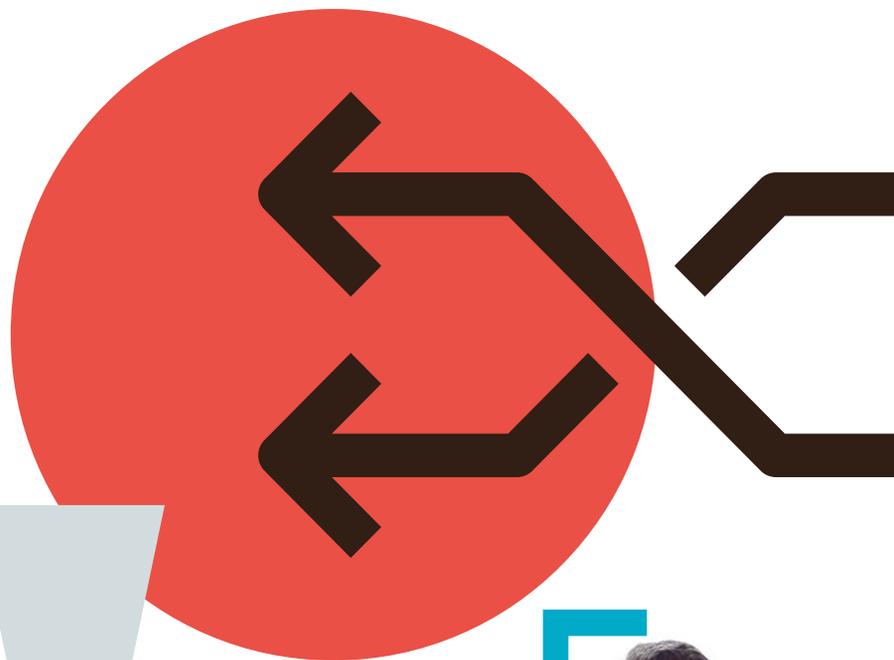
### REMAINING RELEVANT

In my opinion, MFM is a step in the right direction. For bunker surveyors, while we understand that change is inevitable, we are also concerned about how we can stay relevant in the new system. It is important to stress that MFM does not make the bunker surveyor's role redundant. MFM changes the functions of surveyors, but not their role as an independent witness to ensure compliance throughout the entire bunker delivery process.

Even though the MFM system is now mandatory, it is important to continue having bunker surveyors on board to ensure the integrity of the entire MFM system, both before and after delivery. Meters measure quantity, not quality. We will be required to perform various new functions

such as ensuring that the meters are reset to zero before bunkering takes place, and cross-checking seal verification report with actual physical seals at various locations in the MFM system. We also need to ensure that bunker samples are taken correctly, properly sorted and sealed, that all parties receive the correct samples, and to check for signs of malpractice.

The new system requires a different skill set and a change in mindset for bunker surveyors. In this regard, MPA is looking to expand the scope of



### ABOUT DARAJIT DAUD

He is Senior Manager of Operational Integrity for Singapore and Malaysia at inspection, verification, testing and certification company SGS Testing & Control Services Singapore. He was involved in drafting a set of standard operating procedures to help bunker surveyors identify their responsibilities during bunker deliveries involving mass flow meters in Singapore. He is also Chairman of the Technical Committee for Cargo Inspection at the Singapore Accreditation Council, the national authority that independently accredits conformity assessment bodies in Singapore.

work for surveyors, and exploring the possibilities of training bunker surveyors to perform zero verification for approved MFM systems. MPA is working with various organisations to conduct technical workshops, pre-conference symposiums and bunker surveyor refresher courses to ensure bunker surveyors attain the competency to handle MFM delivery.

I hope bunker surveying companies will respond to these moves favourably and that surveyors will look to ways to reinvent ourselves.



# platform for growth

The 6th Maritime Public Leaders' Programme, held in Singapore from Oct 3-7, 2016, provided an opportunity for senior officials from maritime and port administrations around the world to share knowledge and experiences on a broad range of topics, from port management to public governance, as well as gain insights into Singapore's maritime operations. Participants share with *Singapore Nautilus* their thoughts on the programme as well as their outlook for the industry

**CLOCKWISE FROM TOP LEFT** Vusumzi Gladwell, September, Operations Manager, Office of the Chief Operating Officer, South African Maritime Safety Authority; John Vincent Tunidau, Chief Executive

Officer, Maritime Safety Authority of Fiji; Eduardo Segura Botello, General Counsel, Panama Maritime Authority; Hajj Muhammad Salihin Haji Aspar, Acting Director of Marine, Marine Department Brunei.

## **SINGAPORE NAUTILUS (SN): WHAT DO YOU HOPE TO GAIN THROUGH THE MARITIME PUBLIC LEADERS' PROGRAMME (MPLP)? HOW HAVE YOU CONTRIBUTED AS A PARTICIPANT?**

### **HAJI MOHAMMAD SALIHIN HAJI ASPAR (HMS):**

The MPLP is a fantastic platform where high-level maritime administrators from different parts of the world, like South America, Africa and even the Pacific islands, can meet to exchange knowledge and experiences. This is also a good opportunity to expand the administrators' network.

The MPLP is a good opportunity for me to share my department's knowledge and experience and to gather ideas and knowledge on how we can adapt some of MPA's best practices to meet our requirements and to improve our human resource and economic development over the long term.

**JOHN VINCENT TUNIDAU (JVT):** It was, firstly, an opportunity to learn from Singapore and the best in the maritime industry, and find ways to implement some of its ideas and concepts within our national jurisdiction. Secondly, it is a platform for delegates from participating nations to discuss, share, and learn from each other, on how maritime developments are handled in their country. The third thing is the networking during the MPLP programme, which can lead to solutions to common maritime issues that cannot be solved within our own states.

On my part, I shared the perspective and the experience of Fiji as a Small Island Developing State – how we tackle matters as a regulatory authority for maritime safety and marine environment protection. I also gave advice to those countries that find it hard to comply with the relevant International Maritime Organization (IMO) instruments that they have ratified.

**EDUARDO SEGURA BOTELLO (ESB):** The Panama Maritime Authority plans to make some changes to its regulations, and Singapore's experience will allow us to obtain ideas for projects we wish to develop. On our part, we consider the sharing of our own achievements in recent years on issues relating to ship registration and the port industry to be relevant to the participants of the MPLP.

Panama has a tradition of maintaining excellent relationships with other countries. The government actively participates in regional and international forums around the world, and this allows us to receive first-hand information on and have mutual cooperation with many maritime nations. We see our participation as an opportunity to bring innovative proposals in

## COMMUNITY TALK

maritime matters to the Maritime Administration of Panama, as well as to provide examples of modern public policy that have been applied to Singapore's growth process.

**VUSUMZI GLADWELL SEPTEMBER (VGS):** The key aspects of the MPLP are the sharing of information and knowledge that reflects the diverse views of participants, and learning from advanced nations such as Singapore. The MPLP also gives delegates the chance to form friendships and a professional global network of maritime practitioners.

From a South African perspective, we shared our experiences and the leadership role we play in progressing the maritime agenda within the African continent. The ocean economy has been identified as the new frontier for the advancement of Africa.

**SN: WHAT ARE YOUR ORGANISATION'S KEY CONCERNS? HOW ARE YOU ADDRESSING THEM?**

**HMS:** One of our main concerns is the lack of marine experts such as master mariners and chief engineers to meet our maritime needs. We do have people with the necessary competencies, but we need more of them to build up our maritime capabilities and prepare for succession planning in our department. This is why, a few years ago, the Brunei government set up a maritime academy called the Brunei Maritime Academy. Hopefully, we will be able to grow the number of Bruneian seafarers and the competencies of our marine experts over the next eight to 10 years.

Another concern is about keeping up with IMO conventions. This is a challenge because it takes time to incorporate the international conventions and promulgate them into national legislation. We hope that with more competent personnel, more work can be carried out to meet our international obligations.

**JVT:** The Maritime Safety Authority of Fiji (MSAF) has been successful in ensuring that Fiji has moved ahead in ratifying six IMO conventions. It was not an easy decision for Fiji as it requires the commitment of the whole state to implement and enforce these international instruments, especially now that the IMO Member State Audit Scheme has become mandatory. To prepare for the audit, the MSAF needs to look at our human resources and capacity to ensure that we are able to fully implement and comply with the IMO instruments that Fiji has ratified.

In the last three to four years, the MSAF has reviewed Fiji's maritime legislations to take into

account the six IMO treaties that Fiji has ratified. We still face some resistance from ship operators domestically in implementing the new maritime and marine environment regulations. We need to work with our stakeholders such as shipowners and seafarers to ensure they comply with the requirements of Fiji's maritime legislations.

One of the things the MSAF is doing is job evaluation for its staff, and ensuring that we provide an attractive employment package. We have identified what our human resource needs are and are actively recruiting specific qualified and experienced personnel for critical technical positions within the organisation.

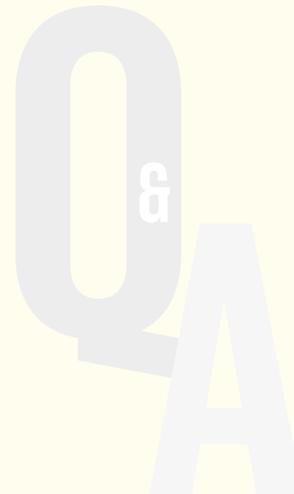
**ESB:** One of our chief concerns is in strengthening our logistics platform in a safe and thoughtful manner. The fact is that the demand for new ports is a reality more on the Pacific coast than the Atlantic coast, due to a higher rate of container movements in the Pacific. The Panamanian government is considering granting a concession to build a new port terminal on the Pacific coast.

To reinforce the leadership, credibility and stability of the Panama Ship Registry, we aim to maintain and promote Panama's competitiveness as a global ship registry hub. We hope to involve relevant maritime institutions and the private sector in this. We hold regular meetings between the executive branch, the private sector, and all public institutions involved in the maritime and logistics sector. Such meetings have been positive and have allowed us to make corrections and improve on what we have done well.

**VGS:** Our main concern, common to many maritime authorities, is an ageing workforce. Annually, we lose about two to three experienced workers to retirement. Their skills cannot be immediately replaced. However, we are implementing succession plans to mitigate this.

Secondly, we do not have a well-coordinated education system. For instance, our National Cadet Training Programme, which aims to train more seafarers, is hampered by limited maritime career awareness in the country, few maritime training institutions, and the lack of training berths for our cadets. We are negotiating with international partners for training berths.

Thirdly, there is the challenge of keeping up to date with IMO regulations and conventions, especially with the frequency in which they are being introduced or amended lately. The process of ratifying and implementing IMO regulations and conventions is a slow one. We hope to learn



from Singapore on how to reduce red tape and make the ratification process faster and more efficient. We also need to bring these international conventions in line with our national law.

**SN: WHAT IS THE CURRENT BIGGEST CHALLENGE FOR MARITIME AND PORT ADMINISTRATORS GLOBALLY? HOW CAN WE MITIGATE IT?**

**HMS:** The decline in oil price has impacted the development of countries reliant on the export of oil and gas. This is a challenge for port administrators, especially those looking to develop their port facilities as their shipping industry grows. They may now need to decide if this is the time to execute their development plans. Maritime and port administrators need to constantly engage with stakeholders to explain the current situation and to keep them updated on their plans.

On the other hand, maritime administrators of flag states also face challenges in fulfilling international requirements in order for their ships to be able to call at international ports.

**JVT:** It is still a challenge for some maritime administrators to meet their obligations, whether national, regional or international, within the treaties that each state has ratified. For Small Island Developing States, particularly in the Pacific, human capacity is an issue as they have to ensure maritime safety and protect the marine environment in vast sea areas. Singapore is helping to train and build capacity for such states through programmes like the MPLP, but developing states need to do more to improve their own capability.

The state of global trade affects port operations. Port authorities and port management companies need to consider the risks involved, as well as future risks, and see how they can counteract these and come up with solutions that ensure that ports remain financially and economically sustainable for the future.

**ESB:** The decline in cargo movement is the biggest challenge currently facing maritime and port administrators. But we must never lose hope that the numbers are temporary and will improve. In the meantime, we must be creative, and the public and private sectors must act together, not only within each country, but regionally, to address current challenges. All public and private sector policies should aim to improve the competitiveness that has been lost.

The Panama Maritime Authority is actively engaged in improving port infrastructure and efficiency, providing high service standards to

shipping lines, promoting seafaring as a career, as well as managing the environmental impact.

**VGS:** The main challenge is slow economic growth, especially in advanced economies. Shipping is dependent on international trade. A decline in international trade translates to a decline in shipping. A second challenge is the oversupply of ships and not having enough cargo to move around. A third challenge is related to port efficiency and security. The top 10 most efficient ports in the world are Asian ports. African ports are not even in the top 20. This is a huge area of learning for Africa and a big area for interventions from advanced economies such as Singapore.

**SN: WHAT IS YOUR OUTLOOK IN 2017 FOR THE MARITIME INDUSTRY? WHAT WILL IMPACT THIS?**

**HMS:** It will be volatile and unpredictable. But as maritime regulators, we have to remain positive. I hope we will be able to recover in a few years' time. On our part, we should support maritime players in overcoming the downturn rather than simply reinforcing regulatory regimes.

With technology, green ships will be a future trend though this is still nascent. But changing mindsets is difficult and will take time. We need to help people to understand these trends first; only then will things start to develop and improve.

**JVT:** For Fiji, it will only get better because we are putting in place mechanisms to ensure we are able to meet our obligations. The maritime industry, including shipping, will continue to grow because there will always be opportunities out there. In Fiji, the number of registered ships has grown from about 600 in 2013 to about 1,300 in 2015. The relatively recent rise in the number of registered ships indicates growth in the number of cargo and passengers both locally and internationally. Despite challenges, the maritime industry has always been resilient.

**ESB:** There has been very significant decline in cargo movement. Specialised trade journals have also observed this trend and asserted that recovery will be slow. The volume of cargo through the Panama Canal dropped by between 11 per cent and 14 per cent in September 2016 compared to the same period in 2015. The shipping industry will have to play their best cards and enhance their bargaining power through strategic decisions to improve their cost efficiency, as well as form appropriate partnerships, while keeping in mind the economic sustainability of the maritime logistics industry. The public sector



“THE MARITIME INDUSTRY,  
INCLUDING SHIPPING, WILL  
CONTINUE TO GROW BECAUSE  
THERE WILL ALWAYS BE  
OPPORTUNITIES OUT THERE...  
DESPITE CHALLENGES, THE  
MARITIME INDUSTRY HAS ALWAYS  
BEEN RESILIENT.”

JOHN VINCENT TUNIDAU, CHIEF EXECUTIVE OFFICER,  
MARITIME SAFETY AUTHORITY OF FIJI



will have to provide economic and regulatory incentives to encourage shipowners to continue investing in modernising their fleets.

**VGS:** There will be tough times ahead, maybe for the next 12 to 18 months, before things start to improve. Currently, there is cancellation of ship orders, scrapping of old vessels, and laying up of unemployed ships. These may make things better in the long run, once we achieve a balance between demand and supply.

For developing countries like those in Africa, the rates of economic growth will be slightly higher than that of developed countries. What is likely to happen is that developing regions like Africa, which don't normally trade among themselves, will start doing so.

#### **SN: HOW CAN THE INDUSTRY PREPARE ITSELF?**

**HMS:** To keep up with international requirements and new technology, the maritime industry should explore opportunities and invest in infrastructure to fulfil international obligations and remain updated on key technological developments. This

is where collaboration between the government and the maritime sector is pivotal in ensuring improvement in the safety and security of the maritime industry and marine environmental protection, while the industry continues to grow.

**JVT:** Regulators need to look out for key trends within the maritime industry. For instance, in Fiji, we are about to start bauxite and iron ore mining. That means we need to draw up policies to address maritime safety issues and ensure the protection of the marine environment. There also needs to be cooperation between government agencies and maritime stakeholders to ensure that maritime safety is not compromised, and that the marine environment is protected, so as to safeguard our tourism industry.

**ESB:** Shipowners, financial institutions and shipping lines have to make important decisions in shipbuilding orders in order for the world's fleet to meet demand. An analysis will be crucial in determining the correct amount of freight that shipping companies should prepare for.

The size of the workforce and the availability of industry expertise also impact the maritime industry. Some universities' maritime programmes may have difficulty attracting students as such programmes are spread out across a few institutions that are competing for enrolment, graduate students, and funding. In Panama, we are trying to mitigate these effects by establishing collaborative programmes between the government and the private sector to maximise available expertise and ensure practical application of research results.

The maritime industry has to develop policies to address these key trends base on research and analysis. This is especially so for global trade issues in which economic, technological, social, environmental as well as safety and security considerations must all be weighed.

**VGS:** When the maritime industry starts to pick up, we are likely to see bigger ships come into play. The maritime industry, especially those in the port sector, will have to invest in port infrastructure to ensure they can cater to bigger ships.

New and bigger ships are also likely to be equipped with new technology. This will impact seafarers as these vessels will require less people to operate. Countries which a majority of the world's seafarers hail from need to prepare for this eventuality by equipping seafarers with soft skills and management skills, to enable smooth transitions from sea- to shore-based work.

# grow with the flow

Captain Mohd Mominul Hoque tells Desmond Ng why bunker surveyors play an important role in ensuring Singapore's status as a top bunkering port



## TO QUALIFY AS A BUNKER SURVEYOR ONE MUST:

1.

Have a Diploma in Nautical Studies, Maritime Transportation, Marine Engineering, or an equivalent.



2.

PASS A BUNKER  
SURVEYING  
EXAMINATION  
ADMINISTERED  
BY MPA.



3.

Possess the integrity to work independently and maintain neutrality.



After almost 16 years traversing the oceans on board various multinational vessels, including five years as a Master Mariner, Captain Mohd Mominul Hoque traded his captain's cap for a hard hat as a bunker surveyor.

To spend more time with his family, he chose to become a bunker surveyor as it allows him to work on board ships without having to be away for extended periods of time. "My kids are growing up and I miss them. When I was sailing, I used to be on board a vessel for about four months [a year], and on land for six to eight months," says Capt Mohd, 44, who has three children.

Bunker surveyors are employed to independently check and verify the quantity and quality of bunker fuel delivered to a buyer. They are sometimes required to board vessels to conduct surveys, but return to shore thereafter.

Capt Mohd took a bunker surveying course and obtained his bunker surveyor license in 2011. He then became a Marine Services Manager at Maritec, which provides professional marine surveys and fuel testing consultancy services to the shipping community in major bunkering ports. He says: "Independence, transparency and integrity are the core values of Maritec's survey procedure. Maritec is the only survey company to use the polygraph as a testing tool to determine a surveyor's integrity."

One of his key roles at Maritec is to manage the bunker survey department. For this, he oversees a team of about 35 bunker surveyors in Singapore, Malaysia, South Korea, Hong Kong, China, Dubai, Gibraltar and Panama. On average, a bunker surveyor conducts about 15 bunker surveying jobs a month, with each job taking at least 10 to 12 hours. Capt Mohd conducts about two to three jobs a month on top of his managing role.

### CRITICAL ROLE

In Singapore, the world's top bunkering port, bunker surveyors not only play a key role in ensuring the safe, efficient and accurate transfer of bunker, says Capt Mohd, but are also important when disputes arise between suppliers and buyers.

Despite the current low oil price, bunker fuel remains a significant component of operational cost for shipping companies. Says Capt Mohd: "Without an independent third party verifier like a bunker surveyor, it will be very difficult to ensure that Singapore maintains its position as the top bunkering port in the world in terms of quantity and quality. Bunker surveyors need to perform their job with competence and precision. Their integrity and professionalism must not be compromised."

With the mandatory use of mass flow metering (MFM) systems for bunkering in the Port of Singapore since Jan 1, 2017, Capt Mohd points out that the job scope of bunker surveyors has evolved, but they will continue to play the critical role of an independent party in witnessing and ensuring compliance during bunkering.

Even with the MFM system, Capt Mohd says that bunker surveyors will still be necessary to ensure the integrity of the entire MFM process. For instance, since the MFM is installed only on bunker tankers and manual measurement is still used to determine quantity on board receiving vessels, bunker surveyors will still be needed should a dispute over the quantity of bunkers arise.

He says: "With MFM, the role of bunker surveyors has not diminished. It has been expanded and amplified. It has changed from that of a verifier to one that ensures the validity and integrity of the MFM system by checking various parameters to ensure that all is in order and meets strict bunkering criteria."

Outside of work, Capt Mohd, a self-confessed nature lover, enjoys park hopping with his family. He says: "I like to spend time with them and take them close to nature, which always fascinates me and gives me a lot of joy."



**ADHERE TO SINGAPORE PORT REGULATIONS AND THE INTERNATIONAL REGULATIONS FOR PREVENTING COLLISIONS AT SEA (COLREGS).**

**KEEP TO A SAFE SPEED.**

OBSERVE SAFE NAVIGATION PRACTICES.



*DO NOT NAVIGATE OR OPERATE MACHINERY WHEN UNDER THE INFLUENCE OF ALCOHOL.*

**safety first**

The Safety@Sea Singapore campaign continues its industry-wide efforts to increase maritime safety by stressing the importance of everyone doing their part. Make safety your priority. Here are some important safety practices to follow:

TAKE NOTE OF THE TRAFFIC INFORMATION PROVIDED BY THE **SINGAPORE VESSEL TRAFFIC INFORMATION SERVICE (VTIS).**

DON APPROPRIATE PROTECTIVE GEAR WHENEVER NECESSARY.



LIFE JACKETS



SAFETY HELMETS



GOGGLES



GLOVES



SHOES



HARNESSES

# MULTIPLE PATHWAYS TO A REWARDING AND ENRICHING MARITIME CAREER



Singapore's maritime sector offers many diverse opportunities in both sea and shore careers. Whether you are a student, fresh graduate or mid-career professional, there are various programmes available to help you acquire new skills and continually sharpen them at every stage of your career.

	Maritime/Non-Maritime Students		
 <p><b>In School</b></p>	Seafaring Careers	Shore-Based Careers	
	<p><b>Tripartite Maritime Scholarship (TMSS)</b> Scholarships to groom future seafarers.</p>	<p><b>MPA Global Internship Award (GIA)</b> Sponsored internship with an overseas component for undergraduates.</p>	<p><b>Industry Attachment</b> Additional allowance for students undertaking maritime internships.</p>
 <p><b>Starting Work</b></p>	Fresh Graduates		
	Seafaring Careers	Shore-Based Careers	
	<p><b>SkillsFuture Earn &amp; Learn Programme (ELP) for Seafaring Deck Officer / Seafaring Marine Engineer Officer</b> Structured on-the-job training with sign-on incentive of \$5000.</p>	<p><b>Achievement Award</b> \$2000 incentive for cadets who attain relevant certificates.</p>	<p><b>SkillsFuture Earn &amp; Learn Programme (ELP) for Port Operations Officer</b> Structured work-study programme with sign-on incentive of \$5000.</p>
 <p><b>Growing your career</b></p>	Mid-Career Entrants		
	Seafaring Careers	Shore-Based Careers	
	<p><b>Tripartite Nautical Training Award (TNTA) / Tripartite Engineering Training Award (TETA)</b> Training programmes to support locals to become seafarers.</p>	<p><b>Employment Enhancement Programme</b> Shipboard training with sign-on incentive of \$5000.</p>	<p><b>Maritime Career Conversion Scheme</b> Structured training programme for maritime career converts.</p>
 <p><b>Growing your career</b></p>	Maritime Employees		
	Seafaring Careers	Shore-Based Careers	
	<p><b>SkillsFuture Study Awards</b> \$5000 monetary award for skills upgrading.</p>		
	<p><b>Achievement Award</b> \$3000 incentive for officers who attain relevant certificates.</p>	<p><b>Upskill Allowance</b> Training allowance for cadets attending specific preparatory courses.</p>	

#### SkillsFuture Credit

Singapore Citizens aged 25 and above can utilise their SkillsFuture Credit and choose from more than 150 maritime courses to upgrade/deepen their skills.

#### SkillsFuture Mid-Career Enhanced Subsidy

Up to 90% course fee subsidy for Singapore Citizens aged 40 and above taking on WDA-supported maritime courses.

