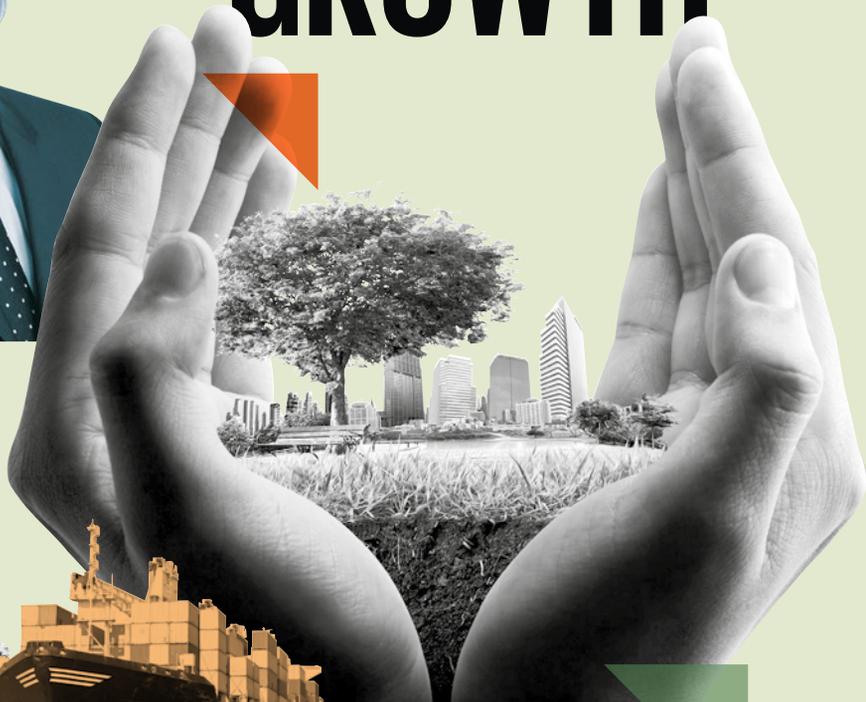


POSITIONING FOR FUTURE GROWTH

01/2016 no.34



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week in numbers**



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SINGAPORE

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STORIES

16-24 April 2016 || Marina Square, Central Atrium
11:00am - 9:00pm Daily



FOREWORD

welcome to the 11th singapore maritime week



Since the inaugural Singapore Maritime Week (SMW) in 2006, the maritime industry has weathered its fair share of ups and downs in tandem with changing global economic conditions and market trends.

This year is no different for the maritime industry as it looks set to face headwinds, with market outlook remaining uncertain.



In such times, while it is important that the industry's leaders are able to help address key areas of concern such as the economic downturn, a tougher regulatory environment and the oversupply in the shipping sector, it is equally important for them to continue to sharpen the competitiveness of the industry in the long term by investing and boosting capabilities in sustainability, productivity and manpower development.

To ensure its vitality, the industry also has to come together to build a strong and cohesive maritime community and continue to engage the wider public's understanding and interest in Maritime Singapore through public outreach activities.

These are the key themes for SMW 2016, driven by the Maritime and Port Authority of Singapore (MPA). Read more about this year's offerings in the main feature.

This issue also highlights some

of the key initiatives that Singapore is investing in to ensure that it continues to be a leading international maritime centre. These include its move to become one of the first few countries to offer liquefied natural gas as an alternative bunker fuel, which you can read about in the Port and Starboard section. In the Maritime Services section, find out how MPA is working with the country's key financial institutions, such as the Singapore Exchange, to raise the profile of Singapore as a maritime financial hub.

Happy reading and join us at SMW 2016!



**AU KHENG SHENG
EXECUTIVE EDITOR**

SINGAPORE LAUNCHES WORLD'S FIRST NATIONAL STANDARD FOR MASS FLOW METERING

In a world-first move, the Maritime and Port Authority of Singapore (MPA) has launched the National Technical Reference for Bunker Mass Flow Metering, TR48: 2015, on Feb 16.

The technical reference sets out clear requirements for measurement and system integrity, which provides a fair basis for the transfer of bunker fuel between suppliers and buyers in Singapore. This precedes the mandatory use of the mass flow metering system for marine fuel oil deliveries in the Port of Singapore from Jan 1 next year.

Since standardised bunker delivery procedures were adopted in the early 1990s, bunkering in Singapore has grown tremendously, with MPA reporting record bunker sales of 45.16 million tonnes last year. This makes Singapore the world's largest bunkering port, and the technical reference will be crucial in supporting the further growth of the country's bunkering industry.

The adoption of the mass flow metering system for bunkering at the Port of Singapore will provide better assurance of the quantity of bunker delivered for both bunker buyers and suppliers.

Said Mr Wong Suan, Regional Sales Manager of ExxonMobil Asia Pacific: "The mass flow metering system has a number of key

benefits; most importantly transparency, efficiency and security...Looking ahead, we will continue to invest in innovation that can help to set new standards of transparency and reliability for fuel measurement throughout each stage of the supply chain."

Mr Teo Choo Wee, Executive Director of Pacific International Lines, said: "Eighty per cent of Pacific International Lines' total bunker consumption comes from Singapore. The use of mass flow meters has enabled us to shorten the time for receiving bunkers in Singapore, and as a result, has improved our vessels' service efficiency."

The Technical Committee for Bunkering developed TR48 in conjunction with the Chemical Standards Committee (CSC). The CSC is one of 12 Standards Committees set up by the industry-led Singapore Standards Council to oversee the development, review and promotion of standards in various industries and functional areas. Mr Seah Khen Hee, Chairman of the Technical Committee for Bunkering, said: "This technical reference ushers bunker fuel measurement into the digital age and will help Singapore's efforts to maintain its position as the world's top bunkering port in terms of tonnage."

SINGAPORE AND PORT OF ROTTERDAM STRENGTHEN PARTNERSHIP



Since a Memorandum of Understanding to promote cooperation and exchange of information as well as research and development was signed between the Maritime and Port Authority of Singapore (MPA) and the Port of Rotterdam (PoR) in April last year, the two organisations have strengthened their partnership through a series of collaborative projects.

The latest was a lecture co-organised by the Centre for Liveable Cities, the Embassy of the Kingdom of the Netherlands in Singapore and MPA Academy (MPAA), the training arm of MPA, on March 1. Titled The Port And City Of Rotterdam - Era Of Transition, the lecture discussed ways in which the port industry can transit towards a sustainable and bio-based economy.

The lecture was helmed by Mr Adriaan Visser, Vice Mayor of Rotterdam, and Mr Allard Castelein, President of PoR, who shared insights on creating a port that takes into consideration issues of liveability and adaptability. Mr Andrew Tan, Chief Executive of MPA, moderated the session.

Following this, MPAA hosted a round-table discussion with PoR on March 2, which touched on topics like the development of Singapore's Tuas port, the operation and development of Rotterdam's Maasvlakte 2 - a major civil engineering project which saw the construction of a new port and supporting infrastructure on reclaimed land in the Netherlands - as well as issues relating to liquefied natural gas (LNG) bunkering and green practices for ports.

The round-table discussion was supported by the Embassy of the Kingdom of the Netherlands in Singapore as well as representatives from industry partners and research institutes from Singapore

and the Netherlands. Discussions also included the sharing of best practices in data analytics and research and development on port efficiency and optimisation.

Mr Tan said: "The dynamic and complex challenges facing the shipping industry brought about by strong economic headwinds, stricter regulations, ever-growing vessels and new technologies require port authorities to work more closely with each other and with industry partners to develop innovative solutions to tackle the challenges."

Mr Castelein said: "MPA and PoR share the same ambition – to deliver an efficient, smart, safe and secure, and a green and community-oriented port. Through the sharing of collaborative experiences via interactive platforms such as the lecture and round-table discussion, we can expand on solutions for the development of our ports. Throughout our long-standing partnership with MPA, we've shared the goals of leveraging technologies and the exchange of new ideas to develop cutting-edge solutions for the port industry."

MPA and PoR have also strengthened their partnership through joint projects such as the harmonisation of LNG bunkering standards and procedures, and MPA's participation in the Port Call Optimisation Taskforce initiated by PoR to standardise and exchange nautical and port information to raise efficiency in the port.



FACING PAGE (From left) Mr Adriaan Visser and Mr Allard Castelein gave the lecture, which was moderated by Mr Andrew Tan. **ABOVE** Participants at the lecture.

SINGAPORE REAFFIRMS RECAAP'S ROLE IN REGIONAL COUNTER-PIRACY EFFORTS

Singapore, as a contracting party to the Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP) and host to the ReCAAP Information Sharing Centre (ISC), reaffirmed the instrumental role ReCAAP has played in regional counter-piracy efforts during its 10th Governing Council meeting on March 17.

Singapore will continue to work with ReCAAP and its partners to strengthen ReCAAP's position as a regional centre of excellence for information sharing.

At ReCAAP's High Level Ministerial Meeting on March 18, Mr Khaw Boon Wan, Singapore's Coordinating Minister for Infrastructure and Minister for Transport, joined other

high-level representatives from contracting parties to deliberate and endorse a joint statement that sets out ReCAAP ISC's aspirations for the next 10 years. The statement also underscores the contracting parties' continued commitment to safe and secure waterways in Asia.

At the event, ReCAAP also launched its commemorative publication, which highlights its achievements and challenges in the past decade.



PREPARING FOR LNG BUNKERING

The Maritime and Port Authority of Singapore (MPA) awarded two liquefied natural gas (LNG) bunker supplier licences to Pavilion Gas and a joint proposal of Keppel Offshore & Marine and BG Group (which is now part of Shell) in January.

The two licensees won the bid out of a total of 12 bids submitted in response to MPA's call for proposals, which closed on Sept 30 last year. MPA will work with the two licensees to develop the necessary infrastructure for them to begin supplying LNG bunker to vessels in the Port of Singapore by early 2017.

MPA is also working with stakeholders to develop LNG bunkering standards and procedures at both national and international levels. It has signed memorandums of understanding with the Port of Rotterdam, the Antwerp Port Authority and the Port of Zeebrugge to harmonise LNG bunkering standards and procedures.

MPA is also funding up to S\$12 million for the building of six LNG-fuelled vessels, in addition to engaging towage service providers in Singapore to consider switching to LNG when they commission new tugboats.

SHIP'S LOG HAPPENINGS

LUNAR NEW YEAR LOHEI AND LUNCHEON 2016



To build on good relations, the Maritime and Port Authority of Singapore (MPA) hosted boat operators and tenants at a Lunar New Year luncheon and lohei on Feb 16 at the Furama Riverfront Hotel.

MPA WORKPLAN SEMINAR 2016



MPA staff and members of Singapore's maritime community gathered on Feb 25 for the annual MPA Workplan Seminar, during which Mr Andrew Tan, MPA's Chief Executive, shared the organisation's strategic outlook for 2016 and beyond.

SHIP'S LOG HAPPENINGS

VISIT BY FRENCH MINISTER ALAIN VIDALIES



Mr Alain Vidalies, France's Minister of State for Transport, Marine Affairs & Fisheries, was in Singapore for a three-day visit in February for the Singapore Airshow. During his trip, he visited the Port Operations Control Centre (POCC) Vista to learn how technology is used to manage traffic in Singapore's port waters.

VISIT BY MR HITOSHI KIKAWADA TO POCC VISTA



Mr Hitoshi Kikawada, Japan's Parliamentary Vice-Minister for Foreign Affairs, who was in Singapore for the 10th Governing Council meeting of the Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP), visited POCC Vista on March 17.

SHIP'S LOG HAPPENINGS

MARITIME YOUTH CLUB GATHERING



On March 7, Mr Andrew Tan, MPA's Chief Executive, hosted the first Maritime Youth Club gathering. The International Maritime Organization Maritime Ambassador, Mrs Mary Seet-Cheng, and various Maritime Youth Club groups attended this gathering to learn more about the initiative and to share their projects.

ONE STOP DOCUMENT CENTRE OFFICIAL OPENING



Following renovations, MPA's One Stop Document Centre at Tanjong Pagar Complex was officially opened on March 1 by MPA's Chief Executive, Mr Andrew Tan.

SHIP'S LOG HAPPENINGS

MPA-PORT OF ROTTERDAM ROUND TABLE



On March 2, the MPA Academy hosted a round-table discussion with the Port of Rotterdam. It was supported by the Embassy of the Kingdom of the Netherlands in Singapore as well as representatives from industry partners and research institutes from Singapore and the Netherlands.

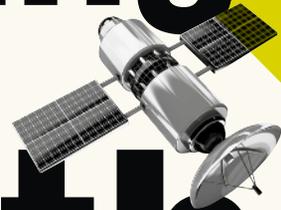
RECAAP CELEBRATES 10TH ANNIVERSARY



ReCAAP held a High Level Ministerial Meeting in Singapore as part of its 10th anniversary event on March 18.



positioning for future growth



Rahita Elias highlights some of the key events taking place during the 11th edition of Singapore Maritime Week this year

The global maritime community will congregate in Singapore for the much-anticipated annual Singapore Maritime Week (SMW) from April 17 to 22. Home to more than 130 of the world's top shipping groups, Singapore also offers a rich diversity of maritime products and services. It is the ideal Asian gateway for global leaders in shipping finance, shipbroking, risk management and marine insurance. The Republic is also fast becoming Asia's hub for maritime law and arbitration, and is the top global player in the offshore and marine engineering industry.

POSITIONING FOR FUTURE GROWTH

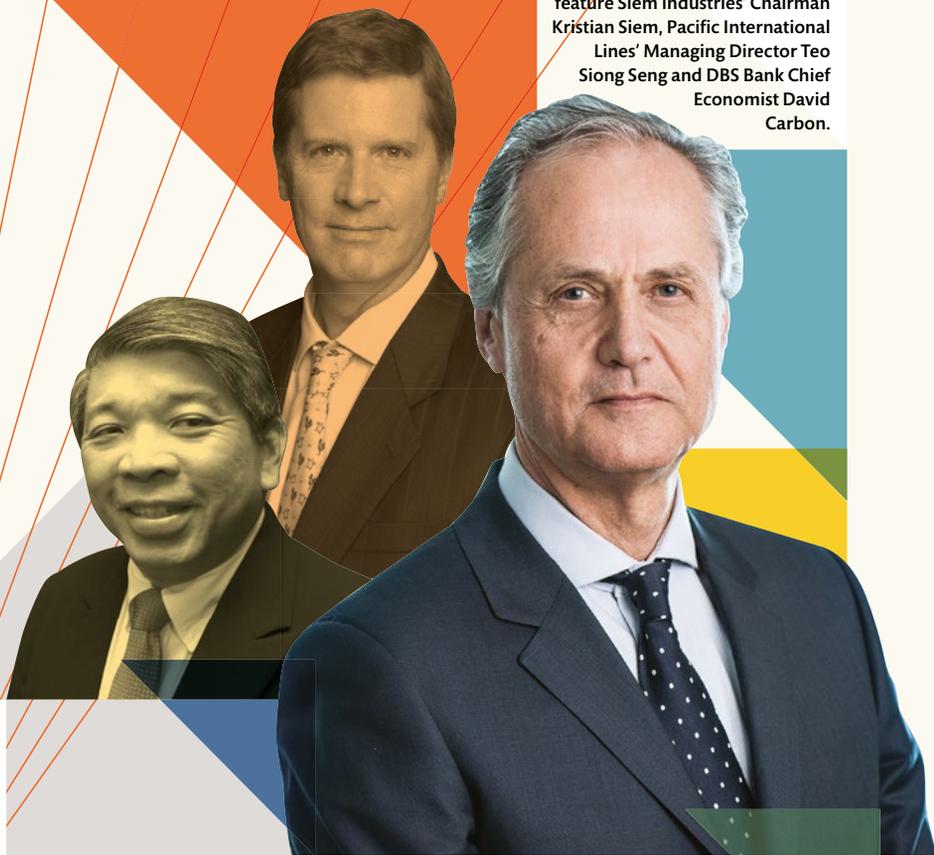
Driven by the Maritime and Port Authority of Singapore (MPA), SMW is the leading maritime event in Asia and is known for its diversity of community events, exhibitions, conferences, workshops and social activities. It attracts more participants from around the world with each edition, and delegates and attendees can expect to experience something new every year. As in previous years, a veritable powerhouse of shipping luminaries, C-suite maritime professionals and world-class academics will be making their way to the 11th edition of SMW this year.

This year's theme, "Positioning for Future Growth", gels perfectly with the current market situation facing industry players, who are currently consolidating and priming themselves for future growth. Speakers, delegates, guests and participants alike can look forward to a week chock-full of events as People, Ideas and Opportunities take centre stage.



FEATURE

CLOCKWISE FROM BELOW This year's Singapore Maritime Lecture will feature Siem Industries' Chairman Kristian Siem, Pacific International Lines' Managing Director Teo Siong Seng and DBS Bank Chief Economist David Carbon.



SPOTLIGHT ON THOUGHT LEADERSHIP

SMW 2016 will be launched on April 17 at Marina Square's Central Atrium. Singapore's Coordinating Minister for Infrastructure and Minister for Transport, Khaw Boon Wan, will attend the launch event together with invited guests from various maritime associations.

With a host of some 30 events lined up this year, SMW 2016 is all set to take thought leadership to the next level. With the industry weathering headwinds in an uncertain market, SMW 2016 will tackle topical key areas of concern within the industry including the economic downturn, infrastructural developments, green shipping, oversupply, and maritime technologies.

These are also some of the issues that SMW's anchor event, the Singapore Maritime Lecture (SML) on April 18, will address. In celebration of its 10th edition, SML will feature a new format. It will start with a keynote address by Kristian Siem, Chairman of Siem Industries, an industrial holding



FEATURE



company with diversified interests in oil and gas, shipping, mining and finance.

This will be followed by a discussion featuring a high-level panel of speakers from BW Group, DBS Bank and Pacific International Lines to explore issues facing the industry as well as prospects for the industry.

About 400 guests comprising management representatives and C-suite executives from leading maritime companies and organisations are expected to attend the lecture. They can look forward to insightful, lively and cogent discussions from both the speaker and the panellists.

On the same day, the SMW Opening Reception will bring together around 200 partners and industry peers for a night of fun, entertainment and drinks. This exclusive event will also be a platform for maritime leaders to network and build strong collaborative relationships in an informal setting.

Other thought leadership events during SMW include the inaugural Maritime Administrators' Forum and the Maritime Sustainability Forum,

which will both be held on April 19, as well as the Maritime Cyber Security Seminar on April 20.

The Maritime Administrators' Forum, organised by MPA Academy – MPA's training arm – dovetails perfectly with the theme, "Shipping: Indispensable to the World", for the International Maritime Organization's World Maritime Day in September this year. It aims to highlight the importance of shipping and raise awareness of shipping's role in supporting and sustaining the world's economy. The forum will comprise two sessions, which will look into maritime initiatives in different countries, as well as regulatory requirements and capacity building activities in the shipping industry.

The Maritime Sustainability Forum is aimed at port and terminal operators, shipyards, classification societies, technology developers and solution providers, policymakers, maritime administrators and academia. It will offer insights into global trends, strategies and technological advancements in the areas of sustainable shipping, ports and maritime activities. It will provide a platform for speakers and participants to network

FEATURE



and identify current industry challenges and explore potential research and development opportunities in smart maritime solutions and technologies for next-generation ports and ships.

At the Maritime Cyber Security Seminar, shipowners, shipping agencies, ship managers, terminal operators, maritime insurers, port authorities, classification societies, shipyards and marine equipment suppliers will learn ways to address relevant challenges in the digital age.

HONING A COMPETITIVE EDGE

The whys and how-tos of maintaining and sharpening the industry's competitive edge will be the focus of various other conferences and seminars during SMW 2016. These events serve to explore ideas for strengthening business competencies and addressing economic challenges. They will also discuss ways in which investing and boosting capabilities in sustainability, productivity and manpower development will help identify unexplored areas for growth. Examples of these events include the



second Offshore Marine Forum and the Singapore Exchange (SGX)-MPA Capital Markets Roundtable.

The Offshore Marine Forum, co-organised by Seatrade and the Singapore Maritime Foundation, will be held on April 19. This event is timely, given the current challenging and complex operating environment faced by the offshore sector. At the half-day high-level industry forum, invited chief executive officers (CEOs) and chief operating officers from the offshore industry will gather to network and discuss their views and outlooks on the industry. Jarand Rystad, Managing Partner of Rystad Energy, will make a keynote presentation, while BW Group Chairman Andreas Sohlen-Pao will chair the panel discussion. Joining Rystad on the panel are other renowned maritime industry players such as Carl K Arnet, CEO of BW Offshore, Chow Yew Yuen, CEO of Keppel Offshore & Marine, and Ron Mathison, Managing Director of Swire Pacific Offshore.

On April 22, SGX and MPA will co-host the SGX-MPA Capital Markets Roundtable. The event will be a good opportunity for companies to learn about how Singapore's equity and debt capital



FEATURE

BELOW AND RIGHT Some of the public outreach events under SMW include the International Sportsweek for Seafarers, the Amazing Maritime Challenge and the SMW MPA Learning Journeys.



markets can support the shipping and offshore sectors. SGX CEO Loh Boon Chye will share with invited CEOs and chief financial officers his insights on the Singapore capital market and the opportunities it offers the maritime industry.

PUBLIC ENGAGEMENT

SMW also highlights the need for a strong and cohesive maritime community that engages the public. In particular, it seeks to enhance public awareness of and interest in the sector through a variety of interesting and engaging public outreach programmes. The SMW Exhibition, the Amazing Maritime Challenge and the SMW MPA Learning Journeys are just some of the events aimed at drawing the wider community closer to the maritime world.

The well-received SMW Exhibition returns this year from April 16 to 24 at the Central Atrium in Marina Square. Titled Our Maritime Singapore Stories, members of the public will get to hear stories behind Singapore's success as a global hub port and an international maritime centre. They will learn from those who have worked in

collaboration to keep Singapore at the forefront of the global maritime industry. They will also get the rare opportunity to virtually pilot a ship using a ship bridge simulator.

Meanwhile, the stars of the OSV@Vivo Showcase event will be two high-tech offshore support vessels (OSVs). Between April 21 and 23, members of the public can get up close and personal with the OSVs – workhorses of the offshore industry – through an eye-opening tour of the vessels' equipment and technology. For many, it will be their first time on board an OSV.

Even as SMW serves up this year's offering of events, the stage is being set for the next year. Sea Asia 2017's launch event will be held on April 19 this year during SMW 2016. Co-organised by Seatrade and the Singapore Maritime Foundation, the biennial Sea Asia conference will be held in April next year, in conjunction with SMW 2017.

Participants can look forward to hearing from international thought leaders who will address the latest topics, debate on key trends, and discuss the commercial opportunities and challenges facing maritime and offshore businesses.



TAP FOR VIDEO

15 APR
—FRI—

16 APR
—SAT—

17 APR
—SUN—

18 APR
—MON—

Memoirs of City Port Scenes

FREE ADMISSION

SMW MPA Learning Journeys

BY REGISTRATION

Opening of
SMW 2016

FREE ADMISSION

Singapore
Maritime
Lecture

BY INVITATION ONLY

Amazing
Maritime
Challenge

BY REGISTRATION

SMW
Opening
Reception

BY INVITATION ONLY

SINGAPORE
maritimeweek®
2016

EVENT CALENDAR

VISIT WWW.SMW.SG FOR MORE INFORMATION



►PEOPLE◀



►IDEAS◀



►OPPORTUNITIES◀



19 APR
—TUE—

20 APR
—WED—

21 APR
—THU—

22 APR
—FRI—

23 APR
—SAT—

24 APR
—SUN—

SMW 2016 Exhibition: Our Maritime Singapore Stories

FREE ADMISSION

Inaugural
Maritime
Administrators'
Forum

Maritime
Cyber
Security Seminar

COC Special Limits
3rd Graduation
Ceremony

SMW MPA
Learning Journeys

BY REGISTRATION

BY INVITATION ONLY

BY REGISTRATION

BY INVITATION ONLY

MPA Bunker
Forum

BY INVITATION ONLY

International Sportsweek for Seafarers

BY INVITATION ONLY

Maritime
Sustainability
Forum

BY REGISTRATION

OSV@Vivo Showcase Event

FREE ADMISSION

SMI Seminar
2016:
Smart Ships

BY REGISTRATION

Dynamic Positioning 2016

BY REGISTRATION

NYPE 2015
Seminar

BY REGISTRATION

Offshore
Marine
Forum

BY REGISTRATION

TOC Asia 2016

BY REGISTRATION

SGX-MPA
Capital Markets
Roundtable

BY INVITATION ONLY

Launch of
Sea Asia
2017

BY REGISTRATION

Gaining the
Competitive Edge
with Efficiency

BY REGISTRATION

SGX Dry Bulk
Freight Derivatives
Seminar

BY REGISTRATION

Offshore Vessel & Rig Connect Asia 2016

1. 8th Annual OSV & Subsea Vessels Conference 2016
2. 7th Annual FPSO Conference 2016
3. 8th Offshore Drilling & Rigs Conference 2016
4. 2nd Offshore Accommodation & Access Conference 2016

BY REGISTRATION

Moore
Stephens -
BNP Paribas
Singapore
Shipping
Forum

BY REGISTRATION

MPA
Professorship
Inaugural Lecture

BY REGISTRATION

IFC Shared
Awareness
Meeting

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Lloyd's
List Asian
Networking Drinks

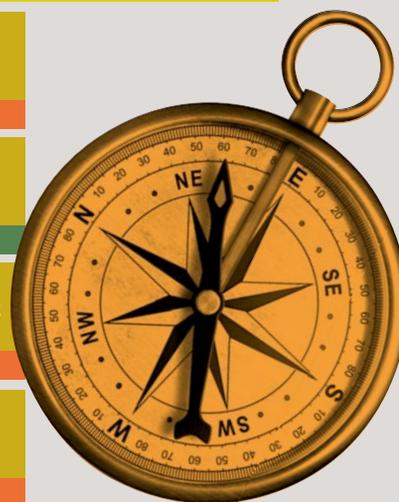
BY REGISTRATION

Signing
Ceremony for
MPA & CIL
Research
Programme

BY INVITATION ONLY

IBIA Dinner

BY INVITATION ONLY



-  KEY EVENTS
-  MPA EVENTS
-  CO-LOCATED EVENTS
-  BY INVITATION ONLY
-  FREE ADMISSION
-  BY REGISTRATION

A team of researchers from Nanyang Technological University (NTU) in Singapore is looking at a novel way of applying a well-known scientific phenomenon, known as the magnetocaloric effect, to cool large electrical machines on board ships to improve their overall efficiency. This will help to mitigate the environmental impact of shipping by reducing greenhouse gas emissions.

Discovered by a pair of French and Swiss physicists in 1917, the magnetocaloric effect refers to a change in the temperature of a magnetic material caused by the exposure to a changing magnetic field (see sidebar).

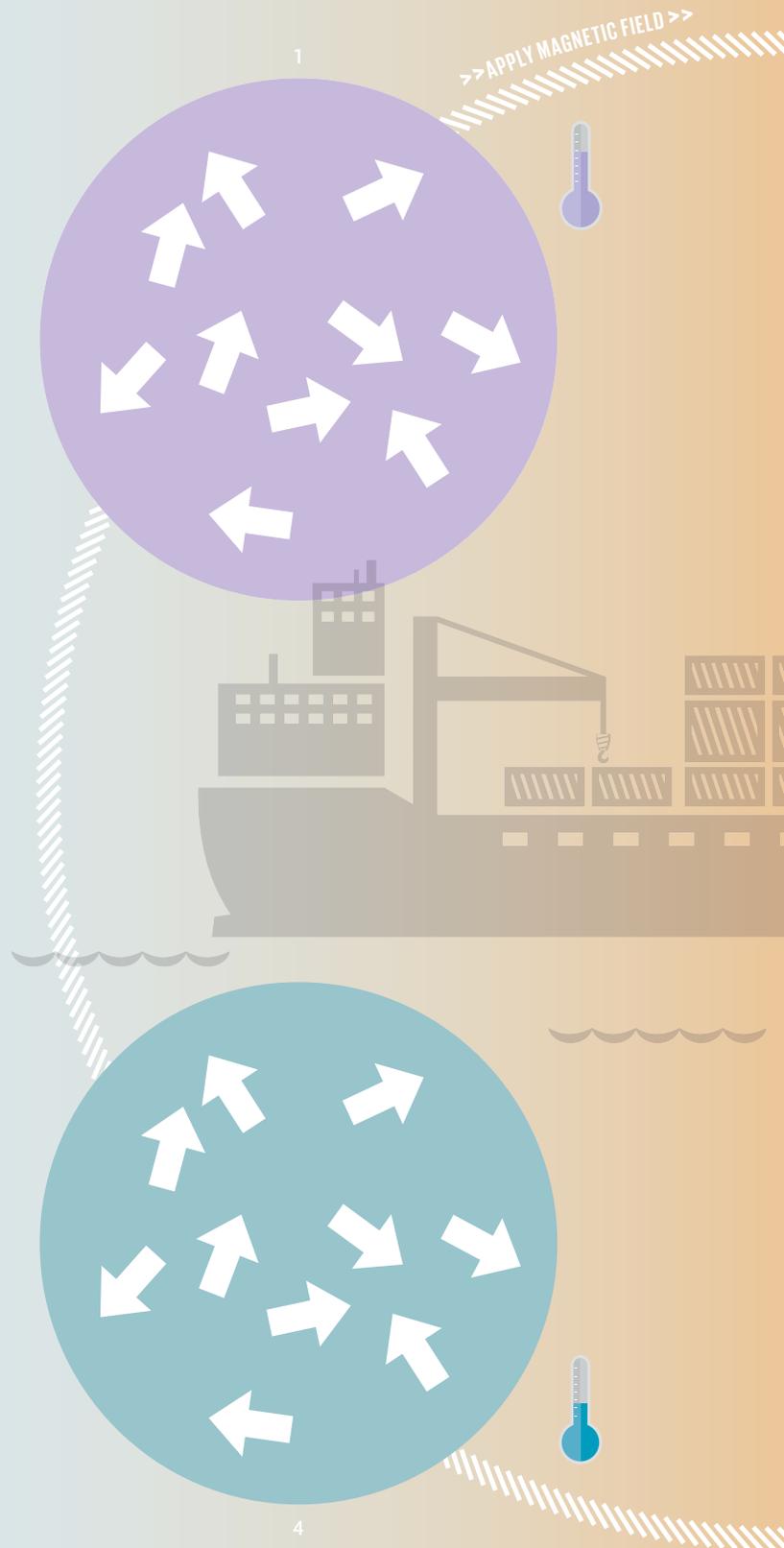
The project, conducted at the Energy Research Institute at NTU (ERI@N), is supported by the Maritime and Port Authority of Singapore's Maritime Innovation and Technology (MINT) Fund. Rolls-Royce Singapore is a collaborator on the project.

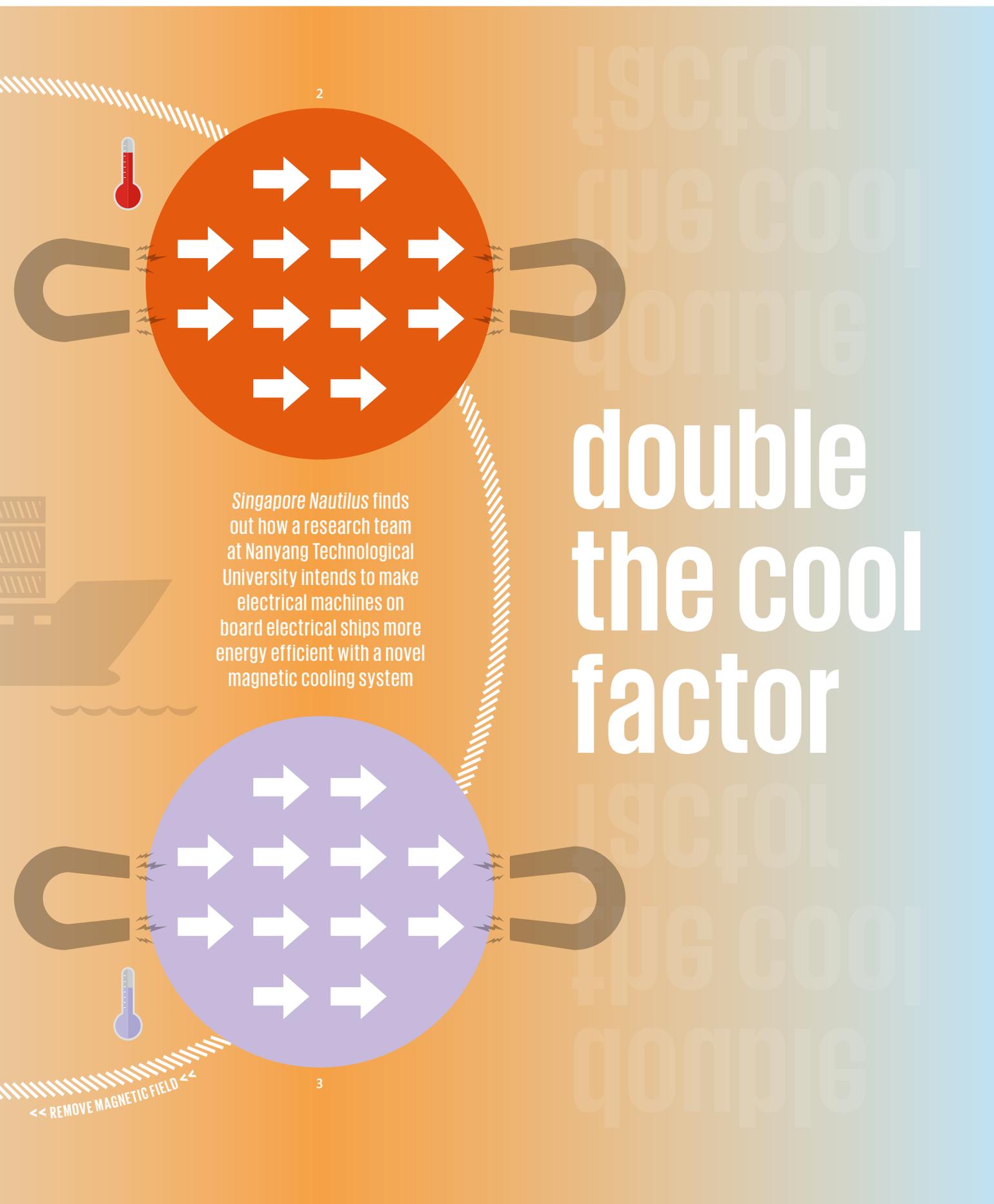
NTU's Associate Professor Raju Vijayaraghavan Ramanujan, who leads the research, says: "The objective of this project is the use of energy efficient, green, high-performance and low-cost magnetocaloric materials to achieve cooling in large scale electrical machines and HVAC (heating, ventilation and air conditioning) systems on ships."

Prof Ramanujan's team of scientists decided

MAGNETIC COOLING IN MARINE APPLICATIONS

- 1 At the start of a magnetic cooling cycle, the magnetic moments in the magnetic material are randomly oriented and the material is at room temperature.
- 2 When a magnetic field is applied adiabatically without gain or loss of heat, the magnetic moments become aligned parallel to the magnetic field, resulting in an increase in temperature of the magnetic material.
- 3 This heat is removed from the material using a heat transfer fluid and the magnetic material returns to room temperature.
- 4 When the magnetic field is removed, the magnetic moments become randomly oriented again, resulting in a drop in the temperature of the material. This cooled magnetocaloric material can be used to cool the heat load using a heat transfer medium.





2



Singapore Nautilus finds out how a research team at Nanyang Technological University intends to make electrical machines on board electrical ships more energy efficient with a novel magnetic cooling system

double the cool factor

3



<< REMOVE MAGNETIC FIELD <<

to focus on this particular aspect due to the potential environmental benefits that can be accrued. He says: "There is a clear consensus that the burning of fossil fuels contributes adversely to climate change and global warming, regardless of its cost. Globally, the entire marine industry, including ports and ships, is under pressure from environmental groups and global agencies to be greener and more energy efficient."

IMPROVING ENERGY EFFICIENCY

NTU's scientists believe that the current state of energy efficiency measures on board electrical ships can be significantly improved by magnetic cooling. In particular, magnetic cooling of electrical machines will increase their efficiency by allowing them to operate at higher temperatures, while applying the principle of magnetic cooling to air conditioning on ships will help reduce the amount of energy required to run them.

Prof Ramanujan adds that previous studies have shown magnetocaloric cooling systems to be highly efficient, without the resultant greenhouse gases, vibration and noise generated by traditional vapour compressor cooling systems. The maintenance of a magnetocaloric cooling system is also relatively easier and cheaper than that of traditional vapour compressor systems.

"THE MOST ATTRACTIVE FEATURE IS THE HIGH COOLING EFFICIENCY, WHICH IS ALMOST TWICE THAT OF A TRADITIONAL VAPOUR COMPRESSOR COOLING SYSTEM."

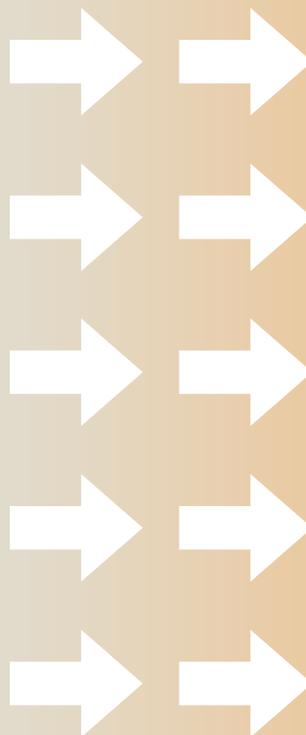
ASSOCIATE PROFESSOR RAJU VIJAYARAGHAVAN RAMANUJAN

He says: "The most attractive feature is the high cooling efficiency, which is almost twice that of a traditional vapour compressor cooling system."

A key challenge to the widespread adoption of this technology has been its limited scalability. Currently, the technology is only used in small devices. However, with a combination of electrical, mechanical and materials engineering techniques, ERI@N scientists were able to assess the scalability of the novel cooling technology for its future use in larger devices.

Besides its application on board electrical ships, the magnetic cooling technology can be applied to a broad number of applications ranging from wine coolers and laptop cooling to even gas liquefaction. It can also be used in devices that handle a wide range of heating load temperatures as magnetocaloric materials can be calibrated to required working temperatures.

Prof Ramanujan stresses that there needs to be more concerted research and development efforts to propel magnetic cooling technology beyond its current boundaries. Companies are already actively pushing for the commercialisation of this technology, such as Chinese appliance maker Haier Group, German chemicals group BASF, American multinational conglomerate General Electric, and American appliance maker Whirlpool Corporation.





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The global maritime industry has been taking steps towards more sustainable shipping practices through reducing carbon emissions. As a responsible member of the international community, the Port of Singapore will also be providing cleaner sources of fuel, such as liquefied natural gas (LNG). This is in line with the key strategic thrusts in the country's Next Generation Port 2030 initiative.

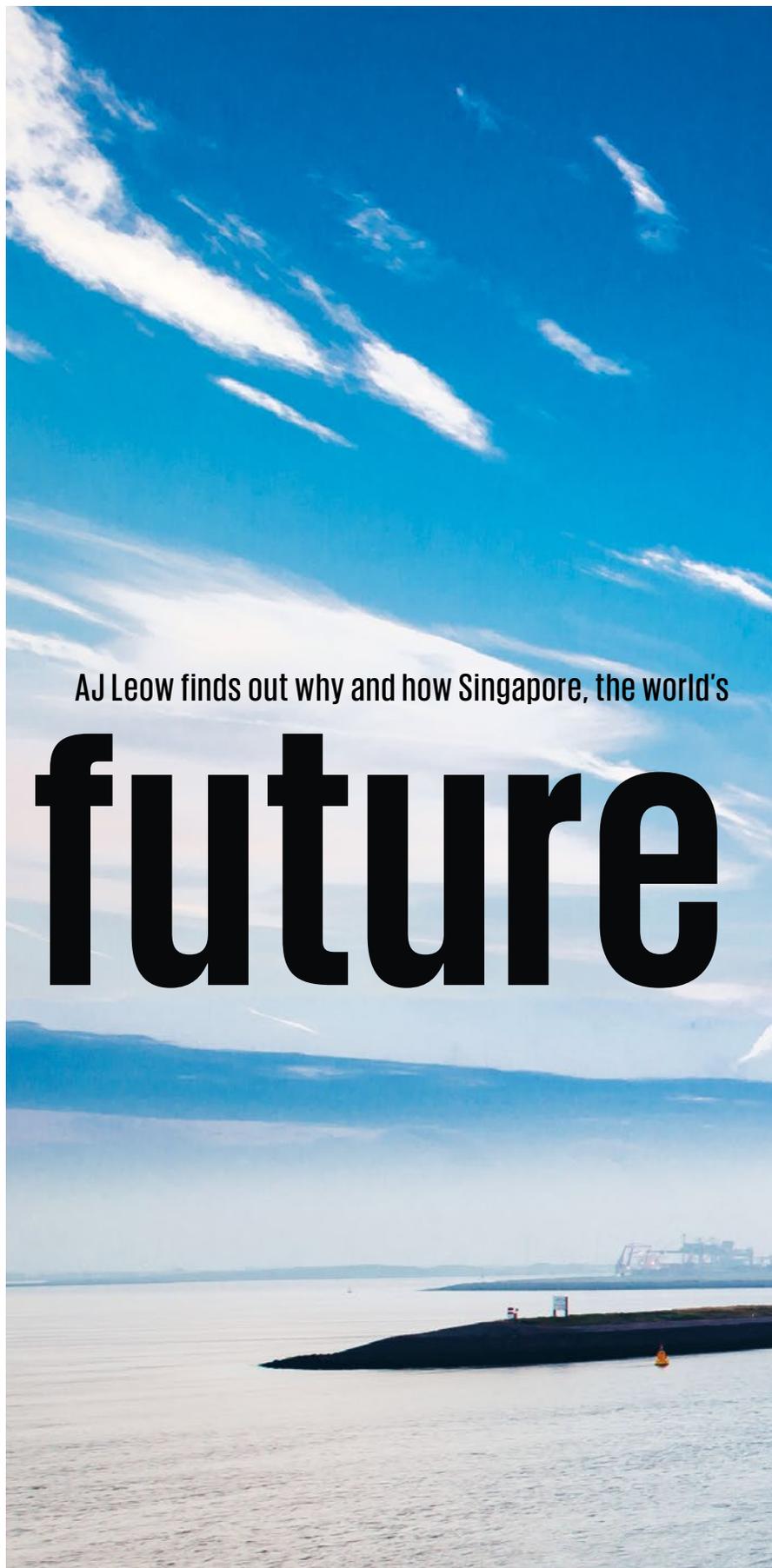
LNG is already widely recognised as an important next-generation fuel for the maritime sector due to its more environmentally friendly characteristics. It virtually eliminates the emission of sulphur oxides, and dramatically reduces that of nitrogen oxides and other particulate matter by more than 85 per cent. In addition, LNG also lowers carbon dioxide emissions by at least 20 per cent. Supply-wise, it has been estimated that there are at least 200 years' worth of gas reserves.

fuel for the

LNG can play a significant role in responses to the regulatory and environmental challenges faced by the shipping industry. It has been identified as a key fuel that may be used to achieve compliance with Regulation 14 of Annex VI under the International Convention for the Prevention of Pollution from Ships (MARPOL) to limit sulphur content in marine fuels.

There has been growing groundswell for its adoption as energy demand continues to grow. LNG has already been adopted as a marine fuel in northern Europe and has also made significant inroads in North America.

In a recent report, United States-based market intelligence company Transparency Market Research has projected that the LNG bunkering



AJ Leow finds out why and how Singapore, the world's

future

leading bunkering port, is investing in a future in which ships are fuelled by liquefied natural gas



market will expand at a rate of more than 60 per cent a year between 2014 and 2025.

This rising demand is in part driven by the expansion of emission control areas (ECAs). In Asia, LNG bunkering is expected to grow significantly as regulations on sulphur emissions tighten. China has issued a plan to promote LNG as a marine fuel and set up its own ECAs, while there are proposals to extend ECAs to Japan and South-east Asia. Furthermore, LNG vessels have so far shown an outstanding safety record with much lower local environmental impact in the event of spills.

The use of LNG as a marine fuel is, however, in its nascent stages due to commercial stumbling blocks including the high costs involved in building or retrofitting LNG-fuelled vessels and adding bunkering infrastructure to ports. Its adoption has also been hampered by low oil prices and uncertainty over when the International Maritime Organization will implement the 0.5 per cent global sulphur cap.

So far, LNG fuel initiatives have been confined to ferries and supply vessels plying within or between ECAs that are relatively close in proximity such as in the Baltic and North seas. But with a greater emphasis on sustainability in shipping, it is likely to gain greater traction.

To date, some 48 ports around the world including Jacksonville, Yokohama, Gothenburg, Rotterdam, Zeebrugge, Gibraltar, and Antwerp are either LNG bunker ready or have plans in the pipeline to become so. As the world's top bunkering port, Singapore is well positioned to capitalise on its status to offer LNG as a bunker fuel. Being an early adopter will further establish Singapore as one of the global LNG bunker hubs.

The country is taking steps to prepare itself to be an LNG bunker-ready port when LNG becomes more viable as an alternate fuel. This will enable the port to service a range of vessel types and sizes seeking to use LNG as a marine fuel. While LNG bunkering is likely to take off for short sea voyages in its initial stages, the Maritime and Port Authority of Singapore (MPA) hopes to promote greater discussions and cooperation among global hub ports interested in providing LNG bunkering for vessels such as short sea and ocean-going vessels.

PILOT PROGRAMME

Singapore will be commencing the LNG bunkering pilot programme in 2017 as a platform from which to test LNG bunkering procedures in Singapore. MPA has, to this end, set the stage after handing



"WE WILL WORK CLOSELY WITH MPA AND OUR PARTNERS TO DEVELOP AND TEST SAFETY PROCEDURES AND BUILD RELEVANT INFRASTRUCTURE TO MAKE LNG BUNKERING A REALITY IN SINGAPORE. IT IS EXCITING TO SEE THE GROWTH OF THE LNG BUNKERING INDUSTRY AS IT SUPPORTS SINGAPORE'S EFFORTS TO BE AN ASIAN LNG HUB."

SEAH MOON MING, GROUP CEO OF PAVILION ENERGY



PORT & STARBOARD



out the first pair of licences for LNG bunkering to two parties: Pavilion Gas, a wholly-owned subsidiary of Pavilion Energy, and a joint venture between Keppel Offshore & Marine and BG Group, which is now part of Shell. Both parties aim to be operationally ready by early 2017.

MPA is concurrently also looking to fund up to S\$12 million for the building of six LNG-fuelled vessels in a move to stimulate demand for LNG as a bunker fuel. To ensure global standardisation of LNG bunkering procedures, MPA is working with the port authorities of Antwerp, Zeebrugge and Rotterdam to align the operational procedures for LNG bunkering. It has also engaged the Society for Gas as a Marine Fuel, a non-governmental organisation with the aim of creating global LNG bunkering standards, on this matter.

Lauran Wetemans, General Manager of Shell's LNG Business Development, says: "MPA's LNG bunkering pilot programme is a significant step towards developing the LNG bunkering market not just in Singapore, but also as part of a network of ports around the world to supply LNG.

"As Singapore, which is already the largest and most important bunkering port in the world, builds up its LNG infrastructure, more regional shipowners will be confident in investing in LNG-fuelled ships. With our global LNG portfolio and as

an LNG import licence holder in Singapore, Shell is well placed to help provide security of supply of LNG for marine customers in Singapore."

Michael Chia, Managing Director (Marine & Technology) of Keppel Offshore & Marine, adds: "The joint venture between Keppel and Shell will be able to supply LNG bunkering at a competitive price and help encourage shipowners to convert their vessels to use LNG or build new LNG-fuelled vessels. The joint venture will also leverage Keppel's years of experience and expertise in servicing vessels including gas carriers to provide safe and efficient bunkering solutions."

Seah Moon Ming, Group Chief Executive Officer of Pavilion Energy, is positive about the future of LNG bunkering in Singapore. He says: "Our strategic location in the Strait of Malacca and the South China Sea sees over 50 per cent of global LNG supplies passing through the proximity of Singapore – that's approximately 2,000 cargoes per year. While South-east Asia may be a busy maritime region, there is currently no LNG-fuelled ship in the region.

"In time to come, by having LNG bunkering services in Singapore, we will be able to act as a refuelling station for South-east Asia and promote the use of both international and regional LNG-fuelled ships in Asia."

CLOCKWISE FROM ABOVE Gas carriers being serviced at one of Keppel's shipyards in Singapore; A dual-fuel LNG diesel tug, developed by Keppel Offshore & Marine, which won the Outstanding Maritime R&D and Technology Award at the Singapore International Maritime Awards 2015; Singapore's first LNG terminal commenced commercial operations in May 2013.

courting listings maritime

Singapore Exchange (SGX) Chief Executive Officer Loh Boon Chye tells Rahita Elias why SGX remains the natural and relevant listing venue for the maritime and offshore services sector

Singapore Exchange (SGX) is going all out to attract more maritime and offshore services companies to moor alongside its berth. The bourse is part of a quadripartite working group, led by the Maritime and Port Authority of Singapore (MPA), to woo these companies to list in Singapore. The Monetary Authority of Singapore (MAS) and the Singapore Shipping Association (SSA) are also part of the working group. SGX Chief Executive Officer, Loh Boon Chye, says: "We appreciate MPA's efforts to promote maritime listings on SGX and are pleased to join the working group set up by MPA that also includes SSA and MAS."

MPA has also led the formation of another working group to strengthen Singapore's position as a leading international maritime centre and raise the profile of Singapore as a maritime financial hub.

STRONG MARITIME CLUSTER

In all, 62 maritime and offshore services entities are listed on SGX. Of these, 14 are in the shipyard business, 12 in shipping and 33 in offshore services. The remaining three entities are business process services. Two of the counters are listed on the Catalist platform for fast-growing enterprises. "The maritime and offshore services sector is one of our main sector strengths, and a strong cluster of 62 entities listed on SGX (with a total market capitalisation of US\$31 billion) as at end December 2015." Loh Boon Chye, SGX CEO, says of the recent addition to SGX's maritime



TAP FOR MORE

MARITIME SERVICES

and offshore services sector is Singapore-based oil and gas services firm NauticAWT, which launched its initial public offering (IPO) in the second half of 2015. At the time of the listing, John Gronbech, CEO of NauticAWT, said that he was delighted with the strong support and response towards their IPO, and believes that the successful listing of NauticAWT on SGX will provide them with the platform needed for the group's long-term growth strategy.

MAJOR DRAW

Companies list on SGX for many reasons. For companies like NauticAWT, Singapore's role as an international maritime centre features as a key motivating factor. Given the country's enduring position as a regional and international trading hub, the maritime and offshore fraternity is au fait with the Republic. Loh points out: "SGX is based in Singapore, a country that maritime and offshore services entities would be very familiar with. Singapore has the world's largest bunker and transhipment port. These maritime and offshore services entities have their partners and clients based in the region, making SGX a natural and relevant venue for listing."

SGX's reputation as an international, multi-asset exchange is also a draw. As at December 2015, some 36 per cent of the maritime and offshore services companies listed here hail from outside of Singapore. Loh says: "SGX is a natural platform for both local and foreign maritime companies to be listed in Singapore. Given that the maritime industry is an international one with businesses and owners located globally, SGX's ability to attract international investors is another appealing factor."

TOP MARITIME COUNTERS BY MARKET CAPITALISATION AS AT DECEMBER 2015**Shipbuilders:**

1. Keppel - US\$8.3 billion
2. Yangzijiang - US\$3.0 billion
3. Sembcorp Marine - US\$2.6 billion

Shipping companies:

1. Genting HK - US\$2.7 billion
2. Neptune Orient Lines - US\$2.3 billion
3. Pan Ocean - US\$1.8 billion

Business trusts:

1. Hutchison Port - US\$4.6 billion

Offshore services:

1. Ezion - US\$679 million
2. PACC Offshore - US\$383 million
3. Ezra - US\$205 million

MARITIME SAVVY INVESTORS

Since the maritime industry is one of Singapore's core sectors, it is no surprise that investors here have a firm understanding of the sector.

"This can be seen by investor interest in the sector at the height of the economic cycle and the strong pool of investors and research houses covering it," says Loh.

SGX also works with MPA and stakeholders such as SSA to organise investor education seminars to help improve investors' understanding of the different maritime sub-sectors. These sessions see a few hundred attendees each time.

Last year, SGX launched a series of SGX Thematic Indices, including the SGX MOE (Maritime & Offshore) Index, the SGX Maritime Index, and the SGX Offshore Services Index. These indices aim to offer insights into both risk and performance associated with the various sub-sectors. "The indices will further enhance the understanding of investment opportunities and factors that drive returns in these markets," explains Loh.

SIGNIFICANT MARKET SHARE

It is not surprising then that Singapore has secured a significant slice of the maritime and offshore services action. Bloomberg's data as at December 2015 shows that, excluding the United States, SGX accounted for 27 per cent of global maritime and offshore services listings. This is comparable to the Oslo Stock Exchange's 28 per cent and Hong Kong Stock Exchange's 25 per cent.

Loh points out that SGX offers attractive valuations and liquidity for the maritime and offshore services sector. "While the sector is currently facing headwinds, it is worthy to note that maritime and offshore services companies raised nearly US\$4 billion from 2013 to 2015 through IPOs, secondary fund raising and bond listings on SGX. We have seen these listed companies embark on strong growth journeys post-listing, and subsequently spin off businesses and raise funds through our platforms."

Overall, Loh says that SGX will continue to actively engage the maritime and offshore services sector as well as other sectors to understand what the exchange can do to support them.

He adds: "As we further strengthen our equities market, we will continue to enhance the attractiveness of our market for companies looking to raise capital, by constantly reviewing our market structure and regulations."

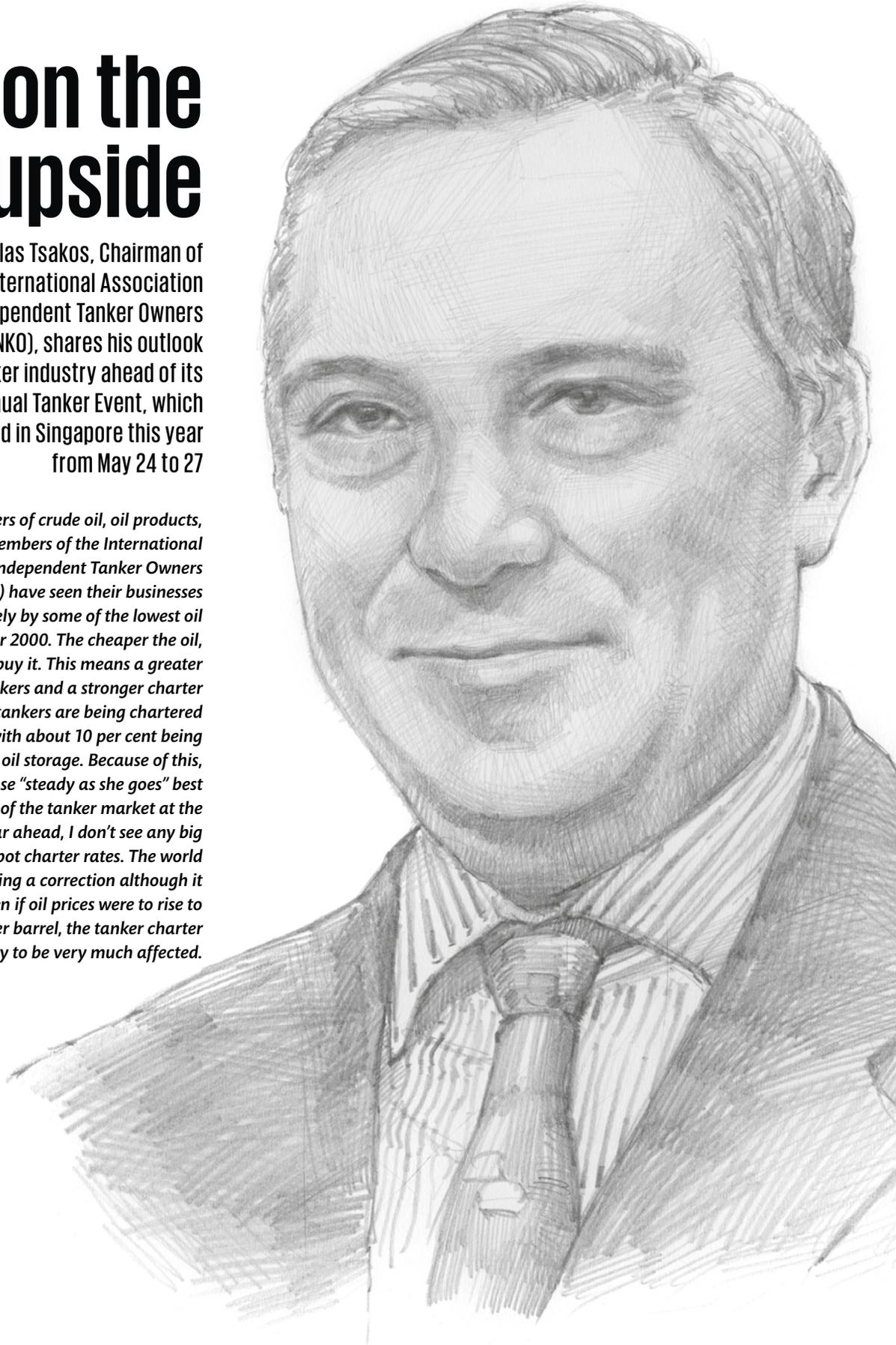


TOP Singapore Exchange (SGX) office at SGX Centre. LEFT At the listing ceremony of oil and gas services firm NauticAWT in July last year.

on the upside

Nikolas Tsakos, Chairman of the International Association of Independent Tanker Owners (INTERTANKO), shares his outlook on the tanker industry ahead of its 2016 Annual Tanker Event, which will be held in Singapore this year from May 24 to 27

As transporters of crude oil, oil products, chemicals and gas, members of the International Association of Independent Tanker Owners (INTERTANKO) have seen their businesses affected positively by some of the lowest oil prices since the year 2000. The cheaper the oil, the more people will buy it. This means a greater demand for tankers and a stronger charter market. Most of the tankers are being chartered for transportation, with about 10 per cent being hired for floating oil storage. Because of this, I think the phrase "steady as she goes" best describes the state of the tanker market at the moment. In the year ahead, I don't see any big increases in tanker spot charter rates. The world economy is undergoing a correction although it will still need oil. Even if oil prices were to rise to about US\$60 (S\$83) per barrel, the tanker charter market is unlikely to be very much affected.



INDUSTRY ENHANCEMENTS

It is true that a lot of newbuilding tankers will be coming on stream this year and next year when over 15 per cent of larger crude tankers and just over 10 per cent of Medium Range product tankers are scheduled for delivery, according to analysts from shipbroking firm Barry Rogliano Salles. These tankers are being built in China, South Korea and Japan for owners from Europe and Asia. This additional tonnage supply, however, will to some extent be counterbalanced. Although global oil demand growth is forecasted to ease back this year, it will still increase by 1.2 million barrels per day this year, according to the latest forecast from the International Energy Agency, and there will also be some tonnage that will be sent to scrap.

"IN THE YEAR AHEAD, I DON'T SEE ANY BIG INCREASES IN TANKER SPOT CHARTER RATES. THE WORLD ECONOMY IS UNDERGOING A CORRECTION ALTHOUGH IT WILL STILL NEED OIL...THE TANKER CHARTER MARKET IS UNLIKELY TO BE VERY MUCH AFFECTED."

NIKOLAS TSAKOS, CHAIRMAN OF INTERTANKO

Since the shipping industry is reducing its carbon footprint, the newbuildings coming on stream will be even more environmentally friendly. In terms of cargo volumes, shipping already is the most economical means of transportation and has the smallest carbon footprint. Today, we are working to make our ships even more eco-friendly.

Maritime education is another important issue for the industry. This is something that is close to my heart. On a personal level, my father and I set up the Maria Tsakos Foundation, in honour of my sister who passed away five years ago. Through the foundation, young men and women have the opportunity to learn about maritime and environmental issues and make a positive contribution to the industry.

EXPANDING THE FOLD

The tanker industry tends to be quite fragmented in terms of ownership. It needs to have an organisation that will represent its interests worldwide and provide a forum where tanker owners can get together to discuss matters of common interest. This is where INTERTANKO can contribute.

As an industry organisation, INTERTANKO focuses on technical, operational, regulatory and commercial issues, working to draw closer to all stakeholders in the industry; not only tanker owners but also oil companies, ports, insurers and brokers. We started out in 1970 as a forum for oil and chemical tanker owners. In November last year, we opened up the association to liquefied gas tanker owners such as Malaysian shipping line MISC, which is one of the biggest in South-east Asia, along with Japan's "K" Line, Mitsui OSK Lines and Nippon Yusen Kaisha. Many of our members, such as the Japanese carriers, own both oil and gas tankers. Since oil tanker owners and gas tanker owners both face similar challenges, it makes sense to have all types of tankers under one organisation.

RISING ASIA

INTERTANKO appreciates the growing importance of Asia. We already have an office in Singapore, which is and will continue to be our Asian headquarters. We have had very good and professional support from the Singapore Government and the Maritime and Port Authority of Singapore. Because the Asian market is growing strongly, we will be increasing the staff strength of our Singapore office this year so as to continue supporting all our members in the region.

Singapore will be the venue for our 2016 Annual Tanker Event to be held in May. About 500 people, representing tanker owners from all over the world, will be attending the event. We chose to hold it in Singapore because it is an important tanker hub. In previous years, we have held the event in other major hubs, including Oslo, New York and Athens.

I look forward to welcoming our members in Singapore, where they will be able to interact with other members from around the world as well as with representatives from the oil industry and the local Government, in relaxed surroundings. This will be to their mutual benefit and enjoyment.

a steadfast vision

Andreas Sohlen-Pao, who was recently inaugurated as Chairman of the Singapore Maritime Foundation (SMF), shares insights on SMF's role in championing the local maritime industry

Andreas Sohlen-Pao, Chairman of global shipping company BW Group, took over the reins of the Singapore Maritime Foundation (SMF) from Michael Chia, Managing Director of Marine and Technology at Keppel Offshore & Marine, in January this year. Established in 2004, the SMF was created to forge a strong partnership between the public and private sectors of the maritime industry and to further enhance Singapore's position as a leading International Maritime Centre. He shares with Singapore Nautilus his thoughts on how SMF can support the maritime industry in the face of challenging conditions in the macro environment.



WHAT ARE YOUR PRIORITIES AS SMF CHAIRMAN?

My top priorities are to ensure that SMF remains a strong voice for the private sector in Singapore's maritime industry, and to work closely with maritime players and government agencies to maintain a cohesive maritime community in Singapore. Another key priority is to attract and develop manpower for the industry to ensure that it has a strong pool of talent for the future.

HOW WILL SMF BE DEEPENING THE LOCAL MARITIME INDUSTRY'S TIES WITH THE REST OF THE INTERNATIONAL MARITIME COMMUNITY?

SMF will continue to participate in international maritime shows such as Posidonia in Greece and Nor-Shipping in Norway to create a strong Singapore presence globally and to promote Singapore's maritime services and capabilities.

Through our Sea Asia shows, in which we have been expanding our presence with each successive show, we are creating a platform to facilitate the exchange of views among fellow players in the

industry, and we will continue such efforts.

We will also work with the Maritime and Port Authority of Singapore (MPA) and the private sector to explore more collaborations with global maritime organisations to raise Singapore's profile in various areas.

A recent example is our work on the revision of the New York Produce Exchange time charter party form – the most widely used standard time charter party in the dry cargo sector – in collaboration with the Association of Ship Brokers and Agents (USA) Inc. and BIMCO, the world's largest international shipping association.

HAVING TAKEN UP THE POST AT A TIME WHEN THE MARITIME INDUSTRY IS EXPECTED TO WEATHER MORE CHALLENGES, WHAT ROLE CAN SMF PLAY TO SUPPORT THE INDUSTRY DURING SUCH TIMES?

While the industry will always face ups and downs, SMF's mission has remained constant. We are helping the industry by investing to enhance the flow of talent into the maritime sector through

PERSONALITY



publicity, scholarships and linking academic institutions with businesses.

We are also creating a platform for industry players to connect and share ideas. We are promoting Singapore as a maritime centre, and ensuring that continuous dialogue takes place between the public and private sectors to strengthen Maritime Singapore.

WHAT IS YOUR TAKE ON THE CURRENT UNFAVOURABLE MACRO ENVIRONMENT FACING THE MARITIME INDUSTRY? HOW DO YOU THINK SINGAPORE'S MARITIME SECTOR WILL FARE IN THESE DIFFICULT TIMES?

There is no question that some companies and sectors face severe headwinds. With a challenging global economic backdrop and volatile stock markets, many other industries also face challenging times.

The great thing about the maritime industry is that we have managed through this often before. The industry will not go out of fashion; despite the

near-term pressures, the maritime sector provides an indispensable service. And partly because of this volatility, it is an exciting business to work in. Singapore is well-positioned to ride out the storm given the strong maritime platform that has been built here over the years.

WHAT PLANS DOES SMF HAVE TO FURTHER STRENGTHEN PUBLIC-PRIVATE PARTNERSHIP IN THE MARITIME SECTOR?

SMF will continue to fulfil its mandate to enhance the relationship between the public and private sectors by creating more platforms to allow parties to engage and keep each other informed of what is happening. With MPA also working proactively via the SkillsFuture initiative, this will be an area for close collaboration.

ONE OF THE CHALLENGES THAT THE GLOBAL MARITIME INDUSTRY FACES IS MANPOWER SHORTAGE. DOES SINGAPORE FACE A SIMILAR CHALLENGE? HOW DO YOU HOPE TO RAISE THE PROFILE OF THE INDUSTRY TO STUDENTS AND JOBSEEKERS?

The global maritime business has always found ways to meet its manpower needs, but the key question is how to keep attracting the best and the brightest so that we have the right skills to thrive as an industry in future. In Singapore, much has improved over the past decade with many Government and private-sector led initiatives in place to encourage students to take up maritime courses and careers.

SMF has started on a new set-up called the Maritime Singapore Connect Office to promote and profile maritime careers as part of the nationwide SkillsFuture initiative. Launching at the end of this year, the new portal will be the central node connecting maritime employers with students and jobseekers.

WHAT IMPACT WILL THE CHALLENGING ECONOMY HAVE ON RECRUITMENT AND TRAINING IN THE MARITIME INDUSTRY? HOW WILL SMF BE RESPONDING TO THIS?

Continuing our profiling initiatives will show that the maritime sector remains committed to developing talented individuals, although we have to be realistic in sectors where there may be fewer opportunities in the near future. We will also facilitate the matching of jobseekers and job opportunities to make it easier for people to find the right jobs.

Audrina Gan finds out how PSA Institute ensures that Singapore's biggest port operator, PSA International, stays on top of its game



where
human capital is

KEY

The development of PSA Institute, the in-house training centre of PSA International (PSA), has in a sense mirrored the growth of the Port of Singapore. PSA, a leading global port group with port projects around the world, is one of two port operators in Singapore.

PSA Institute started as a training section of the Staff Department (now the Human Resource Division) in the then Singapore Harbour Board (now PSA) back in 1962. At that time, the training section was a modest set-up comprising five course instructors and two training officers, says Tan Bee Ling, Assistant Vice President of Group Human Resource at PSA and PSA Institute.

As Singapore's fortunes grew, so did the training outfit. Today, PSA Institute is a premier



training institute that has trained over 400,000 workers and executives from the port and various other industries in Singapore and across Asia, Europe, the Americas, Africa and Australia.

PSA Institute has contributed to the training of generations of world-class port workers who have helped Singapore win the accolade of Best Seaport in Asia 27 times at the annual Asian Freight, Logistics and Supply Chain Awards.

PROGRESSING WITH THE TIMES

Recalling PSA Institute's humble beginnings, Tan says: "Back then, training was conducted mostly on an ad hoc basis to cater to the training needs of port workers, as and when it was required. Its primary focus was the training of workers to

handle break-bulk and other conventional cargo, which were the types of cargo in those days before the onset of containerisation."

In those days, the institute trained mostly ship foremen, stevedores and wharf workers who handled cargo, winchmen and signalmen who operated lifting gears on board ships, as well as forklift drivers, mobile crane operators, godown foremen and cargo checkers.

With the opening of Singapore's first container terminal in Tanjong Pagar in 1972, PSA Institute evolved from training workers to handle conventional cargo to preparing them for mechanised port operations. The workers were also taught how to operate new machines such as quay and yard cranes.

ABOVE, FROM LEFT PSA operates a total of 57 berths at its container terminals in Tanjong Pagar (pictured), Keppel, Brani and Pasir Panjang; PSA Institute is located at PSA Vista in Pasir Panjang.

COMPANY SPOTLIGHT

ABOUT PSA INSTITUTE

- Started in 1962 as a training section in the then Singapore Harbour Board (now PSA).
- It had five course instructors and two training officers.
- Since then, it has trained over 400,000 workers and executives from the port and various other industries in Singapore and around the world.
- It is the approved training centre for nationally certified courses by organisations such as the Ministry of Manpower, the Institute of Technical Education, the Singapore Workforce Development Agency and the Maritime and Port Authority of Singapore.

As the container throughput of PSA Singapore Terminals grew from under 30,000 twenty-foot equivalent units (TEUs) in the early 1970s to over 30 million TEUs over four decades, so have the demands on training. Tan says: "The growing business complexity and expanded use of computers since the 1970s meant that PSA staff had to be adept in the use of increasingly sophisticated port equipment and IT systems."

STATE-OF-THE-ART TRAINING

To ensure that PSA maintains its competitive edge, PSA Institute plays a critical role in the port operator's success by training its staff to achieve high operating standards. Over the years, PSA Institute has designed several hundred training courses and developed training curriculum and materials in-house.

To maximise learning effectiveness, PSA Institute designs its courses in bite-sized modules and customises them to cater to the different profiles of its learners. It has an in-house audio-visual team that can produce training videos, graphics and illustrations for training. The institute also makes use of innovative course design and blended learning, which combines classroom instruction with online resources, to facilitate knowledge transfer and learner engagement.

In 2011, PSA Institute launched the Port Services Workforce Skills Qualification (WSQ) competency framework, which provides a nationally recognised structured training framework for port employees. To date, it has introduced nine WSQ courses for the port industry in the use of mobile equipment and

lashing tracks, to ensure port employees keep up with the latest equipment and technologies.

As the institute believes in getting the best industry practitioners who have real-life ground operations experience and knowledge to conduct its courses, its trainers include experts from PSA's various key operations departments, as well as retired veteran staff from PSA who have a wealth of experience and expertise to share with new generations of port workers.

Tan says: "Trainers are rigorously screened to ensure they are positive role models with the requisite attributes. Senior leaders and managers are involved in training from time to time, reflecting the quality of courses that PSA Institute conducts as well as the importance of and commitment to people development at PSA."

Currently, most of the institute's trainees are workers involved in port operations, as well as port equipment repair and maintenance. It also trains other local port users and overseas participants in port management and operations, handling of port equipment and dangerous cargoes, as well as safe work practices.

With the trend towards mega ships and mega alliances between container liners, PSA is upgrading its facilities in Singapore and around the world to better serve its customers' changing needs. Similarly, PSA Institute has been updating its curricula and developing new ones to equip port workers with the relevant skills and know-how to operate in this new environment, which calls for greater automation, more sophisticated equipment, and newer operating procedures.

"New training programmes have been



COMPANY SPOTLIGHT



developed for staff deployed at PSA's newest Pasir Panjang Terminal Phases 3 and 4, which feature some of the latest fully-automated container handling equipment," says Tan.

PSA Institute has also invested in state-of-the-art simulators which allow trainees to hone their skills across a wide range of scenarios. It is an industry pioneer in the use of simulators to train quay crane operators. Tan says: "Simulator training is a key component of PSA Institute's training as it better prepares trainees...to operate real machines and carry out operations in real-life conditions. To build upon this, PSA Institute is developing simulators to train prime mover drivers. This is expected to be ready by the end of the year."

CONTINUING PEOPLE DEVELOPMENT

Beyond conventional training in equipment and systems, PSA Institute also plays an increasingly important role in driving leadership development and organisation culture transformation within PSA. Tan says: "There will be a concerted roll-out of signature programmes on leadership,

coaching and cultural enhancement, designed and developed in-house to equip leaders with the skills to effectively lead in the future and create a conducive organisation culture that supports people development and continuous improvement towards excellence."

Such forms of human capital training are not new to PSA Institute. The institute has played a key role in PSA's people development efforts over the years. PSA has gained recognition for its achievement in this regard, including being awarded the Singapore Quality Award in 1999 and the People Excellence Award in 2001 by enterprise development agency SPRING Singapore as part of a business excellence scheme.

Going forward, PSA Institute will continue reviewing its training programmes and designing new ones to ensure PSA employees and its service providers have the requisite skills and knowledge to stay ahead of evolving industry needs. Tan says: "To ensure our training is effective and relevant, we will maintain close links with operating units to get constant updates and feedback."

CLOCKWISE FROM ABOVE
PSA Institute's outdoor training facility at Pasir Panjang; Trainees learning about wharf side operations; A trainee in the institute's crane simulator.



TAP FOR VIDEO

Rahul Kapoor traces the dynamics of the ebb and flow of the shipping industry and says that the industry needed an overhaul for a sustained rebound

After completing my degree in marine engineering, I joined my first ship, an Aframax tanker, in early 2003 as an engineer.

It was simpler times for the shipping industry back then compared to what it is now. In our shipping economics class, we had learnt that boom and bust cycles were long and that returns were modest in the shipping industry.

But things changed at the turn of the current century with China's integration into the global economy, which brought shipping into the mainstream. My friends who quit sailing early and switched to commercial activities within the industry, such as shipbroking and the sale and purchase of ships, talked of high returns and owners recovering their investments in a relatively short span of three to five years. In its heyday, from 2007 to 2008, the payback period was even shorter, at one to two years.

Shipping had truly arrived. During the boom years, stories abounded of new shipping millionaires or rock star shipbrokers and investment bankers who made their fortunes on the back of a one-of-a-kind shipping boom.

TURNING POINT

Then came the 2008 global financial crisis. What resulted was nothing short of a meltdown. Financial services firm Lehman Brothers filed for bankruptcy and the financial markets collapsed.

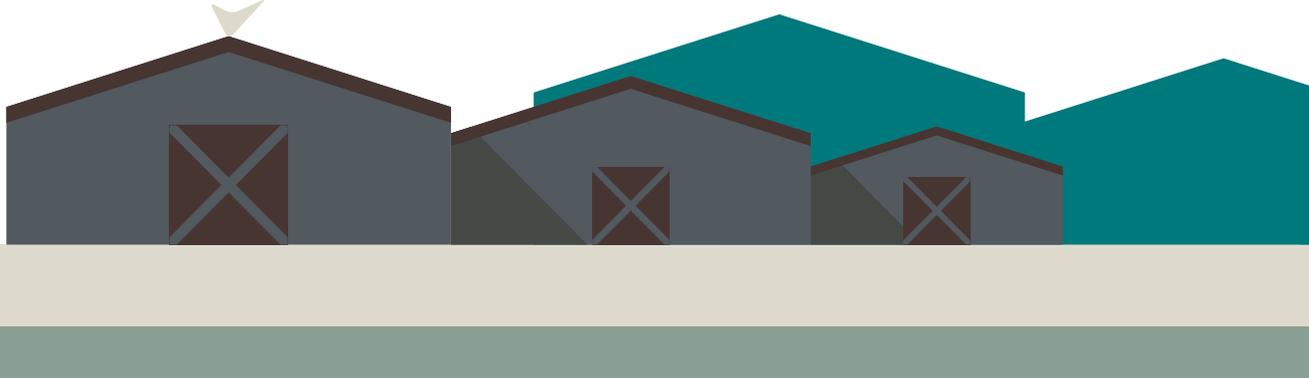
In the shipping industry, the Baltic Dry Index (BDI) – an economic indicator compiled by the London-based Baltic Exchange and which covers prices for transported cargo such as coal, grain and iron ore – had peaked at about 11,000 points in June 2008. Half a year later, in December 2008, it had plummeted by over 90 per cent to about 600 points. Even though the shipping markets were distressed over the short term, most shipping companies survived the crisis because China withstood its impact.

Post-crisis, the dry bulk shipping market rebounded strongly, led by inventory restocking demand, and newbuilding ordering activity resumed. In the aftermath of the 2008 financial crisis, a new breed of yield seekers, in the form of private equity firms and companies funded by initial public offerings, replaced traditional finance firms in the shipping industry. Backed



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changing



by this new capital, shipowners embarked on a massive ordering spree, which resulted in a glut of ships. At the same time, shipyards and shipbrokers touted eco-ships as the new saviours of the shipping industry. This only served to exacerbate the oversupply situation and worsen the demand-supply imbalance.

Earlier this year, the BDI hit an all-time low of 290 points – the lowest since the records began in 1985 – and has been under pressure as of late due to a slump in the commodities market and a slowdown in China's economy. The current situation is not simply caused by a slowdown in demand from China, but a result of the shipping industry's collective inability to address the oversupply situation and its failure to manage its excesses. The shipping industry needed this shake-up in order to restructure itself and rein in excesses. I believe the bottom to be near, although it is tough to time it. I hope that the industry recovers from this abyss sooner rather than later. However, it is likely to be a slow ride up with return expectations significantly lower than during the boom time of the last decade.

fortune

CAREERS

Few people in Singapore can claim to have had a hand in shaping the country's maritime future. But civil engineer Lee Wee Kiat, who is with the Tuas Port Development team of the Maritime and Port Authority of Singapore (MPA), can take some credit for that through his involvement in phase two of the development of Tuas Terminal.

Singapore is currently building a mega port in the western corner of the country as part of its plans to consolidate its container port-related activities in Tuas Terminal so as to free up prime land in Tanjong Pagar and Pasir Panjang for future high value development. When fully completed, Tuas Terminal will have the capability to handle up to 65 million twenty-foot equivalent units of cargo per year.

Lee, 28, is involved in the conceptualisation and preliminary design process of the land reclamation project for the terminal. Currently, the project is still in the planning and pre-tender stage.

As part of his work, Lee is carrying out soil investigation works to test the site's suitability for land reclamation before calling for tenders on the project. He is also working with appointed consultants on the design and development of the project. He will relocate temporarily from his office at PSA Building on Alexandra Road to Tuas once construction starts.

SCHOLARSHIP PROGRAMME

On what drew him to the maritime industry, Lee, who is an MPA scholar, says that he was impressed by the fact that the industry contributes 7 per cent of Singapore's GDP. This was something he found out from reading up about the industry after completing his A levels at Hwa Chong Institution.

Back in 2007, Lee, then 19, was left momentarily stumped when he was asked at an interview for a place in the MPA Scholarship Programme if he had even been on a ship or boat. His earnest reply, "Only to Tekong on a fast craft during my National Service days," earned the interviewers' laughter.

Lee thought he had blown his chances at the scholarship. Fortunately, the interviewers did not take issue with his lack of seafaring or maritime experiences, and he managed to clinch a place in the programme.

He went on to study civil engineering at the National University of Singapore (NUS) as the subject was closely related to the work of MPA, and he took up offshore engineering modules to prepare him for a career in the maritime sector.

TO APPLY FOR AN MPA SCHOLARSHIP, YOU SHOULD:

- Be Singaporean.
- Have outstanding results in your GCE A-level or International Baccalaureate diploma exams, or a Diploma with Merit for polytechnic students.
- Have a good track record of co-curricular activities.



GAINING EXPERIENCES

At university, Lee's MPA Scholarship gave him an opportunity to go on overseas exchange for a semester at the University of Toronto in Canada. He also underwent a work attachment stint at MPA, where he learnt to solve engineering issues, like how to test the strength of soil for construction. This knowledge has come in handy in his current work.

Coincidentally, his mentor during his attachment is now his manager. Lee says: "It was a good experience as it provided me with good insights to what I was going to do in the future when I return to MPA."

engineering a future

Desmond Ng finds out how civil engineer Lee Wee Kiat contributes to the long-term development of Maritime Singapore



To be able to communicate effectively.

TO BE A GOOD CIVIL ENGINEER, YOU NEED:



To keep an open mind.



To have good technical knowledge.

Since Lee started work at MPA in 2013, he has chalked up more maritime experiences, and has been on surveyor boats and other types of vessels for work.

One of the interesting aspects of his job is the opportunity to interact and work with international consultants. He says: "We have to work with a few external parties. The most challenging thing is to coordinate and manage different people's expectations and come to a common solution and agreement on issues."

Lee also relishes the training he gets from being involved in a project of such scale. He says: "Working on such a project allows me to view

things more holistically; I also need to consider many things for a project to run smoothly."

His advice to potential MPA scholars is to keep an open mind as the maritime industry is a big one and is constantly evolving, ensuring there is always much to learn about the industry.

He says: "Communication skills are important. You must be able to bring your point across to other parties. And you may be dealing with people with more experience, so you must be able to speak up for yourself. It's OK not to know about the industry before you enter it. It's more important to keep an open mind and come in to learn."

THE FIRST SMW IN 2006 ATTRACTED OVER 2,900 PEOPLE.

31,700
people attended SMW 2015.

singapore maritime week in numbers

Singapore Maritime Week (SMW), driven by the Maritime and Port Authority of Singapore (MPA), is in its 11th edition this year. Here are some highlights from previous years, and what participants can look forward to at SMW 2016.

SMW has grown steadily from 9 events during its inauguration in 2006 to more than 30 events this year.

6 new MPA-led events this year.

SMW's anchor event - the Singapore Maritime Lecture:

IN 2015

More than 300 attendees from 12 countries.

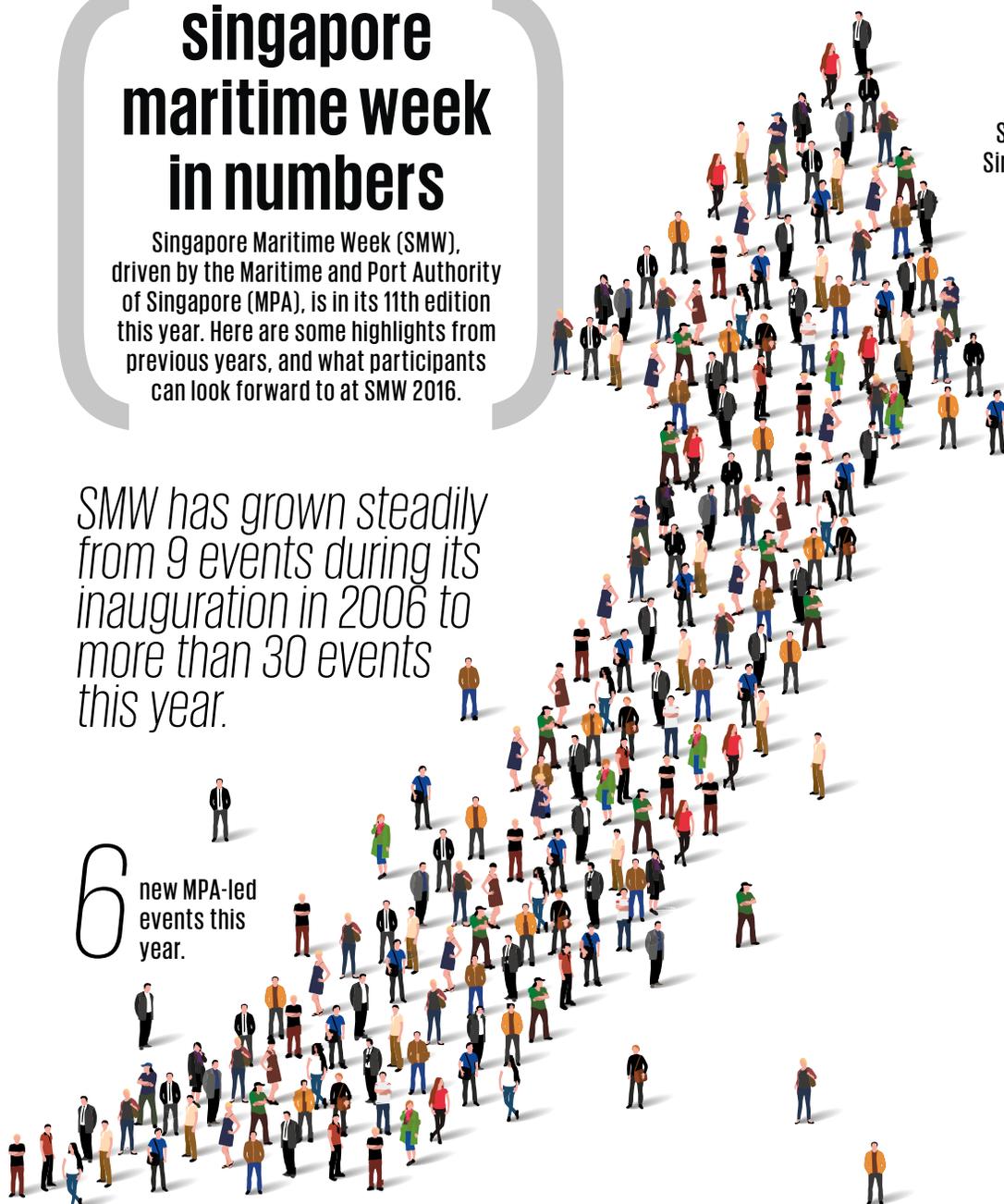
Tung Chee Chen, Chairman of Orient Overseas (International) Ltd, was the keynote speaker.



IN 2016

Close to 400 maritime leaders expected to attend.

Kristian Siem, Chairman of Siem Industries, is the keynote speaker this year.





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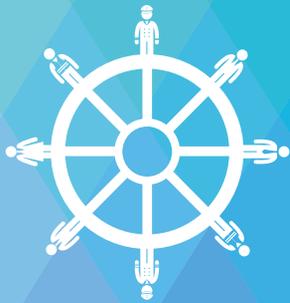


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