

# OFFSHORE MARINE

A newsletter of Keppel Offshore & Marine

November – December 2016

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## PURSUING OPPORTUNITIES IN ADJACENT MARKETS



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In 2016, Keppel FELS completed 18 repair and upgrading projects, including the Ocean Great White (pictured), with total contracts amounting to more than S\$100 million.

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Dear readers,

*OffshoreMarine* will be moving to a quarterly format, as part of Keppel Group's efforts to streamline publications and increasingly use electronic means to communicate with our stakeholders. The Nov-Dec 2016 issue will be *OffshoreMarine's* last edition in the current bi-monthly version. The new quarterly *OffshoreMarine* will be published in end April 2017. We appreciate your readership and value your support in this exercise.

*OffshoreMarine* Editorial Committee

# Resilience to emerge stronger

Keppel has taken significant steps to steady itself against the strong headwinds in 2016 and chart the course for sustainable growth.

Mr Loh Chin Hua, Chairman of Keppel Offshore & Marine (Keppel O&M) and CEO of Keppel Corporation, discussed the Group's strategic developments and performance at the Company's 4Q & FY 2016 results conference and webcast on 26 January 2017.

*OffshoreMarine* reproduces highlights of his speech.



Mr Loh Chin Hua (first from left), Chairman of Keppel O&M and CEO of Keppel Corporation and Mr Chow Yew Yuen (second from left), CEO of Keppel O&M were part of the panel which shared the Group's performance for FY16

## MACRO ENVIRONMENT

2016 was a challenging and eventful year, marked by the US Presidential election, Brexit and slow global growth. A rising trend of insularism and increasing anti-globalisation sentiments, if left unchecked, could threaten free trade. The rapid evolution of new technologies and business models has also disintermediated many traditional businesses, while creating new opportunities for companies able to seize them.

A key development at the end of 2016 was the decision by oil producing nations, both in and outside OPEC, to reduce output, the first cut in over a decade. This brought renewed optimism and confidence to the industry, with oil prices rising to around US\$55 per barrel, double the price seen a year ago.

While spending by oil majors is expected to increase, we do not envisage a quick recovery for the

offshore business, which continues to be under pressure from weak utilisation of the existing operating fleet, coupled with a supply overhang of newbuilds. We are thus prepared for the challenging conditions in the offshore business to remain for some time.

*Continues on page 4...*

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Keppel O&M delivered more than 20 projects in 2016, including the FPSO conversion projects – Armada Olombendo and Karapan Armada Sterling III

Over the year, we expanded our capabilities and solutions with our acquisition of the LETOURNEAU™ suite of jackup rig designs as well as aftersales and aftermarket services. We seized new growth opportunities in the LNG supply chain. We will continue to look for ways to deepen collaboration as OneKeppel and hunt more effectively as a pack, to create compelling propositions for our customers and investors.

#### **BUSINESS UPDATES**

Our O&M Division has remained profitable despite the sharp downturn, with a net profit of \$29 million for FY 2016.

Keppel O&M's operating profit was \$412 million and operating margin was 14.4% for FY 2016, before impairments of \$277 million for fixed assets, stocks & work-in-progress and investments. Apart from reducing variable costs, we

have also worked on cutting our overheads, achieving cost savings of some \$150 million year-on-year.

We have responded decisively to the challenging conditions facing our O&M business, not just in anticipation of a long and harsh winter, but also to build a stronger, leaner and more competitive Keppel O&M.

The painful but necessary measures

to rightsize our O&M Division must continue.

In 4Q 2016, Keppel O&M reduced its direct workforce by 2,620 or about 11.8% from the previous quarter. This includes a reduction of about 1,930 in Singapore and 690 in our overseas yards.

For the whole of 2016, Keppel O&M reduced its direct workforce by about 10,600 or 35%, with about 3,800 in Singapore and 6,800 overseas. Subcontract headcount in Singapore, which has already been lowered significantly, was further reduced by about 3,300.

In tandem, we are also cutting our yard capacity and have mothballed two overseas supporting yards. In Singapore, we are in the process of closing three supporting yards.

In 2016, the O&M Division secured new contracts worth about \$500 million and delivered more than 20 projects including several FPSO conversions and fabrication jobs,

an accommodation semi, a land rig, four jackups, as well as a few specialised vessels.

We understand the strong headwinds in the offshore industry and continue to work closely with our customers to respond to the challenging conditions. On 30 December 2016, we announced that we had arrived at a settlement agreement with Parden's guarantor for the jackup, B361, at a sale price matching the remaining payment obligations of Parden in a new sales contract with an associate of the guarantor. The rig will be delivered in 4Q 2017.

We have received requests to defer the delivery of the jackup for Falcon Energy to the second quarter of this year, and that for BOT Lease Co to January 2019. For the Falcon rig, we have received 20% downpayment, and for the BOT rig, 60% of the milestone payments.

Meanwhile, the DSS™38M semi, being built in our Caspian Shipyard

Company in Azerbaijan, is on track for delivery, albeit slightly later, from 4Q 2016 to 2Q 2017 due to additional modifications needed for its charter to TOTAL. Meanwhile, the FPSO for Yinson is on track to set sail soon to begin work for Eni in Ghana.

In 2017, our yards will continue to focus on executing both existing and new contracts well. We expect to deliver some 20 newbuild and conversion projects including the world's first-of-its-type FLNG vessel conversion, Golar Hilli.

On the investigations in Brazil, Keppel continues to cooperate with relevant authorities towards resolving issues in relation to contracts with Petrobras and Sete Brasil.

Keppel has a zero-tolerance stance against any form of illegal activity, including bribery and corruption, involving its employees or associates.

*Continues on page 6...*



Keppel Singmarine secured contracts from Jan De Nul Group in July 2016 to build three Trailing Suction Hopper Dredgers worth about S\$100 million in total

Continued from page 5.

## **PURSUIING OPPORTUNITIES**

Beyond dealing with immediate challenges, Keppel O&M is also positioning itself for the upturn.

We are investing prudently in R&D and building new capabilities while looking out for opportunities to service niche, adjacent, or even new markets. These include production solutions, non-drilling solutions as well as specialised vessels, such as the three dredgers awarded to Keppel O&M by the Jan De Nul Group in July last year.

Keppel is also well positioned to address growing requirements across the LNG value chain. In addition, we are exploring ways to re-purpose the technology that we developed in the offshore industry for other uses.

Ultimately, our efforts are geared towards entrenching our leadership position in the global offshore and marine industry.

## **IN CONVERSATION**

*OffshoreMarine* shares highlights of the 4Q & FY 2016 results Question & Answer session, where senior management addressed issues and concerns of the financial community.

**Q: 2016 was a tough year for Offshore & Marine. Given the recent oil price rebound, how is 2017 looking for Keppel Offshore & Marine (Keppel O&M)?**

**LCH:** The rebound in oil price

sets the necessary stage for the eventual recovery of the offshore sector, as it will lead to a more substantial increase in exploration and production spending. But it is not the only condition. There still needs to be improvements in terms of the utilisation rate of existing fleets and absorption of the excess supply of newbuild rigs.

**Q: Why was there a need for such a huge impairment in 4Q 2016?**

**LCH:** A lot of the impairments relate to the rightsizing exercise at Keppel O&M. We are going through a very long and harsh winter, so it is not business-as-usual. The steps we are taking to rightsize Keppel O&M to make it stronger and more efficient for the future necessitates that we take some strong actions in terms of capacity.

We are not just rightsizing but also looking for other new markets and new revenue streams to prepare for the upturn. In addition to gas, Keppel O&M is looking at non-drilling solutions such as production platforms and dredgers, and also re-purposing our technology to serve new markets.

**CYY:** To add, if we were to look at how we had built up to the high point and how the market has softened, we have to do the prudent thing. As mentioned in CEO's speech, we have mothballed two of our overseas supporting

yards. These are supporting facilities, not primary facilities.

The primary yards remain very much intact. In fact, one of our objectives is to maintain our capability and core competence and prepare ourselves for the next upturn.

**Q: Can you provide some colour on the adjacent markets flagged for the O&M Division? For instance, what opportunities do you see from the offshore wind sector?**

**CYY:** Besides our core businesses, we are looking at opportunities in power generation, desalination and dredging. There are also opportunities in specialised projects like small-scale gas distribution projects and Floating Storage and Re-gasification Units, areas in which we had built up capabilities over the last eight years.

In the offshore wind sector, we are pursuing opportunities in sub-stations and production units such as compression modules. Some of these are self-elevating platforms, which utilise our jackup technology. We will continue to look for suitable opportunities.

**LCH – Mr Loh Chin Hua,  
CEO of Keppel Corporation**

**CYY – Mr Chow Yew Yuen, CEO of  
Keppel O&M**

# Expanding partnerships in Brazil

BrasFELS continues to form new business partnerships as it expands its client base amidst an increasingly competitive offshore and marine environment.

## SIEM HELIX 1

On 26 December 2016, BrasFELS received its first job from Helix Energy Solutions to conduct upgrading works for the well intervention vessel Siem Helix 1.

The upgrading job consisted of fabrication and installation of a bulk transfer system as well as a new mezzanine deck. A zone classification of the mud pit room was also conducted.



Siem Helix 1 undergoes upgrading works at BrasFELS shipyard, in Angra dos Reis, Brazil

The vessel, which is owned by Siem Offshore Inc. and chartered by Helix, is expected to be delivered in February 2017. Siem Helix 1 will then operate in the Santos Basin, Brazil's pre-salt region.

"BrasFELS is committed to meeting the needs of our client and delivering the vessel safely, on time, and on budget, while also ensuring quality standards are met. In doing so, we hope to secure the satisfaction and confidence of our new customer in Brazil", said Mr Bruno Ferrari, BrasFELS' Project Manager for the Siem Helix 1 repair job.

## DRILLSHIP CORCOVADO

BrasFELS also recently completed the re-delivery of the drillship Corcovado, its first-ever repair job for Ocean Rig UDW, a Greece-based offshore drilling contractor.

Its work scope for this project comprised piping and steel outfitting, fabrication and installation. The vessel entered the yard on 20 October 2016 and departed on 22 November 2016.

Airton Rodrigues, Assistant Operations Manager, BrasFELS, said, "We are pleased to forge a strong partnership with Ocean Rig and work closely together towards a safe and successful re-delivery."



Drillship Corcovado is BrasFELS' first repair job for Ocean Rig

# Preferred repair partner

As a leader in the industry, Keppel FELS is the partner of choice not just in newbuild but also repair and modification projects.

In 2016, Keppel FELS completed 18 repair and upgrading projects with total contracts amounting to more than S\$100 million. Repeat customers, such as Diamond Offshore and China Oilfield Services Limited, entrusted Keppel FELS with major repair projects, including the refurbishment of semisubmersible rig, Ocean Great White, and jackup rig, Hai Yang Shi You 937.

## OCEAN GREAT WHITE

Following the successful re-deliveries of semisubmersible rigs Ocean Rover, Ocean Patriot and Ocean Quest, Keppel FELS was tasked by repeat customer Diamond Offshore with a series of upgrading works on its ultra-deepwater harsh environment semisubmersible, Ocean Great White, in 3Q 2016.

The work scope on Ocean Great White included an upgrade in rig stability, station keeping and the removal of marine growth from submerged areas, making it one of the most challenging repair jobs undertaken by Keppel FELS.

Multiple works of various trades were also carried out at the same

time. The rig arrived in Singapore in August 2016 and column installation was completed ahead of schedule.

An inclining experiment was carried out after the major structural changes were completed. Subsequently, a sea trial was conducted in the South



Upgrading works performed on Ocean Great White (pictured) was one of Keppel FELS' most challenging projects in 2016



Keppel FELS was awarded a US\$100,000 bonus from repeat customer, Diamond Offshore, for its early delivery of semisubmersible Ocean Great White



The project team from China Oilfield Services Limited and Keppel FELS celebrated the successful re-delivery of Hai Yang Shi You 937

China Sea in October 2016 before the rig departed in the same month.

Mr Chris Ong, MD, Keppel FELS, said, "The entire project was executed offshore at anchorage, so we had to overcome logistical and executional obstacles while working hard to ensure that we kept to our timeline and maintained a high standard of safety and quality. Our strong partnership with Diamond Offshore enabled us to ensure a smooth and successful delivery."

Mr David Wedgeworth, Director of Engineering Projects, Diamond Offshore, said, "We were once again impressed with the

professionalism and responsiveness of the Keppel FELS project team. Their dedication gave us the confidence to award the additional work scope to Keppel instead of engaging third-party vendors.

"All our partnerships with Keppel FELS have proven that Keppel does not just deliver to meet expectations but value-adds to each job. Ocean Great White was no exception. We look forward to our next project together."

#### **HAI YANG SHI YOU 937**

On 22 October 2016, China Oilfield Services Limited's (COSL) jackup rig, Hai Yang Shi You 937, arrived in Keppel FELS for repair and refurbishment works before it was re-delivered on 1 December 2016.

The job scope included intermediate class survey, hull and leg structure painting, replacement of the high pressure mud piping system, as well as the flooring of living quarters.

Mr Lim Yak Yang, Project Manager, Keppel FELS, shared, "To refurbish the living quarters' flooring while the crew continued staying on board, both projects teams had to coordinate closely to ensure a smooth execution so that the rig would be delivered in time for its next job."

# Construction begins for dual fuel tugs

Keppel Singmarine has commenced work on the first of two 65-tonne Azimuth Stern Drive (ASD) dual fuel tugs to be built for Keppel Smit Towage and Maju Maritime.

The strike steel ceremony, held on

1 December 2016, was attended by key stakeholders including management and representatives from Keppel Singmarine, Keppel Offshore & Marine (Keppel O&M), the Maritime and Port Authority of Singapore (MPA), Boskalis,

Keppel Smit Towage, Shell, and the American Bureau of Shipping.

The vessels, which can run on both Liquefied Natural Gas (LNG) and diesel fuel, have been granted funding of up to \$2 million each under the MPA's LNG Bunkering Pilot Programme to establish Singapore as a key LNG bunkering hub in the region by 2020.

For its innovative design of the dual fuel tugs, Keppel was awarded the Outstanding Maritime R&D and Technology Award at the 2015 Singapore International Maritime Awards.



Stakeholders and management from Keppel Offshore & Marine celebrate the commencement of work on the award-winning 65-tonne ASD dual fuel tug

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# Barge to strengthen capabilities

On 13 January 2017, Keppel FELS celebrated the keel laying ceremony of the CAN DO II barge.

Slated for completion by 31 December 2018, the CAN DO II barge will measure 230m by 79m, with a lifting capacity of 60,000 tonnes.

Supporting Keppel FELS' future business plans, the barge significantly adds to the yard's infrastructure and expands its capacity to take on repairs and upgrading works for a variety of vessels, as well as conduct special periodic surveys.

Mr Mohamed Sahlan Bin Salleh, ED (Operations), Keppel FELS, shared, "The CAN DO II barge demonstrates our ongoing commitment to improve yard facilities and infrastructure."

This new barge is another world-class facility that adds to our operational excellence, allowing us to deliver on our commitments safely and efficiently."



Mr Mohamed Sahlan Bin Salleh (third from right), ED (Operations), Keppel FELS, and key members of the project team, celebrating the keel laying milestone of the CAN DO II barge

# Showcasing strengths at OSEA

The offshore and marine industry remains an important part of Singapore's economy despite the challenges it is facing, and the Government stands committed to invest in its future. Dr Koh Poh Koon, Singapore's Minister of State for National Development and Trade & Industry, said this in his opening address at the 21st International Oil & Gas Industry Exhibition & Conference (OSEA) held in Singapore on 29 November 2016.

As an industry leader, Keppel Offshore & Marine (Keppel O&M) participated in the exhibition with a booth to showcase its suite of products. Keppel O&M's senior management showed



Representatives from Keppel Offshore & Marine presented the company's suite of solutions to Dr Koh Poh Koon (sixth from left), Singapore's Minister of State for National Development and Trade & Industry, at OSEA 2016

Dr Koh around the booth and explained the company's expertise and strategies in riding out the current downturn, such as Keppel's innovative liquefied natural gas (LNG) solutions.

Dr Koh reiterated that Singapore continues to invest heavily in expanding the country's LNG refining and storage capacity and

is well-placed to establish itself as a major LNG hub in the region.

A well-established platform in Asia, OSEA 2016 attracted some 18,000 trade attendees and over 1,300 exhibitors from 49 countries. It was also a good opportunity for Keppel to network with customers and partners from around the world.

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## Model shipyard for environmental training

An exemplary shipyard with environmentally friendly practices, Keppel AmFELS opened its doors to the Texas Commission on Environmental Quality (TCEQ) to conduct inspector training sessions during the fourth quarter of 2016.

TCEQ is a government agency that establishes and directs industry policy for the State of Texas by enforcing environmental compliance and protecting public health and natural resources.

The 16 trainee inspectors learnt about the operations of a shipyard,

as well as unique aspects of environmental management, such as controlling waste generation activities. Keppel AmFELS also provided insights on the various programmes and processes that help the yard meet the highest standards of clean air, clean water and waste management.

In a letter of appreciation to Keppel AmFELS, Mr Francisco J Chavero, Jr Section Manager, Air, Water and Waste Programs, Harlingen Region Office of TCEQ wrote, "The field trip to the Keppel AmFELS facility in Brownsville,

Texas, was exceptional and the tour of the Perforadora Central UXPANAPA vessel was a highlight of the training event. Hands-on experience is an invaluable teaching tool for our staff and we are pleased you could be part of our training event."

As a host shipyard, Keppel AmFELS is not only able to showcase how it is exceeding environmental compliance and expectations, but also foster strong relationships and trust with the TCEQ team of inspectors.

# Sharing best practices

To better understand and learn from Keppel's Total Workplace Safety and Health (WSH) approach, a delegation from Shell's Health team visited Keppel Shipyard on 18 January 2017.

Hosted by Vincent Yip, Assistant General Manager (HSE), Keppel Shipyard, the delegation visited the recently completed Keppel Wellness Centre, which comprises a medical centre as well as various fitness equipment, and exchanged ideas on promoting personal health and physical well-being among the workforce.



The delegation from Shell was briefed on various interactive features in the Keppel Wellness Gallery

On top of learning about Keppel's health and wellness initiatives, the delegation also toured Cassia Lodge, where they got a glimpse of the wide array of amenities

in the dormitory aimed at promoting harmonious living and bonding amongst a multinational workforce.

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# Furthering partnerships

Keppel Offshore & Marine (Keppel O&M) continues to forge strategic partnerships with governments and industry leaders, and regularly hosts distinguished guests to share insights and best practices.

On 17 November 2016, Japanese Ambassador to Singapore, H.E. Kenji Shinoda, visited Keppel O&M to explore further collaboration between Keppel and Japanese companies in providing offshore and marine solutions.

H.E. Shinoda was hosted by Mr Loh Chin Hua, Chairman of Keppel O&M and CEO of Keppel Corporation. They were joined by the management of Keppel FELS, Keppel Shipyard and Keppel Singmarine.

H.E. Shinoda penned in the guest book, "We will continue to work closely as we further promote our Singapore-Japan business partnership."



Japanese Ambassador H.E. Kenji Shinoda (fourth from left), penned his wish for greater collaboration in Keppel O&M's guest book. He was hosted by Mr Loh Chin Hua (second from right), Chairman of Keppel O&M and CEO of Keppel Corporation, Mr Chris Ong (third from left), MD of Keppel FELS, Mr Chor How Jat (extreme right), MD of Keppel Shipyard, Mr Louis Chow (extreme left), ED (Commercial) of Keppel Shipyard, and Mr Keith Teo (second from left), GM (Marketing) of Keppel FELS

Keppel's services for Japanese customers range from building jackup rigs for drilling operators, repairing and upgrading tankers and liquefied natural gas vessels for ship-owners, to converting floating production storage and offloading vessels for oil companies.

# Improving through innovation

The month of December saw two innovation campaigns held throughout Keppel Offshore & Marine (Keppel O&M) as part of efforts to improve work processes and efficiency.

On 15 December 2016, Keppel FELS held the closing ceremony for its 13th Innovation Quality (iQC) campaign which saw a total submission of 27 creative ideas.

Two projects stood out, winning the coveted Star Awards. The first was presented to a team from the commissioning department, for their solution that optimises fuel efficiency in diesel generators by automating the process of power requesting and usage.

The second Star Award was presented to a team from the piping department, for their use of a temperature monitoring device on welding quivers instead of leaving the quivers continually heated beyond the required temperature. This helps to conserve energy, resulting in significant cost savings.

The 2016 iQC campaign was launched on 4 October with the theme of 'Smart Technology', in conjunction with Singapore's vision to become a Smart Nation.

On 12 December 2016, the BrasFELS Innovation Awards Ceremony was held to recognise participants of the Keppel O&M Innovation Awards as well as the INOVE Programme, its annual innovation competition.

BrasFELS had won Silver and Bronze awards at the Keppel O&M Innovation Awards for projects involving vertical pipe installation and stainless pipes respectively.

The Star Award for the INOVE Programme was awarded to the team from the Scaffolding section.

Their scaffolding plank fastener which reduces the need for steel wires to secure the wooden planks on the scaffolding. This device not only reduces the possibility of employees getting hurt, but also lowers cost as less steel wires need to be purchased.



Mr Chow Yew Yuen (third from left), CEO of Keppel Offshore & Marine, presenting the Star Award to Team Quiver from Keppel FELS



BrasFELS President Mr Marlin Khiew (second from left) with Team Inovação Andaime, winners of the INOVE Programme Star Award

# Soldiering on, emerging stronger – 2016 in review

Over the past year, Keppel Offshore & Marine has soldiered on despite industry headwinds by focusing on delivering projects well, exploring new markets and opportunities, investing prudently in R&D and building new capabilities.

## JANUARY

Keppel FELS delivered Halul, a KFELS B Class jackup rig, to Qatari rig operator Gulf Drilling International (GDI).

Keppel Offshore & Marine (Keppel O&M) and BG Group (now Shell) jointly won the licence to supply Liquefied Natural Gas (LNG) bunker to vessels in the Port of Singapore.

Nakilat-Keppel Offshore & Marine (N-KOM) successfully delivered its first liftboat unit, Al Safliya, to GDI.



Al Safliya, the first liftboat to be wholly constructed in Qatar, is built to the ORCA 2500 design developed by Keppel O&M's design arm, Bennett Offshore



Built to Keppel's proprietary KFELS B Class design, CANTARELL I and CANTARELL II will be chartered to PEMEX for operations in the Cantarell oil field in offshore Mexico

## MARCH

Keppel FELS delivered two KFELS B Class jackups, Cantarell I and Cantarell II, to Grupo R.

## APRIL

BraFELS was awarded an FPSO module fabrication and integration project worth S\$190 million by repeat customer MODEC.

## MAY

Keppel O&M completed the acquisition of Cameron International Corporation's offshore product division, which comprises the LETOURNEAU™



Keppel's BrasFELS shipyard has a strong track record of delivering milestone projects for Brazil. It previously delivered FPSO Cidade de Mangaratiba MV24 to MODEC in 2014, ahead of schedule



After adding the LETOURNEAU™ designs to its own offerings, Keppel now has more than 26 jackup rig designs covering almost every requirement and condition in the market. Keppel had previously completed 16 such rigs, including the Papaloapan jackup, a LETOURNEAU™ Super 116E design, which was built by Keppel AmFELS in Brownsville, USA

jackup rig design, rig kit business, as well as its aftersales and aftermarket services. The acquired company is named Keppel LeTourneau and has presence in the US, United Arab Emirates and Singapore.

Keppel O&M entered into a shareholders' agreement with Rosneft Oil Company and MHWirth to set up a Singapore incorporated Joint Venture Company (JVCO). The JVCO will focus on the design and engineering of mobile offshore drilling units for shallow waters to cater to the region.

**JUNE**

Keppel Singmarine delivered a high-specification deepwater

derrick lay vessel, DLV 2000, to Hydro Marine Services, a subsidiary of McDermott International.

Keppel AmFELS delivered one of the world's largest Harsh Environment Enhanced Mobility land rigs.

**JULY**

Keppel O&M appointed Mr Chris Ong as Managing Director of Keppel FELS.

Keppel O&M won 35 awards at the Workplace Safety & Health Awards 2016.

KS Investments entered into a shareholders agreement with Shell Eastern Petroleum for the formation of a Singapore incorporated JVCO, which will establish a LNG bunkering business in Singapore.

Keppel AmFELS delivered Uxpanapa, a KFELS B Class jackup rig, to Mexico's Central Panuco, a subsidiary of Perforadora Central.

Keppel Singmarine secured contracts from Jan De Nul Group to build three Trailing Suction Hopper Dredgers worth about S\$100 million in total.

Three Keppel O&M projects – DSS™ series semisubmersibles, arctic icebreakers and the N Class jackup rig – were among the



Developed by Keppel's design arm, Marine Technology Development, the DLV 2000 is testament to Keppel Singmarine's strong track record in designing efficient and specialised units to meet the needs of the market

*Continues on page 16...*

Continued from page 15.

Top 50 Engineering Feats at The Institution of Engineers Singapore's IES-SG50.

### AUGUST

Keppel Singmarine delivered its fifth anchor handling tug to Seaways International.

### SEPTEMBER

Keppel FELS delivered Floatel Triumph, the fifth high-specification accommodation semisubmersible, to Floatel International.

Keppel Shipyard delivered an LNG FSU, Armada LNG Mediterrana, to Bumi Armada.

### OCTOBER

Keppel O&M secured contracts to build its first two dual-fuel diesel LNG tugs, and signed an MOU with Shell to jointly explore opportunities in using LNG as a fuel.

Keppel Shipyard delivered Armada Kraken, a harsh-environment FPSO unit designed for operations in the North Sea, to Bumi Armada.

### NOVEMBER

Keppel Shipyard delivered one of the world's largest FPSO vessels, Armada Olombendo, to Bumi Armada for operations in offshore Angola. The yard also delivered a spread-moored FPSO unit, Karapan Armada Sterling III, to Armada Madura, a joint venture between Shapoorji Pallonji and Bumi Armada.



The Seaways 24 is the fifth unit in a series of sophisticated and versatile Anchor Handling Tugs that Keppel Singmarine has built for Seaways to date



Keppel FELS delivered Floatel Triumph, the fifth high-specification accommodation semisubmersible built to Keppel's proprietary SSAU™5000NG design, safely and on time



The Armada Kraken, is a harsh-environment FPSO unit built in compliance with the strict regulatory guidelines as defined by the UK Health and Safety Executive and Department of Energy & Climate Change regulations

# 10 Life Saving Rules

Keppel Offshore & Marine (Keppel O&M) has unveiled its 10 Life Saving Rules to guide employees on safe working behavior and to empower them to intervene and stop any unsafe acts in the workplace.

To drive home the message and align all workers and staff in making its yards and offices a safe working environment, Keppel O&M put together the Life Saving Rules booklet, complete with easy-to-remember icons, and distributed it to employees across its business units.

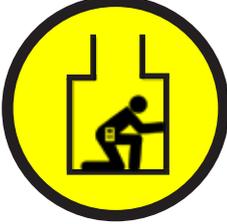
Leveraging its biannual Safety Day on 30 November 2016 to introduce Keppel O&M's Life Saving Rules to staff and workers, Keppel Singmarine called on them to take heed of the Life Saving Rules and corresponding icons and to reaffirm their collective commitment to safety.

Addressing the Safety Day attendees, Mr Abu Bakar Mohd Nor, MD of Keppel Singmarine, said, "Here at Keppel, we believe that all incidents are preventable and these Life Saving Rules have been identified as integral

in the prevention of near-miss occurrences and accidents in the workplace. We urge you to familiarise yourselves with these 10 simple rules in the booklet. Everyone has the power to intervene and put an end to unsafe acts."

Keppel Singmarine's biannual Safety Day was launched as part of its Health, Safety & Environment Action Plan and serves to drive awareness on safety related issues, guidelines and regulations.

## Life Saving Rules

 <p><b>Staying Alert &amp; Keeping Safe</b> I stay alert and am aware of hazards around me</p>	 <p><b>Risk Assessment</b> I only start work after I know the specific job hazards and how to stay safe</p>	 <p><b>Line of Fire</b> I position myself in a safe zone, away from any Line of Fire situations</p>	 <p><b>Working at Height</b> I have full Fall Protection whenever I work at height</p>	 <p><b>Hot Work</b> When doing hot-work, I ensure the workplace is gas free and no flammable materials are around</p>
 <p><b>Permit-to-Work</b> For jobs that require Permit-to-Work, I ensure all controls are in place before starting work</p>	 <p><b>Lifting Operations</b> I never put myself under a suspended load</p>	 <p><b>Confined Space Work</b> I always work with a Buddy when doing Confined Space works and ensure the Confined Space is gas checked before entering</p>	 <p><b>Energy Isolation</b> Before starting work, I ensure all energy sources are fully isolated and it is safe for me and people around me</p>	 <p><b>Management of Change</b> I will stop the job and consult my Supervisor if there is any change in work plan or worksite environment</p>

Keppel Offshore & Marine's Life Saving Rules

# Strong safety culture

BrasFELS, Keppel's yard in Brazil, held the 15th edition of its "Prevention of Accident at the Workplace Week" in November 2016. Themed "Safety starts with me", the annual event aims to educate employees on their collective responsibility to ensure a safe working environment.

During the week, employees attended various talks and workshops covering topics such as safety training with rotating

portable equipment, working at heights, and occupational hearing loss, amongst others.

In addition, children of BrasFELS' employees were invited to participate in a drawing competition, held in conjunction with Children's Day on 12 October 2016, to nurture a strong safety culture among employees' families. A total of 48 drawings were submitted across three age categories.

"The drawing competition was an excellent initiative to educate our young on the importance of safety," said Solange Chagas Moreira, Quality Control Auxiliary at BrasFELS, and mother of João Pedro, one of the winners of the drawing competition.

## SAFETY MILESTONE

BrasFELS and MODEC have achieved one million safe manhours on their latest Floating Production Storage and Offloading (FPSO) collaboration, Cidade de Campos dos Goytacazes MV29.

The project teams celebrated the safety milestone together with Petrobras and Karoon Gas during the latter's visit to the shipyard. BrasFELS and MODEC Offshore Production Systems also held a ceremony to present tokens of appreciation to three employees in recognition of their exceptional contributions.

Mr Luiz Caetano, Operations Director of BrasFELS, said, "Cidade de Campos dos Goytacazes MV29 is our fifth FPSO project with MODEC companies. We are proud of our partnership with MODEC. Our four previous projects were delivered safely, on time and to high quality standards.

"We are committed to ensure strong execution of our projects and will continue to build upon operational and safety capabilities to achieve this goal."



During the Week for the Prevention of Accident at the Workplace 2016, children of BrasFELS employees were encouraged to participate in a drawing competition to nurture a strong safety culture among employees' families



BrasFELS celebrated one million safe manhours on their Floating Production Storage and Offloading project, Cidade de Campos dos Goytacazes MV29, together with representatives from Karoon Gas, Petrobras and MODEC

# Reinventing marine operations

Imagine being able to “feel” objects underwater in the comfort and safety of an office desk. This is technology that Professor Oussama Khatib at Stanford University has developed, and could reinvent future marine operations.

Speaking at the 14th Keppel Offshore & Marine (Keppel O&M) Lecture organised in conjunction with National University of Singapore (NUS) Centre for Offshore Research and Engineering, Professor Khatib introduced humanoid robot OceanOne. The event was held on 6th January and attracted a sizeable crowd of over 200 participants.

Fitted with human vision, haptic



Dr Lee Boon Yang (fifth from left), Chairman, Keppel Corporation, Mr Loh Chin Hua (eighth from left), CEO of Keppel Corporation and management of Keppel Offshore & Marine thanking Professor Khatib for his informative lecture

force feedback and an artificial brain, OceanOne is a robotic avatar that allows the operator to feel what the robot is doing during an underwater expedition.

By distancing humans physically from dangerous workspaces while connecting their skills, intuition and experience, this technology has the potential to

reinvent marine operations such as underwater pipeline maintenance and coral reef monitoring.

OceanOne was first deployed in 2016 off the waters of Toulon, France, where it successfully recovered artifacts from the flagship of King Louis XIV that have been untouched for centuries since its sinking in 1664.

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## Subcontractors night

Management and employees of Keppel FELS gathered to celebrate the collaborative spirit and unity shared with its subcontractors at the company’s 13th Subcontractors Night held on 18 November 2016.

Addressing the audience that

comprised over 120 subcontractors, Mr Chow Yew Yuen, CEO of Keppel Offshore & Marine (Keppel O&M), said, “As a result of strong headwinds affecting the industry, we are restructuring Keppel O&M to make the company leaner and stronger in preparation for the upturn.

“We will continue to look for opportunities in new market segments and we are glad that in this period of transition and change, we can continue to count on all of you as we work together to ride out the storm.”

In appreciation of the lasting partnerships forged over the years, 13 subcontractors were presented with the ‘10-year Partnership Award’ and two recipients received the ‘20-year Partnership Award’. Three subcontractors also received awards for their meticulous execution to uphold high standards of safety.



During the 13th Keppel FELS’ Subcontractors’ Night, the company expressed appreciation for the hard work put in by its subcontractors to ensure multiple successful project deliveries over the years

# United as *OneKeppel*

The 2016 Keppel Games came to a stunning close with the last three sports events held during the Grand Finale at Ngee Ann Polytechnic sports complex on 20 November 2016.

Hot on the heels of defending champions Atlantic, Caspian and Pacific put up a strong fight.

Despite this, Atlantic emerged

victorious once more, clinching the Overall Challenge Trophy by winning a grand total of 29 gold medals as well as the Grand Challenge Trophy.

Old rivalries flared again at the swimming championships, with dark horses Pacific and Caspian pulling off a few podium finishes to upset Atlantic's dominance.

Pacific managed to take one back by winning the Men's 4 X 100m Relay event, with passions running high amidst deafening cheers from the stadium.

Despite the fierce competition, Keppelites demonstrated camaraderie and sportsmanship in abundance throughout the Games by helping each other on and off the field.



Management and Keppelites epitomising the OneKeppel spirit at the 2016 Keppel Games

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## Empowering Lives

On 14 December 2016, the BrasFELS' Alumni Programme consisting of current and former participants of the two-year Trainee Engineers programme, held its biannual briefing for the shipyard's management and alumni members.

The Programme, which saw the introduction of its new executive committee during the event, successfully organised a wide variety of activities in 2016 such as Technical Workshops, the BrasFELS Olympic Games and volunteer

initiatives such as the Teach-It-Forward programme, which actively engages students through industry sharing sessions and tuition classes.

The management awarded certificates of participation to the Programme's Executive Committee, as well as two of the most active volunteers, for their efforts in the Teach-It-Forward programme, which has had a positive impact on the community.

Marlin Khiew, President of

BrasFELS, said at the event, "Our future is exactly what we do and what we fail to do today. Students who participate in the Teach-It-Forward, for example, they are potential employees or suppliers of BrasFELS. The Alumni Program is there to build our foundation, the foundation for our future. A future that these children will surely be part of. Internalise what Keppel's Core Values mean to you and the community. If we apply these values to everything we do, we will make the difference."

# Recognising long-serving stalwarts



Keppel O&M Management with the Long Service Award recipients

Business units across Keppel Offshore & Marine (Keppel O&M) acknowledged and thanked long-serving Keppelites who have each contributed some 10 to 40 years of loyal and unwavering service.

211 Keppelites from Keppel Shipyard and Keppel Singmarine were honoured for their dedicated service at the Long Service Awards Ceremony held on 18 November 2016. Each of the long-serving stalwarts have been with the company for an average of twenty years.

In Brazil, 223 Keppelites from BrasFELS were recognised for contributing 10 years to the company. The three-day event held from 6-8 December 2016 saw Keppelites from different departments each receive a token of appreciation from the BrasFELS management.



Mr Michael Chia (right) received his long service award from Mr Chow Yew Yuen, CEO of Keppel O&M

"I began my career in Keppel FELS in 1980 and over the years, I took on different roles, from yard facility planning to corporate development. It has been an extremely rewarding journey and I have had the privilege to lead some very dedicated and driven Keppelites."

**Mr Michael Chia**  
MD (Marine & Technology),  
Keppel Offshore & Marine,  
35 years of service



Mr Burt Loh was one of the forty Keppelites who celebrated 40 years of service with Keppel O&M

"In my four decades in Keppel, I have not just advanced my career but also built my family. I am glad to have grown together with my fellow colleagues and friends."

**Mr Burt Loh**  
GM (Operations),  
Keppel Shipyard,  
40 years of service

# Concluding 2016 on a positive note



Keppel O&M Management led by Mr Wong Ngiam Jih (seated fourth from left), CFO, Keppel O&M, Mr Michael Chia (seated fifth from left), MD (Marine and Technology), Keppel O&M and Mr Abu Bakar (seated sixth from left), MD, Keppel Singmarine, and staff at Keppel Singmarine's Appreciation Lunch

Despite the headwinds in the oil and gas industry, Keppel Offshore & Marine (Keppel O&M) has soldiered on due to the collective efforts of staff who were dogged and resolute throughout the year.

In appreciation of their hard work and *Can Do!* spirit, year-end events were held and management took this opportunity to thank employees who have helped make the company more resilient, as well as clients and contractors for their continued support.

For Keppel Shipyard, an informal lunch was held on 30 December at the Benoi, Gul and Tuas yards for staff and business partners to get together. In addition, awards were presented to outstanding employees, including those who participated in the Innovation Quality Circles (iQC) campaign as well as the fiercely contested Keppel Games.



BrasFELS employees enjoyed a Christmas musical by the BrasFELS choir at the year-end event

Keppel Singmarine's Appreciation Lunch which took place on 29 December saw active participation from its management trainees, who put together a skit highlighting the importance of synergy and teamwork amongst the departments, and how collective strengths of individuals can be leveraged to overcome hurdles.

Over in Brazil, BrasFELS Shipyard employees gathered for its year-end event on 13 December 2016. During the event, employees enjoyed a Christmas musical put up by the BrasFELS Choir. Winners of the innovation awards organised by BrasFELS and Keppel O&M were also recognised.

# Latin American flavour

Now into its 6th edition, the annual Keppel Latin American Film Festival has garnered a loyal following in Singapore. Long queues of avid movie-goers were seen at Golden Village Suntec City for this year's festival held from 17 to 20 November 2016.

Opening night saw various ambassadors, diplomats and business leaders treated to a screening of "Panama Canal

Stories", an anthology of five short dramas trailing the lives of locals affected by the strategic canal from 1913 to 2013.

Speaking at the opening, H.E. Alfredo A. Spiegel Aponte, the Ambassador of Panama to Singapore, said the film tells stories that are "unique and riveting", while shedding light on aspects of the republic's history that few outsiders know.

The Keppel Latin American Film Festival is jointly organised by the embassies of Brazil, Colombia, Costa Rica, Chile, Mexico, Panama, Peru, Venezuela and Uruguay in Singapore. Sponsored by Keppel Offshore & Marine, the festival showcases diverse and award-winning films from each of its 10 member countries.

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# Making a difference together

Wrapping up a year of making a difference in the community, Keppel Volunteers held its annual appreciation event on 5 December 2016, in conjunction with International Volunteer Day.



Mr Thomas Pang (left), CEO of Keppel Telecommunications & Transportation, and Mr Robert Chong (right), CEO of Keppel Care Foundation and Director, Group Human Resources of Keppel Corporation, congratulating the Volunteer of the Year, Ang Wen Xiang (middle), an engineer at Marine Technology Development, Keppel Offshore & Marine

Over 30 regular volunteers received certificates of appreciation for their faithful service to beneficiaries supported by Keppel Care Foundation.

In collaboration with Corporate Social Responsibility (CSR) teams from across the Group, Keppel Volunteers exceeded the 2016 target of 6,000 volunteer hours. Other milestones shared at the event included the setting up of overseas Keppel Volunteers chapters in China, Vietnam, Philippines and Brazil.

Sharing his experience in the Keppel FELS CSR committee, vice-chairperson Soon Ning said he was thankful for the unwavering support from Keppel FELS' management. At every event organised, at least one middle-management representative

would show up to walk the talk. He added that the motivation for organising such activities was not about meeting target hours, but to encourage volunteerism as a way of life for Keppelites.

The special award of Volunteer of the Year was presented to Ang Wen Xiang, an engineer at Marine Technology Development under Keppel O&M, for participating in and organising a record 25 events during the year.

Wen Xiang shared, "Keppel Volunteers provided me with a platform to push myself to come up with diverse and interesting activities to engage our beneficiaries meaningfully. My wish for every event organised is that there are not only takeaways for beneficiaries but also for our volunteers to apply in their lives."

# Season for giving



Keppel O&M Management presenting canvas drawings of golden roosters at the Keppel FELS Chinese New Year get-together

This festive season, Keppel Offshore & Marine (Keppel O&M) took the opportunity to pool resources and give back to local communities. This was a timely reminder of the importance of doing good as much as doing well.

The Keppel FELS Chinese New Year (CNY) committee organised a donation drive in December 2016 and sold unique EZ link cards designed by Yeo Wei Zheng from the Outfit production team. With the help of over hundred Keppelites, a total of \$6500 was raised for the beneficiaries from Thye Hua Kwan (THK) Ang Mo Kio.

The cheque for the money raised was presented to Mr Lee Kim Siang, Chairman of THK, at the Keppel FELS CNY get-together held on 27 January 2017. Attendees of the event, including Keppel FELS staff and business partners, were treated to an exciting programme of calligraphy presentations and canvas drawings.

“The donation drive was a way



BrasFELS volunteers celebrated Christmas with children from Lambicada neighbourhood

of giving back to the community. This year, we designed a zodiac-themed EZ link card to encourage Keppelites to collect all 12 zodiacs designs over the next 11 years. The response was fantastic, and we look forward to continuing this donation drive on a yearly basis”, said Tan Wei Jie, Chairman of the Keppel FELS CNY committee.

On 17 December 2016, volunteers from BrasFELS participated in two volunteer initiatives, bringing joy to the young and old in the community.

The afternoon started with a visit to the Elderly Home São Vicente de Paulo Charity Association, a

non-profit organisation. After a performance by the BrasFELS choir, the volunteers handed over daily necessities donated by BrasFELS employees.

Later that afternoon, four BrasFELS volunteers joined a group of children for a Christmas celebration organised by the Neighbourhood Association of Morro da Lambicada community, located close to BrasFELS shipyard in Agra, Brazil.

Bringing gifts of toys to the underprivileged children living in the area, this is the second time BrasFELS has supported supported Lambicada’s Christmas celebration.

# Caring for the environment

Keppel Offshore & Marine participated in multiple initiatives over the past few months as part of efforts to increase awareness of personal responsibility for the environment.

On 1 December 2016, over 30 management and employees from

Keppel FELS participated in a beach clean-up at Pasir Ris Beach in Singapore.

The volunteers worked together to gather and remove trash that had washed up on the coastline.

First-time volunteer Ong Teng Ho,

Production Engineer, Keppel FELS, shared, "The sheer amount of litter that we found along the beach is an important reminder that everyone has a part to play in protecting the environment. I will definitely participate in future clean-ups."

This event was the first in a series of quarterly tie-ups that Keppel FELS will be organising to keep Singapore's beaches and waterways trash free, in partnership with the National Environment Agency's Public Hygiene Council.

In Brazil, BrasFELS' Environment and Integrated Management Systems department organised an environmental workshop for students from the Cornelis Verolme Municipal School on 20 October 2016 in celebration of the country's National Tree Day.

The workshop gave students the opportunity to sow their own plants, allowing them to appreciate the challenges of the planting process, as well as experience the joy of seeing their plants grow over time.

Since 2015, volunteers from BrasFELS have been engaging the students from Cornelis Verolme Municipal School through the shipyard's Teach-It-Forward Programme, where they conduct Portuguese and mathematics classes for students in need of academic assistance. The school is located near the shipyard in Angra dos Reis, Brazil.



It was a morning of hard work as volunteers and management of Keppel FELS, including Shipyard Manager, Mr Roy Lim (foreground, centre), participated in the beach clean-up to preserve the environment



Employees from BrasFELS and students from the Cornelis Verolme Municipal School commemorated the National Tree Day in Brazil by planting seeds for the future

# Brightening lives

Keppel Volunteers continues to support a variety of worthwhile causes as it strives to make a positive impact on local communities.

## GREEN FINGERS

Keppel Volunteers organised a terrarium workshop for 35 students from Student Care Services (Hougang) on 27 October 2016, where 20 Keppelites bonded with the students while helping them create their own personalised mini gardens.



Keppel Volunteers and youth from Student Care Services (Hougang) were all smiles as they created colourful terrariums and fond memories together

Kelvin Xu, Assistant Research Engineer at Keppel Offshore & Marine Technology Centre, shared, "It was a fun and enriching session. I was heartened to see the students beaming with pride at their unique art pieces."

## SUPPORTING YOUTH

Twenty-six volunteers from Keppel Batangas Shipyard joined hands on 22 October 2016 to participate in the annual Alay Lakad, a nationwide walk that aims to raise

funds for out-of-school youth in the Philippines.

Mr Richard Cabral, President of Alay Lakad Association of Bauan (ALAB), said, "We are appreciative of Keppel's continuous support in providing technical training to Bauan's out-of-school youth, equipping them with practical life skills to enhance their employability so that they can grow to become contributing members of society."

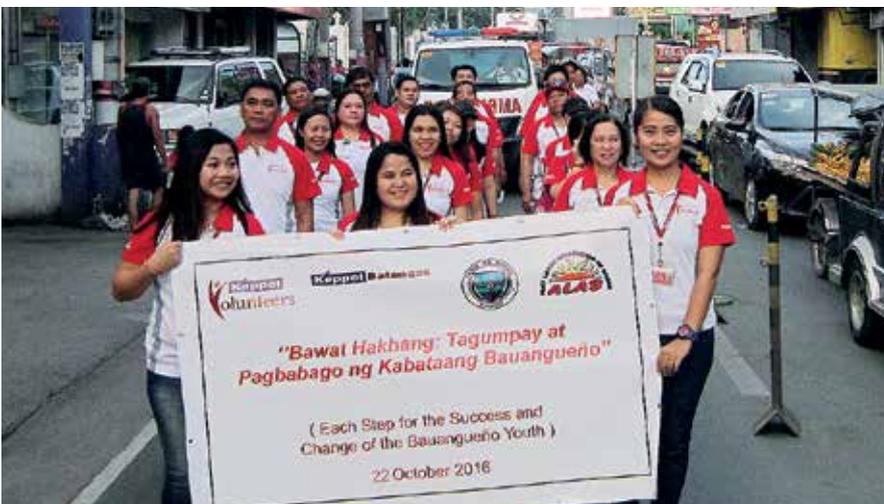
Mr Wong Jen Ming, President of Keppel Batangas Shipyard, added, "In Bauan, the percentage of out-of-school youth is 9.9%, whereas the Philippines national average is 3.5%. This makes this programme all the more integral to building a better future for the community."

To date, a total of 25 ALAB scholars have graduated from the Shielded Metal Arch Welding and Structural Fitting training courses at the Keppel Batangas Training Centre.

## MARINE CONSERVATION

As part of Keppel's environmental conservation efforts, 30 Keppel Volunteers from Keppel FELS participated in an Intertidal Watch survey workshop led by the Singapore's National Parks Board (NParks) on 30 October 2016.

The workshop aims to equip volunteers keen on participating in NParks' Intertidal Watch surveys with the necessary skills to collect quantitative data to aid in the science-based management of Singapore's coastal areas.



In the Philippines, Keppel Volunteers took a morning walk through Bauan to raise funds for the town's out-of-school youth

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# Baku Shipyard secures new contracts

Keppel Offshore & Marine's (Keppel O&M) joint venture shipyard in Azerbaijan, Baku Shipyard LLC, has secured orders to build four new vessels.

On 18 November 2016, it signed a contract with Caspian Shipping Company to build two crude oil tankers that can enter the shallow ports around the Caspian Sea as well as travel along the narrow Volga-Don and Volga-Baltic canals.

The self-propelled tankers will be equipped with six cargo tanks each and be able to carry crude oil and petroleum products with densities of up to 1.015 t/m<sup>3</sup>.

The contract was signed by the Chairman of Azerbaijan Caspian Shipping CJSC, Mr Rauf Valiyev, and GM of Baku Shipyard, Mr Lam Khee Chong. The signing was witnessed by H.E. Ilham Aliyev, President of Azerbaijan.

Earlier, Baku shipyard had signed a contract on 26 October 2016 with Azerbaijan Caspian Shipping CJSC for the construction of two new unique Ro-Pax (roll-on/roll-off passenger) ferries.

The ferries are designed for freight and passenger traffic across the Caspian Sea.

Baku Shipyard was jointly developed by SOCAR, Azerbaijan Investment Company (AIC) and Keppel O&M. SOCAR, AIC and Keppel O&M own 65%, 25% and 10% share in the yard respectively.

The 62-ha yard is capable of undertaking the construction of a wide range of specialised vessels and merchant ships including subsea vessels, anchor handling tug/supply vessels and multi-purpose offshore support vessels such as platform supply vessels, as well as tankers and cargo vessels. The yard also has ship repair and conversion capabilities.



President of the Republic of Azerbaijan Ilham Aliyev (left), witnessed the signing of the contract for the two oil tankers by the Chairman of Azerbaijan Caspian Shipping CJSC Mr Rauf Valiyev (center) and the General Manager of Baku Shipyard Mr Lam Khee Chong (right)