

Keynote Speeches (approx 10 mins)

Maritime Education (Prof Freddy Boey, Provost, Nanyang Technological University)

Maritime Sector (Mr Andreas Sohmen-Pao, CEO, BW Maritime)

Offshore Sector (Mr YY Chow, COO, Keppel Offshore & Marine)

Research & Development (Dr Claus Myllerup, MD, Lloyd's Register Group Technology Centre)

Singapore Maritime Institute (SMI) Forum 2012

29 Nov, 9am - 2pm, Nanyang Executive Centre

Keynote Speech (Offshore Sector) by Mr Chow Yew Yuen, COO, Keppel O&M

Objective: To share on the development and trends of the offshore sector

Mr S S Teo, Chairman, Singapore Maritime Institute

Professor Freddy Boey, Provost, Nanyang Technological University

Mr Andreas Sohmen-Pao, CEO, BW Maritime

Dr Claus Myllerup, MD, Lloyd's Register Group Technology Centre

Distinguished guests, Ladies and Gentlemen,

A very good morning,

Introduction

- Today I am pleased to be able to share with you on the outlook for the offshore sector, Singapore's role and how we can play a part in the sector's growth.
- Singapore has built about 70% of the world's jackup rigs and more than 50% of the semisubmersible rigs since 2000. We are also a leader in the conversion of Floating Production Storage and Offloading Vessels or FPSOs, typically capturing some 60% of market share.¹
- Customers come to Singapore because we have carved a reputation for consistently delivering products of high quality in a safe and timely manner. The country has also produced a suite of technologically advanced rig designs which have become widely adopted in the industry.
- Over the years, the offshore industry had its share of ups and downs. Up to mid 2004, the industry was in a prolonged industry downturn. When the building boom arrived, it was interrupted by the Global Financial Crisis in 2008 and 2009.
- However, Singapore yards weathered that storm well as we had a good backlog of orders built up from 2006 to 2011. Despite the downturn, we continued to build up our capabilities and seized opportunities as they came.

¹ According to International Maritime Associates *FLOATING PRODUCTION SYSTEMS* report July 2012

- In late 2010, we began to see the industry recover as the market still needed new rigs, having endured under investment in the past 20 years.
- Today, there are about 80 jackup rigs on order worldwide, of which some 51 rigs are with Singapore yards. Singapore yards are also building 8 of the 32 semisubmersibles on order in the market.

Global economic climate

- Despite the uncertain economic climate, the oil and gas sector has remained robust, backed by a steady oil price. The US economy is also showing some signs of recovery. E&P activities on both sides of the Gulf of Mexico are also on the rise.
- Demand for energy continues to increase with global population growth, greater wealth and the rise of the middle class in many parts of the world such as Asia and Latin America.

Demand for Energy, E&P development, oil and gas assets

- This demand is driving a new wave of exploration and production by oil companies in new deepwater fields and harsh environments.
- In addition, the high oil price seen over the last few years has resulted in a new cycle of investment and looks set to continue. According to Macquarie's estimates, Brent oil price is expected to stay above US\$105 per barrel and increase gradually to US\$118 by 2015.
- E&P spending in 2012 globally by oil companies is forecast to be close to \$600bn.
- The strong demand for oil and gas augurs well for Singapore companies in the offshore and marine cluster.

Trends in the offshore sector

Aging rig fleet

- There is a drive for a new cycle of replacement. Half of the world's existing fleet is more than 25 years old. Other than being inefficient, many of these rigs cannot operate in more complicated and deeper water operations.
- In addition, new jackups or floaters with higher capabilities help to reduce the total project cost due to a shorter drilling period required.

Deeper waters and harsher environments

- The development of deepwater and ultra-deepwater fields is rapidly increasing as shallow water discoveries become depleted.

- DNB Nor Markets notes strong growth in the number of fields onstream in 5,000 feet of water depth or above.
- Douglas Westwood expects \$29 billion in deepwater expenditure in the Asia Pacific region over the next five years.
- Areas where offshore activities are prolific include the golden triangle in the Atlantic Basin which is made up of Brazil, West and East Africa, and the Gulf of Mexico.
- More sophisticated rigs are needed as more oil discoveries are made in deepwater offshore frontiers, where operations are more complex and environmental conditions are harsher.

Safer and Higher specifications

- The Macondo incident in the Gulf of Mexico in 2010 underscored the need for modern assets equipped with the latest safety features and technology.
- We are also seeing more hurricanes and typhoons around the world. Offshore assets need to be able to withstand or evade these storms in a timely manner.
- With customised rig designs, drilling contractors can have the flexibility to incorporate unique features to reduce environmental impact, while addressing technological changes in drilling equipment and processes.

Technology and Innovation for new frontiers

- As the industry rapidly expands into deep waters and harsh environments, we must keep up with this development by evolving our designs, enhancing our solutions with the latest requirements and preferences.
- The modern jackup rig will be expected to drill faster, be more cost-effective, robust and well-suited to operate in various parts of the world such as the UK, Norwegian and other European sectors of the North Sea.
- There have also been advancements in harsh environment floaters which will be required to work in ultra deep waters of 10,000+ feet and be equipped with winterised features such as derrick cladding and machinery space heating.

Local content – Near Market Near Customer (Mobility of workforce)

- Another major trend in the offshore industry has been the rise in importance of national oil companies (NOCs), which are increasingly placing local content demands on assets such as rigs and offshore vessels deployed in projects in their waters.
- NOCs now account for the largest portion of E&P spending. According to DNB Markets, 42% of E&P spending in 2012 will come from NOCs.
- It is therefore helpful to the customer now more than ever that we go to where they operate to support their operations.

- This is most evident in Brazil where Petrobras has stated a requirement for 65 deepwater drilling rigs by 2020. They will also need 100 locally-built offshore support vessels by 2020.
- With Brazil demanding 55% to 70% local content, shipyards and supporting services have started setting up operations there.
- It is a market that companies in Singapore as well as in Asia can benefit from. Already, a number of new yards have set up there and they will need a strong supporting maritime cluster and infrastructure to be successful.
- Fortunately, we in Singapore saw the potential in Brazil more than 10 years ago and have successfully completed projects for them.
- As a result, for Petrobras' most recent tender of 28 drilling units, Singapore yards received 12 of those orders as well as several FPSO topside fabrication projects.

Productivity

- While there are many opportunities in the offshore sector, there is also stiff competition in terms of the number of ship and rig building yards around the world.
- In a market where financing has been impacted by the Eurozone crisis, cost competitiveness is a significant differentiator between winning and losing a job.
- We need to continually improve the processes and the productivity levels in our shipyards. For us in Singapore, the scarcity of land and the tightening of foreign worker quotas provides an additional impetus for us to find new ways to further improve productivity.
- We can do this through innovative building processes and leveraging technology to be more efficient.
- The use of mechanisation, automation and IT technologies can help to improve productivity.
- Besides implementing this within the industry, understanding productivity concepts and having the right mindset is what will drive continuous improvement.

Need for skilled workforce

- Even as the offshore and marine industry grows, there is an acute shortage of skilled personnel. We should look to develop a constant pool of talents.
- For example, Keppel has been working with schools and universities to provide scholarships as well as courses and seminars to increase the knowledge and technology capital in Singapore. The Keppel Professorship in Ocean, Offshore and Marine Technology in NUS is one such initiative.

- It is important that we support and collaborate with the government and the industry to attract, nurture, educate and develop a healthy pipeline of skilled engineers.
- Today, the Offshore and Marine industry in Singapore employs about 80,000 workers and accounts for about 2% of Singapore's GDP.
- This has resulted in educational institutions having more courses and R&D programmes related to the offshore and marine industry. There are now a wide range of good degree and diploma courses in mechanical, marine and offshore engineering subjects.

R&D

- Besides being cost competitive, staying relevant in the industry also means developing win-win solutions for the market.
- In Singapore, companies like ABS, DNV and Lloyd's register have set up R&D centres here, recognising the growing role Singapore is playing as a global offshore energy center.
- Earlier this year, Keppel O&M's Technology Centre and Conoco Philips announced plans to jointly design a first-of-its-kind ice-worthy jack-up rig to operate in the Arctic seas.
- When treading into the unknown, collaborations with like-minded partners is a way to reduce R&D costs and leverage each other's expertise to develop a breakthrough for the market.
- We also need to see how we can leverage our competencies to enter into adjacent industries and emerging markets and develop innovative solutions.
- The construction of offshore wind turbine installation vessels for the offshore wind market is one such example. The first such vessel was recently completed in Singapore and perhaps there can be more to come once the market picks up.
- The construction of drillships is another area we can improve on. While space is a disadvantage for us in Singapore in the building of drillships, we can find innovative solutions such as building compact drillships or provide modification services to drillship operators.
- Many companies also look to collaborate with universities and research centres around the world.
- For instance, Keppel is in the process of setting up a technology centre in Brazil where we can tap on the resources and technical competence of some of the top researchers and professors in the Brazilian universities.

- We are collaborating with NUS, University of Rio de Janeiro and University of Sao Paulo to work together with CENPAS, the research institute of Petrobras to work on offshore solutions for Brazil's pre-salt fields.

Conclusion

- Singapore's success as an international maritime centre is a result of the strong support from the government and industry partners in building up a comprehensive infrastructure and vibrant maritime cluster here.
- Favourable tax laws, efficient processing systems and importantly, skilled professionals have also played an important role.
- For Singapore to move up the technology value chain in the offshore and marine industry, we need to also be a top R&D centre and develop our own intellectual properties.
- From all indications, the fundamentals of the offshore sector will remain strong for years to come. The industry will need new technologies and innovations, and Singapore is in a good position to develop the right solutions.
- Thank you.