



The ABS classed *Cidade de Maricá* was converted into an FPSO by SBM, and classed in 2016. It flies the Bahamas flag and operates in the Lula Alto field. It has a production capacity of 150,000 bopd



# FPSOs: COVID-19, CONVERSIONS, SAFETY & THE CHANGING DIGITAL LANDSCAPE



There is always the discussion over whether to convert FPSOs or build new, but how has that changed during COVID-19, what impact does this have on safety, and how will the industry change as the world slowly recovers, asks Luiz Feijo, Director Global Offshore, Market Sector Lead – Production, American Bureau of Shipping (ABS).



It has been a tough 12 months, with offshore production activity fluctuating dramatically with changing market economics and a global health pandemic, heightened geopolitical tensions, and new IMO regulations which were introduced at the beginning of 2020. Four months into 2021, are the market parameters the same? I believe concerted efforts are being made to improve project economics across the floating production storage and offloading (FPSO) vessel market.

### An evolving market

More newbuilds are being scheduled than ever before, with standardised designs being introduced to lower CAPEX while maintaining safety levels. FPSOs in operation, or available for deployment, have grown 26% over the past 10 years – from 159 units at end-2011 to 200 units at end-2020. According to *World Energy Reports* database, 220 FPSOs are now in operation, on order, or available, accounting for 68% of the total oil/gas production floater inventory.

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Overall, the FPSO inventory is forecast to expand as incoming larger units join ageing FPSOs to expand production. Conversions are still in demand, although the focus for where conversions take place has transitioned from Singapore – once recognised as the conversion centre of the world – to China, which is absorbing a greater proportion of the conversion market.

Crucially, operators have to assess the viability of a vessel conversion that could be deployed for a prolonged service life as an FPSO, knowing that it will have more maintenance and fatigue issues towards the end of its lifecycle. The increased costs for integrity management expertise to minimise risk from an ageing asset and to enable continued safe operations need to be fully understood and planned for. Also, shorter life deployments are becoming more mainstream, as well as variances in vessel capacity, with some FPSO units as small as <20,000 b/d oil processing plants, and mega units capable of processing over 200,000 b/d.

Complexity is growing. Larger production capacity requirements supported by processes mean larger deck areas are needed for conversions. The large tankers for conversion are not so easy to find compared to just 20 years ago, which brings into play cost advantages for newbuild construction.

And there is more – markets are beginning to evolve as investment levels pick up, particularly in Brazil, where both Petrobras and international oil companies are again active. Around 38% of FPSO projects in the planning stage are located in Brazil, some of which require multiple FPSOs. Africa has 24% of planned FPSO projects. Nigeria and Angola account for two-thirds of the African projects. Other major locations are SE Asia, Northern Europe, Guyana/Suriname and Australia. New entrants are making strong headway in regions such as Mexico, where Petroleum Reform is opening offshore exploration and production to foreign companies. CAPEX associated with FPSO orders over the next five years is projected to total \$56 billion in the most likely scenario – an average CAPEX of \$11.2bn per year.

### COVID – a reality, or an excuse to delay FPSO maintenance?

The outbreak of the coronavirus (COVID-19) continues to impact global economic activity. However, progress in vaccinations brings cautious optimism for those working on converting FPSOs, or in newbuilds.

The virus has increased uncertainty in a number of areas of the FPSO market, including operational, commercial and financial activities. A key challenge in managing the operation of an FPSO is focused on ensuring the health and safety of its employees, while providing safe and reliable operations. Crew on board and staff onshore continue to take precautions with respect to social distancing and other measures, following local guidelines and regulations, to minimise the spread of the virus.

But the continuing international travel restrictions increase challenges for how maintenance and integrity support are performed, how conversion work projects are managed, and even to the extent of available crew changes.

“MARKET CONDITIONS AND INDUSTRY PRESSURES HAVE CREATED AN UNPRECEDENTED CHALLENGE FOR THE INDUSTRY'S SAFE OPERATIONS.”

Restricted access, and in some cases, closure of yards, ports and terminals in regions affected by Covid, have led to further operational issues for vessel conversions and repairs that will inevitably result in higher costs. A strain on critical material supplies and parts, adequate staffing and fulfilling operational obligations are still causing challenges throughout the supply chain. In certain countries, extensive staffing and supply shortages are delaying conversion and newbuild project deliveries by 12 months.

The one major issue is that neither corrosion nor ageing of structures stop. While the pandemic has increased

maintenance backlog significantly, at the same time, FPSO operators are trying to maximise production and avoid major disruptions. These market conditions and industry pressures have created an unprecedented challenge for the industry's safe operations.

### Advancing FPSO technology

FPSOs are complex units that require a significant amount of preventative attention for early stage identification of degradation, and to enable owners and operators to take proactive measures for maintaining structural integrity and reducing the need for refits. In the drive to achieve better, safer and efficient operations, the FPSO industry is turning to digital, data and technology to help improve the availability of their assets and how they are maintained, to manage OPEX reduction. However, are enough operators realising the tangible and measurable value from data?

Optimising maintenance activities for FPSOs is no longer time consuming, complex, and costly, and today's smart solutions allow operators not just to tackle the 'here and now' issues but to use a systematic, informed and optimised maintenance strategy. It represents a safety-first approach.

While the FPSO concept itself evolves, the real evolution influencing change is around asset management and the related technologies to support that activity. ABS has been effective in the use of data and the role of digital tools to help industry deliver the next generation FPSO performance and safety, and which touches every aspect of the project lifecycle; from design concept, through construction, operations, and end of life.

Combining data sets from multiple sources, together with the latest technologies, are driving the industry to make better decisions and, when combined with artificial intelligence and machine learning, even predict issues before they arise.

The digital twin solution and systems ABS makes available maximise the use of this data, managing and analysing



it to deliver unprecedented visibility into an FPSO, allowing operators to make the right choices faster to improve efficiency, safety, integrity, performance and return on investment.

ABS Condition Manager software has the unique feature of combining both the structure and the latest developments on machinery. This is the foundation of a complete condition model within a Digital Twin including remote tracking and trending of an asset's hull and machinery integrity. The recently-launched ABS My Digital Fleet platform is one of the only customisable risk management platforms that provide real-time data-driven insights to improve fleet efficiency, reduce costs and manage risks.

### New era

As technology matures, so too does the investment in more digital techniques and tools to unlock and enhance FPSO performance. This includes a digital asset framework that not only improves FPSO safety and performance with

digital twins, but also cyber security strategies, and remote technologies that support business sustainability and improve asset management. Just in the last 12 months, ABS has experienced an 800% accelerated use of remote surveys during the Covid-related travel restrictions. It is fast becoming the preferred option for many owners and operators who seek better ways to improve safe working practices, optimise scheduling efficiencies, increase operational flexibilities and reduce logistical costs. There are also direct benefits that feed into reducing a company's operational carbon footprint.

As FPSO operators and vendors begin to transition and adapt to digital asset integrity methods, it is the beginning of a new era for improved risk efficiencies. The 'digital first' approach is sparking innovation that makes more use of real-time monitoring, so that a company's technical team can safely perform more witness inspections from wherever they are in the world. ■



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