NEWSLETTER OF THE MARINE & OFFSHORE DIVISION

VeriSTAR news OFFSHORE

CONTENTS
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FOREWORD BY LARS KVERNELAND

Oil & Gas Manager
Norway

Oil & Gas has been through an extremely tough period since the oil price dropped dramatically back in 2014. But since 2017, oil prices have been in recovery, and industry players are starting to feel more optimistic. Investments have been increasing, even if clients continue to expect a strong focus on cost-efficient solutions. These include standardization, automation, digitalization and other innovative means that allow our customers to meet their business targets and to increase their competitiveness.
Bureau Veritas' 2020 strategy demonstrates our serious commitment do what is necessary to grow our business with both established and new Oil & Gas majors. ONS is one of the most important global energy meeting places, connecting international suppliers, operating companies and decision makers. Discover how Bureau Veritas can support you to meet your business goals.

Visit us at ONS*, 27-30 August 2018.

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SBM OFFSHORE MOVES A STEP CLOSER TO FAST4WARD™

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Bureau Veritas' relationship with SBM Offshore has gone from strength to strength in the past 18 months, through innovative projects and a global technical and commercial frame agreement encompassing classification, second-party inspection and design assessment studies. Its work with SBM Offshore, a market leader in floating production solutions for the offshore energy industry, started with support in the development of the company's flagship Fast4Ward™ project (pictured).

The world's first Multi-Purpose Floater (MPF) program, Fast4Ward™ provides a generic yet modular approach to standardize the construction and delivery of FPSOs. A Fast4Ward™ FPSO costs significantly less than a standard vessel, and the process can shave 6 to 12 months off the usual three-year wait for a third-generation FPSO. Through standardization and repetition, the company aims to offer greater safety, more costefficiency and productivity, more reliability and assured delivery deadlines.

Bureau Veritas was involved in SBM's internal FEED and provided full Basic Design Approval for the hull. It understood the company's generic and design envelope approach and made several recommendations that improved details of the hull structures. Impressed by the speed and quality of Bureau Veritas' support, SBM Offshore extended collaboration on the Fast4Ward™ project to full classification.

In doing so, it underlined its confidence in Bureau Veritas' surveying experience in the construction of ships and complex offshore units in China. China is the second-largest country for Bureau Veritas Group, with 10,000 employees, and is steadily becoming a second headquarters in marine and offshore expertise. This enables it to class FPSO concepts for both European and Chinese owners. Since 2017, Bureau Veritas was also selected to class four major offshore floating projects. In addition to plan approval offices, technical center and on-site presence in yards, Bureau Veritas offers an Advanced Technical Research Center in Shanghai that enables it to work on Approvals in Principle of innovative designs.

Bureau Veritas' teams in China work seamlessly with its teams in Europe and around the world: it ensures the undertaking of thorough engineering scrutiny, and that nothing is left to chance. During the fabrication, erection and testing phases, Bureau Veritas surveyors are responsible for assuring compliance with Rules, all statutory-based requirements and, equally as important, good manufacturing practices.

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WINTERIZATION INNOVATION

Transporters use arctic shipping routes to reduce distance between ports, but they must take special steps to combat frigid temperatures. "Whether carrying goods to the northern reaches of Norway or over to Alaska, shippers need to protect their vessels against icing," explains Atle Gundersen, Sales and Marketing Director for Roxel Products. "We help make sure they don't freeze up, even under extreme conditions."

Roxel Products is a subsidiary of Roxel Group, a diversified Norwegian company that supplies drilling and well products, systems and solutions around the world. It specializes in rig integration, control & automation systems, rig solution turnkey projects, and project management. Its headquarters is in Stavanger, in southwestern Norway.

"We really try to work closely with our customers to come up with intelligent and innovative solutions," says Atle, who joined the company in 2011. Roxel works with Bureau Veritas as part of this innovation process: "We use them as sparring partners for new projects: they have very competent engineers who help us ensure we get it right first time."

One example of this work is Roxel's winterization facility in Stavanger that tests equipment and procedures that help safeguard rigs and supply vessels against the harsh northern temperatures.

It has partnered with American company Advanced Mat Systems (AMS) to test newly developed de-icing mats called The Arctic Pad, with a heat trace conduit that de-ices escape routes and deck landings on vessels. "We can test everything," Atle says. "We can simulate snow, sleet and wind. Imagine a rubber mat with a heat trace cable in it. Instead of walking on the deck, you put the mats out, and they'll never have any ice on it."

AMS' heavy-duty heated rubber mat system is certified, but Roxel needed to get certified test procedures, for equipment used in the Arctic to be aligned with the updated International Code for Ships Operating in Polar Waters (known colloquially as the Polar Code). "We contacted Bureau Veritas to ensure our solution met the Polar Code's new set of guidelines and regulations," Atle says. "Bureau Veritas helped us devise the testing procedure, which we can then perform for the client. Beyond just consulting on the testing procedure, Bureau Veritas can class and certify the system for us, as well."

Bureau Veritas also worked with Roxel on another project, certifying that Managed Pressurized Drilling equipment was NORSOK-compliant and offering Independent Review Certification. "Often we have short timelines to work within, and we know Bureau Veritas will be there for us," Atle says. "When we call, they answer the phone! Their rates are competitive, and with a very large professional network, they have everything under control. There are never any issues."

www.roxel.no

CERTIFYING CARBON CAPTURE AND STORAGE

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Carbon Capture and Storage (CCS) is increasingly regarded as a promising counter-measure to the negative impact of CO_2 emissions on our planet. Its success depends on the correct implementation of critical aspects of the process.

Bureau Veritas is playing a major role in CCS by helping stakeholders achieve certification under Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide. We are proposing a certification plan that ensures integral safety throughout the CO_2 injection process operation and subsequent permanent storage. To be published soon, the plan includes:

1. Approval in Principle
2. Concept Approval
3. CIS - Certification of Conformity of CO_2 Injection and Storage Certificate
4. CISC - Certification of Conformity of CO_2 Injection, Storage and Closure Certificate
5. CISM - Certification of Conformity of CO_2 Injection, Storage, Monitoring and Post-Closure Certificate

We are additionally providing an Independent Module Certification for CO_2 Injection and Storage Systems, which will take into account country-specific legislations.

With this reliable certification framework in place, stakeholders can be assured that the process is being safely and successfully assessed, implemented and completed.

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RENTEL OFFSHORE SUBSTATION HELPS NEW STANDARDS DEVELOPMENT

Electrical offshore substations comprise a vital and complex installation that links an offshore wind farm's turbine and ensures that energy is transmitted to the electrical grid. As substations grow in size, so do challenges. Improvements must be based on development of efficient concepts and advanced functional platform design, while maintaining harmonized requirements.
At Bureau Veritas, we have gained valuable offshore wind experience working on European Offshore projects, and in substation certification in particular. Following on our work on


Courtesy Chantiers de l'Atlantique

Rentel in the North Sea, we are developing a new Guidance Note (NI651) that covers the design of Offshore Substations. Incorporating experience-based feedback and industry input, the Guidance Note responds to industry demands and addresses a clear and comprehensive overview of principles and technical requirements specific to the issues of offshore substations. In particular, our work includes guidance in geotechnical design and structural design for the jacket and topsides, with independent analysis. We are conducting other studies as well, including a review of corrosion protection.

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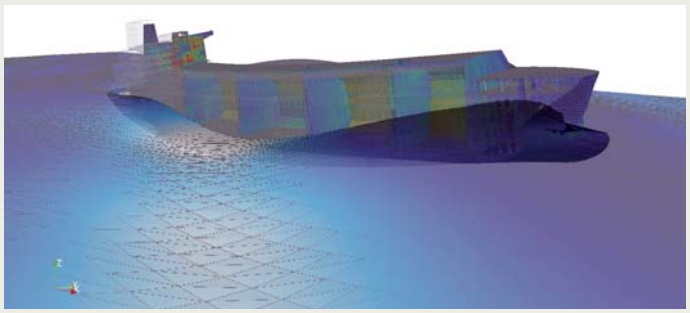
HOMER HELPS DESIGN UNCONVENTIONAL STRUCTURES



When designing offshore units against structural failure modes, such as yielding and buckling, the popular technique today is to review a limited number of load cases. These are defined to maximize a design load, such as vertical bending moment, horizontal bending moment, acceleration, pitch and roll angle. Questions arise, however, when dealing with unconventional units, such as those with large breadth/lenght ratio, unusual structural arrangement or a round hull. Are those design load cases still relevant? And how, amoung the 100 million waves encountered during the unit life, do we choose the few ones that are dimensioning for the structure?
The solution lies in combining HOMER, the powerful Bureau Veritas hydro-structure software, with an iterative methodology that defines the design waves to directly maximize the stress levels in some selected structural elements. By comparison with spectral analysis, it is verified that a dozen different Design Waves can maximize stress in all structural elements. Yielding and buckling checks can then be applied to verify the structure. This approach is a very good example of how R&D tools and methods can be used to improve efficiency and accuracy in offshore unit design.

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FULL SET OF RULES FOR **FSRUs**

Last November, Bureau Veritas published NR645, the first rules document fully dedicated to Floating Storage and Regasification Units (FSRU). Now, two new documents will soon see print.
NI655 deals with the conversion of existing liquid natural gas (LNG) carriers to FSRUs or FSUs. Particular focus will be on the scope of survey during conversions, reassessment of hull structure and cargo containment, modification needs of cargo handling systems, and in-service inspection programs.
Meanwhile, NR656 covers units equipped with power generation systems that serve as a power resource connected to the electricity grid. To cover such usage, which is increasingly seen as a relevant added service for FSRUs, a new class notation POWERGEN has been introduced and developed based on our experience on real projects.
With this new set of documents, we aim to help designers and operators by ensuring safe and reliable units that leverage our experience in the LNG field.

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Courtesy MOL

NEWS *IN BRIEF...*

COMMITTEE DISCUSSES OFFSHORE TRENDS Bureau Veritas held its seventh offshore technical committee meeting in June 2018. More than 30 industry participants shared their experiences and perspectives regarding innovative offshore wind farm vessels and cybersecurity. The Committee also discussed the new remote inspection techniques in the offshore industry. A roundtable discussion debated inspection programs for FSRU LNG containment systems. Members also discussed such topics as CO_2 injection and storage in oil & gas fields, as well as classification of the artic YAMAL LNG carriers.


Courtesy Shell

DEEPENING DECOMMISSIONING UNDERSTANDING

Earlier this summer, Bureau Veritas was delighted to launch its latest decommissioning guide at Decom Offshore 2018.

'Decommissioning on the UK Continental Shelf – an overview of regulations' provides up-to-date, easy to understand, guidance of the regulations that apply to decommissioning work, from operators and stakeholders to the supply chain.

In recent years, the decommissioning industry has grown as an increasing number of assets come to the end of their lives; with approximately $102 billion of decommissioning-related expenditure forecast to 2040 in Western Europe. This represents a significant opportunity for a supply chain that has proven itself willing to adapt to the increasingly challenging physical and commercial environment in the mature North Sea basin.

Decommissioning presents its own unique set of challenges, with extensive legal obligations placed on operators, engineers and project managers. The detailed guide, compiled by Bureau Veritas, describes the necessary procedures for operators and duty holders to plan, execute and follow-up decommissioning work and help them comply with the relevant legislation.

Bureau Veritas' experienced decommissioning engineers and inspectors have worked closely with dedicated partners in HSE services and plugging and abandoning assurance. The Guide is built on the wealth of knowledge accumulated on projects in the North Sea and around the world. While the Guide is focused on North Sea regulations, it is also designed to support operators in other oil and gas regions that will face the decommissioning challenge in the near future and will require this kind of thorough documentation to guide them through the process.

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Link to the downloadable guide

https://www.bureauveritas.com/White-Papers/offshore-decommissioning-guide

MODEC POWERS UP WITH NEW CONCEPT

Bureau Veritas combined its expertise in LNG shipping and FSRUs to assess the innovative concept design by MODEC for a floating storage, regasification, water-desalination and power-generation (FRSWP®) vessel. The new concept could provide clean energy and water faster and cheaper than current solutions.

MODEC developed three generic sizes of FSR-Power® solutions (FSRWP and FSR-Power are registered trademarks of MODEC, Inc.) ranging from 80MW to 1,000MW, with an FSRWP® concept ranging from 80 - 480 MW and 50,000 to 300,000 m^3 water/day. The vessel type and LNG cargo containment system differ depending on the size.

Bureau Veritas worked with MODEC to identify the potential incremental risk from the new features included in the concept compared to a standard FSRU or FPSO. Following a risk assessment, analysis was carried out on the concept's technical feasibility. An Approval in Principle was then issued, and contributed to the definition of tasks to be undertaken by the developer in the project's future development.

Experience gained on this, and other projects relating to units equipped with power generation systems has been used in the development of a new set of requirements and class notation: POWER-GEN.

MODEC notes that its Power and Water Solutions use LNG (or domestic gas) as a fuel source to provide power and water within 18 to 24 months of contract award. In addition, temporary power solutions can be provided within 60 to 90 days, making the concept faster, more economical and efficient than a conventional land-based solution.

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Mr.Toshiro Miyazaki, President & CEO MODEC receiving the AiP certificate from Matthieu de Tugny, COO Bureau Veritas.

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