



**CONTENTS**  
MAY 2019

**2** Marine Warranty Surveyors with Ark Syndicate  
Mexico's developing offshore market

**3** Twintelligence™  
Structural Bond Strength JIP

**4** Supporting the energy transition  
Enhance safety in FPSO designs

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**Digitalization presents challenges, but also offers opportunities. Bureau Veritas helps you seize them.**

As the digital revolution continues to impact offshore players the world over, Bureau Veritas is working to support our clients through this period of change. In addition to developing our internal systems to serve you more effectively, we are enhancing our service portfolio with customized responses to client needs. We are also gearing up to support upstream and downstream developments following major final investment decisions in the liquefied natural gas sector this year.

While the world's markets remain volatile, many show signs of recovery. We remain committed to improving our ability to meet demand as major projects are conceived, developed and implemented. One last thing: great news! We recently received approval from the U.S. Coast Guard for the use of Bureau Veritas rules as an alternative to the Code of Federal Regulations for offshore units.

**Come and talk to us at OTC\* in Houston, on May 6-9 2019 to discuss how we can support your business!**

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## TAPPING INTO THE POTENTIAL OF DIGITALIZATION



**In our industry, digitalization has the power to mitigate risk, improve assessment accuracy and create savings.**

For the oil and gas industry, the digital revolution has the potential to deliver major cost savings, but is also a source of disruption. Conscious of the potential impact on our own services, Bureau Veritas is working on an ambitious yet pragmatic strategy that focuses on the value add to our own operational efficiency and to our clients.

Bureau Veritas' mission is to ensure that the design and operational conditions of clients' marine and offshore assets meet acceptable safety levels. Thus far, this task has been accomplished by placing expert independent surveyors on board, which sometimes puts them at risk (e.g., when working in confined spaces). While their presence on board will remain necessary for many years to come, the development of new techniques, such as drones, ROVs and high-performance cameras, can help reduce risks. Furthermore, due to the increased amount of data they collect, these technologies will allow for more precise assessments of a facility's condition. If, for example, we compare a 3D laser

scan of a corroded link in a mooring chain with a conventional caliper measurement, it's clear that the laser technology drastically reduces uncertainties concerning the chain's corrosion status, allowing for better forecast and failure prognostics.

To maximize the benefits of innovative monitoring and inspection techniques, it is essential that data captured is analyzed efficiently and presented in an intuitive manner. By integrating condition data into a virtual representation of the asset, we can create a digital twin that mirrors a facility's operating life. By consolidating data collected from the physical asset, the twin provides unrivalled visibility over the asset's condition and facilitates timely decision-making. With these objectives in mind, Bureau Veritas is continuously improving our Veristar AIM<sup>3D</sup> solution for integrity management, developed in partnership with Dassault Systems. Veristar AIM<sup>3D</sup> has already been implemented for several floating facilities to help clients manage hull structure integrity. We are also working with operators on the possibility of implementing the solution for marine systems and equipment, as well as topsides, while interfacing with legacy information systems.

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## MARINE WARRANTY SURVEYORS AND UNDERWRITERS FORM STRONG BONDS

**Marine Warranty surveyors are the eyes and ears of underwriters when it comes to insuring offshore projects. Working hand in hand with underwriters, marine warranty experts are entrusted to protect all parties' interests and bridge the gap between clients and insurers. MatthewsDaniel is Bureau Veritas' leading provider of insurance services, and a longtime partner of Ark Syndicate. Melanie Raven, Senior Energy Underwriter at Ark Syndicate, details the importance of a strong partnership between underwriters and marine surveyors.**



**Melanie Raven**  
Senior Energy Underwriter  
Ark Syndicate

The Gulf of Mexico is known for powerful hurricanes that can shut down offshore projects. Perhaps nowhere are marine surveyors more vital, helping ensure that a critical load-out isn't in the path of any oncoming severe weather patterns. Marine surveyors are on-site to provide that safety check for offshore companies. "Everyone has the common goal of achieving a successful project," says Melanie Raven, Senior Energy Underwriter for Ark Underwriting. "It's three-way dialogue between insurers, our clients and surveyors."

### **A symbiotic relationship**

Ark is a Syndicate at Lloyd's of London that underwrites a balanced and diversified portfolio of insurance and reinsurance business, and has a particularly strong presence in the Energy industry. The underwriting process begins with a client's project submission, detailing their insurance needs. Once reviewed, an underwriter like Melanie will then reach out to an experienced surveyor. The surveyor's role is then to assess the risks associated with the agreed upon marine construction operations,

and ensure that risks are reduced to an acceptable level in accordance with best industry practice.

MatthewsDaniel, a founding member of the Society of Offshore Marine Warranty Surveyors (SOMWS), is one of the most technical marine warranty surveyor companies in the world. As such, it counts a significant number of SOMWS' 150+ members among its ranks. "It's good for your company's reputation if you employ a number of surveyors who are SOMWS-accredited," Melanie says. "It serves as a big endorsement to underwriters, knowing the surveyors we choose have certification from the society. It tells us immediately that they're someone experienced, with the necessary qualifications, who we want to work with."

Melanie has worked with MatthewsDaniel surveyors for decades. "They're a real constant in the industry," she adds. "Even as the market fluctuates, they maintain great reliability, always professional, upfront and transparent. They create that solid connection with clients and build confidence."

### **Business picking up**

That relationship will be all the more important in the near future. Though Offshore oil and gas projects slowed to a crawl when oil prices plummeted in 2014, there has been an upward trend over the last 18 months. "We're starting to see an increase in rigs being used, as well as wells coming on stream," Melanie says. "With more stable oil prices, there's greater confidence in the market. Underwriters and marine surveyors are not inundated yet, but the uptick in the number of offshore wells being drilled and projects in the pipeline is a very good sign of a more active future."

[www.arkunderwriting.com](http://www.arkunderwriting.com)

## MATTHEWSDANIEL BUOYS MEXICO'S DEVELOPING OFFSHORE MARKET

2019 has sparked a new era in Mexico's Offshore Energy construction industry, as Energy Reform legislation has opened up leases to foreign operators. The first of these projects, ENI Mizton, began construction earlier this year, and MatthewsDaniel was delighted to be at the forefront of this exciting development, acting in the capacity of Marine Warranty Surveyor. MatthewsDaniel will also provide marine warranty surveys for ENI's Amoca project, and has been awarded the same task for Hokchi Energy's field development project, both of which will be installed in the Bay of Campeche later this year.

As the floodgates have opened and more operators are realizing the development potential in Mexican waters, MatthewsDaniel is proud to partner with new clients, offering our vast regional knowledge and resources to support the safe installation of their assets. From our bases in Mexico City and Tampico, we have supported full field development installations in the Bay of Campeche for PEMEX for years, assisting with the loading, securing and installation of jackets, decks, piles and pipelines. We are looking forward to further expanding our

presence in the region as this exciting new era in Offshore Energy progresses. We will continue to bring our wealth of deepwater Gulf of Mexico expertise to new operators developing in Mexican waters for the first time.

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# TWINTELLIGENCE™ - THE RIGHT DATA, ANYTIME, ANYWHERE



Bureau Veritas Solutions M&O offers the ultimate in digital twin technology to ensure you stay way ahead of the competition.

Business is in a hurry. The right data is needed, right now. Veristar AIM<sup>3D</sup> is Bureau Veritas Marine & Offshore's revolutionary system that provides an accurate, four-dimensional, "as is" picture of your asset's condition. With Twintelligence™, information is available at all times, from any platform or device.

Veristar AIM<sup>3D</sup> does not just deliver advances in asset integrity management. Bureau Veritas Solutions – Marine & Offshore provides both the digital twin technology and its associated services, which apply across a variety of verticals, providing insight with regards to both Performance Assurance and Integrity Assurance. Veristar AIM3D provides

visual insights that are accessible anytime, anywhere, helping users balance the needs of both performance and integrity assurance.

Through Veristar AIM<sup>3D</sup>, you can view an exact digital replica – a twin – of your asset, showing it exactly as it is, wherever it is. This allows asset owners and operators to make better, faster, more informed decisions regarding performance and integrity, helping you gain competitive advantage and improving your ROI.

This is where insight and foresight meet analysis. This is a serious, technologically sophisticated business tool, the most intelligent digital twin solution on the market. This is the future of performance and integrity assurance. This is Twintelligence™.

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**BUREAU  
VERITAS**

**SOLUTIONS**  
Marine & Offshore

## STRUCTURAL BOND STRENGTH JIP GETS UNDERWAY

Bureau Veritas joins major players from across the industry to produce a guidance note that aims to accelerate the use of bonded repairs for offshore units.

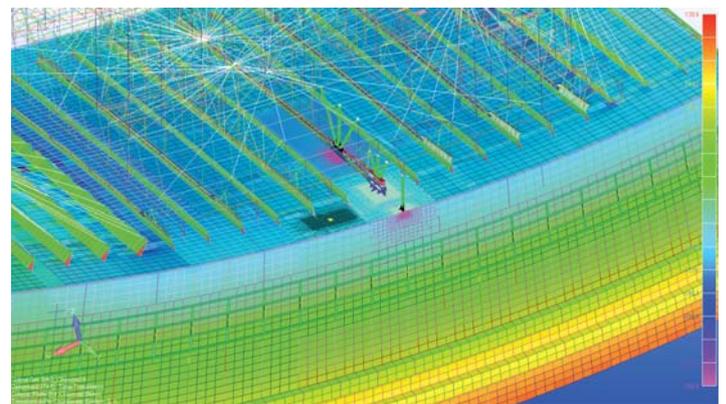
Bureau Veritas is initiating a Structural Bond Strength Joint Industry Project (JIP) that will work on assessing the strength of bonded repairs for offshore units.

FPSO units are permanently moored in oil fields, and dry-docking is only considered in the event of major damage. For a steel structure operating offshore – sometimes for over 20 years – corrosion is a constant threat and maintenance a real challenge. Conventional techniques of crop and renew result in a long cargo hold inerting phase, structural risks, production disruption and potential risks for operators.

Bonded repairs have the potential to overcome most of these problems, but their development has been hindered by a lack of recognized, industrially applicable guidance for qualification. The process is long, costly and incompatible with the industry's needs.

This JIP's primary objective is to study strength and fatigue of composite repairs for corroded steel plates. It will focus on the method and numerical tools needed for qualification in order to produce a generic guidance note. Its secondary objective is to gather data on typical composite repairs and develop the experience of all partners.

The consortium brings together major oil players, naval shipyards, composite manufacturers, bonded repair providers, software providers and specialist laboratories. Our goal is to produce clear and industrially applicable design guidance. The consortium includes experts with key knowledge of offshore bonded repairs and experience in all the necessary domains.



This three-year project, which benefits from the participation of a dedicated PhD student, kicked off in March 2019. JIP progress meetings will be held biannually during FPSO JIP week. The next meeting will be held in October, in Houston, Texas.

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## NEWS IN BRIEF...

### ■ BUREAU VERITAS' 8TH OFFSHORE TECHNICAL COMMITTEE

Bureau Veritas' eighth Offshore Technical Committee was held in March 2019. More than 40 participants from across the industry were invited to discuss the development of new rules and tools. These included new offshore rules, a classification scheme and method for Risk Based Inspection (RBI) of offshore floating assets, RBI methods

for jackets, guidelines for the certification of floating wind turbines and the VeriSTAR AIM3D asset life management solution.

With focus areas in Data, Representation, Intelligence and Collaboration, participants have discovered a range of techniques for improving, and collaborative solutions.



## SUPPORTING THE ENERGY TRANSITION

**The latest energy transition aims to answer a range of social, political and environmental challenges. The International Energy Agency's latest World Energy Outlook confirmed the peak oil for conventional fossil resources. Our global growth model based on energy consumption is therefore exposed.**

Today, the world total final consumption (TFC) is largely dominated by fossil primary sources, with 66% coming from coal, oil & natural gas. Electricity accounts for 19% of the TFC, with the remaining part being energy produced from biofuels and wastes. Final users of fossil

fuels are mainly transport (27%), industry (16%), residential (8%) and agriculture (4%) sectors. Large-scale electrification of these end use sectors is key for the energy transition, with a share in the total TFC reaching 40-45% by 2050, according to the International Renewable Agency.

To transform energy production, storage, transportation and distribution systems, substantial R&D budgets are available in Europe, Asia, and America. Power networks will move toward more hybridized generation systems, with electricity generation shifting from 25% of renewable sources today to 85% of renewable sources in 2050.

Bureau Veritas is involved in numerous onshore and offshore wind and solar projects, and brings key knowledge to designers and developers, helping to ensure the safe and efficient execution of these solutions. With solar and wind requiring greater system flexibility, electricity and gas made from renewables will be the two main energy carriers. Development of the electrical grid and gas network, as well as mid and long-term storage capacities (e.g., gas storage, battery, mechanical and thermal systems) will allow the shift from fossil-powered toward electric or gas-fueled transportation. Bureau Veritas' long history with gas storage and carriage, both on land and for marine environments, is valued by energy providers and operators as a way to answer numerous technical challenges.

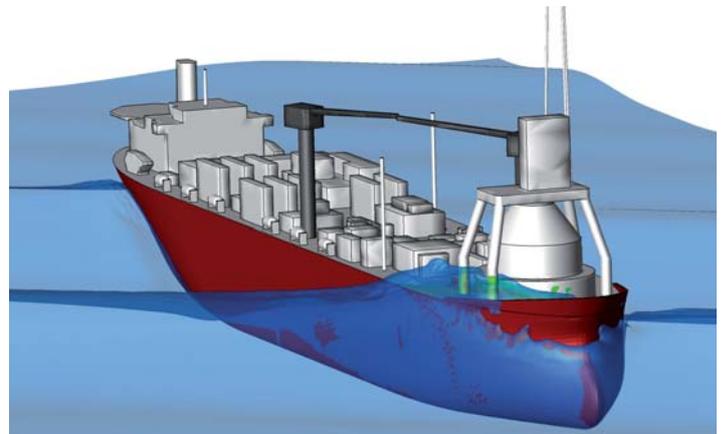
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## DEVELOPING A RISK-BASED METHODOLOGY FOR ADDRESSING GREEN WATER IN FPSO DESIGNS

**As part of an international JIP, Bureau Veritas explores how to use the results of scale model tests and CFD to enhance safety in FPSO designs.**

Recent FPSO projects in moderate to severe environmental conditions, such as the waters in the North Sea and around Brazil, have raised concerns among operators about the risks associated with green water. Greenwater occurs in severe weather conditions, when waves and motions can become so large that water flows onto the ship's deck, potentially damaging safety-critical elements of the unit.

Due to its complexity, current methods for managing this hydrodynamic phenomenon rely on the performance of tests using scale models. Developments made in Computational Fluid Dynamics (CFD) have enabled operators to add this as a complementary tool to model tests, since CFD can capture small geometric details of topsides that cannot be reproduced in a model. In addition, once validated, CFD computations can accelerate the evaluation of different design solutions. While the procedures to perform a deterministic assessment of green water load through model tests or CFD are reasonably defined and continuously improved, there remain important questions about the identification of critical conditions and the practical application of results to structural design.



Working alongside major oil and gas players, including designers, operators, shipyards and research institutes, Bureau Veritas has initiated an FPSO Greenwater Joint Industrial Project (JIP) to develop a risk-based methodology for addressing the risks of green water on FPSOs. Currently, whenever green water is a concern, great effort is put into tests and CFD, but operators remain unsure how to use the results. And green water loading can sometimes still occur, even in conditions that were never identified as critical. This JIP seeks to address those problems, optimizing the use of green water assessments and integrating green water controls in the formal safety assessments of FPSOs.

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