



# FOR THE BUSINESS AHEAD

BUREAU VERITAS SOLUTIONS  
MARINE & OFFSHORE



**BUREAU  
VERITAS**

**SOLUTIONS**  
Marine & Offshore





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VERITAS**

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## What is Bureau Veritas Solutions Marine & Offshore?

Bureau Veritas Solutions Marine & Offshore is the Technical Advisory, Asset Management and Assurance Solutions provider within our Marine & Offshore activities. These services shall be performed independently from Bureau Veritas Marine & Offshore regulated activities, such as classification and statutory certification.

# TECHNICAL ADVISORY, ASSET MANAGEMENT AND ASSURANCE SOLUTIONS FOR THE MARINE AND OFFSHORE ENERGY MARKETS

—  
**190**  
YEARS OF  
EXPERIENCE

—  
**5**  
AREAS OF  
EXPERTISE

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# HIGH-PERFORMANCE SOLUTIONS FOR FAST-CHANGING MARINE & OFFSHORE ENERGY MARKETS

Bureau Veritas Solutions Marine & Offshore is an entrepreneurial, collaborative solutions provider, building on 190 years of experience.

## Our offer

We provide technical advisory, asset management and assurance solutions for the Marine and Offshore energy markets. Our top-tier, added-value solutions enable clients to resolve new and complex issues, de-risk projects, and optimize costs.

## Our strengths

By engaging with our clients and gaining an in-depth understanding of their needs and challenges, our experts can deliver tangible improvements to asset and business performance, safely and responsibly. In an increasingly digital world, we partner with clients to go beyond compliance, enabling their assets to perform reliably, efficiently and with a significantly reduced level of risk and cost.

## Our resources

As part of the world-renowned Bureau Veritas Group, BV Solutions M&O relies on a set of dedicated partners and legal entities worldwide. Our experts benefit from the technical support of Bureau Veritas Group's extensive network, allowing us to meet our clients' needs, wherever and whenever they are.

## Our mission

Our past experience is a valuable resource, shared by our people to develop new solutions to the challenges our clients face. From increased efficiency to environmental management, the changes we seek are essential for long-term success.

**TOGETHER WE BUILD ON  
WHAT WE KNOW **TODAY** TO CHANGE  
HOW THINGS ARE DONE **TOMORROW**...  
FOR GOOD.**



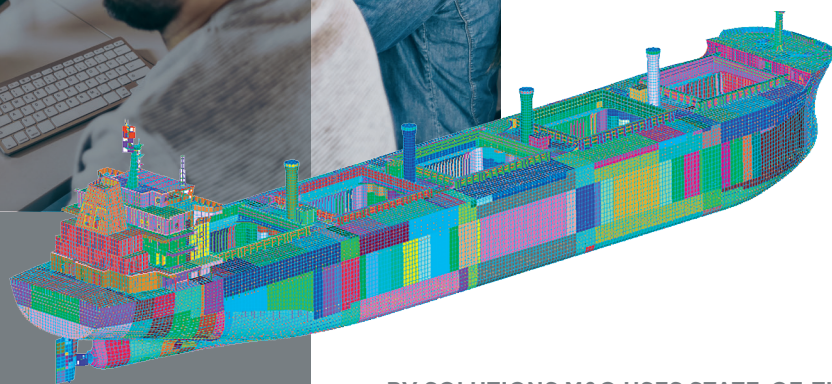
# ENGINEERING OPTIMIZED SAFETY AND PERFORMANCE

**BV Solutions M&O provides shipyards, design offices, naval architects, shipowners, offshore operators and contractors with high-value engineering services beginning at the design phase and continuing throughout the asset lifecycle. Our expertise, innovative software and onboard measurement capabilities enable clients to safely design, retrofit and operate their assets.**



## **STRUCTURAL INTEGRITY**

We ensure the long-term, safe and environmentally-friendly performance of increasingly large assets by optimizing their structural design with our customized solutions. We offer world-class technical expertise in design assessment, and our calculations help you achieve a range of objectives, from minimizing asset downtime and avoiding high vibration levels, to improving structural integrity in challenging conditions.



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## **BV SOLUTIONS M&O USES STATE-OF-THE-ART MODELING SOFTWARE TO PERFORM:**

- » Strength analyses
- » Fatigue and life extension studies
- » Dynamic analyses
- » Shaft alignment studies
- » Non-linear analyses
- » Vibration and noise analyses





### ENERGY EFFICIENCY

Profitability is a key concern for asset owners, and fuel efficiency can make all the difference. BV Solutions M&O uses an array of expert methods, ranging from advanced Fluid Dynamics simulations to Model Based System Engineering, to optimize fuel consumption, reduce environmental impact and lower operational costs. We can also evaluate the benefits of new onboard technologies (e.g. electrical energy storage).

#### CREATE

the best possible ship design through our bespoke methodology

#### REDUCE

OPEX and fuel consumption via retrofit studies and trim optimization software

#### IDENTIFY

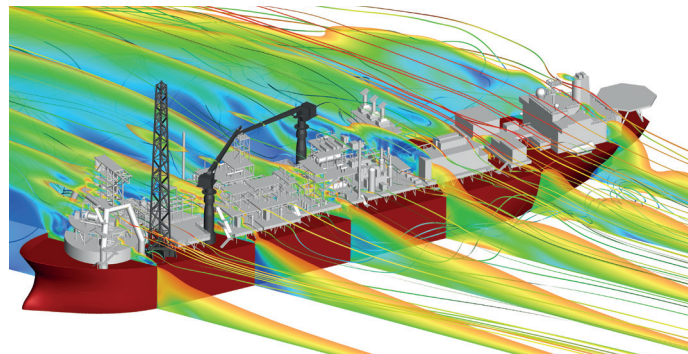
sources of inefficient performance to find cost-saving solutions

#### MAXIMIZE

hydrodynamic efficiency by optimizing hull form, ship system design and onboard energy production

### TECHNICAL ASSISTANCE

BV Solutions M&O's worldwide network of experts provides comprehensive technical assistance and advisory services to help clients design the most efficient units, while maximizing asset longevity and reducing operational costs.



### MOORING AND DYNAMIC POSITIONING

A reliable station-keeping system is integral to the safe operation of vessels and offshore units. BV Solutions M&O provides technical consultancy services related to the analysis of station-keeping systems, including static and dynamic analysis, strength checking, fatigue analysis and heading analysis for mooring systems.

### LIFE EXTENSION

Extending the operating life of existing assets through modifications is a cost-efficient alternative to newbuilding. To ensure continuous performance, BV Solutions M&O draws on decades of experience to help you identify and prioritize the safest, most profitable life extension options.

### CONFORT AND OPERABILITY

Optimizing asset operability and crew comfort are key to reducing OPEX and ensuring profitability.

BV Solutions M&O offers a range of solutions to improve efficiency, comfort and operability, including seakeeping assessments, noise and vibration studies and maneuvering and aerodynamics evaluations.



# RISK

## ADVANCED EXPERTISE THROUGHOUT THE LIFECYCLE

**BV Solutions M&O provides a host of methods that help clients safeguard their business by minimizing risk to assets, personnel and operating environment. We provide expertise on safety, cost-effective risk reduction, cybersecurity optimization and proactive maintenance, to ensure our clients' assets remain secure, reliable and profitable. By undertaking risk studies at the earliest stages of a project, asset owners can make better decisions and reduce engineering, fabrication, construction and operational costs down the line.**

### **ALTERNATIVE DESIGN**

BV Solutions M&O relies on over 20 years' experience in developing alternative designs, using cutting-edge digital simulation tools to demonstrate all types of equivalence, including:

### **FIRE SAFETY**

We use simulations to demonstrate that your alternative design achieves a safety level equivalent to the conventional design.

### **LIFE SAFETY**

Alternative design studies for life-saving appliances include risk assessments and time domain simulations for the abandonment process.



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### **QUALITATIVE AND QUANTITATIVE RISK ASSESSMENTS**

In marine and offshore operations, managing risk is critical to safeguard personnel, reduce environmental impact, limit damage to assets, protect company reputation and ensure business continuity. Our risk management team has decades of experience working with all types of assets, and can provide the necessary insight for developing cost-effective risk-reduction measures and new technologies. Additionally, our experts have demonstrated great dependability, and a sound understanding of safety and reliability requirements in a variety of contexts.



### **CYBER SAFETY AND SECURITY**

Today's ships and offshore units are increasingly connected to shore via centralized systems.

The advantages are clear: personnel can access real-time operational data, and provide remote access for onshore maintenance. However, connectivity also increases risk. A single security breach can expose volumes of private data, resulting in severe operational disruption.

Our portfolio of cyber safety and security services enables clients to identify, protect, respond to and recover from cyberattacks.

### **WE PROVIDE NUMEROUS SERVICES, INCLUDING:**

- » Hazard assessment (HAZID, HAZOP, SIMOPS)
- » Failure Modes, Effects, & Criticality Analysis (FMECA)
- » Consequence modeling and assessment (fire, explosion, gas dispersion, ship collision)
- » Quantitative Risk Assessment (QRA)
- » Safety Integrity Level (SIL) Assessment
- » Development of Safety and Environmental Critical Element (SECE)
- » As Low As Reasonably Practicable (ALARP) demonstration
- » Safety Case development
- » Marine traffic risk analysis





# ASSURANCE ASSETS THAT ARE SAFE, AND FIT FOR PURPOSE

**BV Solutions M&O supports your fleet operations with unparalleled assurance services, including verification of vessel condition, regulatory guidance, defining risk management strategies and vessel reactivation services. Our experts help clients improve unit safety, achieve greater cost-efficiency and increase profitability.**



## **COMPLIANCE SURVEYS AND AUDITS**

In activities deemed to carry elevated risk, units must comply with high operational safety and reliability standards. Compliance surveys and audits carried out by a reputable partner enable owners to confirm the condition of their units to oil and gas majors, charterers and insurers and provide evidence that they are fit for purpose.

Drawing on its international expertise and extensive work with offshore operators, BV Solutions M&O provides industry-leading condition assessment services. Our modular approach and digital reporting structure offer increased flexibility and cost-efficiency with minimal operational disruption.

## **OUR COMPLIANCE OFFER INCLUDES:**

- » Condition assessments (CAP)
- » CMID/OVID audits for offshore vessels
- » Conversion and life extension studies
- » Condition surveys prior to conversion
- » Compliance audits
- » 360 Quality Code
- » Out-of-gauge surveys
- » Suitability, on-/off-hire, and pre-loading/pre-discharge surveys





#### **DP ASSURANCE AND CONSULTANCY**

BV Solutions M&O provides multidisciplinary technical and operational experts to assist clients in the selection, integration, operation and verification of Dynamic Positioning (DP) systems. We provide cost-effective solutions that enhance the safe operability of vessels in the most commercially viable way.

#### **THE SCOPE OF OUR DP ASSURANCE AND CONSULTANCY SERVICES INCLUDES:**

- » FMEA Design/ Review / Trials
- » DP incident investigation
- » DP operations manual development and review
- » DP design review



#### **MARINE ASSURANCE**

Conducting safe and efficient operations throughout a vessel's lifetime requires well-defined procedures that focus on mitigating risk. BV Solutions M&O's marine assurance services provide ship owners and operators with innovative solutions to define and improve procedures, ensuring they are sufficiently comprehensive, relevant and precise.

Our experts understand the operational needs of vessel management teams, and support you through all phases of operations, while our comprehensive reactivation assessments help you reactivate laid-up offshore units and vessels by preparing them for class surveys.



#### **PROJECT ASSURANCE**

Ensuring safety, quality and cost-efficiency are top priorities for shipping and offshore projects. BV Solutions M&O provides project assurance as on-site, second-party representation to supplement our clients' in-house teams.

Shipowners are supported by our international teams to ensure that new construction, conversion and repair works are completed to specification and quality standards. For offshore projects, our engineers and naval architects ensure that all units undergoing work of any kind comply with relevant Quality, Health, Safety and Environment (QHSE) standards.



# ASSET MANAGEMENT TARGETING OPERATIONAL EXCELLENCE

Asset management is the systematic process of cost-effectively developing, operating, maintaining, upgrading and disposing of assets. BV Solutions M&O provides a comprehensive approach, defining the right asset management strategy for your units with our advanced Veristar AIM<sup>3D</sup> digital twin technology. We couple this approach with reliability and maintenance services that last throughout an asset's life cycle, from

acquisition and design to late life and decommissioning. Our end-to-end asset management solutions help clients reach strategic goals, including CAPEX optimization and sustainability planning, maintaining operational performance, and managing cost and risk.







## VERISTARAIM<sup>3D</sup>

A BUREAU VERITAS SOLUTION POWERED BY DASSAULT SYSTÈMES

BV Solutions M&O is proud to offer VeristarAIM<sup>3D</sup>, a state-of-the-art, holistic asset integrity management solution. Based on a digital twin of your asset, Veristar AIM<sup>3D</sup> acts as a single source of information, automatically updating inspection and maintenance data, and capable of simulating the impact of unit modifications. Operators using VeristarAIM<sup>3D</sup> for several assets can also compare risks across their portfolio to highlight concerns and optimize performance.

Veristar AIM<sup>3D</sup> can be integrated into client planning systems to account for shutdowns, optimize maintenance and assess the risk of temporary repairs. It enables comprehensive condition monitoring of each element, with its current or foreseeable degradation, enabling clients to make better maintenance and repair decisions.

**TO OPTIMIZE ASSET MANAGEMENT,  
A BUREAU VERITAS GROUP INITIATIVE  
HAS CREATED VERISTAR AIM<sup>3D</sup>  
A COMPLETE DIGITAL SOLUTION  
POWERED BY THE DASSAULT SYSTÈMES'  
3D EXPERIENCE PLATFORM**



### RELIABILITY AND MAINTENANCE

Reliability, availability and maintainability are crucial for the prevention of financial losses. In both marine and offshore sectors, asset and ship owners are moving from a reactive stance to a proactive maintenance strategy, looking to optimize the trade-off between OPEX and CAPEX.

### OUR EXPERTS DRAW ON EXTENSIVE EXPERIENCE AND IN-DEPTH TECHNICAL KNOWLEDGE, TO IMPROVE ASSET PERFORMANCE THROUGH:

- » Equipment criticality analysis
- » Reliability, Availability & Maintainability (RAM) analysis
- » Reliability Centered Maintenance (RCM) analysis
- » Condition Based Maintenance (CBM) analysis
- » Spare parts analysis
- » Risk-Based Inspection (RBI)

### DECOMMISSIONING

Decommissioning of ageing vessels and offshore infrastructure is a major challenge for operators looking to retire their units safely and efficiently. BV Solutions M&O offers a single-source solution. We support operators across the globe at every phase of decommissioning, from portfolio planning, to asset decommissioning programming, to in-field delivery—all in line with regulatory standards and with an eye on cost optimization.





# REGULATORY SOLUTIONS CONVENIENT SOLUTIONS FOR ENVIRONMENTAL COMPLIANCE

BV Solutions M&O has developed a range of services and digital solutions focused on helping shipowners comply with international maritime regulations relating to environmental performance and safety. These services help you remain compliant, improve cost savings and assure the safety of your assets and personnel.



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## SHIP RECYCLING

Ship recycling must be carried out in compliance with numerous regulations. Complying fully demonstrates your commitment to protecting people and preserving the environment, minimizing risk to your reputation.

BV Solutions M&O helps you understand all mandatory regulations and limit potential risk, with rigorous monitoring of the dismantling process. We provide assistance with your inventory of hazardous materials (IHM) and define your ship recycling plan under EU SRR.





### **UNDERWATER RADIATED NOISE (URN)**

IMO guidelines for underwater ambient noise are primarily designed to protect the marine environment. However, the reduction of vessel vibration also improves onboard comfort, and reduces the fuel ships burn. Compliance thus boosts the energy efficiency of your fleet, helping you achieve crucial cost savings.

BV Solutions M&O performs URN studies to help clients obtain notations through a comprehensive, four-step assessment program. We offer two different levels of URN studies, along with specialist notation for ships meeting additional requirements.



### **BALLAST WATER MANAGEMENT (BWM)**

The International Convention for the Control and Management of Ships' Ballast Water & Sediments requires that all vessels carrying ballast water improve their design, equipment and treatment systems to prevent the spread of potentially harmful aquatic organisms.

BV Solutions M&O supports you by providing an approved BWM Plan. We provide technical assistance through feasibility and retrofit studies, and pair it with applying guidelines, assessing risk and offering certification services. Our online platform, My BWMP, enables shipowners to receive quotes, submit documents and monitor the BWM certification process.



### **EMISSIONS MONITORING**

Ship operators must stay up-to-date with emissions regulations relating to the monitoring, reporting and verification of CO<sub>2</sub> (EU MRV and IMO DCS), and the IMO Global Sulphur Cap in force from 2020. BV Solutions M&O supports operators and ship designers with its in-depth regulatory knowledge, helping clients remain compliant with emissions reduction and proper reporting of emissions data.

### **POLAR CODE**

Ships operating in Arctic and Antarctic waters are subject to the Polar Code, a regulatory framework to ensure safe ship operation and environmental protection in extreme conditions. BV Solutions M&O provides a range of advisory services to help vessels achieve compliance.





# FORWARD- **THINKING** FORWARD- **ACTING**

For our clients' assets, processes, people and data management in the shipping and offshore energy markets, BV Solutions M&O is the technical advisory, asset management and assurance solutions partner.

In an increasingly digital world, we go beyond pure compliance to enable our clients' assets to perform more reliably, more efficiently and at a significantly reduced level of risk. Our strong culture of service and quality allows us to resolve new or complex client issues and deliver well-packaged, top-tier solutions that de-risk projects and optimize cost.











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[www.bvsolutions-m-o.com](http://www.bvsolutions-m-o.com)



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