



**BUREAU
VERITAS**

VeriSTAR NEWS

NEWSLETTER OF THE MARINE DIVISION
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FOREWORD

BY MARIE-FRANÇOISE RENARD
Offshore Product Manager



Floating LNG terminals are the new big offshore challenge. The need for them is clear, and major Oil and Gas as well as utilities companies are working to bring them on line around the world. To move from concept to reality requires detailed engineering and the ability to bring together experience with ships, offshore structures and gas handling facilities normally built on shore. Bureau Veritas has world leading experience with FPSO structures and unique experience classing five LNG-RV vessels in service and three more building under construction. These have proven the concept of regasification on a sea-going vessel and by classing them Bureau Veritas has refined its knowledge of how to blend onshore and offshore technologies on one floating platform. We are the only society with that successful experience. That is why out of around twenty FLNG projects under development globally, fourteen have turned to BV for assistance. Front End Engineering Design is the key step, and that is where BV can provide make or break input to your FLNG project.

Visit us at DOT,
Monaco 3 – 5 November.

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NEW FRONTIERS

FEED CRUCIAL TO FLNG DEVELOPMENT



Courtesy: SBM, Exmar, GTT

Energy importers are looking for ways to bring reliable supplies of LNG to consumers. They face many planning obstacles to building onshore, so often it is attractive to build an offshore terminal. To ensure that terminal is safe requires a blend of experience with Offshore Floating Units and LNG transportation, regasification and liquefaction.

BV is involved in Front End Engineering Design studies on 14 floating LNG terminal projects. These are almost all for newbuildings and on behalf of Oil Majors and utilities companies. The locations for the terminals are all around the world, in Asia, Australia, Latin America, the Middle East and West Africa. They include LNG FPSOs, FSRUs and also FLNG terminals.

To help share its unique experience with both offshore and gas handling at sea Bureau Veritas has completed the first phase of a rule development project for the classification of floating offshore gas terminals. The results have been published in guidance note NI 542. Combining BV's experience with the classification of liquefied gas carriers and FPSOs, this document provides requirements for structural safety and cargo containment system assessment. These requirements are applicable for offshore units including LNG FPSOs, FSRUs, gas production units or FSOs.

The guidance note covers various types of containment systems for liquefied gases including

integral tanks, membrane tanks and all IMO types of independent tanks. The design loads are calculated through direct hydrodynamic analysis. Particular attention is given to the evaluation of sloshing loads for membrane tanks. Structural criteria are based on a semi-probabilistic approach, with safety factors corresponding to the offshore environment. Assessment of the hull and cargo tank structure and supports through a 3D finite element model is mandatory, and specific requirements for structural modelling, load modelling and different criteria to be applied are provided in the note.

In addition, BV will shortly publish specific requirements for subdivision and stability, electrical installations, piping systems, equipment, fire safety and topsides of offshore LNG terminals.

FLNG projects face many challenges, including location and sea condition, type of vessel and containment, mooring, access for vessels, cargo transfer, type of plant, liquefaction / regasification, deck congestion and possible emergencies. Class has to be sure the project is safe. The earlier in a project these challenges are tackled, the more successful the project will be. Working with class to develop detailed FEED studies provides the building blocks of a safe and efficient FLNG terminal.

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> CLIENT PROFILE

MISC TAKES DELIVERY OF BV-CLASSED LNG SHIPS

MISC Berhad, the Malaysian company which is the single largest owner-operator of LNG tankers in the world, has recently welcomed two new Bureau Veritas-classed vessels into its fleet – the 107,000 gt LNG carriers *Seri Balhaf* and *Seri Balqis*.

Both vessels will be employed under long-term charter to Yemen LNG. The charters are for twenty years, with options for a further eleven years. They are the first long-term, third-party LNG shipping contracts entered into by MISC, which operates a fleet of 20 LNG carriers. They represent a significant milestone in MISC's overall plan to expand its third-party LNG shipping business and to increase its LNG operations beyond its traditional core Asia Pacific routes.

Upon commencing operations, the two vessels will transport LNG for TOTAL Gas & Power Ltd from Yemen to the United States, Mexico and other major LNG terminals worldwide, beginning with maiden calls to the Balhaf LNG terminal at the end of 2009.

Both vessels were built and delivered this year by Mitsubishi Heavy Industries in Nagasaki, Japan. They are membrane-type LNG carriers, with main electrical propulsion provided by the Dual Fuel Engine (DFE) system, which achieves optimum fuel oil efficiency. The vessels' propulsive performance is enhanced by a refined hull form using



CFD (Computational Fluid Dynamics) and optimum dimensions for the membrane tank system.

Ease of operation is further improved by means of a distributed control system which monitors and controls the vessels' principal machinery and equipment, and cargo handling areas from the centralised control room.

The vessels have a cargo tank capacity of 157,000 cu m. They are 294.6 m in overall length. They have a breadth of 46.5 m and a depth of 25.8 m, with a design draft of 11.15 m. The dual fuel engines comprise three units producing 11,400 kW, and one unit producing 5,700 kW. The service speed of the vessels is 19.5 knots.

MISC is a valued customer of BV. It prides itself on reliability of service, the highest standards of safety, and on-time deliveries of LNG. It also provides assistance to charterers and other clients in connection with the design and commissioning of receiving terminals, and has to date successfully assisted in the commissioning of seven LNG import terminals and one LNG export terminal. It has achieved in excess of 5,000 safe and timely LNG deliveries, aggregating approximately 275m tonnes, since it completed its first shipment to Japan more than 25 years ago.

Its expertise in the LNG transportation sector has earned MISC a reputation for excellence and reliability, and the endorsement and confidence of a range of leading charterers.

> TECHNICAL FOCUS

BUREAU VERITAS TO CLASS CASPIAN ICE-BREAKING TUGS



Bureau Veritas has been chosen to class two different series of sophisticated ice-breaking tugs for service in the Caspian Sea.

yard in Romania for the Caspian Offshore Construction group project in the North Caspian Kashagan oil field.

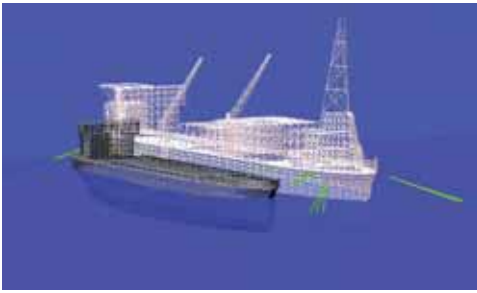
The first series is for three plus two 66 m LOA ice-breaking and ice management tugs with 50 tonne bollard pull and Ice Class IA Super Special Service – North Caspian Sea Icebreaker with ice breaking capability up to 0.6 m level ice thickness. Designed by Aker Arctic, they will be built in the STX RO Offshore Braila

Bureau Veritas experts have evaluated the ship's hull structure under ice-breaking loads, taking into account the specific conditions of the North Caspian Sea, by performing a direct assessment of the ice pressures under different operating scenarios.

The second series is for shallow draft ice-breaking Anchor Handling Tug Supply (AHTS) vessels to be built for Silverburn Shipping. Designed by Netherlands-based Offshore Ship Designers these vessels will be easy to maintain and repair and can work in 70 cm of ice. They have a significant load carrying capability on a shallow draft and provide a minimum 45 tonne bollard pull.

NEW TOOLS

OFFSHORE ASSESSMENT TOOLS



Bureau Veritas has developed new generation tools to assess complex offshore projects. New hydrodynamic software dedicated to multi-body computations is able to assess side by side offloading operations or floatover operations, where relative motions between units, second order wave loads and limiting wave operation conditions are of major importance. Mechanical interaction can now also be considered using

new developments in the ARIANE mooring software allowing consideration of the non linear behaviour of fenders in the calculations.

A new spectral analysis module StarSPEC has been released for HydroSTAR allowing users to perform spectral analysis and fatigue damage calculations for unimodal and bimodal sea states in a very efficient way using different kinds of wave spectra. Short and long term predictions as well as fatigue damage calculations for a given S-N curve can be performed for accurate evaluation of environmental conditions on floating unit response. The new module is now supported by the HydroSTAR Windows interface to allow efficient post-processing delivering the interactivity and productivity needed for engineering applications.

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NEW TOOLS

WARSHIP SOFTWARE FIRED UP FOR CORVETTES

Bureau Veritas has updated its Rule software MARSMILI to include Corvettes. A new notation to cover Corvettes has been added to BV's warship rules covering warships with displacement between 1,000-2,500 tonnes, length 60m - 90m and maximum speed above 25 knots.

Corvettes present special challenges in hull strength assessment, as they need to be checked for both displacement speed and very high speed modes. The new version of MARSMILI allows the designer to check the compliance of the structure for both modes using one single tool. The graphical interface has been improved to include the additional input data and information covering the high speed mode.



The Corvette upgrade provides designers and naval yards with time saving during the design phase and a high level of confidence regarding compliance of structure design.

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TECHNICAL FOCUS

FOCUS ON CORROSION CONTROL

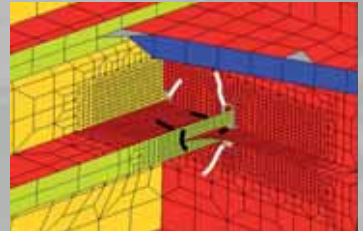
Corrosion failures don't always have simple causes. So Bureau Veritas' expert corrosion laboratories offer a forensic service to identify the cause of corrosion problems. A recent example involved blade erosion on the impellers of centrifugal pumps. BV's experts traced the fault to fouling of an input filter causing cavitation. A problem which the owner thought was due to defective blade material was solved by regular filter maintenance. Corrosion can be controlled, but it requires skilled analysis to identify what is causing it.

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...NEWS IN BRIEF...

■ BV has developed the **FATIGUE PLUS notation** which covers enhanced fatigue checking of structural details in addition to those strictly required by CSR for oil tankers...



■ The Malta College of Arts, Science and Technology Maritime Institute has become the latest **training institute certified by Bureau Veritas** under its Certification of Training Institutes and Courses scheme. The scheme requires rigorous auditing and has been applied to certification of training institutes in Brazil, Croatia and Angola. BV has also certified DVDs and distance learning training courses for Videotel and the MPI Group...

■ BV has published the new guidance note NI 534, **Classification and certification of Self-Elevating Units**. It covers design principles, environmental conditions, hydrodynamic calculation, overall and local structure assessment.



The non linear behaviour of these units in elevated condition, due to wave kinematic, resonance effect and non-linear amplification of the deflections of the leg is covered by both simplified and sophisticated methodologies...

■ In view of the upcoming EU Directive 2005/33/EC, applicable on 1st January 2010, BV has issued an information note for shipowners on the **safety of boilers when changing from residual fuels to distillate fuels**, when ships are at berth in European ports....

> BV EVENTS

BV-CLASS MEGA YACHT LAUNCHED AT CMN

Cherbourg-based CMN (Constructions Mécaniques de Normandie) has launched the 60 m mega yacht Slipstream, the largest vessel ever built at CMN. Built to BV class, Slipstream can accommodate fourteen guests and is part of the new CMN LINE 60 series of vessels developed by CMN in co-operation with Andrew Winch Designs.

The yacht offers over 500 sq m of living areas and 200 sq m of outdoor decks. A panoramic open/close dining room has been added on the aft bridge deck. The VIP suite boasts a private foredeck with sweeping ocean views. Designed for cruising, Slipstream is powered by twin caterpillar 3516B engines of 1641 kW each, delivering 17 knots maximum and a range in excess of 5,000 nautical miles at 12 knots.

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The 60 m mega yacht Slipstream

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> BV EVENTS

CSSC DELEGATION VISIT BV



A high level delegation from the Chinese shipbuilding industry visited Bureau Veritas head office in Paris in September. Discussions focused on offshore projects and plans to undertake joint cooperation on engineering analyses including hydrodynamics, mooring, sloshing and structural analyses of various types of offshore floating units. The delegation included Mr. Sun Jianwei, Director of Administration Office of Technology and Economy committee of CSSC, Mr. Li Xiaoping, Assistant President of MARIC, Mr. Wang Qi, Vice President of SWS, Mr. Chen Gang, Manager of Offshore Department of SWS and Mr. Zhang Yonghui, China Shipbuilding Economy Research Centre CSSC.

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> BV EVENTS

ULJANIK LAUNCHES JAN DE NUL DREDGER

Croatia's Uljanik shipyard has launched the first of a series of four very large cutter suction dredgers which it is building for the Belgian Jan de Nul group. Built to BV class, the four dredgers will be 138.50 m LOA and able to dredge down to 36.6 m depth with a 900 mm suction pipe.

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