

JMU completes newly developed Dunkirkmax-type bulk carrier PROTEUS



Japan Marine United Corporation (JMU) delivered the PROTEUS, 181,000DWT bulk carrier, at the Ariake Shipyard on July 12, 2023. This is the first vessel of newly developed Dunkirkmax-type bulk carrier, called N181BC, which is successful in both economical and environmental friendly design.

The Energy Efficiency Design Index (EEDI) of this N181BC has achieved Phase 3 (30% reduction from the reference line) by application of latest energy saving technologies. This challenge will contribute to green environment by its eco-friendly performance.

The Vessel has larger deadweight and cargo hold capacity suitable for loading bulk coal and iron ore in its nine cargo holds, achieved by JMU's expertise and vast experience. The SSD[®] (Super Stream Duct[®]) and SURF-BULB[®] equipped fore and aft of the propeller, respectively, greatly improve the propulsion performance. The ALV-

For further information please contact:

Fin[®] (Advanced Low Viscous Resistance Fin) equipped fore of the propeller controls stern water flow to gain better propulsive efficiency.

Furthermore, a unique bow shape, LEADGE-Bow[®], can reduce the added resistance due to waves, and the wellrefined shape of the superstructure can attain low wind resistance.

Principal particulars

- L (o.a.) x B (mld.) x D (mld.) x d (mld.): 292.000m x 45.000m x 24.550m x 18.234m
- DWT/GT: 181,577t/93,367 Main engine: MAN B&W 7S60ME-C10.6-HPSCR diesel x 1 unit Speed: 14.4kt Complement: 25

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ssification:	ClassNK

Website: http://www.jsea.or.jp



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KHI develops cargo tank technology for large LH₂ carrier

Kawasaki Heavy Industries, Ltd. (KHI) has completed technological development for a cargo containment system (CCS) to be used in large liquefied hydrogen (LH2) carriers. This project was carried out under the New Energy and Industrial Technology **Development Organization of Japan** (NEDO) subsidy program "Technology Development Project for Building a Hydrogen Society, Technology Development for Using Hydrogen Energy on a Large Scale, Development of Large-Scale Transport and Storage Equipment, and Export and Import **Terminal Equipment for Liquefied** Hydrogen." As part of this project, Kawasaki designed and built a test tank to be used to verify the performance of a CCS for large liquefied hydrogen carriers, and conducted verification tests.

Large-volume marine transportation of hydrogen requires that the hydrogen must be cooled to minus 253°C to be liquefied and reduced to 1/800 of its gaseous-state volume, and these low-temperature conditions reliably maintained for long periods. To achieve this, Kawasaki developed a new distinctive CCS, the CC61H type, for largescale liquefied hydrogen carriers. The CCS uses a spherical design to minimize the outer surface area relative to the inner



capacity and minimize heat ingress. The CCS also features a double-shell structure that provides high-performance, two-step thermal insulation.

The test tank designed based on the CC61H type is similar in size to the planned CCS for use in large liquefied hydrogen carriers, each of which will be equipped with four 40,000m³ tanks for a total cargo capacity of 160,000m³. The structural dimensions of the test tank components, such as the thickness of structural members and thermal insulation materials, were adapted to match current vessel designs. Moreover, the integrity of the new structure was verified, including assembly, welding, and workability of insulation. During the final step of the development process, Kawasaki carried out gas replacement, cooling, and heat-up tests using the test tank. Efficient gas replacement was confirmed for the internal space of a large tank using inert gas, and insulation performance was achieved as planned.

Kawasaki will continue work on large liquefied hydrogen carriers for commercial operations, in line with a liquefied hydrogen supply chain commercialization demonstration project running through 2030. Through these efforts, Kawasaki will contribute to the promotion of hydrogen energy use and the achievement of carbon neutrality.

MITSUI E&S completes first MET turbocharger for marine engines under license from MHI-MME

MITSUI E&S Co., Ltd. (MITSUI E&S), signed a license agreement with Mitsubishi Heavy Industries Marine Machinery & Equipment Co., Ltd. (MHI-MME) to manufacture MET turbochargers in 2022, and MITSUI E&S has now completed the first two turbochargers manufactured under this license, MET66MBII and MET42MB. These turbochargers will be installed on the 6G80ME-C10.6-EGRTC marine main engine manufactured by MITSUI E&S. MITSUI E&S plans to complete the first MET42MBII in fiscal 2023, and to subsequently expand the model series as appropriate to meet the diverse demands of its customers.



MHI-MME has been developing MET turbochargers since 1965 as a technology that meets the demand for high-output high-efficiency engines. MET turbochargers supply an approximately 50% share of the large two-stroke marine engine market. MITSUI E&S has manufactured and sold over 4,000 MAN turbochargers in the roughly 40 years since it signed a license agreement with the current MAN Energy Solutions SE in 1981. By adding MET turbochargers to its lineup of in-house manufactured turbochargers, MITSUI E&S can select the most suitable turbocharger for its Mitsui-MAN B&W engines.

In addition, by leveraging its many years of experience as a turbocharger manufacturer and engine manufacturer, MITSUI E&S will strengthen its system for supporting its customers throughout the entire life cycle of Mitsui-MAN B&W engines, from manufacture to after-sales service, and for providing full support for safety and security.

Mitsubishi Shipbuilding begins market demonstrations of the MAmmoSS[®] Ammonia Handling System

- Completion of the demonstration facility to safely process surplus ammonia from ammonia-fueled vessels.
- Testing begun to support the market launch of MAmmoSS[®], a system package comprising an ammonia fuel supply system and peripheral equipment.

Mitsubishi Shipbuilding Co., Ltd., a part of Mitsubishi Heavy Industries (MHI) Group, is currently developing the Mitsubishi Ammonia Supply and Safety System (MAmmoSS®), an ammonia handling system to support the utilization of ammonia as marine fuel, which has the potential to significantly reduce greenhouse gas (GHG) emissions from ships. As part of this development project, Mitsubishi Shipbuilding has begun demonstration testing of the Ammonia Gas Abatement System (AGAS), a subsystem of the MAmmoSS® to safely treat surplus ammonia.

Using the AGAS demonstration facility at the Nagasaki District MHI Research & Innovation Center, Mitsubishi Shipbuilding will conduct demonstration tests of the processing performance under various scenarios simulating onboard ammonia operations and explore broadening the range of maritime industry through collaboration with related equipment manufacturers. The new ammonia related technology will be applied for various industries to support safe handling.

The MAmmoSS® consists of sev-

eral subsystems in addition to the AGAS, including a high-pressure/ low-pressure ammonia fuel supply system (AFSS) and an ammonia fuel tank system. A

key feature of MAmmoSS[®] is that each of these subsystems can be modularized, allowing Mitsubishi Shipbuilding to provide the optimal modular configuration in a package for onboard plants consisting of multiple engines and boilers.

Mitsubishi Shipbuilding, together with MHI Group's strategy for advancement of the energy transition, will bring together its technologies and expertise in ammonia handling accumulated through its history of building transport carriers, and as a shipboard ammonia-handling systems manufacturer, supply products with an emphasis on safety and reliability. Mitsubishi Shipbuilding will contribute to the further development of marine logistics and the reduction of its environmental impact on a global



MAmmoSS® modules (image)



Ammonia Gas Abatement System (AGAS) demonstration facility

scale as a maritime system integrator, by providing shipbuilding engineering services for ammonia-fueled vessels, along with construction support and other services to meet customers' needs.

To our readers

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Namura completes Dunkirkmax-type bulk carrier, WORLD SEAFARER

Namura Shipbuilding Co., Ltd. delivered the WORLD SEAFARER, a 182,344DWT bulk carrier, at its Imari Shipyard & Works on July 7, 2023. The vessel is the first of a newly developed 182,000DWT-type bulk carrier with excellent features.

The principal dimensions have been optimized to satisfy the restrictions of the Port of Dunkirk in France. Further improvement of propulsion performance and fuel saving in conformity with EEDI Phase 3 were achieved by adoption of three energy saving devices, the Namura flow Control Fin (NCF), the Rudder-Fin and a fin behind the NCF developed by Namura, and an electronically controlled main engine, the latest model of high efficiency propeller, and low friction type anti-fouling paint.

For environmental protection, the vessel is equipped with a main engine and generator engines compliant with Annex VI of the MARPOL 73/78 regulations to reduce NO_x emissions, and an air seal type stern tube sealing device to reduce the risk of oil leak-

age. In addition, the vessel also complies with the SOLAS Chapter II-1 Regulation 3-12, Code on noise levels onboard ships to improve the environment in the living quarters. The ballast

water treatment system to control the quality of ballast water is equipped to protect the marine environment to comply with the International Convention for the Control and Management of Ships' Ballast Water and Sediments. The vessel has class notation IHM (Inventory of Hazardous Materials) for compliance with the ship recycling convention according to the Guidelines for the Inventory of Hazardous Materials.

The vessel has several storage tanks for appropriate management and discharge of drainage, sewage,



rain water, and water used for cleaning cargo holds to satisfy port restrictions on such discharges.

Principal particulars

L (o.a.) x B (mld.) x d (mld.): 291.92m x	
45.0m x 18.2m	
DWT/GT:	182,344t/93,719
Main engine: MAN	NB&W 7G60ME-
C10.5-EGRBP diesel x 1 unit	
Complement:	24
Classification:	ClassNK
Registry:	Marshall Islands
Completion:	July 7, 2023

Sasaki completes pressurized LPG carrier, SINAR TORAJA

Sasaki Shipbuilding Co., Ltd. completed construction of the pressurized LPG carrier, SINAR TORAJA, capable of transporting 7,500m³ LPG, for delivery to the overseas shipowner on June 27, 2023.

This LPG carrier is the third ship of the first Japanese series mounted with a dual-fuel engine using LPG as the LPG carrier with transport capacity below 11,000m³. The cargo tank consists of two $3,750m^3$ pressurized tanks, and one $450m^3$ LPG fuel tank is provided. The cargo tanks are durable against the maximum pressure of 17.65 bar and at the minimum temperature of minus $10^{\circ}C$.

The carrier adopts Sasaki stern fins (patented) before the ship's propeller. This device smooths water flow before the propeller, to increase propulsion efficiency and reduce the fuel costs.



To decrease the environmental load and pollutant emissions, the carrier complies with the EEDI Phase 3 requirements and BV's CLEAN SHIP regulations, and is compliant with BV's AUT-UMS requirements, by which unmanned engine operation is permitted, alleviating the work load of crews.

Principal particulars

Ship type: Ocean-going LPG carrier L (o.a.) x L (b.p.) x B (mld.) x D (mld.) x d (mld.): 116.82m x 110.90m x 19.00m x 9.10m x 6.80m DWT/GT: 7,225t/6,530 Cargo tank capacity: $7,524 \text{ m}^3$ Hitachi-MAN B&W Main engine: 5S35ME-C9.7-LGIP diesel x 1 unit M.C.O.: 3.000kW x 143min⁻¹ Speed, service: Approx. 13.0kt **Classification:** BV **Registry**: Singapore June 27, 2023 Completion:

Naikai completes 9,980GT-type RO/RO passenger ferry, PENGHU

Naikai Zosen Corporation completed construction of the PENGHU, a 9,980GT-type RO/RO passenger ferry, for delivery to Taiwan Navigation Co., Ltd. at its Setoda Shipyard on August 9, 2023.

The PENGHU was designed for coastal shipping service and is now plying between Kaohsiung Port, on the Taiwanese mainland, and Magong Harbor, Penghu County.

For this shipping service, the ferry is equipped with a two-engine, twopropeller, and two-rudder propulsion system to maintain good maneuverability in navigation, and transports passengers, automobiles, trucks, motorbikes, containers, and bulk cargoes. The automobiles and trucks can roll on and off through ramp doors at the bow and stern.

Two vehicle decks are provided. The roll-on/roll-off deck for boarding can load vehicles and general cargoes on the fore and aft deck spaces of the stern ramp door, respectively. The car deck under the boarding deck is permitted to load only automobiles.

The living

quarters consist of four-deck structures, which include Decks C, B, and A provided for the passengers' living quarters. The remaining deck over the passengers' living quarters is for the crew.

The ferry's hull form has excellent sailing performance thanks to repeated water tank tests. The bow thruster installed on the ferry facilitates berthing and unberthing.

Principal particulars

L (o.a.) x L (b.p.) x B (mld.) x D (mld.)



x d (mld.): 119.99m x 110.00m x 21.00m x 8.00m x 5.50m DWT/GT: 1,915t/9,932 632 (inc. passengers) Complement: Main engine: Daihatsu 8DKM-36e diesel x 2 units 4.400kW x 165.5min⁻¹ MCO: CSO: 3,695kW x 156.2min⁻¹ Speed, max. trial: Approx. 22.0kt Speed, service: Approx. 19.3kt Classification: CR **Registry:** Republic of China Completion: August 9, 2023

TSUNEISHI SHIPBUILDING builds pressurized LPG-cargo tanks – One step ahead of its Advanced Technology Road Map –

TSUNEISHI SHIPBUILDING Co., Ltd. (TSUNEISHI SHIPBUILD-ING) has now established full inhouse manufacturing of pressurized tanks for LPG carriers. Molding the rounded parts of fore and aft side of the pressurized cargo tank was a great challenge for the manufacturer, but was successfully achieved using existing equipment. The tanks will be installed on the first LPG carrier to be built by the company.

The LPG carrier has 99m length, 17.6m breadth, and 8m depth, and will have two cargo tanks with a total storage capacity of 5,000m³. Mitsui E&S Shipbuilding Co., Ltd. of the TSUNEISHI GROUP has provided the expertise for tank manufacturing and gas outfitting, which included the basic design, detailed design for the gas tank and gas system, assembly procedure, and precision management method. Moreover, the LPG carrier with the tanks retains the main dimensions of the standard 5,000m³ LPG carrier class.

The carrier will feature a hull form that reduces propulsion resistance and the newest main engine model to comply with the CO₂ emission regulations of EEDI Phase 3. The carrier



is equipped with SCR (Selective Catalytic Reduction) to qualify as an eco-ship with excellent propulsion and environmental performance that satisfies the requirements of the NO_x Tier III regulations.

TSUNEISHI SHIPBUILDING has developed an Advanced Technology Road Map targeting 2025 and is conducting intensive research and development to realize zero-emission ships. With this in-house manufacturing of the pressurized tanks for LPG carriers as a base, TSUNEISHI SHIPBUILDING is now planning to manufacture LNG fuel tanks.

Growing demand and increased building is expected for ships using new fuels such as LNG, ammonia, and hydrogen. The company intends to apply its newly-gained pressurized tank manufacturing technology to other fuel tanks. By implementing new technologies and bolstering collaboration with other group companies, TSUNEISHI SHIPBUILD-ING will lead the shipbuilding and shipping industries in decarbonization as an environmentally-friendly company.

No. 421 Oct. - Nov. 2023 Page 6

WAN HAI 366

Owner: Wan Hai Lines (Singapore) Pte. Ltd. Builder: Japan Marine United Corporation Hull No.: 5511 Ship type: 3,055TEU container ship L (o.a.) x B x D x d: 203.5m x 34.8m x 16.60m x 11.5m DWT/GT: 37,160t/30,676 Main engine: MAN B&W 7S70ME-C10.5 diesel x 1 unit Speed, service: 21.5kt Complement: 25 Classification: DNV/CR **Registry:** Singapore Completion: July 14, 2023



GLANZ CORAL

Owner: Panamanian owner Builder: Shin Kurushima Hiroshima Dockyard Co., Ltd. Hull No.: S-6180 Ship type: General cargo ship L (b.p.) x B x D: 114.00m x 21.20m x 14.05m DWT/GT: 13,542t/9,943 Main engine: MAKITA-MITSUI-MAN B&W6S35MC7.1 diesel x 1 unit Speed, service: 12.0kt Classification: ClassNK Registry: Panama Completion: June 27, 2023



OG GINKGO

Owner: Prime Star Transportation Services Pte. Ltd. Builder: Oshima Shipbuilding Co., Ltd. Hull No.: 11030 Ship type: Chip carrier L (o.a.) x B x D x d (ext.): 209.97m x 37.00m x 22.80m x 11.553m DWT/GT: 60,683t/49,759 Main engine: MITSUI-MAN B&W 6S50ME-C9.7-EGRBP diesel x 1 unit Speed, service: 14.50kt Classification: ClassNK **Registry:** Singapore Completion: June 21, 2023



PRINCESA GUAYARMINA

Owner: Blue Line Trading Limited Builder: Niigata Shipbuilding & Repair, Inc. Hull No.: N-0121 Ship type: Refrigerated cargo ship L (b.p.) x B x D: 75.20m x 12.40m x 8.10m DWT/GT: 1,446t/2,156 Main engine: Akasaka Diesels AX34-AFD diesel x 1 unit Speed, service: 12.5kt Classification: ClassNK Registry: Panama Completion: June 30, 2023



LEMESSOS QUEEN

Builder: Tsuneishi Shipbuilding Co., Ltd. Hull No.: 1627 Ship type: Bulk carrier L (b.p.) x B x D : 229.00m x 32.26m x 20.15m DWT/GT: abt.82,400t/abt.44,000 Main engine: MAN-B&W 7G50ME-C9.6-EGRBP diesel x 1 unit Speed, service: 14.30kt Classification: BV Registry: Panama Completion: June 28, 2023



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