SEA-Japan

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JMU completes 209,000DWT G-Series bulk carrier, FOMENTO FOUR

Japan Marine United Corporation delivered the FOMENTO FOUR, a G-Series 209,000DWT bulk carrier, at the Tsu Shipyard on June 17, 2019. This Cape size bulk carrier has succeeded in dramatic reduction of fuel oil consumption by using various and comprehensive measures for energy-saving, so that GHG (Greenhouse Gas) emissions can be reduced and categorized into Phase 2 of the Energy Efficiency Design Index (EEDI) as defined in MARPOL Annex VI.

This Cape size bulk carrier design has larger deadweight and capacity suitable for bulk coal and iron ore in its nine cargo holds, and has been developed with the expertise and vast experience of Japan Marine United Corporation. The SSD® (Super Stream Duct®) and SURF-BULB® (Rudder Fin with Bulb) are equipped in front and behind the propeller, respectively, to improve the propulsion performance. Furthermore, the unique bow shape of the LEADGE-Bow® reduces the added resistance due to waves, and the well-refined shape of superstructure has low wind resistance.

Compliance with the fuel oil tank protection rules and MARPOL NO_x tier-II for the main engine and provision of the ballast water treatment system make the vessel more environmentally friendly.

The CSR (Common Structural Rules) for bulk carriers and PSPC (Performance Standard for Protective Coatings) for ballast water tanks are applied for the safety and maintenance of the vessel.

Principal particulars

L (o.a.) x B x D x d:	299.99m x 50.00m x 25.00m x 18.40m
DWT/GT:	209,951t/107,148
Main engine:	MAN B&W 7S65ME-C8.2 diesel x 1 unit
Speed:	14.7kt
Complement:	25
Classification:	LR

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MHIMSB completes new generation MOSS type LNG carrier, DIAMOND GAS SAKURA

Mitsubishi Shipbuilding Co., Ltd. (MHIMSB), a group company of Mitsubishi Heavy Industries, Ltd. (MHI) completed construction of the DIAMOND GAS SAKURA (HN:2332), a new generation MOSS type LNGC called "SAYARINGO STaGE" with a tank capacity of 165,502m^3, and delivered the vessel to Diamond LNG Shipping 3 Pte. Ltd. on May 15, 2019.

The "SAYARINGO STaGE" succeeds the "SAYAENDO" (podded peas) type, a vessel highly acclaimed for its improved Moss-type spherical tanks that deliver a high level of reliability. The adoption of apple-shaped (ringo) tanks in the "SAYARINGO STaGE" has enabled increased LNG carrying capacity without changing the ship's beam, and incorporation of a hybrid propulsion system has significantly boosted fuel efficiency compared with the "SAYAENDO."

"STaGE," an acronym deriving from "Steam Turbine and Gas Engines," is a hybrid propulsion system combining a steam turbine and engines that can be fired by gas. Efficient use of the engine's waste heat in the steam turbine results in substantial improvement in plant efficiency, enabling high-efficiency navigation throughout a full range of speeds. The adoption of a tank cover integrated with the hull structure, developed by MHI Group with technical support from Aker Arctic Technology Inc. of Finland, enables a lighter vessel while fully retaining overall structural strength. The design also reduces wind resistance during navigation.

MHIMSB will continue to deliver solutions that enable stable energy supply and environmental benefits by constructing high quality and environmental-friendly LNG carriers with advanced technology.

Principal particulars

L (o.a.) x L (b.p.) x B x D x d: 293.5m x 289.0m x 48.94m x 27.0m x 11.05m
Gross tonnage: 144,828
Cargo tank capacity: 165,502m^3
Main Engine:
1) Mitsubishi, MR21-II, marine steam turbine with reduction gear x 1 set
   Output: 12,400kW x 61.0rpm
2) GE, N3 HXC 1000 J8, electric propulsion motor with reduction gear x 1 set
   Output: 12,400kW x 61.0rpm
Speed, service: 19.5kt
Classification: ABS

MES-S completes 33th neo60BC, KOBAYASHI MARU

Mitsui E&S Shipbuilding Co., Ltd. (MES-S) completed and delivered the 60,000DWT type bulk carrier KOBAYASHI MARU (HN: 1955) at its Chiba Shipyard on August 8, 2019 to Dilemin Shipment Ltd., Republic of the Marshall Islands.

The vessel is designed for loading various bulk cargoes such as coal, ore, and grain, as well as long/heavy cargoes such as steel pipes and hot coils. The design achieves over 60,000 deadweight tons with Panamax beam and retains the neo56 compatibility for ports and trade routes.

The vessel has four cranes and five cargo holds and retains the superior usability of the Mitsui 56 series. The size of the hatch openings is the largest for this type of vessel in terms of both length and width. The new form of the bow and stern maintains good performance under rough sea conditions as well as calm sea conditions and achieves better maneuverability.

The main engine, a MITSUI-MAN B&W 6S50ME-B9.3 diesel engine, complies with the MARPOL NO_x restriction (Tier-II) for exhaust gas emissions, and has superior fuel oil consumption over a wide range of outputs. The ship has low sulfur fuel oil tanks, which are designed for operation in Emission Control Areas (ECAs), considering the strengthened restrictions for SO_x emissions. Compliance with the SOLAS Noise Code contributes to improved crew working and living environments.

Principal particulars

L x B (mld.) x D (mld.): 199.99m x 32.25m x 18.50m
DWT/GT: 60,397t/34,552
Main engine: MITSUI-MAN B&W 6S50ME-B9.3 diesel x 1 unit
Speed, service: abt. 14.5kt
Complement: 24
Classification: NK
Registry: Marshall Islands
Delivery: August 8, 2019

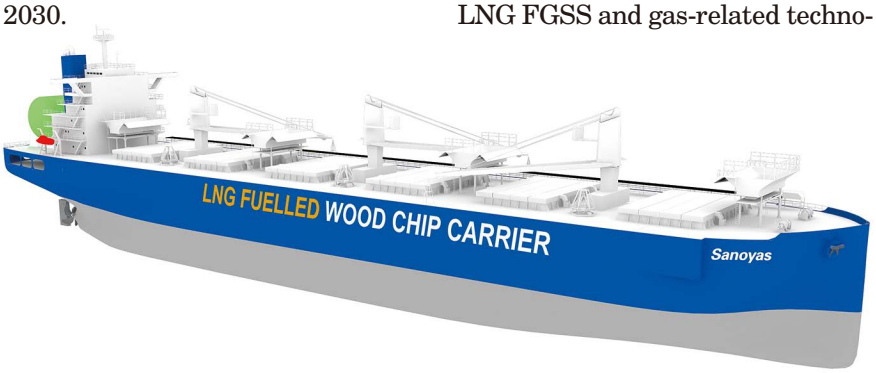
Sanoyas is ready to build LNG fuelled wood chip carriers

Sanoyas Shipbuilding Corporation has obtained an AiP (Approval in Principal) certificate from ClassNK for the design concept of its LNG-fueled engine-mounted 4.3 mil. cft wood chip carrier. The vessel will meet the market's needs for eco-friendly ship operation prior to the IMO's forthcoming environmental regulations, so was designed to achieve 40 percent or greater improvement in EEDI (Energy Efficiency Design Index), coping with the IMO's GHG strategy up to 2030.

For the ship design, Sanoyas has already developed the LNG fuel tank together with the LNG fuel gas supply system (FGSS: see SEA-Japan No 396). The LNG fuel tank will be installed on the stern deck behind the superstructure to permit maximizing the cargo hold capacity. FGSS will be arranged near the engine room, utilizing space along the depth of particularly deep cargo hold of wood chip carriers.

Sanoyas has been trying to develop LNG FGSS and gas-related technology based on rich experiences in building pressurized LPG storage tanks including semi-refrigerated gas tanks, and associated gas piping arrangements onboard. The company has already entered the business, FGSS/engineering service, to cope with growing needs, and has now started to design an LNG-fueled wood chip carrier as the first step for applying LNG fueling systems to other ship types.

AiP certificate given by Mr. Masanori Akagi (left), Manager of Ship Hull Division, ClassNK, to Mr. Kenta Koike, General Manager of Research and Development Department of Sanoyas



An image of LNG fueled wood chip carrier

Oshima completes 55,807DWT open-hatch cargoship, SAGA FAITH

Oshima Shipbuilding Co., Ltd. delivered the 55,807DWT open hatch type general cargo carrier, SAGA FAITH, to Saga Shipholding (Norway) AS on May 10, 2019. The vessel is suitable to carry various cargoes, such as roll papers, wooden pulp bales, packaged lumbers, containers, grain, aluminum ingots, industrial vehicles, steel hot coils, steel pipes, sulphurs, other bales, and bulk cargoes.

Cargo holds with squared hatch corners and flush bulkhead surfaces allow smooth handling of unitized cargoes. The high stability hull form is adopted for carriage of cargoes on hatch covers. A hold dehumidifier is provided to keep damp-sensitive cargoes like roll papers and wood pulp dry. Two sets of high performance 42t gantry cranes manufactured by IKNOW Machineries enable efficient cargo handling. Rain protectors are also equipped for loading/unloading in bad weather.

The main engine is the electronically controlled type for increased propulsion efficiency and has obtained the E0 notation from DNV GL for its automatic and remote control systems. Furthermore, Oshima originally developed energy saving devices, "Flipper Fins" and "Seaworthy Bow," are installed for further improvement of propulsion efficiency. Employment of a bow thruster and high-lift rudder has greatly improved ship maneuverability at ports and harbors.

This vessel has various eco-friendly features. The main engine complies with NO_x emission Tier II regulations, all fuel oil tanks have double side skin construction, and the ballast water treatment system is fitted. In addition, the vessel has been designed to comply with the Marine Labour Convention 2006 for crew and officer comfort during voyages and meets with requirements for the expanded New Panama Canal for flexible trade routing.

Principal particulars

L (o.a.) x L (b.p.) x B x d: 199.90m x 194.00m x 32.26m x 19.50m x 13.30m (summer)

DWT/GT:	55,807t/37,441
Loading capacity:	64,510m³
Main engine:	DIESEL UNITED WARTSILA 6RT-flex50D x 1 unit
MCR:	9,474kw at 124.0rpm
Speed, service:	15.0kt
Classification:	DNV GL
Completion:	May 10, 2019

Kawasaki-LNG floating power plant obtains AiP from DNV GL

Kawasaki Heavy Industries, Ltd. has developed an LNG floating power plant equipped with its own high-efficiency power generation equipment and the gas engine model has obtained Approval in Principle (AiP)*1 from DNV GL based on its "Gas Power Plant" rules which were introduced in 2018.

An LNG floating power plant is an integrated system, in which LNG fuel tanks, LNG regasification unit, power generation equipment, and switchyard are all outfitted on the hull. The plant is towed on the sea or river, and then moored at the installation site, where power is generated and supplied to the onshore power grid.

Demand for this type of power plant is expected to be strong in countries where demand for electricity is rapidly increasing, such as in Southeast Asia, especially on islands or in locations where stable power sources are diffiicult to secure, and also in areas with geographical problems such as lack of land for constructing onshore power plants. LNG has a cost advantage over heavy oil for power generation as a fuel of the power plant, and emits less greenhouse gases than coal and heavy oil. As an environmentally friendly fuel, the scale of supply and demand as well as applications of LNG are expected to expand.

The main features of the Kawasaki - LNG Floating Power Plant are as follows:

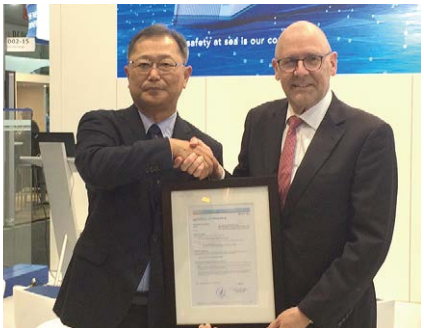
(1) The plants are equipped with in-house developed gas engine or gas turbine with the world's highest level of power generation efficiency in this class. (Gas engine: 49.5%, Gas turbine combined cycle: 54.4%) These system have low nitrogen oxide (NO_x) emissions and low environmental impact.

(2) The gas engine (of the gas engine model) can reach the rated load in 10 minutes from start, and can also achieve high partial load performance over a wide power range (30 - 100%).

(3) A durable, highly insulated aluminum tank is used with the same specifications as for small LNG carriers/bunkering vessels.

(4) High quality and reliable delivery are achieved through a seamless manufacturing value chain at Kawasaki's own factories for the main products such as power generation facility, tank, and barge.

Image of Kawasaki - LNG Floating Power Plant



Yoshinori Mochida, Kawasaki (left) Mr. Johan Petter Tutturen, DNV GL (right), at the recent Nor-Shipping trade fair in Oslo.

Kawasaki has built over 40 LNG-related vessels since constructing Asia's first LNG carrier in 1981, including large LNG carriers and LNG fuel vessels, and has received an order for Japan's first LNG bunkering vessel. Kawasaki is a leader in LNG transportation technology with abundant expertise and rich experience. In addition, Kawasaki has extensive capabilities of developing, designing, and manufacturing the core equipment, gas engines, gas turbines, steam turbines, and heat recovery steam generators (HRSG) using its own expertise in the power plant field, and abundant experience of plant engineering in Japan and around the world. Therefore Kawasaki can provide integrated package solutions for the LNG bunkering vessel and tanks for the LNG secondary terminal.

Taking advantage of synergies between these LNG and energy related technologies, Kawasaki will actively market its energy related products and equipment including small and medium-size distributed power sources, which will contribute to development in areas where stable power sources are difficult to secure.

Outline of specifications of Kawasaki — LNG floating power plants

Model	Gas engine (*Obtained AiP from DNV GL)	CCPP (*Applying for AiP to DNV GL) (combined cycle power plant)
Configuration	Gas engines: 4 units	Gas turbine combined cycle (2 gas turbines, 2 heat recovery steam generators, 1 steam turbine)
Power output	30MW	80MW
Barge size	L120m x W36m x D6.5m	L110m x W48m x D20m
LNG tank	3,500m³ x 2 units	5,500m³ x 2 units

1 Approval in Principle (AiP)

To obtain confirmation by the classification society as a third party by a risk assessment and verification of compliance with classification rules for the conceptual design of new products and technologies.

NAMURA completes Malaccamax-type VLCC, TENRYU

Namura Shipbuilding Co., Ltd. delivered the 312,611DWT VLCC, TENRYU, built at its Imari Shipyard & Works, to Kyoei Tanker Co., Ltd. on July 23, 2019.

The vessel is the third of the newly developed 310,000DWT type VLCC complying with the Harmonized Common Structural Rule (CSR-BC&OT) for Namura. The vessel has a length of about 339m, maximizing the loading capacity and propulsion performance with the improved hull form and increasing the safety and economic efficiency.

The vessel also complies with the latest requirements of international regulations, such as IMO PSPC-COT and PSPC-WBT for corrosion protection of cargo oil tanks and water ballast tanks to increase safety of the vessel.

The propulsion performance has greatly been improved by the adoption of energy saving devices developed by Namura, which include the Namura flow Control Fin (NCF) and the Rudder Fin attached to the stern, together with the wind force reduction type superstructure, hub vortex reduction type propeller boss cap ECO-Cap, low-friction type antifouling paint applied to the outside shell, and an electronically controlled main engine which contributes to reduction of fuel oil consumption. For environmental safety, the vessel is equipped with a main engine and generator engine compliant with the Annex VI of MARPOL 73/78 regulations (Tier II) to reduce NO_x emissions.

The vessel has three large capacity cargo oil pumps that enable loading/unloading of three grades of cargo oils and two cargo oil stripping eductors for unloading cargo oils more efficiently. The ballast water treatment system to control the quality of ballast water is equipped for protection of the marine environment to comply with the International Convention for the Control and Management of Ships' Ballast Water and Sediments.

Principal particulars

L (o.a.) x B (mld.) x d (mld.) : 338.95m x 60.00m x 21.05m

DWT/GT:	312,611t/160,008
Complement:	34 + 10 (Workers)
Classification:	ClassNK
Registry:	Liberia

Naikai completes RO-RO cargo ship, IZUMI MARU, for Japanese owner

Naikai Zosen Corporation completed construction of the 13,000GT-class RO-RO cargo ship, IZUMI MARU, at the Setoda Shipyard on May 24. The ship construction order had been placed by Izumi Kisen Co., Ltd. and the ship is now chartered by Fujitrans Corporation.

The ship features loading of cargoes of passenger automobiles and trailers. Seven cargo decks are provided, one of which can accommodate trailers. Roll-on/roll-off operation of the cargo vehicles is carried out through the shore-ramp gate at the stern, and inboard ramps allow access to assigned bays on the car decks.

The hull form has been designed with a bulbous bow and the Ultimate Rudder* to achieve improved propulsion performance. (* The Ultimate Rudder is a rudder bulb type, which is designed to be installed very closely to the propeller.) The main engine is the electronically controlled type (model ME-C) with further improvement of fuel consumption and combustion conditions.

The ship uses fin stabilizers to reduce the rolling motion during navigation, and maneuvering at a port can easily be attained by thrusters installed at the bow and stern.

Principal particulars

L (o.a.) x L (b.p.) x B x D x d: 165.00m x 157.00m x 27.60m x 24.59m x 6.60m

GT:	13,038
Vehicle loading capacity:	50 units of 13m trailers 1,463 units of passemger cars
Main engine:	Hitachi-MAN B&W 8S50ME-C8.5 diesel x 1 unit
MCO:	12,200kW x 127.0min^{-1}
NCO:	10,370kW x 120.3min^{-1}
Speed, service:	21.0kt
Classification:	ClassNK
Registry:	Tokyo, Japan
Completion:	May 24, 2019

NSU ZENITH

Builder: Imabari Shipbuilding Co., Ltd.
Ship type: Bulk carrier
L (o.a.) x B x D: 299.9m x 50.0m x 24.7m
DWT/GT: 207,600t/108,000
Main engine: 6G70ME-C9.5 diesel x 1 unit
Speed, service: 14.6kt
Classification: ClassNK
Completion: August 29, 2019

ARIZONA LADY

Owner: First Clean Air LR2 Pte. Ltd.
Builder: Sumitomo Heavy Industries Marine & Engineering Co., Ltd.
Hull No.: 1397
Ship type: Crude oil/product carrier
L x B x D: 237.00m x 44.00m x 21.8m
DWT/GT: 116,653t/60,465
Main engine: Hitachi MAN B&W 6G60ME-C9.5 diesel x 1 unit
Speed: 15.0kt
Classification: LR
Registry: Singapore
Completion: July 30, 2019

ONE CYGNUS

Owner: Denen Ship Holding LLC
Builder: Japan Marine United Corporation
Hull No.: 5125
Ship type: Container carrier
L (o.a.) x B (mld) x D (mld) x d (mld): 364.15m x 50.60m x 29.50m x 15.79m
DWT/GT: 138,611t/146,694
Main engine: WinGD W9X82 diesel x 1 unit
Speed: 22.5kt
Complement: 30
Classification: ClassNK
Completion: July 10, 2019

CHARISMA. GR

Owner: Cardinal Maritime S.A.
Builder: Saiki Heavy Industries Co., Ltd./Onomichi Dockyard Co., Ltd.
Hull No.: 766
Ship type: Bulk carrier
L (o.a.) x B x D x d (ext.): 179.9m x 30.00m x 15.10m x 10.50m
DWT/GT: 37,295t/23,765
Main engine: MAN B&W 6S46ME-B8.5 diesel x 1 unit
Speed, service: 15.0kt
Classification: ClassNK
Registry: Panama
Completion: April 25, 2019

OXALIS LOTUS

Owner: Oxalis Shipping Co. Pte. Ltd.
Builder: Shin Kurushima Dockyard Co., Ltd.
Hull No.: 6016
Ship type: Product tanker
L (o.a.) x B x D: 106.5m x 19.20m x 9.9m
DWT/GT: 7,999t/6,011
Main engine: B&W6L35MC6 diesel x 1 unit
Speed, service: 12.9kt
Classification: ClassNK
Registry: Singapore
Completion: May 14, 2019

SOUTHERN GLORY

Builder: Tsuneishi Shipbuilding Co., Ltd.
Hull No.: S1571
Ship type: Tanker
L (o.a.) x B x D: 243.80m x 42.00m x 21.48m
DWT/GT: 108,441t/61,100
Main engine: MAN-B&W 6G60ME-C9.5 diesel x 1 unit
Speed, service: 15.55kt
Classification: ClassNK
Registry: Panama
Completion: May 28, 2019