

Sasaki completes LPG dual-fueled LPG carrier, MARKO MARULIC



Sasaki Shipbuilding Co., Ltd. completed construction of the MARKO MARULIC, a 7,500m³ class LPG-fueled LPG cargo carrier, and delivered the carrier to an overseas owner on October 24, 2022.

This is the first LPG carrier propelled by a dual-type LPG-fueled main engine built in Japan as a smaller ship than 11,000m³ cargo loading capacity, and has two pressurized cargo tanks with designed capacity of 3,750m³, and one LPG-fuel tank of 450m³ capacity. The cargo tank is durable up to 17.65 bar as well as minus 10°C.

The carrier is equipped with Sasaki patent stern fins in the front of the propeller. The stern fins control water flow before the propeller, resulting in improved propulsion performance and fuel reduction.

To achieve environmental load reduction and less pollutant emissions, the MARKO MARULIC has been designed to conform with requirements of EEDI III (Engine Efficiency Design Index) and BV's Clean Ship regulations, and is compliant with the class notation AUT-UMS of BV, which allows ship M0 operation and alleviates the work load of the crew.

Moreover, the Croatia-registered carrier has been provided with a format of IHM-EU (Inventory of Hazardous Material required by EU) for the Ship Recycling Regulation (EU SRR). According to the regulations, ships above 500GT and flying the flag of an EU/EEA member state, or third-party flagged vessels calling at European ports, must

carry an IHM certificate on board.

A small LPG carrier involves difficulty in designing ship arrangement, due mainly to the limit to engine room space for installing equipment related to LPG fuel supply. Sasaki Shipbuilding has been flexibly coping with custom designs for shipowners, and has already completed designs of 5,000m³ and 11,000m³ as well as 7,500m³ LPG carriers.

The company has received orders for three 7,500m³ LPG carriers, and the MARKO MARULIC is the first of the series. The two remaining ships will be completed by mid 2023. These carriers are also compliant in advance with EEDI III requirements that become effective on and after 2025.

Principal particular

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:	7,261t/6,515
Cargo tank capacity:	7,524m ³ (3,750m ³ x 2)
Main engine:	Hitachi-MAN B&W 5S35ME-C9.7-LGIP diesel x 1 unit
MCO:	3,000kW x 143min ⁻¹
Speed, service:	abt. 13.0kt
Classification:	BV
Registry:	Croatia
Completion:	October 24, 2022



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JMU completes 3,013TEU-type container ship, WAN HAI 357

Japan Marine United Corporation (JMU) delivered the WAN HAI 357, a 3,013TEU container ship, to Wan Hai Lines (Singapore) Pte. Ltd. at its Kure Shipyard on November 29, 2022.

This is the fifth vessel of a new class of 3,013TEU-capacity container ships which satisfy the new environmental regulations (NO_x Tier III) and are based on the eight 3,055-TEU-capacity container ships delivered last year by JMU. The vessel is optimally designed for medium to long distance routes as the amount of seaborne trade to and from Asia and within Asia is increasing. The design achieves significantly improved environmental and operational performance compared with conventional vessels, with both high loading capacity and high navigation performance using JMU's latest technology.

- The vessel achieves high propulsion efficiency through its advanced lower resistance hull form and

JMU energy saving devices such as the ALV-Fin® (Advanced Low Viscous resistance Fin).

- The latest electronically controlled main engine, a MAN B & W 7S70MEC10.5, and the inverter controlled cooling sea water pump reduce fuel oil consumption.
- Safety and convenience for control during the voyage and berthing and unberthing are improved by adopting the INS (Integrated Navigation System) and fully enclosed navigation bridge.
- Voyage assistance and monitoring of the engine room by a CCTV camera system improves safety.
- This vessel class has obtained the ABS SMART (INF) Notation,



which is granted to vessels fitted with smart technology such as monitoring systems.

Principal particulars

L (o.a.) x B (mld.) x D (mld.) x d (mld.):	203.50m x 34.80m x 16.60m x 11.50m
DWT/GT:	36,776t/30,776
Main engine:	MAN-B&W 7S70ME-C10.5 diesel x 1 unit
Speed:	21.5kt
Complement:	25
Classification:	ABS

Shin Kurushima Sanoyas completes Ultramax bulker, THERESA GLORY

Shin Kurushima Sanoyas Shipbuilding Co., Ltd. completed building of the THERESA GLORY, an Ultramax bulk carrier, at its Mizushima Shipyard and completed delivery on December 15, 2022.

This is the 4th vessel of a series of the Sanoyas newly developed 64,000DWT type Ultramax bulk carriers. The vessel not only complies with the latest rules such as CSR B&T and NO_x Tier III regulations, but also has large deadweight within a ship length of less than 200m. The THERESA GLORY exceeds in advance the 30% reduction of CO₂ emissions (Phase 3) of the IMO's EEDI (Energy Efficiency Design Index: grams CO₂ per ton nautical mile)

regulation, which will be applied to ships with building orders contracted in or after 2025.

For improvement of propulsion efficiency, the vessel is equipped with a low-speed & long-stroke electronically controlled main engine combined with a high-efficiency propeller and rudder appendages. Furthermore, patented energy saving devices of Shin Kurushima Sanoyas have been applied to the vessel, which include the Sanoyas developed STF (Sanoyas-Tandem-Fin) and ACE DUCT (Sanoyas Advanced flow Controlling and Energy saving DUCT). These improved devices have achieved over 8% reduction of energy consumption so that the EEDI Phase 3 can be certainly satisfied.

Eco-friendly features include various countermeasures such as the main engine with EGR compliant with the NO_x emission Tier III limit for the prevention of air

pollution, and the dedicated low sulphur gas oil tank to cruise in ECAs (Emission Control Areas). In addition, countermeasures for marine environmental protection have been taken with the Ballast Water Treatment System, independent holding tanks for rainwater on upper deck, etc.

The vessel has five cargo holds with a hatch opening optimized to load various cargos such as grain, ore, coal, hot coils, and steel pipes. Four 31t deck cranes are installed for handling cargoes.

Principal particulars

Ship type:	Ultramax bulk carrier
Hull No.:	1386
L (o.a.) x B (mld.) x D (mld.) x d (ext.):	199.99m x 32.24m x 19.22m x 13.520m
DWT/GT:	63,921t/36,298
Cargo hold capacity:	81,490m ³ (grain)
Classification:	ClassNK
Complement:	24
Speed, service:	about 14.1kt
Delivery:	December 15, 2022



World's first AiP granted to Kawasaki's 2.4MW class dual fuel engine using hydrogen gas

Kawasaki Heavy Industries, Ltd. has announced that an Approval in Principle (AiP) was granted by ClassNK for Kawasaki's dual fuel (DF) engine using hydrogen gas as fuel, which will be installed on a 160,000m³ liquefied hydrogen carrier developed by Kawasaki.

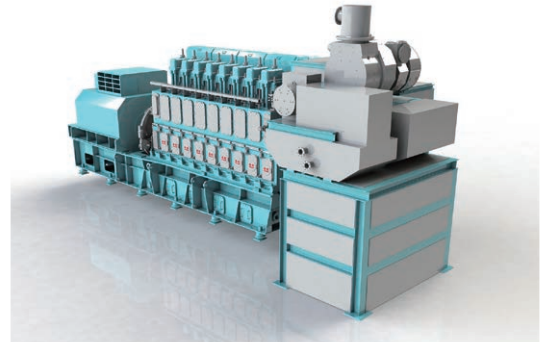
This DF engine allows operators to flexibly alternate between the use of hydrogen fuel and conventional low-sulfur fuel oil. When hydrogen fuel is selected, the boil-off gas that evaporates naturally from the liquefied hydrogen cargo tanks is used as the main fuel at a calorie-based ratio of 95% or higher^(*), which results in a significant reduction of greenhouse gas emissions. (Note *: A calorie-based ratio of hydrogen boil-off gas to low-sulfur fuel oil)

Kawasaki has already sold more than 200 engines fueled only by natural gas. To expand its product portfolio, Kawasaki developed combustion technologies tailored to hydrogen, including rapid combustion, which often results in backfires, and high com-

bustion temperature.

A demonstration test using a single-cylinder test engine achieved stable combustion of hydrogen without causing abnormal combustion or the overheating of parts in the combustion chamber. Kawasaki is now developing hydrogen powered engines for propulsion as a Green Innovation Fund Project of the New Energy and Industrial Technology Development Organization (NEDO). Kawasaki intends to conduct a demonstration test of this engine after installation as a generator engine on a large-scale liquefied hydrogen carrier which is planned to be commercialized in the mid-2020s.

Kawasaki forecasts a significant increase in the use of hydrogen energy in the future, which will be vital in achieving a decarbonized society, so is developing a range of technologies for the hydrogen supply chain (production, transportation, storage, and



Artist's rendition of a DF engine using hydrogen gas as fuel

utilization). The technology used for this engine supports the "transportation" and "utilization" stages, covering both the demand and supply aspects of the supply chain. Moving forward, Kawasaki will continue to develop more products that capitalize on hydrogen energy, to promote carbon neutrality.

Specifications of the DF generator engine using hydrogen gas as fuel

Rated output: 2,400kW_e (using hydrogen fuel)

Cylinder diameter: 300mm

Namura completes Dunkirkmax-type bulk carrier, CAPE CORMORANT

Namura Shipbuilding Co., Ltd. delivered the CAPE CORMORANT, a 182,090DWT bulk carrier, at its Imari Shipyard & Works on October 19, 2022. The vessel is the seventh 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 can be achieved by adoption of two energy saving devices, the Namura flow Control Fin (NCF) and the Rudder-Fin developed by Namura, an electronically controlled main engine, the lat-

est 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 leakage. 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 of 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: 182,109t/93,719

Main engine: MAN B&W 6G70ME-C9.5-EGRBP diesel x 1 unit

Complement: 23

Classification: ClassNK

Registry: Liberia

Completion: October 19, 2022



Oshima completes 99,000DWT box shaped bulk carrier, SHOFU MARU

Oshima Shipbuilding Co., Ltd. delivered 99,000DWT-type box-shaped bulk carrier to Mitsui O.S.K. Lines, Ltd. on October 7, 2022. This is the first delivery of a hard-sail-powered vessel, the so-called “Wind Challenger,” which incorporates a wind-force propulsion system.

The hard sail system consists of three FRP (Fiber Reinforced Plastics) sails and one steel sail, and is extended and reefed automatically in response to the wind conditions and ship motion. The height of the sail from the main deck is about 53m with all sails fully extended and is about 20m with all sails reefed, and the direction of the sail can rotate 180 degrees. The width of the sail is about 15m and complies with SOLAS regulations for visibility from the bridge. By slewing in an appropriate direction, a large amount of wind forces is converted into the propulsive force of the ship and reduces fuel consumption, by about 8% on the North American route, and 5% on the north-south route. Telescopic extension and slewing of the hard sail system are automatically controlled by the Inte-

grated Automation System (IAS) in the bridge, as well as manually using a controller in the bridge or elsewhere.

This vessel has been optimized for various cargoes such as grain, coal, ore, and bauxite. The box-shape cargo hold structure prevents cargoes from accumulating on hold frames which facilitates cargo handling as well as discharging and cleaning work.

Measures to prevent marine pollution include the gray water tank and collecting tank to store waste water and water used for cargo hold and deck cleaning. To reduce air pollution with SO_x and NO_x emissions, the main engine complies with NO_x emission Tier III regulation and the exhaust system also complies with IMO SO_x regulation. In addition, for higher propulsion efficiency, an electronically controlled main engine and a high efficiency propeller with PBCF (Propeller Boss Cap Fins) are equipped. Furthermore, Oshima energy saving devices, such



as Advanced Flipper Fins, Rudder Fin, and Seaworthy Bow are applied for further improvement of propulsion efficiency. Therefore, this vessel has already achieved about 30% less from the IMO reference line of EEDI (Energy Efficiency Design Index).

Principal particulars

L (o.a.) x B (mld.) x D (mld.) x d (ext.):	235.00m x 43.00m x 20.05m x 13.910m
DWT/GT:	100,422t/58,209
Hold capacity:	115,304ft ³
Main engine:	Mitsui-MAN B&W 6S60ME-C10.5-EGRBP diesel x 1 unit
MCR:	9,180kW at 84.0rpm
Speed, service:	about 14.30kt
Classification:	ClassNK
Completion:	October 5, 2022

Oshima receives DNV's AiP of basic design for ammonia-fueled ships

Oshima Shipbuilding Co., Ltd. obtained AiP (Approval in Principle) of the basic design for ammonia-fueled ships, developed in cooperation with Sumitomo Corporation, from the DNV ship classification society on December 5, 2022. This AiP proves that the design of ammonia-fueled ships has been confirmed to satisfy technological requirements and safety standards.

Ammonia does not generate CO₂ during combustion, so is expected provide a zero-emission fuel as one of the next generation engine-fuels, and significant in the decarbonization of the maritime industry.

With the cooperation of Sumitomo Corp., DNV, and others, Oshima Shipbuilding will advance further optimization of the ammonia-fueled shipbuilding design, to tackle decarboniza-



From left are Mr. Toyota, General Manager of Sumitomo Corp, Mr. Hiraga, President of Oshima Shipbuilding, and Mr. Stian Erik Sollied, President of DNV Japan

tion in the marine transport industry as well as environmental protection through development and basic studies of new technologies for society, such as the construction of an LNG-fueled ship to be completed in Spring 2023 and construction of the Wind Challenger ship in 2022.

LNG fuel is one of the next genera-

tion fuels that has low environmental load. Compared with heavy fuel oil for marine engines, LNG can be expected to reduce emissions of approximately 100% of SO_x, 80% of NO_x in lean-burn, and 30% of CO₂. Therefore, Oshima will complete building a post Panamax bulk carrier propelled by a LNG-fueled engine in this spring and concluded the basic agreement for building of the second and third LNG-fueled ships of the same type from Nippon Yusen Kabushiki Kaisha (NYK) in November 2022.

Oshima Shipbuilding completed the world's first Wind Challenger ship, SHOFU MARU, last year, and will complete the second Wind Challenger for Ultramax to be delivered to Mitsui O.S.K. Lines, Ltd. in 2024. (Wind Challenger: refer to the above SHOFU MARU)

Naikai delivers cargo/passenger ship, LADY SAMOA IV, to Samoa

Naikai Zosen Corporation has completed construction of the inter-island cargo/passenger ship, LADY SAMOA IV, at its Setoda Shipyard, ordered by the Japan International Cooperation System (JICS: a general incorporated foundation) for delivery to the Independent State of Samoa.

This ship was built under the "Economic and Social-Development Plan toward Independent State of Samoa in 2018," which involves supply of a passenger/cargo ship, as grant cooperation as part of Japan's ODA (Official Development Assistance). The LADY SAMOA IV left the Setoda Shipyard for Samoa on October 8, 2022, and was delivered to the Samoa Government at a local site on October 29.

The Independent State of Samoa consists of two main islands and seven other small islands. Consequently, Samoa is obliged to largely depend on marine transport. Samoa exports large quantities of agricultural and marine products to American Samoa, the biggest importers for Samoa. So, marine transport is indispensable for Samoa.

The LADY SAMOA IV replaced its predecessor, the 20-year-old LADY NAOMI, and is now plying between Samoa and American Samoa to transport about 10,000 passengers and about 1,000 tons of cargoes a year.

This ship is a cargo/vehicle-and-passenger ferry with two main engines, two propellers, and two rudders, and roll-on and roll-off of vehicles are

carried out through the ramp door at the stern. The ship can load trucks, passenger cars, containers, and bulk cargoes as well as passengers. Cargo handling is performed with a deck crane at the portside of the stern. The vehicle hold consists of one deck, and the vehicle loading area and general



cargo area are separated by the gate door of the hold.

The ship complies with USCG regulations for passenger ships to navigate the seaways connecting to American Samoa belonging to the US. To cope with an emergency, the ship has been designed to allow passengers to easily take refuge, or abandon the ship. Wider passages and quick door-release arrangements will permit passengers to move smoothly during normal navigation. Fire prevention measures have been also taken in various ways for ensured safety. Doors of fire-protection compartments have adopted high-grade fireproof material, and heat-resistant materials have been applied to various parts. Measures against power outage include an emergency generator, power supply battery, emergency lamps with a built-in battery, luminescent information boards, etc. In case of emergency, safety measures have been taken for passengers to reach up to a place of disembarkment.

The LADY SAMOA IV has been also designed with various features considering environmental protection as well as safety and health. The ship has excellent hull form for navigational speed performance, designed

through repetitive water tank tests, and demonstrates good maneuverability in berthing and unberthing with the bow thrusters. The upper section of the ship hull has been installed with solar panels to provide electric power for the passenger spaces. Open air passenger seats have been made

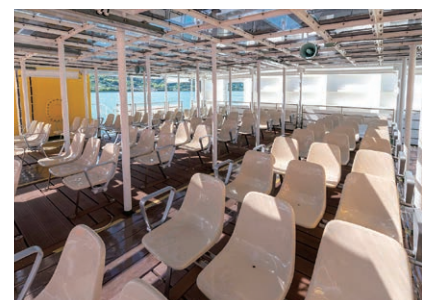
using resin wood that is resistant and sanitary. Antibacterial coating has been applied to the ceiling, walls, and furnishings in passenger cabins to inactivate adhered viruses and suppress propagation. Two air purifiers with antibacterial/virus filters have been installed for the passenger cabins and provide clean air.

Principal particulars

Length (o.a.):	48.00m
Breadth (mld.):	12.00m
Depth (mld.):(03 Deck/02 Deck)	6.30/3.80m
Draught (mld.):	2.35m (designed full load)
Draught (mld.):	2.45m (scantling)
GT:	1,200
DWT:	177t (scantling draught)
Cargo loading area:	225m ²
Passengers:	280 people
Crew members:	17 persons
Main engine:	Yanmar 6EY17W diesel 2 units (2 propellers)
NCO:	712kW (85%) x 1,374/277min ⁻¹ x 2
Speed, service:	about 11.5kt
Classification:	ClassNK
Registry:	APIA
Service route:	Samoa (Apia) to American Samoa (Pago Pago)
Delivery:	October 29, 2022



Passengers' room



Open-deck passengers' seats

BUNGO CROWN

Builder: Imabari Shipbuilding Co., Ltd./Minaminippon Shipbuilding Co., Ltd.

Ship type: Chemical/product oil carrier

L(o.a.) x B x D: 184.94m x 32.2m x 19.1m

DWT/GT: 49,994t/30,560

Main engine: 6S50ME-C9.6 diesel x 1 unit

Speed, service: 14.5kt

Classification: ClassNK

Completion: October 5, 2022

**HELIOS**

Owner: Aureole Maritime Ltd.

Builder: Japan Marine United Corporation

Hull No.: 5198

Ship type: 302,000DWT crude oil tanker

L(o.a.) x B x D x d: 330.00m x 60.00m x 29.35m x 21.58m

DWT/GT: 302,093t/156,471

Main engine: MAN B&W 7G80ME-C9.5 diesel x 1 unit

Speed, service: 14.50kt

Complement: 28

Classification: ABS

Registry: Bahamas

Completion: November 25, 2022

**AYANA SMILE**

Builder: Onomichi Dockyard Co., Ltd.

Hull No.: 780

Ship type: Tween deck cargo vessel

L (b.p.) x B x D: 124.47m x 23.60m x 15.85m

DWT/GT: 17,670t/13,263

Main engine: J-ENG 6UEC35LSE-B2 diesel x 1 unit

Speed, service: 14.5kt

Classification: ClassNK

Registry: Manila

Completion: October 18, 2022

**HSL HONOLULU**

Owner: Wealth Line Inc.

Builder: Shin Kurushima Dockyard Co., Ltd.

Hull No.: S6172

Ship type: Bulk carrier

L (b.p.) x B x D: 196.50m x 32.26m x 19.40m

DWT/GT: 64,241t/36,762

Main engine: MITSUI MAN B&W 6S50ME-C9.6-EGRBP diesel x 1 unit

Speed, service: 13.9kt

Classification: ClassNK

Registry: Panama

Completion: January 18, 2023



Stay Tuned JSEA Digital Platform!

We are preparing to release the latest version of the JSEA Digital Platform (JDP) for displaying the Japan Digital Pavilion at the coming NOR-SHIPING 2023 (June 6th to 9th in Oslo) on publication of the next newsletter.

The previously released JDP version for local exhibitions such as Posidonia 2022 and NOR-SHIPING 2022 can be accessed using the QR code below.

JSEA Digital Platform (JDP)



Information from JSEA

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