

Shin Kurushima Toyohashi completes LNG fueled car carrier PLUMERIA LEADER



Shin Kurushima Toyohashi Shipbuilding Co., Ltd. completed the PLUMERIA LEADER, a car carrier capable of transporting 7,000 units, for delivery to Nippon Yusen Kabushiki Kaisha in March 2022.

This car carrier is the next generation type equipped with a dual fuel engine using LNG as a main fuel. The environmentally-friendly main engine can reduce CO₂ emissions by 30% or more and emits almost no SO_x and others compared to the conventional diesel engine fueled with heavy oil.

The carrier has been designed to limit the overall length to less than 200m, instead expanding the breadth greater than the conventional Panamax width. This has increased unit loading capacity, resulting in much better fuel consumption per cargo vehicle compared to current car carriers.

Lower fuel consumption has been achieved by applying the following energy efficiency devices including Shin Kurushima Dockyard designs: A.S. Fin, Turbo-Ring, Skeg Fin, K3 Propeller, Aerodynamic Screen, Reaction Rudder, and Low Friction Type Shell Paint.

The partial bulkheads and reduced structural method have been employed for the ship hull construction. This allows the One-way System for inboard slope accesses on both sides of the ship, facilitating car-loading/unloading operation.

For loading/unloading, the ship has a stern ramp (35m

x 13.2m: SWL 30t) and a center ramp (22m x 4.3m: SWL 15t).

The ship's bridge is the all-weather structure type with improved operation in departure/arrival, surrounding visibility, operability, and safety. The center console has been arranged considering the shape of the bridge and personnel movement. The consoles have all the essential equipment for maneuvering, monitoring, route planning, etc. for efficient ship operation. In addition, the consoles on both wings are provided with a multi-monitor for checking radar images, etc. and equipment required for departure/arrival. These devices are all the latest models satisfying the international regulations.

Principal particulars

Hull No.:	S-6133
Ship type:	Car carrier
L (o.a.) x L (b.p) x B x D x d (ext.):	199.96m x 196.00m x 38.00m x 35.54m x 9.55m
DWT/GT:	17,210t/72,287
Vehicle loading capacity:	7,150 units
Main engine:	DU - Win GD 8X52DF diesel x 1 unit
MCR:	11,920kW x 105min ⁻¹
Speed, service:	18.0kt
LNG tank:	2 units
Complement:	30
Classification:	ClassNK
Completion:	March 2022



For further information please contact:

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

JAPAN SHIP EXPORTERS' ASSOCIATION

15-12, Toranomon 1-chome, Minato-ku, Tokyo 105-0001 Tel: (03) 6206-1661 Fax: (03) 3597-7800 E-Mail: postmaster@jsea.or.jp

JMU completes J-Series 82,400DWT bulk carrier, RUBINA

Japan Marine United Corporation has delivered the RUBINA, a J-Series 82,400DWT bulk carrier, at the Tsu Shipyard on April 7, 2022. This is the 12th vessel of the J-Series of Panamax bulk carriers, called J82BC, which has proved successful in both economical and environmental friendly design.

The J-Series complies with the MARPOL ANNEX VI NO_x Tier III and SO_x emission regulations, in addition to the CSR BC&OT (Common Structural Rules for Bulk Carriers and Oil Tankers). These regulations/rules ensure the ship is environment friendly and has more secure hull structure. On the other hand, these rules have negative impacts on economical design such as decrease of cargo hold capacity, deadweight and increase of fuel oil consumption.

However, JMU has overcome these negative impacts in design using the latest JMU technology, and achieved more cargo capacity, deadweight and lower fuel consumption, compared with the previous G81BC series which

is categorized as Phase 1 of the Energy Efficiency Design Index (EEDI). J82BC is so improved as to satisfy Phase 2 of the EEDI.

The J82BC series has larger deadweight and cargo hold capacity suitable for carrying grain, bulk coal, and iron ore in its seven cargo holds, and has been developed with the expertise and vast experience of JMU.

The SSD[®] (Super Stream Duct[®]) and SURF-BULB[®] are equipped fore and aft of its propeller, respectively, which greatly improve the propulsion performance. In addition, the ALV-Fin[®] (Advanced Low Viscous Resistance Fin) equipped fore of the propeller controls stern flow to obtain better propulsive efficiency. Further-

more, the well-refined shape of superstructure can attain low wind resistance.

Principal particulars

L (o.a.) x B (mld.) x D (mld.) x d (mld.):	229.0m x 32.26m x 20.20m x 14.55m
DWT/GT:	82,384t/44,618
Main engine:	MAN B&W 6S60ME-C8.5-EGRBP diesel x 1 unit
Speed:	14.5kt
Complement:	25
Classification:	ClassNK



Namura completes Dunkirkmax-type bulk carrier, FLORIDA

Namura Shipbuilding Co., Ltd. delivered the FLORIDA, a 182,063 DWT bulk carrier, at its Imari Shipyard & Works on March 29, 2022. The vessel is the third of the newly-developed 182,000DWT-type bulk carrier with the principal dimensions optimized for the restrictions of the Port of Dunkirk in France.

Further improvement of propulsion performance and fuel saving are achieved with 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 latest model of high efficiency propeller, and low friction type anti-fouling paint.

For environmental protection, the vessel is equipped with the main engine and generator engines compliant with the Annex VI of MARPOL 73/78 regulations to reduce NO_x emissions,

and an air seal-type stern tube-sealing device is adopted 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 on board

ships to improve the environment of the living quarters.

The ballast water treatment system is equipped to control the quality of ballast water for protection of the marine environment and comply with the International Convention for the Control and Management of Ships' Ballast Water and Sediments.

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:	182,063t/93,719
Main engine:	MAN B&W 6G70ME-C9.5-EGRBP diesel x 1 unit
Complement:	25
Classification:	ClassNK
Registry:	Marshall Islands
Completion:	March 29, 2022



Kawasaki obtains AiP for large, 160,000m³ liquefied hydrogen carrier

Kawasaki Heavy Industries, Ltd. has obtained the approval in principle (AiP) from Nippon Kaiji Kyokai (ClassNK) for a large, 160,000m³ liquefied hydrogen carrier. This liquefied hydrogen carrier design is a large vessel equipped with a cargo containment system (CCS) comprising four liquefied hydrogen tanks having a combined capacity of 160,000m³. The CCS received its own AiP in April 2021.

The carrier is designed to transport cryogenic liquefied hydrogen, cooled to a temperature of minus 253°C and reduced to one eight-hundredth its initial volume, by sea in large amounts on each voyage, helping to reduce hydrogen supply costs. In order to build this large carrier, Kawasaki leveraged design and ship-building technologies as well as safety-related technologies and knowledge utilized in the construction of the globally pioneering, 1,250m³ liquefied hydrogen carrier SUISEI FRONTIER^{*1}, as well as its many years of experience in building liquefied natural gas (LNG) carriers and other liquefied-gas transport vessels.

This vessel's AiP was issued by ClassNK following examinations to confirm that the vessel satisfies the IGC Code^{*2} and the International Maritime Organization (IMO) Interim Recommendations for Carriage of Liquefied Hydrogen in Bulk^{*3}, and also clears Class regulations as well as a risk assessment based on Hazard Identification Study (HAZID)^{*4} methods.

The main features of Kawasaki's carrier are as follows.

(1) The vessel contains four 40,000m³ liquefied hydrogen carrying tanks for a combined total capacity of 160,000m³. These tanks utilize a newly developed, high-performance insulation system that minimizes boiloff gas (BOG), which occurs in response to heat ingress, in order to enable large-quantity transport of cryogenic liquefied hydrogen.

(2) The propulsion system includes a boiler and steam turbine plant capable of using hydrogen as fuel, and a dual-fuel propulsion system that makes use of natural BOG as fuel to power the ship. Utilizing hydrogen, which does not emit CO₂ during combustion, as a fuel for propulsion contributes to reduced CO₂ emissions from liquefied hydrogen transport operations. Furthermore, the vessel is equipped with a hydrogen-gas-fuel supply system comprising hydrogen

soundness while ensuring safety.

Kawasaki developed this vessel as part of a subsidized project by NEDO^{*5} and is currently carrying out more in-depth design intended to start commercial operations in the mid-2020s. Amid global calls for the early achievement of carbon neutrality targets, the company is striving to achieve large-volume transport of liquefied hydrogen, for which demand is expected to grow as a clean energy source, to promote the use of hydrogen energy and thus help achieve decarbonization for the global future.

Principal particulars

Length:	approx. 346m
Width:	approx. 57m
Draft:	9.5m
Cargo tank capacity:	160,000m ³
(Four 40,000m ³ tanks, enabling carrying of approx. 10,000 tons of liquefied hydrogen)	



gas compression equipment, hydrogen gas heat exchanger equipment and other components to enable supply of BOG from the CCS to the propulsion system.

(3) The vessel uses a cargo handling system designed to load large amounts of liquefied hydrogen onto the vessel in a short time, and is equipped with vacuum insulated double wall pipes to efficiently and safely transfer hydrogen in its cryogenic, liquefied state from onshore storage facilities to the vessel tanks minimizing vaporization.

(4) The hull and draft of the vessel were designed with consideration for the low specific gravity of the liquefied hydrogen cargo, and horsepower required for propulsion was kept low in response, resulting in higher-efficiency propulsion performance. Moreover, risk assessments were carried out for the propulsion system, cargo handling system and other elements in relation to liquefied hydrogen, and suitable safety measures were implemented. This eliminates the risks associated with liquefied hydrogen to the ship's crew, the ship environment, structural strength, and overall ship

Notes

*1 Constructed by Kawasaki as a member of the CO₂-free Hydrogen Energy Supply-chain Technology Research Association (HySTRA; website: <http://www.hystra.or.jp/en/>), as part of the Demonstration Project for Establishment of Mass Hydrogen Marine Transportation Supply Chain Derived from Unused Brown Coal by the New Energy and Industrial Technology Development Organization (NEDO).

*2 International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk. A set of international regulations governing the constructions and equipment of such ships. All ships that carry liquefied gases and that were built in or after 1986 are required to adhere to the code, and ClassNK incorporates the code as part of its Rules and Guidance for the Survey and Construction of Steel Ships.

*3 Provisional recommendations adopted by the IMO for bulk transport of liquefied hydrogen.

*4 Method of assessing risk, which is determined by experts based on the frequency with which potential hazards in a system arise, and aimed at identifying ways to minimize that frequency.

*5 NEDO Technology Development Project for Building a Hydrogen-based Society/Technology Development Project for Large-Scale Utilization of Hydrogen / Project for Enlargement of Liquefied Hydrogen Cargo Tank Facilities and Development of Unloading Terminal Equipment.

Mitsubishi completes conceptual study for ammonia/LCO₂ carrier — Response to increasing demand for transport of ammonia and LCO₂ —

Mitsubishi Shipbuilding Co., Ltd., a part of Mitsubishi Heavy Industries (MHI) Group based in Yokohama, has completed a conceptual study for the design of an “Ammonia/Liquefied CO₂ Carrier” capable of transporting both ammonia and liquefied carbon dioxide (LCO₂). The extensive study conducted with Mitsui O.S.K. Lines, Ltd. provides the basis for a type of vessel with high potential in the LCO₂ carrier market by flexibly meeting the projected increase in demand for transporting ammonia and LCO₂.

Ammonia is a source of stable clean energy projected to be used widely in the future, and LCO₂ carriers will be important in the value chain of carbon dioxide capture, utilization, and storage (CCUS), which has the potential for global decarbonization, by providing a way to efficiently transport recovered LCO₂ to storage sites and facilities for effective utilization. MHI Group estimates that the volume of CO₂ reduction due to CCUS will amount to 4.3 to 13.0 billion tonnes annually by 2050.

The vessel for transporting ammonia and LCO₂ developed through this

conceptual study is designed to carry ammonia on its outward journey, and LCO₂ on the return trip. Specific carriers for each material normally run empty on their return voyage, so a ship capable of carrying both substances will increase operational efficiency, and contribute to enhanced transport efficiency overall.

Mitsubishi Shipbuilding will continue to further develop the technology based on the knowledge acquired and technical issues encountered through this project, and in cooperation with marine-related corporations and petroleum development corporations, aims to commercialize the vessel. Mitsubishi Shipbuilding will continue to develop various types of ships based on this design to respond flexibly to customer needs, considering the entire value chain.

As an integral part of MHI Group's



energy transition strategy, Mitsubishi Shipbuilding has established the MARINE FUTURE STREAM vision for 2050 in the ship and marine sector, setting the goals of “a decarbonized marine world” through autonomous operation and electrification, and “effective utilization of the marine space” through renewable energy and the carbon cycle, and working to generate and implement ideas for marine-related innovation. Going forward, as a marine systems integrator, Mitsubishi Shipbuilding will continue to actively develop and commercialize LCO₂ carriers, build a CCUS value chain spanning land and sea, and strive to realize a decarbonized world.

Mitsui's production of large marine diesel engines in FY2021

Mitsui E&S Machinery Co., Ltd. (MES-M) has produced 122 units totalling 2.67 million horsepower of Mitsui MAN-B&W low-speed diesel engines at its Tamano Machinery Factory in FY2021.

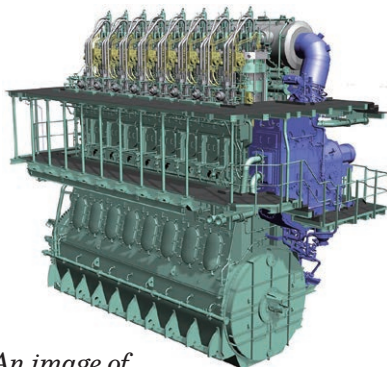
MES-M has become a top global manufacturer since the conclusion of the technical alliance to develop die-

sel engines with B&W (currently, MAN Energy Solutions) of Denmark in 1926, with cumulative production horsepower exceeding 110 million horsepower. MES-M plans to produce 135 units and 3 million horsepower in the current fiscal year.

The Tamano Machinery Factory is now developing the next-generation fuel-burning engine and related equipment based on the requirements for strategic reduction of emissions of greenhouse gases (GHGs), promoted by IMO as well as the international marine transport industry. MES-M will build a production-supply system that can flexibly respond to the requests of the customer as

a ship propulsion system supplier.

The company will continue sales activities based on its production achievements of diesel engines conforming to NO_x regulations as well as gas-fuel diesel engines. Similarly, the company will also conduct sales of various marine propulsion systems for marine transportation of containers, bulk cargoes, vehicles, gases, etc.



An image of
LNG fueled dual diesel engine

[Previous and planned production of Mitsui MAN-B&W low speed diesel engines in the last 5 years]

FY2018	164 units/3.89 million horsepower
FY2019	200 units/3.62 million horsepower
FY2020	152 units/3.57 million horsepower
FY2021	122 units/2.67 million horsepower
FY2022	135 units/3.00 million horsepower

(Estimated numbers for FY2022)

Shin Kurushima Sanoyas completes Ultramax bulk carrier PM HAYABUSA II

Shin Kurushima Sanoyas Shipbuilding Co., Ltd. completed the Ultramax bulk carrier, PM HAYABUSA II, at the Shin Kurushima Sanoyas Mizushima Shipyard on March 18, 2022.

This is the important first vessel of a new series of the Sanoyas 64,000DWT type Ultramax bulk carriers. The vessel has a large deadweight for a vessel with overall length of less than 200m. The design applies the latest rules such as CSR B&T and NO_x Tier III regulations, and exceeds the 20% reduction of CO₂ emissions required by the IMO EEDI (Energy Efficiency Design Index, grams CO₂ per ton nautical mile) regulation and is close to the 30% reduction required for ships for which the building contract is placed 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 such as the

Sanoyas developed STF (Sanoyas-Tandem-Fin) and ACE DUCT (Sanoyas Advanced flow Controlling and Energy saving DUCT) are applied. These energy saving devices achieve about 8% reduction of both energy consumption and CO₂ emissions.

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 dedicated low sulphur gas oil tank to cruise in ECAs (Emission Control Areas). In addition, the Ballast Water Treatment System and independent holding tanks for rainwater on the upper deck are fitted for protection of the marine environment.

The vessel has five cargo holds with hatch openings maximized to load various cargos such as grain, ore, coal,



hot coils and steel pipes. Four 31-ton deck cranes for handling cargo are installed. Furthermore, vessel maintenance is facilitated by access trunks arranged for easy movement from the upper deck to double bottom under the laden condition.

Principal particulars

Hull No.:	1379
L (o.a.) x B x D x d:	199.99m x 32.24m x 19.22m x 13.520m
DWT/GT:	63,883t/36,298
Cargo hold capacity:	81,490m ³ (grain)
Speed, service:	about 14.3kt at (C.S.O. with 15% sea margin)
Complement:	24
Classification:	ClassNK

Naikai completes 14,200GT passenger/car ferry, FERRY TAKACHIHO

Naikai Zosen Corporation completed construction of the FERRY TAKACHIHO, a 14,200GT passenger/car ferry, for delivery to Miyazaki Car Ferry Co., Ltd. at the Innoshima Shipyard on March 28, 2022.

The FERRY TAKACHIHO has twin engines, propellers, and rudders, and is now plying between Miyazaki, Kyushu, and Kobe, Hyogo. Vehicle roll-on/off loading can be achieved through the ramp doors at the bow and stern on the port side, and inboard

ramps allow vehicles to access the assigned bays on the car decks. Ample car-loading capacity is achieved by providing four car decks.

The ship hull adopts the bulbous bow and the catamaran-type stern to increase propulsive efficiency and sea-keeping performance. The rolling motion during navigation is reduced by fin stabilizers, and ship maneuverability is maintained by two bow thrusters, two reaction-type marine Schilling rudders with bulbs, and fiveblade CPP.

Escalators are provided for passengers to move between decks, and an elevator is also provided for aged and disabled passengers

to move easily between the car decks, the passenger entrance, and the cabin entrance at the port side.

Principal particulars

Owner:	Miyazaki Car Ferry Co., Ltd.
Builder:	Naikai Zosen Corporation
Ship type:	Passenger/car carrier
L (o.a.) x B x D x d (ext.):	194.00m x 27.60m x 20.35m x 6.70m x 6.70m
DWT/GT:	5,983t/14,006
Loading capacity:	576 passengers 81 automobiles 163 12m-long trucks Two 8m-long trucks
Main engine:	JFE-S.E.M.T. Pielstick 12PC2-6B diesels x 2 units (Twin engines/twin propellers)
MCR:	8,570kW x 600/134.6min ⁻¹ per unit
Speed, service:	about 23.1kt
Classification:	JG
Completion:	March 28, 2022



DARYA GOMTI

Builder: The Hakodate Dock Co., Ltd.
 Hull No.: 908
 Ship type: 40,000 DWT type log/bulk carrier
 L (o.a.) x L (p.p.) x B (mld.) x D (mld.) x d (mld.): abt 182.90m x 179.90m x 31.60m x 14.80m x 10.37m
 DWT/GT: 40,037t/24,472
 Main engine: MAN B&W 6S46ME-B8.5-HPSCR diesel x 1 unit
 Speed, service: abt. 14.0kt
 Classification: ClassNK
 Registry: Marshall Islands
 Completion: February 25, 2022

**EVER OUTDO**

Builder: Imabari Shipbuilding Co., Ltd.
 Ship type: 2,400 TEU type container carrier
 L (o.a.) x B x D: 194.90m x 32.20m x 17.00m
 DWT/GT: 33,512t/27,025
 Main engine: 8S60ME-C10.5 diesel x 1 unit
 Speed, service: 20.0kt
 Classification: ABS
 Completion: May 26, 2022

**FJ ROSSA**

Owner: Wealth Line Inc.
 Builder: Japan Marine United Corporation
 Hull No.: 5175
 Ship type: Bulk carrier
 L (o.a.) x B (mld.) x D (mld.) x d (mld.): 292.00m x 45.00m x 24.55m x 18.234m
 DWT/GT: 182,309t/93,297
 Main engine: MAN-B&W 7S65ME-C8.5-HPSCR diesel x 1 unit
 Speed: 15.05kt
 Complement: 25
 Classification: ClassNK
 Registry: Marshall Islands
 Completion: April 8, 2022

**CEMTEX EXCELLENCE**

Owner: U-Ming Marine Transport Corporation
 Builder: Oshima Shipbuilding Co., Ltd.
 Hull No.: 11001
 Ship type: Bulk carrier
 L (o.a.) x B x D x d (ext.): 235.000m x 40.000m x 20.000m x 14.441m
 DWT/GT: 99,990t/54,244
 Main engine: Mitsui MAN B&W 6G60ME-C10.5 diesel x 1 unit
 Speed, service: 14.30kt
 Classification: CR/ClassNK
 Registry: Republic of China
 Completion: March 14, 2022

**DARYA RUCHI**

Owner: Ruchi Shipping Limited
 Builder: Tsuneishi Shipbuilding Co., Ltd.
 Hull No.: 1613
 Ship type: Bulk carrier
 L (b.p.) x B x D: 229.00m x 32.26m x 20.15m
 DWT/GT: 82,557t/43,672
 Main engine: MAN B&W 6S60ME-C10.5 diesel x 1 unit
 Speed, service: 14.30kt
 Classification: ClassNK
 Registry: Marshall Islands
 Delivery: March 15, 2022

**Information from JSEA**

Our news letter, SEA-Japan, is now available as e-mail. If anyone wishes to receive the digital edition (pdf format), please contact sea-japan@jsea.or.jp with the following information for identification:

1. Your full name
2. Your company name/occupation, or freelance/others
3. Your company address, or your country
4. E-mail address

You can also find back issues of SEA-Japan at our website: <https://jsea.or.jp>