

World's first success in automatic berthing/unberthing of large car ferry at normal pier

Mitsui E&S Shipbuilding Co., Ltd. (MES-S), Mitsui O.S.K. Lines, LTD. (MOL), Tokyo University of Marine Science and Technology (TUMSAT), and Akishima Laboratories (Mitsui Zosen) Inc. (Akishima Lab.) carried out a verification test of automatic berthing and unberthing using the large car ferry Sunflower Shiretoko owned by MOL Ferry Co., Ltd. (MOL Ferry) at the pier of Oarai Port, Ibaraki in March and April 2021 as part of a demonstration project related to the safety of vessel auto berthing and unberthing (autonomous vessel demonstration project) carried out by the Ministry of Land, Infrastructure, Transport and Tourism. In a world first with a large ferry, the companies succeeded in automatic berthing and unberthing at the port pier. This verification test is the world's first trial involving a large car ferry (total 11,410 tons) in commercial operation. Before proceeding with the verification test, the companies established a ship operation plan, implementation procedures, and abort criteria,

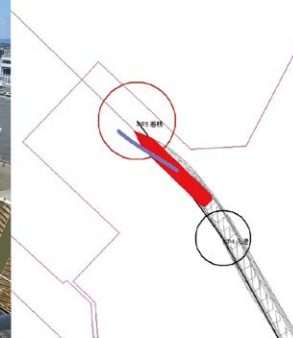
etc. based on the ship handling performance of the Sunflower Shiretoko and thoroughly evaluated the plan safety under various conditions through simulations, etc. Before the verification test, the companies also performed automatic berthing/unberthing to/from a virtual pier in open waters, and also verified the safety of an actual vessel.

In the future, the companies will perform verification tests of automatic berthing and unberthing using other ship types and at actual piers based on the results of this verification test, to increase the versatility of this technology. In addition to automatic berthing/unberthing, activities for realization of autonomous marine navigation will also begin.

MES-S, MOL, TUMSAT, Akishima Lab., and MOL Ferry will continue to pursue safe and secure marine navigation through initiatives to enable automatic cruising, including the autonomous vessel demonstration project, aiming to reduce the labor burden on the crew.



Automatic berthing/unberthing simulation and verification test using the ship: approaching the target pier ahead to the starboard side



Left photo shows final approach using thrusters and approach monitoring (right) in the trial operation.



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JMU completes 7th 3,055TEU-type container ship, WAN HAI 328

Japan Marine United Corporation (JMU) delivered the WAN HAI 328, a 3,055TEU container ship, to Wan Hai Lines (Singapore) Pte. Ltd. at its Kure Shipyard on May 14, 2021.

This is the seventh vessel of the new class of 3,055TEU-capacity container ship constructed by JMU. The vessel can load containers in 12 rows across and six tiers high in the cargo hold, and 14 rows across and 7 tiers high on the deck, with the total of 3,055TEUs.

The vessel is optimally designed for medium to long distance trade as the amount of seaborne trade to and from Asia and within Asia is increasing, and it can achieve 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).

- MAN-B&W's latest electronically controlled main engine, Mark 10.5 and inverter controlled cooling sea water pump reduce the fuel oil consumption.
- Safety and convenience for steering during voyage and reaching/leaving the pier are improved by adopting the INS (Integrated Navigation System) and full enclosed navigation bridge.
- Voyage assistance and monitoring of the engine room by CCTV camera system improves safety.
- This is the first class of vessels in Japan to obtain the DNVGL Smartship Notation which is



granted to vessels fitted with smart technology such as monitoring system.

Principal particular

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: 37,160t/30,468

Main engine: MAN-B&W 7S70ME-C10.5 diesel x 1 unit

Speed: 21.6kt

Complement: 25

Classification: ABS

NAMURA delivered Malaccamax-type VLCC, HIKOSAN

Namura Shipbuilding Co., Ltd. delivered 310,000DWT-type very large crude oil carrier (VLCC), named as HIKOSAN, built at its Imari Shipyard & Works, to Hexagon Transort Inc. on April 16, 2021. The vessel is the sixth series of the newly developed 310,000DWT-type VLCC complying with the Harmonized Common Structural Rule (CSR-BC&OT) and the latest requirements of the international regulations such as IMO PSPC-COT and PSPC-WBT for cor-

rosion protection of cargo oil tanks and water ballast tanks for enhancing the safety of the vessel's operation.

The notable factor of its design is the longer length overall compared with the conventional type VLCC's design contributing the vessel having maximized loading capacity and improved propulsion performance by the optimized hull form in combination with adopting the self-developed energy saving devices, namely "Namura flow Control Fin (NCF)" and "Rudder

Fin," the wind force reduction type superstructure, hub vortex reduction type propeller boss cap, low-friction type antifouling paint and the electronically controlled main engine. In addition,

the vessel has three large capacity cargo oil pumps enabling loading/unloading of three grades of cargo oils and two cargo oil stripping eductors are equipped for achieving efficiency improvement in unloading cargo oils. The ballast water treatment system to control the quality of ballast water is equipped for protection of marine environment to comply with the International Convention for the Control and Management of Ships' Ballast Water and Sediments. The vessel is also equipped with SO_x scrubber for reducing SO_x emissions under the policy of IMO 2020 global sulphur cap.

Principal particulars

L (o.a.) x B (mld.) x d (mld.) : 338.92m x 60.00m x 21.05m

DWT/GT: 312,189t/160,469

Complement: 36 + 12 (Workers)

Classification: ClassNK

Registry: Panama



Kawasaki obtains ClassNK Innovation Endorsement Certificate for SOPass

Kawasaki Heavy Industries, Ltd. has obtained the Product & Solutions certificate for the SOPass from Nippon Kaiji Kyokai (ClassNK) based on evaluation of the innovative applicability of the system, which is included in the Innovation Endorsement newly provided for innovative development by ClassNK. The SOPass is the Kawasaki Ship Operation and Perfor-

mance analysis support system.

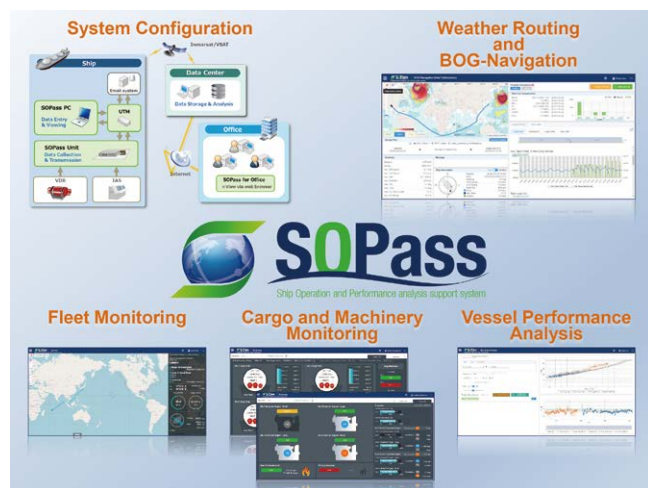
ClassNK Innovation Endorsement is intended to stimulate promotion and evolution of innovative technologies as well as support for environmental conservation, safety improvement, and sustainable development in the field of marine transport.

ClassNK has now verified every function of SOPass which is an advanced solution using digital technologies.

Kawasaki SOPass can provide useful information for ship operational management. Information can be produced by integrating real data received from ships via satellite communication and

Kawasaki's engineering expertise in shipbuilding, and integration is achieved by technologies such as ICT (Information and Communication Technology) and IoT (Internet of Things). This system can offer visualization of ship navigation, various performance analyses, and optimal route simulation that will contribute to energy saving. This system also provides the optimizing function of LNG cargo management for LNG carriers, which is the first in the industry of LNG transport. SOPass can be applied to various ship types and support economical and safe ship operation.

By January 2021, Kawasaki has received orders for SOPass for 17 ships mainly LNG carriers. The company expects that SOPass will be increasingly applied to various types of ship to alleviate the load on the environment and improve business efficiency in marine transport.



Integral system image of SOPass

Naikai completes RO-RO cargo ship, HARUMARU No.5

Naikai Zosen Corporation completed construction of the 12,404GT Roll-on/Roll-off cargo ship, HARUMARU No. 5, at the Innoshima Shipyard for the delivery to Oshima Kaiun Co., Ltd. on May 13, 2021. The HARUMARU No. 5 is now transporting trailers and passenger automobiles in Japanese coastal areas.

The cargo decks consist of four decks: one deck for passenger automobiles and three other decks allotted for trailers and passenger automobiles. Roll-on/Roll-off operation can be achieved through shore ramps provided at the bow and stern on the port side, and inboard ramps allow access to assigned bays on the car decks.

The hull form of the HARUMARU No. 5 was based on repeated water tank tests, and now demonstrates excellent propulsion performance. Adoption of a rudder-bulb type rudder and an energy-saving device STEP (Spray Tearing Plate) decreases

fuel consumption greatly. The STEP attached to the bow above the water line is a device to decrease wave resistance under rough sea conditions. The ship uses fin stabilizers to reduce the rolling motion during navigation, and thrusters installed at the bow and stern can easily attain ship maneuvering in a port.

Principal particular

Owner: Oshima Kaiun Co., Ltd.
 Builder: Naikai Zosen Corporation
 Ship type: RO-RO cargo ship
 L (o.a.) x L (b.p.) x B x D (upper deck)
 x d (scantling): 179.90m x 170.00m
 x 27.40m x 23.30m x 6.75m
 DWT/GT: 7,070t/about 12,500



Loading capacity:

162 trailers (13m L x 2.5m W)
 258 automobiles (4.7m L x 1.7m W)
 Main engine: Hitachi MAN B&W
 9S50ME-C8.5 diesel x 1 unit
 MCR: 13,580kW x 127.0min⁻¹
 Speed, service: about 21.0kt
 Classification: ClassNK
 Registry: Japan
 Completion: May 13, 2021

SAKURA LEADER wins The Ship Of The Year 2020 Award in Japan

The Ship of the Year Award 2020 given by the Japan Society of Naval Architects and Ocean Engineers (JASNAOE) had 13 candidate vessels to choose from this year, the 31st year of the annual event. The Ship of the Year award is given to innovative vessels built in the past year based on technical, artistic, and social considerations.

The candidate announcement meeting and the selection meeting for the Ship of the Year Award 2020 were held on May 11 as a web conference due to the constraints of COVID-19, and the SAKURA LEADER built by Shin Kurushima Dockyard Co., Ltd. was the winner of the Award 2020, as the first large LNG dual-fueled vehicle carrier built in Japan.

Other winners of individual sectors were the SEA SPICA (Small passenger ship sector), KAGUYA (Small cargo ship sector), SOFUKU MARU NO. 1 (Fishing ship/research ship sector), and KAWASAKI (Work vessel/special service ship sector). The prize award ceremony, a joint event organized by the three academic societies in the maritime science sector, took place at the Kaiun Club on July 9. The three societies are the JASNAOE, Japan Institute of Marine Engineering (JIME), and Japan Institute of Navigation (JIN).



SAKURA LEADER - Winner of the Year 2020

The SAKURA LEADER is the first large LNG dual-fueled vehicle carrier built in Japan fitted with with two 1,500m³ LNG fuel tanks. The ship has attained 40% reduction of CO₂ emissions compared with the 2008 reference value. ClassNK has granted the class notation of Digital Smart Ship (DSS) to the carrier, the first worldwide. The SAKURA LEADER is an advanced ship designed for both environment conservation and onboard digitalization. Inboard rampways facilitate the improved roll-on/off of vehicles.

Winners of individual sectors

SEA SPICA (Small passenger ship sector)

The SEA SPICA has been built as the first cruising ship to promote tourism in the area of the Seto Inland Sea, assisted by the Railway Construction/Transportation Facility Development Support Organization under its Domestic System to Build Cruising Ships. SetonaiKaikisen Inc. group, West Japan Railway Company group, and Chugoku Transport & Tourism Bureau of MLIT also agreed in cooperation of the ship construction. The cruising ship provides lounge sofa-like seats and the deck banishes daily life on land for passengers.



KAGUYA (Small cargo ship sector)

The KAGUYA, Japan's first LNG-bunkering ship with LNG loading capacity of 3,193.7m³, was constructed by Kawasaki Heavy Industries, Ltd. with the functions required for a bunkering ship as well as the technological expertise accumulated through construction of coasting

LNG carriers. LNG-fueled ships have increasingly been built worldwide to cope with severer international restrictions for reduction of the load on the environment and GHG emissions. Therefore, the KAGUYA is designed to enable LNG bunkering directly between the KAGUYA and a large transport ship. This service will stimulate the use of LNG fuel and increase the competitiveness of Japanese ports in international trade.



SOFUKU MARU NO. 1

(Fishing ship/research ship sector)

This fishing vessel is the next-generation pelagic tuna longliner designed with the concept of a "fishing vessel attractive to people." The vessel is designed considering the crew first, which is a new concept in fishing vessels, and provides the crew with comfortable life on board during extended cruises. The large bulbous bow and bottom-

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New project launched to develop safe use of ammonia as shipping fuel

Mitsubishi Heavy Industries, Ltd. (MHI) is set to participate in a newly launched project to develop guidelines for the safe usage of ammonia (NH₃) as a shipping fuel as part of its Group energy transition strategy. The project is led by The Maersk Mc-Kinney Moller Center for Zero Carbon Shipping^(Note 1), a research institute created to promote decarbonization of the maritime shipping industry. MHI will participate as a founding partner of the Center, mainly through two Group companies: Mitsubishi Shipbuilding Co., Ltd. and Mitsubishi Heavy Industries Marine Machinery & Equipment Co., Ltd. Project collaboration will also include Lloyd's Register Group Limited (LR)^(Note 2), the British ship classification society, the ultimate aim being to decarbonize the maritime shipping industry through safe usage of ammonia as a shipping fuel.

Use of ammonia as a shipping fuel is eagerly embraced as a potential long-term solution for marine logistics amid the transition to a zero-carbon value chain in the maritime industry. Green ammonia is created by water electrolysis using a carbon-free production process employing renewable energy. Although green ammonia results in zero carbon emissions, it is highly toxic. In order to introduce green ammonia as a safe and sustain-

able marine fuel, the establishment of safety guidelines for its usage is essential, including implementation of specific assessments of safety for humans, ship assets, and the environment.

Currently, the marine transport industry accounts for about 3% of the world's carbon emissions, and as other industries progressively decarbonize, this percentage is quite likely to increase over the next several decades. Going forward, MHI Group, by integrating its own experience with ammonia carriers and ammonia production plants together with the knowledge and problem-solving experience to be accrued through its participation in the new project, will contribute to accelerating the safe adoption of ammonia as an alternative shipping fuel, to the further expansion of marine logistics, and to mitigating environmental impact, a global challenge.

Note 1 The Maersk Mc-Kinney Moller Center for Zero Carbon Shipping is a research institute established in June 2020 at the suggestion of A.P. Moller - Maersk Group, to promote decarbonization of the marine transport industry. Based in Copenhagen, Denmark, the Center was founded by MHI and six other global businesses or organizations, primarily targeted at pro-

New SAJ Chairman appointed



*Mr. Miyanaga,
Chairman of SAJ*

The 83rd annual general meeting of the Shipbuilders' Association of Japan (SAJ) took place on June 17 and elected 19 new directors. Subsequently, the 681st board of directors' meeting was held, and Mr. Shunichi Miyanaga was appointed as the 38th Chairman of SAJ. Mr. Miyanaga is concurrently Chairman of the Board of Mitsubishi Heavy Industries, Ltd.

moting development of new fuels and new technologies to decarbonize the marine transport industry.

Note 2 Lloyd's Register is the world's oldest classification society, established in the UK more than 260 years ago to improve ship safety. Today the organization pursues a greener and more sustainable world applying its Groupwide technologies, innovations and solid foundation of corporate value.

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flow hull form were employed for the first time in a tuna long-liner. The living quarters are designed to resembled life on land.



KAWASAKI

(Work vessel/special service ship sector)

The KAWASAKI is an advanced chemical fireboat to cope with fires at a petrochemical complex and conduct

rescue operations. The fire-fighting equipment has a jet-water range reaching 120m and water cannons expandable up to 21m. These features greatly improve measures for large-scale disasters in port areas. The newly developed hull form displays superior navigation performance. The automatic positioning system is linked with the water-jet propulsion and side thrusters, to maintain a steady position during operation of the water cannons.



SEADUKE

Builder: Imabari Shipbuilding Co., Ltd.
 Ship type: Crude oil carrier
 L (o.a.) x B x D: 339.36m x 60.00m x 28.50m
 DWT/GT: 313,051t/160,255
 Main engine: 7G80ME-C9.5 diesel x 1 unit
 Speed, service: 15.5kt
 Classification: DNV
 Completion: May 28, 2021

**WAN HAI 327**

Owner: Wan Hai Lines (Singapore) Pte. Ltd.
 Builder: Japan Marine United Corporation
 Ship type: Container carrier
 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: 37,160t/30,531
 Main engine: MAN-B&W 7S70ME-C10.5 diesel x 1 unit
 Speed: 21.6kt
 Complement: 25
 Classification: ClassNK

**TONQUIPEARL**

Owner: Nippon Yusen Kabushiki Kaisha
 Builder: Oshima Shipbuilding Co., Ltd.
 Hull No.: 10900
 Ship type: Bulk carrier
 L (o.a.) x B x D x d(ext.): 249.980m x 43.000m x 18.500m x 12.869m
 DWT/GT: 99,893t/56,844
 Main engine: J-ENG UE 7UEC60LSE-Eco-A2-EGR diesel x 1 unit
 Speed, service: 14.00kt
 Classification: ClassNK
 Registry: Panama
 Completion: March 25, 2021

**SEAGUARDIAN**

Owner: Seaguardian Tanker Limited
 Builder: Sumitomo Heavy Industries Marine & Engineering Co., Ltd.
 Hull No.: 1405
 Ship type: Crude oil carrier
 L(b.p.) x B x D: 228.96m x 44m x 21.8m
 DWT/GT: about 112,000t/about 60,200
 Main engine: Hitachi MAN B&W 6G60ME diesel x 1 unit
 Speed: 15.0kt
 Classification: ClassNK
 Registry: Marshall
 Completion: May 28, 2021

**PAVO BRAVE**

Owner: Panamanian owner
 Builder: Shin Kurushima Dockyard Co., Ltd.
 Hull No.: S-6085
 Ship type: Bulk carrier
 L (o.a.) x B x D: 196.50m x 32.26m x 19.40m
 DWT/GT: 64,247t/36,762
 Main engine: Mitsui-MAN B&W 6S50ME-C9.6-EGRBP diesel x 1 unit
 Speed, service: 14.0kt
 Classification: ClassNK
 Registry: Panama
 Completion: March 25, 2021

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