

11<sup>th</sup> April 2024  
Nihon Shipyard Co., Ltd.

## **Execution of Memorandum of Understanding for Joint Development of Ammonia Fueled Bulk Carriers among 6 parties**

Nihon Shipyard Co., Ltd., (headquartered in Chiyoda-ku, Tokyo; Kiyoshi Higaki, President; hereinafter "Nihon Shipyard") announced today that, together with ITOCHU Corporation (hereinafter "ITOCHU"), MAN Energy Solutions (hereinafter "MAN"), Mitsui E&S Co., Ltd. (hereinafter "Mitsui E&S"), Kawasaki Kisen Kaisha, Ltd. (hereinafter "K-Line"), and NS United Kaiun Kaisha, Ltd. (hereinafter "NS United") has executed a Memorandum of Understanding ("MOU") Regarding joint development, effort for the commercialization of ammonia fueled ships.

Ammonia is advancing as a key zero-emission marine fuel solution and it will greatly contribute to Greenhouse Gas (GHG) emissions reduction if ammonia can be commonly used as a marine fuel. The development and commercialization of ammonia dual fueled engine on which ammonia fuel is used for a primary fuel (Ammonia Fueled Engine) is essential for widespread use of ammonia fueled ship ("Ammonia-Fueled Ship"). In Particular, the ensuring of safety in the handling of toxic of ammonia and the confirming of stable operations at sea are important milestones on the road to the social implementation.

This MOU is based on the premise that 200,000 deadweight ton class bulk carriers to be built by Nihon Shipyard will be equipped with Ammonia Fueled Engines being developed by MAN as a "pilot project" prior to commercialization, and that the necessary operational data will be collected after the delivery of the ships, for the commercialization of Ammonia Fueled Engines and Ammonia-Fueled Ships in cooperation with other parties involved.

The execution of this MOU is an important milestone for the implementation of Ammonia-Fueled Ships, a new challenge being taken on by the maritime industry, and also an important step in the ongoing implementation of the "Integrated Project" being facilitated by ITOCHU.

Nihon Shipyard and partners will proceed with the development of the Ammonia Fueled Engines and Ships based on this MOU, and aims to begin its social implementation once it is ready in accordance with the "Integrated project for development and social implementation of ammonia fueled ships" which was adopted to the "Green Innovation Fund Project / Development Project for Next-Generation Ships / Development of Ammonia Fueled Ship", a project publicly offered by New Energy and Industrial Technology Development Organization (NEDO) in October 2021※.

Nihon shipyard will continue to contribute to the realization of a sustainable society through the provision of Eco-Friendly Vessels by utilizing its environmental reduction technologies.

【Key Roles】

Partners	Key Roles
MAN	Design and development of Ammonia Fueled Engine and verification after delivery of 200,000 deadweight ton class bulk carriers equipped with Ammonia Fueled Engines
Nihon Shipyard	Design and construction of 200,000 deadweight ton class bulk carriers equipped with Ammonia Fueled Engines and related system
ITOCHU "K" Line NS United	Crew development and ship management for operation of 200,000 deadweight ton class bulk carriers equipped with Ammonia Fueled Engines and collection of operation data
Mitsui E&S	Manufacturing Ammonia Fueled Engine of 200,000 deadweight ton class bulk carriers and Design and production of related system
ITOCHU	Information sharing for ammonia fuel supply

(Photo) MOU execution Ceremony



From Left, Yoshinori Sato, Executive Officer, NS United; Ichiro Tanaka, Director, Mitsui E&S; Daniel Struckmeier, Managing Director, MAN Energy Solutions Japan Ltd.; Kiyoshi Higaki, President, Nihon Shipyard, Shingo Ikeda, Executive Officer, "K" Line; Hirohiko Ozeki, General Manger of Marine Department, ITOCHU